High Conservation Values Assessment and Management Plan

October 2019

Sustainable Timber Tasmania

Document Summary

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1.0	May 2014		Draft HCV plan for Consultation
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3.0	February 2017	Certification Manager	Revised Draft HCV Plan for Consultation. Revised from version 2.0 after clarification sought from FSC Australia on interpretation of Australian HCV Framework
4.0	March 2019	Certification Manager	HCV Plan revised after stakeholder consultation and alignment with Annexe G of FSC-STD-AUS-01-2018.

Note

This is a controlled document. All printed copies are uncontrolled. The electronic master copy is held on Sustainable Timber Tasmania's Forest Management System WIKI.

It is suggested that this document be read in conjunction with Sustainable Timber Tasmania's Forest Management Plan, which provides a detailed description of the Permanent Timber Production Zone and Sustainable Timber Tasmania's management activities.

Contents

List of Acronyms and Abbreviations

DEE – Australian Government Department of the Environment and Energy

DPIPWE – Department of Primary Industry, Parks, Water and Environment

FPA – Forest Practices Authority

FPO – Forest Practices Officer

FPP - Forest Practices Plan

FSC – Forest Stewardship Council®

HCV – High Conservation Value

IBRA – Interim Biogeographic Regionalisation for Australia

IVG – Independent Verification Group

NRP - Natural Resources Planning Pty Ltd

PTPZ – Permanent Timber Production Zone

REM – Regional Ecosystem Model

RFA – Regional Forest Agreement

TFA – Tasmanian Forest Agreement

TWWHA – Tasmanian Wilderness World Heritage Area

Summary of Identified High Conservation Values

Category/Australian framework value	Tasmania	PTPZ land	Management
HCV 1: Species Diversity			
HCV 1.1 Areas that contain significant concentrations of Threatened species or contain habitat critical to the survival and long-term viability of these species.	More than 700 listed threatened species in Tasmania	432 threatened species relevant to PTPZ land or Sustainable Timber Tasmania operations	Refer page 14
HCV 1.2 Centres of Endemism	Areas of floral, eucalypt and invertebrate endemism identified. Concentrated on East and North East coasts.	Present	Refer page 15
HCV 1.3 Areas that contain rare species that are poorly reserved at the IBRA region scale	refer HCV 1.1	refer HCV 1.1	
HCV 1.4 Areas with mapped significant seasonal concentrations of species	Several migratory bird species aggregate in seasonal concentrations	Swift parrot breeding range	Refer page 19
HCV 1.5 Areas of high species/community diversity	Areas of flora, fauna, community and paleoendemic richness identified.	Present	Refer page 21
HCV 1.6 Refugia	Glacial and contemporary refugia identified.	Present	Refer page 27
HCV 2 Landscape-level ecosystems and mosaics			
HCV 2.1 Landscape level native forests	1.8M ha identified	9,400 ha identified	Refer page 32
HCV 2.2 Forest recognised as Regionally significant	Tarkine Wilderness Area IGA assessment area Swift parrot breeding habitat	Present	Refer page 35
HCV 2.3a Connectivity	Present	Wildlife habitat corridors (44,800 ha)	Refer page 39
HCV 2.3b Refugia	Refer HCV 1.6	Refer HCV 1.6	

Category/Australian framework value	Tasmania	PTPZ land	Management
HCV 2.4a Intact Forest Landscapes	774,000 ha identified	5,900 ha identified	Refer page 40
HCV 2.4b Wilderness Areas	Refer HCV 2.1	Refer HCV 2.1	
HCV 2.4c Roadless areas	1.9M ha identified	13,800 ha identified	Refer page 42
HCV 2.4d Forests not affected by management activity	Refer HCV 2.1	Refer HCV 2.1	
HCV 3 Ecosystems and habitats			
HCV 3.1a Ecosystems that are threatened at the IBRA bioregion scale	323 00 ha of threatened forest communities 113,000 ha of threatened non-forest communities	16,100 ha of threatened forest communities 3,140 ha of threatened non forest communities	Refer page 52
HCV 3.1b Ecosystems that are poorly reserved at the IBRA bioregion scale	10 under-reserved forest communities	10 under-reserved forest communities	Refer page 52
HCV 3.2 Areas for conservation of important genes or genetically distinct populations.	Rare species, hybrids or outliers of the genus Eucalyptus	present	Refer page 54
HCV 3.3 Old growth forests	1.23 million ha of old growth forest communities 74,000 ha of threatened old growth forest communities 9 under-reserved old growth forest communities	98, 000 ha of old growth forest communities 6,700 ha of threatened old growth forest communities 9 under-reserved old growth forest communities	Refer page 60
HCV 3.4a Remnant vegetation in heavily cleared landscapes	Concentrated in agricultural areas	Not present	Refer page 63
HCV 3.4b Mature Forest in degraded landscapes	1.9M ha of forest containing Mature eucalypt crown cover	38 forest blocks that are considered to have either naturally rare or reduced mature habitat cover	Refer page 68
HCV 4: Critical Ecosystem services			
HCV 4.1 Areas that provide protection from flooding	Not identified	Not identified	

Category/Australian framework value	Tasmania	PTPZ land	Management
HCV 4.2 Areas that provide protection from erosion	Class 4 streams with visible erosion features Karst Features Coastal dune systems near Strahan Moderately or highly erosive soils on steep slopes	All features occur on PTPZ land. Features identified during operational planning	Refer page 72
HCV 4.3 Areas that provide barriers to the spread of destructive fires	Priority fire mitigation areas identified in Fire Protection Plans	Many priority fire mitigation areas are on or near PTPZ land.	Refer page 74
HCV 4.4 Areas that provide clean water catchments	Town water catchments	The majority of PTPZ land falls within town water catchments.	Refer page 79
HCV 5: Community Needs			
HCV 5.1 Unique/main sources of drinking water fundamental for drinking and other daily uses	Not identified	Not identified	
HCV 5.2 Unique/main sources of water fundamental for the irrigation of subsistence food crops	Not identified	Not identified	
HCV 5.3 Food and medicines fundamental for local traditional Indigenous uses	Not identified	Not identified	
HCV 6: Cultural Values			
HCV 6.1 Aesthetic Values	Present	Visual values identified during operational planning	Refer page 84

Category/Australian framework value	Tasmania	PTPZ land	Management
HCV 6.2 Historical values of global or national cultural or archaeological significance	3 World Heritage Sites 32 Commonwealth listed sites 10,000 Tasmanian Heritage Register sites Over 2500 recorded historic cultural heritage sites Over 6,600 recorded Aboriginal cultural sites in wood production forests	942 ha of PTPZ land is within the Tasmanian Wilderness World Heritage Area 4 Tasmanian Heritage Register sites 1,100 recorded historic cultural heritage sites Present, Details of Aboriginal cultural sites are confidential.	Refer page 86
HCV 6.3 Long Term Research sites	Present	Warra long term research site	Refer page 87
HCV 6.4 Social (including economic) values	Present	Leatherwood apiary resource Recreational sites Giant trees	Refer page 88
HCV 6.5 Spiritual and Cultural values	Refer HCVs 1,2,3,6.1,6.2 & 6.4	Refer HCVs 1,2,3,6.1,6.2 & 6.4	

Introduction

This document describes the High Conservation Value (HCV) assessment of Permanent Timber Production Zone (PTPZ) land undertaken by Sustainable Timber Tasmania. The document includes:

- Methodologies used in the HCV assessment
- Results of that assessment in the form of identified HCVs; and
- Management actions to maintain and/or enhance those identified HCVs.

It is suggested that this document be read in conjunction with Sustainable Timber Tasmania's Forest Management Plan, which provides a detailed description of the PTPZ land and Sustainable Timber Tasmania's management activities.

HCV definitions and assessment methodology

HCVs are biological, ecological, social or cultural values which are considered outstandingly significant or critically important, at the national, regional or global level. There are six recognised HCV categories, and these are addressed individually in this document.

This assessment has been undertaken in accordance with Annex G of the Forest Stewardship Council® Australia (FSC®) Forest Stewardship Standard. (FSC Australia, 2018), which provides a definition of each HCV category together with a breakdown of subsets of values that are considered under each category to be important in the Australian context. This analysis also used the *Common Guidance for the Identification of HCVs* (Brown et al. 2013) to assist in the interpretation of the Australian HCV framework where appropriate.

Background

Forestry Tasmania first published a HCV Management Plan in October 2014 following considerable expert input and broad consultation with stakeholders. This original HCV Plan was presented to Forest Stewardship Council (FSC) Standard auditors in December 2015 as part of Forestry Tasmania's initial full FSC forest management evaluation audit.

The FSC auditors made note of the comprehensive nature of the analysis but raised significant concerns regarding the use of International HCV guidance documents, and consequently Forestry Tasmania's interpretation of the Australian HCV framework (FSC Australia, 2013). The auditors also requested that Forestry Tasmania modify its planning processes to better identify and manage High Conservation values during its operations.

In response to the audit and stakeholder feedback, Sustainable Timber Tasmania sought clarification from the FSC Australia Board on how the Australian HCV framework should be interpreted. The FSC Australia Board confirmed that all listed values in the Australian HCV framework should be considered as HCVs in the Australian context, and emphasised that expert and stakeholder input was an important component of HCV assessments. As a result of the FSC Australia Board feedback, Sustainable Timber Tasmania fully revised its HCV assessment process and conducted further engagement with experts on HCV identification and management as appropriate.

A revised draft High Conservation Value Management Plan was released for public consultation in February 2017. During the public consultation period, STT publicised the plan widely, including emailing all registered stakeholders. Several presentations to key stakeholders were also undertaken during the consultation period. Subsequently, all

stakeholder responses received during this consultation period were considered during the development of the final plan.

The February 2017 draft HCV plan also had to be reconsidered in light of the development of the FSC Australia Forest Stewardship Standard. During 2017 it became apparent that the FSC Australia National Forest Stewardship Standard was likely to be finalised and become normative within a short period of time. Publicly released drafts of the new standard contained a revised framework that provides guidance on how to identify and manage HCVs in the Australian context. Although similar to the 2013 Australian HCV framework, the new National Standard Framework was sufficiently different to warrant additional analysis, consultation, and restructuring of the February 2017 draft. The alignment of STT's HCV Plan with the new Australian Standard occurred concurrently with reviewing stakeholder feedback on the February 2017 draft.

The overall result of this process is a significantly increased number of HCVs identified in Tasmania and on Permanent Timber Production Zone land compared with the originally released 2014 HCV plan.

Scope

The scope of HCV assessment is Permanent Timber Production Zone land, which comprises approximately 12% of the Tasmanian land area.

The assessment also considers the presence of HCVs in the broader state wide landscape where appropriate. State wide assessments included identifying the existence and extent of HCVs within existing formal and informal reserves (e.g. National Parks, Conservation Areas, Regional Reserves and Future Potential Production Forest land). This approach is consistent with recognised best practice for HCV assessments (Neugarten and Savy 2012) and is appropriate in the Tasmanian context given the significant reserve system that has arisen from previous conservation value assessments and subsequent land use decisions.

If any significant change was to occur in the management of land outside of PTPZ land, the relevant elements of this plan will be reviewed and revised as necessary.

Threats to HCVs

The HCVs identified by Sustainable Timber Tasmania cover a broad range of values, many of which are subject to similar threats and threatening processes. These threats are generally not unique to PTPZ land, with environmental values across all tenures being vulnerable to a range of natural and human-induced impacts. Threatening processes identified by DPIPWE (2013a) that can impact on natural heritage include:

- climate change;
- invasive species and pathogens;
- inappropriate fire regimes;
- habitat loss, degradation and fragmentation;
- unsustainable use and management of natural resources; and
- changes to the aquatic environment and water flows.

Other threats identified by Sustainable Timber Tasmania as relevant to HCVs include:

- impacts from natural events including flood, wind and fire;

- inappropriate recreation activities;
- unauthorised entry to sensitive sites; and
- vandalism and rubbish dumping.

Sustainable Timber Tasmania implements a range of management actions, operating procedures and operational management prescriptions for these threats to forest areas.

In addition to these standard management provisions, this management plan outlines management actions for identified HCVs to minimise these risks.

STT's approach to HCV management

All identified HCVs on PTPZ land will be managed by Sustainable Timber Tasmania with due consideration of relevant threats, the precautionary principle and by using a risk based approach. In all cases, the objective is to maintain and where possible enhance the identified HCV. Where HCVs are identified, Sustainable Timber Tasmania will determine any threats or negative impacts to them from management activities.

Specific management actions for each HCV are detailed in the relevant sections of the report. Many of the identified HCVs are either already protected or adequately represented within formal and informal reserves. However some HCVs do exist in or near production forest areas and are therefore carefully considered during detailed operational planning.

It should be noted that the presence of HCVs does not necessarily preclude harvesting. The Australian HCV framework states:

> *"While the identification or presence of HCVs does not automatically exclude harvesting, it is the responsibility of the forest manager to demonstrate that the HCVs will not be threatened as a result of management activities, and the precautionary principle has been applied."*

HCV management is integrated into Sustainable Timber Tasmania's broader forest management system (FMS). The FMS provides for the development and implementation of appropriate prescriptions to manage HCVs and incorporates them into operational planning. The FMS incorporates compliance with the Forest Practices System, which is regulated by the Forest Practices Authority.

The FMS is described here in order to avoid the need to repeatedly describe the detailed management processes under each individual HCV. The FMS is briefly summarised below:

- Sustainable Timber Tasmania annually publishes its Three Year Wood Production Plan that outlines the locations of proposed harvesting operations. In publishing this plan, Sustainable Timber Tasmania actively encourages stakeholders to register their interest in relation to specific coupes, advise of any issues of particular concern, and indicate if they would like further information. This input is then considered during the operational planning phase.
- A Standard Operating Procedure (SOP) for developing harvest plans (Forest Practices Plans) for harvest operations is required to be followed. The SOP details the steps that a planner is required to undertake in order to finalise a Forest Practices Plan that addresses all of the HCVs and other special values that exist in an operational area.
- Training is provided to staff involved in developing and implementing plans in the identification and management of HCV and other special values. Training provides staff with the competency to carrying out the roles assigned to them and promotes a standard approach to assessment and plan development.

- Databases are used to check for known locations of HCVs and other special values. These databases are spatial, meaning that the known sites can be shown on maps for subsequent field verification. The databases are regularly updated with new information as a result of field surveys by Sustainable Timber Tasmania staff and other experts.

- Identified stakeholders and neighbours are consulted so that any issues can be specifically taken into consideration during planning.

- Comprehensive pre-operation field assessments are required to be undertaken to verify the existence of, or identify new, HCVs and other special values. The field assessments involve staff comprehensively inspecting the planning area on foot, and documenting actual locations of HCVs and other special values. Identification and surveying tools are used to facilitate this process.

- Guidelines provide planners with recommended prescriptions to apply in the event of a HCV or other special value being present. The prescriptions have been agreed to by experts and have been designed to provide for appropriate management of the value in the Tasmanian context. If a planner requires clarification on the existence of a specific value, or on how to manage a particular value, experts at the Forest Practices Authority are readily available for consultation.

- A draft Forest Practices Plan (FPP) and map is developed for peer review. The FPP clearly and concisely specifies the final prescriptions in a manner that can be communicated to those who are going to implement the plan. During this process, the planner uses a checklist to make sure they have considered and included all relevant issues in the FPP.

- The draft FPP is reviewed by peers to confirm that the FPP has been appropriately developed. The planner may subsequently make changes to this plan as appropriate.

- The FPP is certified by a Forest Practices Officer appointed by the Forest Practices Authority. Certification makes the FPP a legal document that is required to be complied with. The FPP is communicated to the harvesting contractor assigned to the operation. This involves a Sustainable Timber Tasmania staff member talking through the detail of the FPP with the contractor. A checklist is used to confirm that the relevant issues have been communicated. The contractor is required to understand and agree to comply with the prescriptions for managing HCV and other special values within the FPP prior to work commencing.

- Monitoring of the operation is undertaken regularly to confirm that the prescriptions within the FPP are being complied with. Any identified issues are communicated to the contractor for corrective action. A final sign off inspection is also undertaken at completion of the harvesting operation.

- Once harvesting has been completed, regeneration operations commence. The objective of regeneration operations is to establish a forest that is similar to that harvested. For example, the aim for a native forest coupe is to have it appropriately stocked with the same eucalypt species within three years of regeneration works commencing. Regeneration works may include tracking, burning, sowing seed and browsing control. Each of these operations are planned and implemented to take into account relevant HCV and other special values. The coupe is regularly monitored during the regeneration phase to check that plans are being implemented and regeneration is occurring as expected.

Changes to STT's approach to HCV management

In response to the FSC auditors request for Sustainable Timber Tasmania to modify its processes to better identify and manage HCVs, the following improvements into its management system have been or are in the process of being implemented:

- Development of a strategic approach to managing swift parrot habitat. The aim is to identify swift parrot habitat at a landscape level and exclude it from production before it reaches the operational planning stage. The approach will be based on a habitat model that uses LiDAR-based data to predict the presence of large mature trees. The outcome of this approach will provide greater certainty that habitat is being retained in the forest landscape and consequently, provide greater protection for the critically endangered swift parrot;

- Implementing expert agreed management recommendations for threatened species habitat;

- Adopting partial harvest techniques as the preferred silviculture in Coupes Containing Old Growth (refer HCV 3.3) and in Landscape Level Forests (HCV 2.1);

- Long-term habitat retention targets at local coupe scale for areas surrounding planned clearfell or aggregated retention coupes (Refer HCV 3.4b);

- Developing mature habitat forest block scale management objectives and other targets so as to manage the cumulative effects of operations (Refer HCV 3.4b);

- Working with the Forest Practices Authority to implement a targeted and priority based monitoring program in order to assess the effectiveness of management prescriptions and protected areas.

HCV 1 – Species Diversity

Guidance

The full description of this HCV is:

Species diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.

Annex G of the Australian FSC standard provides the following guidance on the HCV 1 identification:

Values to be assessed for HCV 1.

- *HCV 1.1: Areas that contain significant concentrations of rare and threatened species or that contain habitat critical to the survival and long-term viability of these species.*
- *HCV 1.2: Areas that contain centres of endemism.*
- *HCV 1.3: Areas that contain significant concentrations of rare species that are poorly reserved at the Interim Biogeographic Regionalisation for Australia (IBRA) region scale.*
- *HCV 1.4: Areas with mapped significant seasonal concentrations of species.*
- *HCV 1.5: Areas of high species/communities diversity.*
- *HCV 1.6: Refugia*

General approach to analysing HCV 1

The analysis of HCV 1 was carried out by identifying and reviewing relevant legislation, data and reports related to the identified values. Expert opinion was used to confirm values and areas identified. The analysis of HCV 1 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

HCV 1.1 Areas that contain significant concentrations of rare and threatened species or that contain habitat critical to the survival and long-term viability of these species.

Guidance

Annexe G of the *FSC Australia Forest Stewardship Standard* provides the following definitions relating to this value:

'Significant concentrations': *Concentrations of species that are considered significant at a global, regional or national scale.*

'Areas that contain significant concentrations of rare and threatened species' *may include specific areas where there are a significant number of multiple species, or where there is a proportionately large population of an individual species. Concentrations of species are often linked to one stage of a species life history and associated with activities such as breeding, staging, feeding or over-wintering.*

Methodology

The best available information identifying the Tasmanian species that are threatened or rare, or considered significant at a global, regional or national scale, are the species listed as threatened under the *Threatened Species Protection Act 1995.* or the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*An analysis of the listed threatened species relevant to PTPZ land was undertaken using the work of Wapstra and Doran (2009) for fauna, and the Forest Practices Authority (2016) for flora. These analyses focused on identifying the species that would require management considerations when planning forest operations.

Results

There are presently more than 700 species currently listed as threatened under the Tasmanian *Threatened Species Protection Act 1995.* There are also a significant number of species that occur in Tasmania that are listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

The analysis identified 432 threatened species relevant to PTPZ land or Sustainable Timber Tasmania's operations (refer to Appendix 1).The listed species include those threatened species that would be considered as iconic by stakeholders (e.g. swift parrot, masked owl, wedge tailed eagle, Tasmanian devil) as well as many lesser known species.

A comprehensive range of information sources on listed species is publicly accessible online. These sources provide relevant information on each species, including respective descriptions, biology, threat status, ranges, habitats and observed locations (Table 1.1). The data and information provided in these databases is the same information that Sustainable Timber Tasmania planners use to assist them in identifying the presence of threatened species when planning operations.

Table 1.1 Publicly available resources on Tasmanian Threatened species (HCV 1.1)

Resource	Description
List of Tasmanian Threatened species	• List of threatened species including assessed Commonwealth and State threat status. • Provides links to additional information on each species (note sheets, Listing statement, Recovery plans where available)
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Lists	• Lists of Commonwealth Threatened species including links to conservation advice and recovery plans.
Threatened fauna species range boundaries and habitat descriptions	• Provides written summaries of threatened fauna species range boundaries and habitat descriptions
Habitat descriptions of threatened flora in Tasmania	• Provides written habitat descriptions and an assessed conservation status of Tasmanian threatened flora.
Threatened Species Link	• Searchable spatial database that provides online profiles of each species, including distribution maps.

Resource	Description
Natural Values Atlas	• A spatial database and web based application that allows species observations from various sources to be viewed, recorded and analysed. It can be used to search for information on more than 20,000 plant and animal species and can display maps showing their location and extent. • Information has been generated through general species surveys and projects undertaken for scientific research, environmental assessments and other purposes throughout the State since the 1800's. • Provides information on species taxonomy, attributes and conservation values and provides access to images, related web sites and management documents such as listing statements and recovery plans. • Range Boundaries for a number of high priority threatened fauna species is also available.
Biodiversity Values database	• A spatial database providing locality data for threatened species and provides information on species range and habitat descriptions for use in site assessments. • Provides links to background information on threatened flora and fauna species.
Forest Botany Manuals	• Provides floristic overviews of each Tasmanian IBRA Region. Identifies conservation priorities including threatened vegetation communities, threatened species, regionally significant species and sites of potential flora significance. • Provides direction for the assessment and management of flora values during FPP planning.
Threatened Fauna Adviser	• Provides management recommendations for threatened fauna to apply when planning forest practices.
Technical Note series	• Provides supplementary information and technical explanation on commonly encountered flora and fauna management issues in production forests.
Review of Threatened Fauna Adviser: Background Document 1 History of the Threatened Fauna Adviser, Overview of Review Process and Species List	• Reviews the Tasmanian threatened fauna and identifies those relevant to the Forest Practices system.
Review of Threatened Fauna Adviser: Background Document 2 Review of Information on Species and Management Approach	• Provides scientific background information and justifications for management approaches to individual threatened fauna species in areas of habitat subject to the *Forest Practices Act 1985*.

Management

The number of threatened species present in Tasmania does not allow for detailed management prescriptions for each species to be identified in this report. Generally, threatened species are managed with the aim of contributing to the maintenance of habitat and populations of threatened species throughout their ranges and over time. This will generally be achieved through the maintenance of the Tasmanian Comprehensive, Adequate and Representative (CAR) Reserve System (which includes reserves on PTPZ land), and through off-reserve management of production areas where appropriate. The general approach to off–reserve management for threatened flora and fauna is detailed below:

Fauna

- Databases and habitat assessments are used to identify field locations or likely habitats of threatened species.
- The management objective and management rationale for each threatened fauna species are detailed in the Threatened Fauna Adviser documentation. The Threatened Fauna Adviser information has been developed in consultation with species experts, and is reviewed regularly.
- Management recommendations for each species identified as being relevant to the operational area are obtained from the Threatened Fauna Adviser. The recommendations have been developed by the Forest Practices Authority in consultation with species experts.

Flora

- Botany Manuals and databases are used to assist in field locations or likely habitats of threatened species.
- Management recommendations for each threatened flora species are developed in consultation with botanists at the Forest Practices Authority. Recommendations are based on both the ecology of the species and the likely impact of forest practices. The aim is maintain populations of threatened species throughout their ranges and over time.

HCV 1.2 Areas that contain centres of endemism.

Methodology

A Centre of Endemism is an area in which the ranges of restricted range species overlap, or a localised area which has a high occurrence of endemics.

This HCV was assessed by conducting a review of the relevant literature and consulting with ecological experts.

Results

Tasmania as a whole could be considered as a centre of endemism. The island contains more than 300 higher plant taxa, 50 vertebrates and a great diversity of invertebrates that have been identified as endemic. Relative to other parts of Australia, Tasmania as a whole has been recognised as a centre of floral endemism (Crisp et al. 2001). Tasmania has also been identified as a site of eucalypt super-endemism (González-Orozco et al. 2016). The high level of endemism is a consequence of a variety of factors, such as Pleistocene glaciations and deglaciations and periodic isolation when sea-level fluctuations caused the closing of the land bridge across Bass Strait (Hill and Orchard, 1999).

Studies have also identified areas of localised endemism on the Tasmanian Island (Tasmanian Public Land Use Commission, 1997a). The areas that have been identified feature either a high number of range restricted plants or terrestrial invertebrates.

Flora endemism

The main body of work on identifying localised floral endemism was undertaken by Hill and Orchard (1999). This study used occurrence records to identify several areas where there were a relatively high number of range restricted species. The areas identified are generally consistent with other work on floral endemism carried out by the Tasmanian Public Land Use Commission (1997a) and Kirkpatrick & Brown (1984). A number of significant eucalypt centre of endemism centred around the central east coast (Peter Harrison per comm.). A summary of the identified areas is provided in Table 1.2 and shown in Figure 1.1.

Vertebrate endemism

Endemic vertebrates are generally mobile and therefore widespread, and experts have concluded that specific areas of vertebrate endemism cannot be identified at finer scales than the Tasmanian Island (Tasmanian Public Land Use Commission, 1997a).

Invertebrate endemism

The first notable attempt to identify centres of endemism for invertebrates was undertaken by Mesibov (1996) who used locality records for selected groups of Tasmanian invertebrates to search for invertebrate bioregions and 'hot spots'. This work was used in combination with expert opinion and other surveys to document the centres of invertebrate endemism in Tasmania (Tasmanian Public Land Use Commission, 1997a). In the twenty years since the initially published work, experts have identified further areas of invertebrate endemism. However, knowedge is still incomplete, and additional areas almost certainly exist (Bob Mesibov 2016, pers comm).

This analysis used the expert opinion of several experts to revisit and revise the previously published list (Public Land Use Commission, 1997a) of invertebrate endemism areas in Tasmania (Figure 1.1).

Management

The majority of areas identified as centres of endemism either do not occur on PTPZ land and/or are areas that are unlikely to be disturbed by Sustainable Timber Tasmania management activities (Figure 1.1).

Effective management actions for the specific value of endemism concentrations will be delivered through management of the CAR reserve system, protection of threatened vegetation communities (refer HCV 3) and implementation of specific recommendations for the relevant threatened species in each area. In many cases, the individual species that contributed to the delineation of an endemic area are often listed as threatened species. It should also be noted that some of the centres of endemism are delineated by species (velvet worms and millipedes) that do not appear to be threatened or affected by forest management activities (Bob Mesibov 2016, pers comm.)

Table 1.2 Areas identified as centres of endemism (HCV 1.2).

Indicative area	Example species
South-west Tasmania	*Epacris stuartii, Geum talbotianum, Lomatia tasmanica, Milligania johnstonii, Sprengelia distichophylla, Senecio papillosus, Winifredia sola*

Indicative area	Example species
Central east coast	*Acacia pataczekii, Epacris barbata, Epacris grandis, Eucalyptus barberi, Melaleuca pustulata, Pultenaea selaginoides*
Area around Douglas Apsley National Park	Eucalypt centre of endemism
Central Highlands	*Cyathodes nitida, Eucalyptus archeri, Gunnera cordifolia, Oreomyrrhis gunnii, Pimelea pygmaea, Ranunculus concinnus*
Mt Wellington	*Senecio brunonis* , *Allocasuarina duncanii*
Dans Hill	*Epacris virgata, Pimelea filiformis, Tetratheca gunnii*
Tasman Peninsula	*Epacris marginata, Euphrasia phragmostoma, Euphrasia semipicta*
Mt Field (alpine)	*Schoenus pygmaeus, Euphrasia gibbsiae* ssp. *pulvinestris*
East Risdon Nature Reserve and adjacent areas	*Eucalyptus risdonii, Lecidea flindersii, Xanthoparmelia vicaria, Caladenia atkinsonii, Eucalyptus morrisbyi*
Mt Anne (north-east ridge)	*Sagina* sp. nov., *Oreoporanthera petalifera*
Vale of Belvoir	*Polyblastia australis, Verrucaria inconstans, Verrucaria tholocarpa*
Sumac	*Menegazzia inactiva, Menegazzia minuta, Parmelia tarkinensis*
Great Lake	Benthic invertebrates: (amphipods, water snails, isopods)
Far north East	Millipedes and snails
Plomleys Island (wetter half of north East highlands)	Snails, millipedes & stag beetles
Elephantia (St Marys area)	Velvetworms, millipedes and snails
Northern east Coast	Velvetworms, millipedes and snails
Central East Coast	Velvetworms and millipedes
Southern East Coast	Velvetworms and millipedes
Forestier and Tasman Penninsulas	Velvetworms and millipedes
Mt Wellington and foothills of Hobart	snails
Cataract Gorge	Trapdoor spiders, pseudoscorpions and water snails.
Karst areas (e.g. Mole creek, Precipitous Bluff, Kitikina cave, Junee – Florentine caves, Ida Bay, Lune River – Mystery Creek caves)	Spiders, water snails, slaters

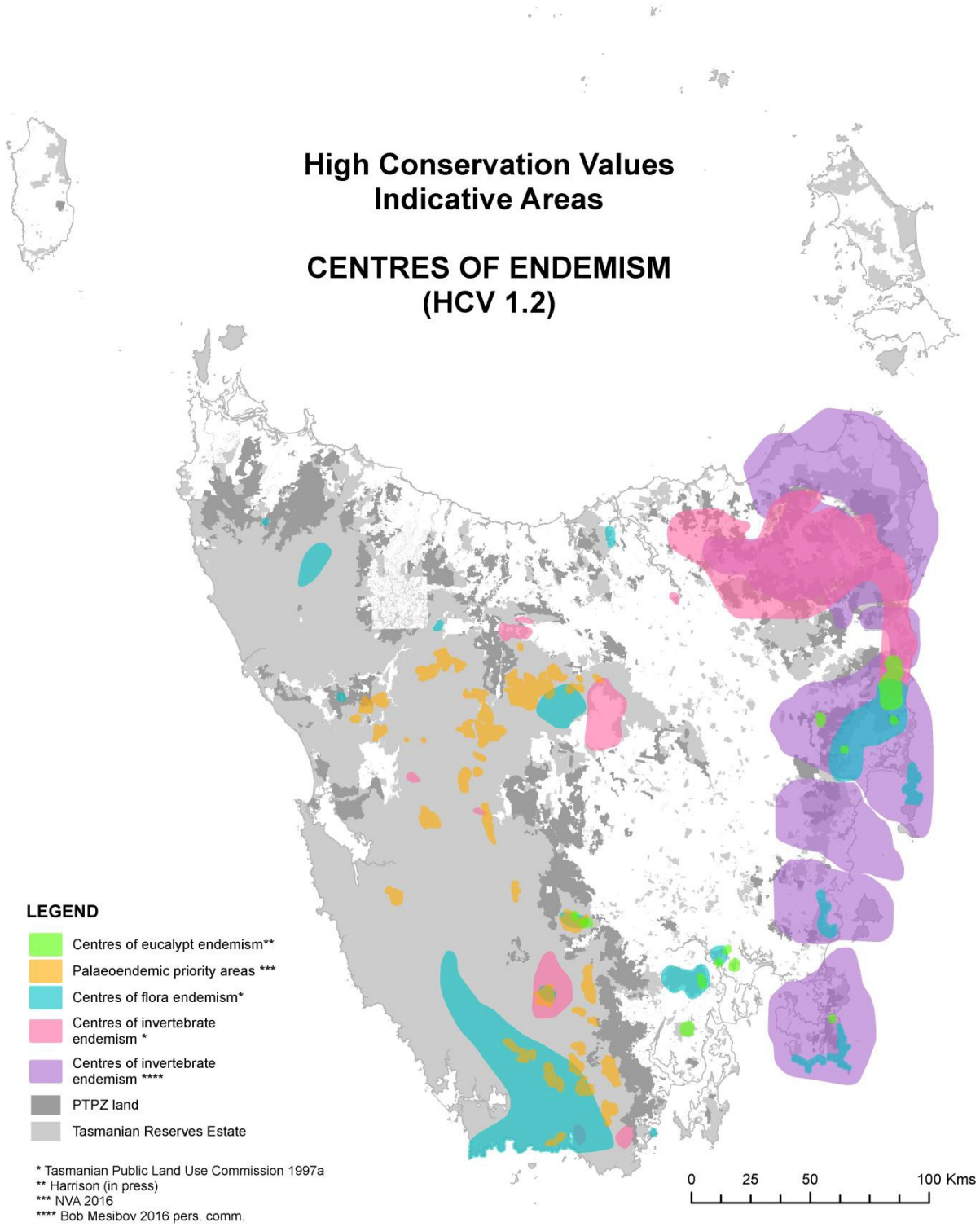


Figure 1.1 Centres of Endemism in Tasmania

HCV 1.3 Areas that contain significant concentrations of rare species that are poorly reserved at the IBRA region scale.

Methodology

The Tasmanian Threatened species list includes those species whose occurences are restricted to one or few IBRA regions, and that have been formally assessed as rare.

Refer to HCV 1.1.

HCV 1.4 Areas with mapped significant seasonal concentrations of species.

Guidance

Annexe G of the *FSC Australia Forest Stewardship Standard* provides the following definition relating to this value:

'Areas with significant seasonal concentrations of species': *areas important to the lifecycle or migration paths of migratory and communal breeding species.*

Methodology

This analysis was undertaken by consulting the datasets that were identified in HCV1.1.

Results

In the Tasmanian context, seasonal concentrations are considered to largely relate to the migratory movement and communal breeding of birds. No significant migration of other vertebrates has been identified as occuring on the Tasmanian landmass. There are generally three groups of migratory birds that may congregate into seasonal concentrations in Tasmania (Figure 1.2). These are:

- Migratory parrots that breed in Tasmania and overwinter on the Australian mainland (swift parrot (*Lathamus discolour*) and the orange-bellied parrot (*Neophema chrysogaster*)). The breeding range of the Swift Parrot is largely restricted to the east and south-east coast of Tasmania, including areas of PTPZ land (Saunders and Tzaros 2011). The orange-bellied parrot's breeding range is located in south-west Tasmania and does not intersect with PTPZ land (BirdLife International 2017).

- Migratory shorebirds that breed in Tasmania and overwinter in the northern hemisphere. Breeding colonies for this species are concentrated on islands and coastal areas. The habitats in Tasmania that are used by migratory shorebirds are the non-forested open habitats around the coastline or occasionally inland (e.g. spits, estuaries, river mouths, tidal mud flats, rocky coastlines, salt marsh, saline wetlands, sand dune and sandy beaches) (Bryant 2002). Such areas do not intersect with PTPZ land.

- Migratory waders that breed in the northern hemisphere and migrate to Australian coastal or wetland areas for the Australian summer. There are 10 wetland areas in Tasmania identified as being of international importance under the Ramsar Convention (DEE 2016). These sites do not intersect with PTPZ land.

Of the above, the only species of relevance to PTPZ land and Sustainable Timber Tasmania's management activities is the swift parrot. This species is also a listed threatened species, being classified as critically endangered under the *Commonwealth Environment*

Protection and Biodiversity Conservation Act 1999 (EPBC Act) The species and its habitat is also identified as a HCV 1.1 and 2.2 in this HCV plan.

Management

The swift parrot (*Lathamus discolor*) is a forest-dwelling species which over winters on mainland Australia but breeds only in Tasmania, predominately on the east coast and offshore islands. This species has highly specific habitat requirements as it relies on specific size and shaped hollows in mature eucalypt trees for nesting. It also requires nearby flowering *E. globulus* and *E. ovata* trees for foraging. Habitat loss is recognised as one of the main threatening processes. However, the swift parrot recently had its threatened status upgraded to critically endangered due to the discovery of sugar glider predation which is having a severe impact on the population.

STT estimates that currently there is approximately 147,000 hectares of potential swift parrot breeding habitat. The majority of this habitat occurs outside PTPZ land, either in the public reserve system (44%) or on private land (40%). The remaining 16% of habitat – or approximately 24,000 hectares – occurs on PTPZ land, predominantly in the Southern Forests.

STT recognises that production forestry can have a potential impact on swift parrot habitat. STT has therefore developed a landscape-scale strategic management approach that provides for the protection of swift parrot habitat on Permanent Timber Production Zone (PTPZ) land while allowing for forest harvesting operations to continue to be planned and implemented in a manner that meets legislated obligations.

The approach involves:

- strategically identifying and protecting potential nesting habitat on PTPZ land within the Southern Forests. This has been facilitated through the development of a habitat model that predicts the presence of large, mature eucalypt trees. As a result, the model identified 9,300 hectares of potential swift parrot habitat across the Southern Forests which is now excluded from production.
- identifying and protecting foraging habitat during operational planning; and
- locating and protecting all known nesting trees during operational planning; and
- implementing precautionary cessation measures in the event that swift parrots are sighted on operations; and
- recognising that Bruny Island is an important – sugar glider free – sanctuary for swift parrots and, until the risk of predation on mainland Tasmania has been significantly reduced, there will be no forest harvesting on Permanent Timber Production Zone land on Bruny Island.

These prescriptions are additional to the prescriptions outlined in this plan for the management of old growth forest (HCV3.3) and mature forest (HCV3.4b).

STT's management approach to swift parrot is formalised through the Forest Practices System (including forest practice plans) for swift parrot habitat outside of the southern forests, and in the southern forests until a Public Authority Management Agreement (PAMA) for management of swift parrot habitat within the Southern Forests PAMA is finalised. The PAMA is a statutory agreement under the *Threatened Species Protection Act 1995* and has been developed between Sustainable Timber Tasmania and Department of Primary Industries, Parks, Water and Environment, with input from the Forest Practices Authority. At the time of publication the PAMA was in the final stages of approval processes.

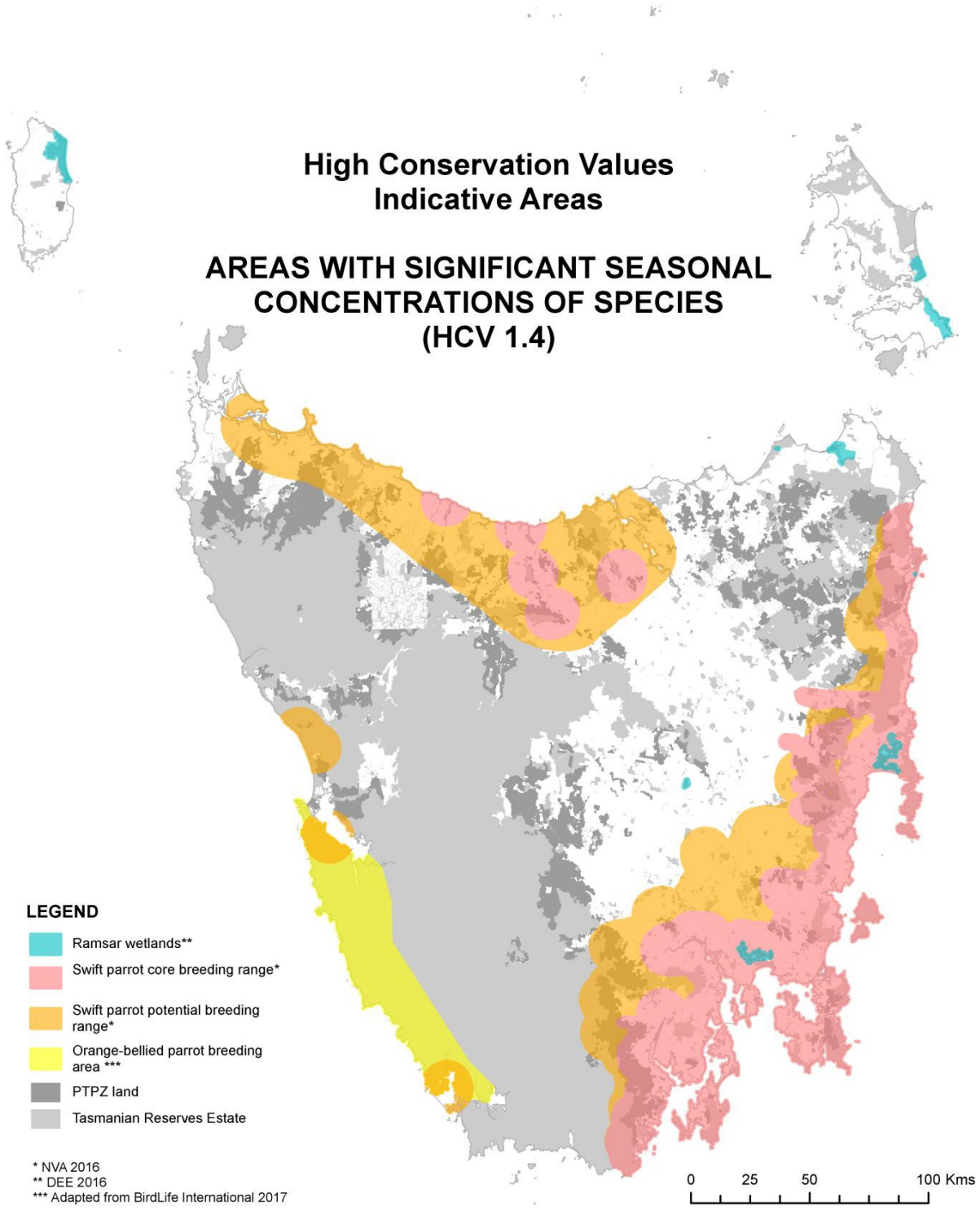


Figure 1.2 Areas with significant seasonal concentrations of species

HCV 1.5 Areas of high species/community diversity

Methodology

This HCV was assessed by conducting a review of the relevant literature and consulting with ecological experts.

Results

Relative to other parts of Australia, Tasmania as a whole has been recognised as a centre of high species richness (Crisp et al. 2001). However, significant variation in diversity exists within the State, with some areas potentially featuring higher levels of diversity than others.

There are two types of diversity or species richness that can be considered:

- Species-level richness, which is usually measured as the number of species occurring within an area of a given size; and
- Community level richness, which is effectively a surrogate measure of the rate of change of species. It is often a good reflection of environmental diversity, where strong gradients produce rapid transitions of different forest communities and their associated species.

The best available information on areas of high species and community richness within Tasmania is from the Tasmanian Public Land Use Commission (1997a). The process employed used existing biodiversity databases, scientific literature, and expert opinion to delineate areas that were high in species and/or community richness relative to other areas of the State (Table 1.3, Figure 1.3).

Expert consultation during compilation of this report confirmed that the work of the Tasmanian Public Land Use Commission (1997a) was sufficiently comprehensive to justify not undertaking a reanalysis of updated flora location data. However, recent work has also identified areas of eucalypt diversity that are focused on the East coast (Peter Harrison pers. comm.). Invertebrate experts consistently expressed a reluctance to confirm or identify sites of invertebrate species richness, owing to the inherent non-correctable sampling biases associated with the study of invertebrates (Mesibov 1996).

Some recent work on Tasmanian biogeography has focussed on paleoendemic flora (Jordan et al 2016). Paleoendemic flora can be defined as ancient groups of plants that are also geographically restricted. Tasmania has been identified as a global centre of plant paleoendemism, containing some of the world's most relictual plant lineages, such as the native conifers (Greg Jordan pers. comm.). Areas rich in paleoendemic species have been identified and supplied to Sustainable Timber Tasmania by DPIPWE (Figure 1.3)

Management

The majority of areas identified as species rich either do not occur on PTPZ land (Figure 1.3) however, for those that do, Sustainable Timber Tasmania will manage them through:

- management of CAR reserves;
- protection of threatened vegetation communities (refer HCV 3); and
- implementation of threatened species management recommendations detailed in the Threatened Fauna Adviser.

Table 1.3 Areas of high species richness

Identified areas	Flora species richness	Fauna species richness	Flora community richness
Asbestos Range	Yes		Yes
Bay of Fires	Yes		No
Ben Lomond		Yes	
Blue Tier		Yes	
Blueman's Creek	Yes		No
Cape Bernier	Yes		Yes
Cataract Gorge	Yes		No
Cradle Mountain-Middlesex Plains	Yes		Yes
Elephant Pass-Douglas Apsley-Freycinet	Yes		Yes
Forestier - Mt MacGregor	Yes		No
Frenchmans Cap	Yes		Yes
Kempton	Yes		No
Maria Island	Yes		Yes
Mt Anne-Lake Judd	Yes		Yes
Mt Arthur - Scottsdale		Yes	
Mt Cameron	Yes		No
Mt Field	Yes	Yes	Yes
Mt Murchison	Yes		Yes
Mt Wellington-Meehan Range	Yes		Yes
Pelion Plains	Yes		Yes
Prosser River	Yes		No
Quamby-Drys Bluff	Yes		Yes
Quoin Mountain	Yes		Yes
Rocky Cape	Yes		No
Snug Tiers	Yes		Yes
Sumac - Savage River	Yes	Yes	No
Tooms Lake area	Yes		Yes

Identified areas	Flora species richness	Fauna species richness	Flora community richness
Walls of Jerusalem	Yes		No
Waterhouse Protected Area	Yes		Yes
Weavers creek		Yes	
Wielangta		Yes	

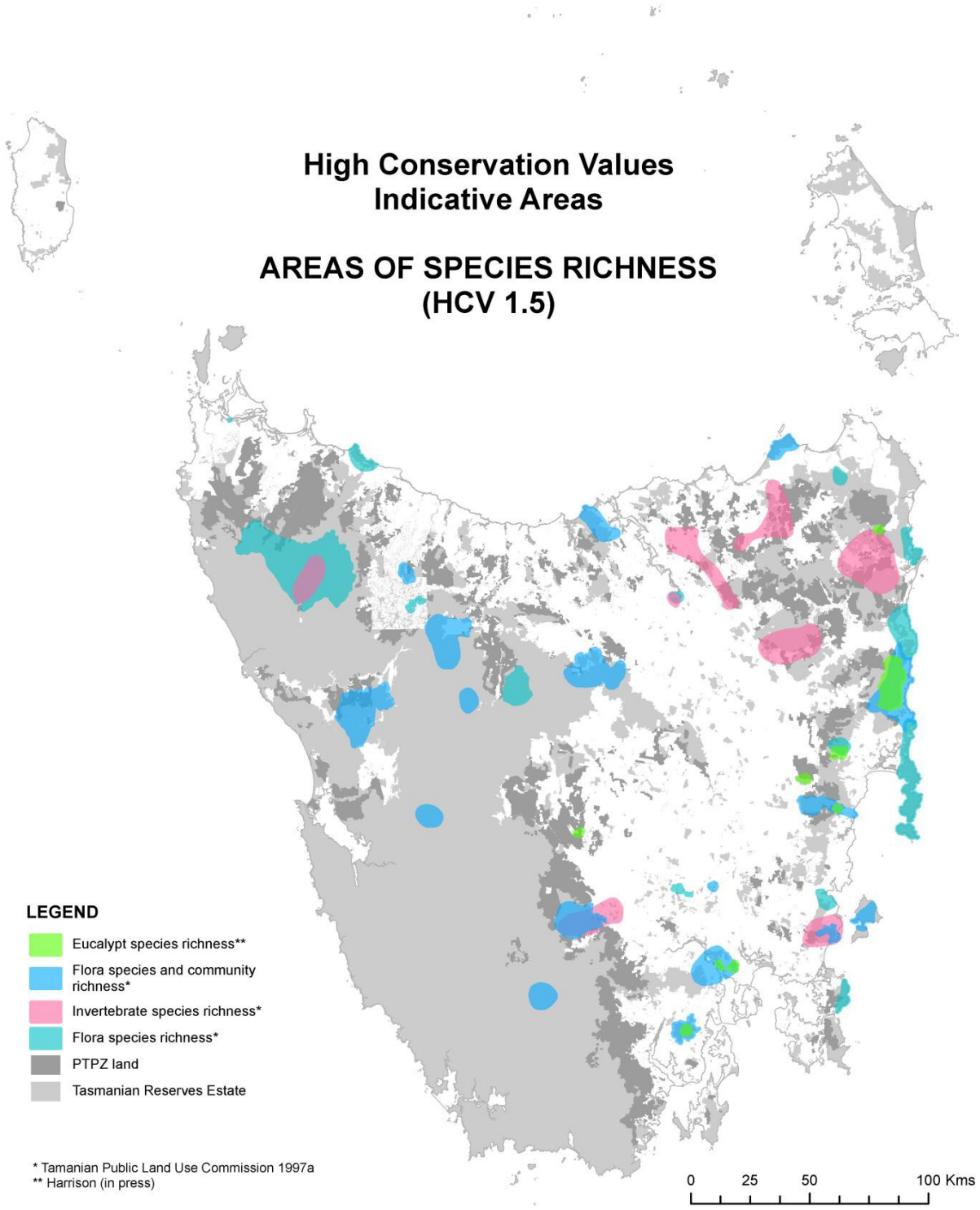


Figure 1.3 Areas of species richness in Tasmania

HCV 1.6 Refugia

Guidance

Annexe G of the *FSC Australia Forest Stewardship Standard* provides the following definition relating to this value:

'Refugia': *an area identified in formally recognised reports or peer-reviewed journals as performing a significant function in maintaining species during, for example, periods of climate variability and extremes; human induced causes such as disease; or population fluctuations from natural or human-induced causes.*

Methodology

This HCV was assessed by conducting a review of the relevant literature and consulting with ecological experts.

Results

Refuges, or refugia, are areas where physical and biological attributes combine to provide an environment that is more resilient to climatic variation than surrounding areas. The identification of refuge areas has two components in the Tasmanian context: glacial refugia and contemporary refugia.

Glacial refugia

A glacial refuge-dependent forest community is considered to be one that occupies a climatic or topographic refuge retaining elements of the climatic regime of the last Ice Age (Tasmanian Public Land Use Commission, 1997a). The best available information on the locations of glacial refugia in the Tasmanian context is based on the work of Kirkpatrick & Fowler (1998) who identified the likely glacial forest refugia in Tasmania (Table 1.4, Figure 1.4) using paleoclimate reconstruction in conjunction with fossil pollen evidence.

Since the publication of Kirkpatrick and Fowler (1998), considerable work has been undertaken on the glacial history of the North Eastern Highlands. Genetic studies have confirmed that multiple refugia existed across the highlands (Nevill 2010; Worth et al. 2009). However, exact locations, aside from the Blue Tier and Mt Victoria are not able to be identified (Worth et al. 2014, G. Jordan pers comm.).

Table 1.4 Areas identified as glacial refugia

Apsley River	Middle Weld Valley
Blue Tier	Mt St John
Cape Pillar/Cape Hauy	Murchison River
Denison River	New River Lagoon
Douglas-Apsley	Old River
Elephant Pass	Pieman River mouth
Esperance	Port Davey
Franklin River	South of Macquarie Harbour
Henty River	St Mary's Pass

Leithbridge Hill	Tasman Peninsula
Lower Gordon River	Yarlington Tier
Middle Picton - Huon Valley	

Contemporary refugia

Contemporary refugia contain communities that are strongly associated with climatic and topographic factors that confer a degree of protection from endangering processes such as fire and disease. These refugia have two important roles: they provide locations for the conservation of species and communities and they provide sources for population expansion if limiting conditions abate. Refugia are considered increasingly important in the face of projected climate change.

Tasmania contains a considerable number of areas that would be considered as contemporary refugia. The best available information on Tasmanian contemporary refugia was compiled by the Tasmanian Public Land Use Commission (1997a). The study used published papers, expert input and GIS analysis to both identify refuge types and to map refuge dependant forest communities that were largely undisturbed by human activity (Table 1.5). The identified refuges include all known occurrences of remnant rainforest, *Lagarostrobos franklinii, Athrotaxis cupressoides, A. Selaginoides, Nothofagus gunnii,* and *Callitris oblonga.* Mapped areas also include indicative sinkholes, *Cyathea* populations and refugias from disease.

The recent work that identified fire refugia that was developed as part of the recent IVG process (Hitchcock, 2012) was reviewed as part of this process but not used. This was because the indexing-based methodology employed is potentially open to criticism and resulted in an outcome that is insufficiently coarse for management actions. Furthermore, the report identified that approximately 84% of the identified high fire refuge areas are now protected in the Reserve system.

Table 1.5 Areas identified as contemporary refugia

Refuge type	Nature of refuge	Community or species	Mapped sites
Sub-alpine plateaus and mountain peaks	Bogs, rocky sites, including blockstreams and craggy areas, lake and river banks, and islands within these water bodies	Open montane rainforest and alpine communities. *Athrotaxis cupressoides, Nothofagus gunnii* and other species, including endemic conifers	Central Plateau, mountains of the Central Highlands, Precipitous Bluff, Mt Anne, Frenchmans Cap, West Coast Range, Western Arthurs
Montane to sub-alpine slopes and mountain peaks in central, western and southern Tas.	Cool, wet climatically protected areas	Cool temperate rainforest dominated by *Athrotaxis selaginoides* or *Lagarostrobos franklinii*	Great Western Tiers, King Billy Range, Mt Algonkian, slopes of Mt Bobs, Teepookana, Pine Valley
Riverine habitats in western and southern Tas.	Cool, wet, regularly inundated areas	Cool temperate rainforest dominated by *Lagarostrobos franklinii*	Gordon, Pieman, Davey, and Huon Rivers

Refuge type	Nature of refuge	Community or species	Mapped sites
Moist sites in dissected hills of eastern and northern Tas. and the Bass Strait islands	South-easterly slopes, wet gullies with protection from sun and wind and increased soil moisture from run-off. Occasionally bog sites	Primarily rain forest and wet scrub communities dominated by *Nothofagus cunninghamii, Atherosperma moschatum, Notelaea ligustrina* and *Pomaderris apetala*. On occasions *Astrotrichion discolor, Phyllocladus aspleniifolius* and *Elaeocarpos reticulatis*.	The Thumbs, Yarlington Tier, Windred Creek, Fergusons Gully, Dazzler Range, Platform Peak, Mt Cameron
Dry sites in dissected hills of eastern and northern Tas.	Dry rocky slopes, gorges and scree slopes	*Callitris rhomboidea, Notelaea ligustrina, Callistemon viridiflorus*	*C. rhomboidea*- Sellars Lagoon, outer Furneaux Islands, Taillefer Rocks, Allans Rd
Riparian habitats in eastern and north-eastern Tas.	High soil moisture and closed canopy	*Nothofagus cunninghamii, Atherosperma moschatum, Acacia melanoxylon, Pomaderris. apetala,* *Callitris oblonga* and *C. rhomboidea*	*C. oblong*Ð-all upstream populations. Callidendrous rain forestÐForester, Great Musselroe and Brid Rivers
Mountain summits on Flinders, Cape Barren and Maria Islands	Cloud forests	*Atherosperma moschatum, Pomaderris racemosa, P. apetala, Tasmannia lanceolata, Bedfordia arborescens , Cyathea cunninghamii, C. marcescens*	Mt Munroe, Mt Strzelecki, Mt Maria
Cool moist mountain plateaus and summits in eastern and south-eastern Tas.		*Nothofagus cunninghamii, Atherosperma moschatum, Phyllocladis aspleniifolius* and other associated rainforest species	Mt Mangana
Sinkholes and collapse features in karst and coastal sediments	Topographic protection and shading	Rainforest species, bryophytes and lichens. At present poorly understood	Mole Creek area, Cape Hauy
Phytophthora refugia		Various	Maria Island, Wielangta Hill, Heazlewood River, Celery Top Islands, Alum Cliffs State Reserve, Southport Bluff, Grey Mountain

Management

The majority of areas identified as refugia do not occur on PTPZ land. However land management activities on PTPZ land have the potential to increase the risk of fire and/or disease threats affecting refugia. To maintain and/or enhance this value, Sustainable Timber Tasmania will:

- maintain its fire preparedness and response responsibilities to minimise the likelihood of unplanned fire affecting these areas;

- contribute to the Statewide fuel management program overseen by the Tasmanian Fire Service (refer HCV 4.3)
- continue to maintain strict weed and disease strategies such as gravel moving rules and vehicle hygiene requirements.

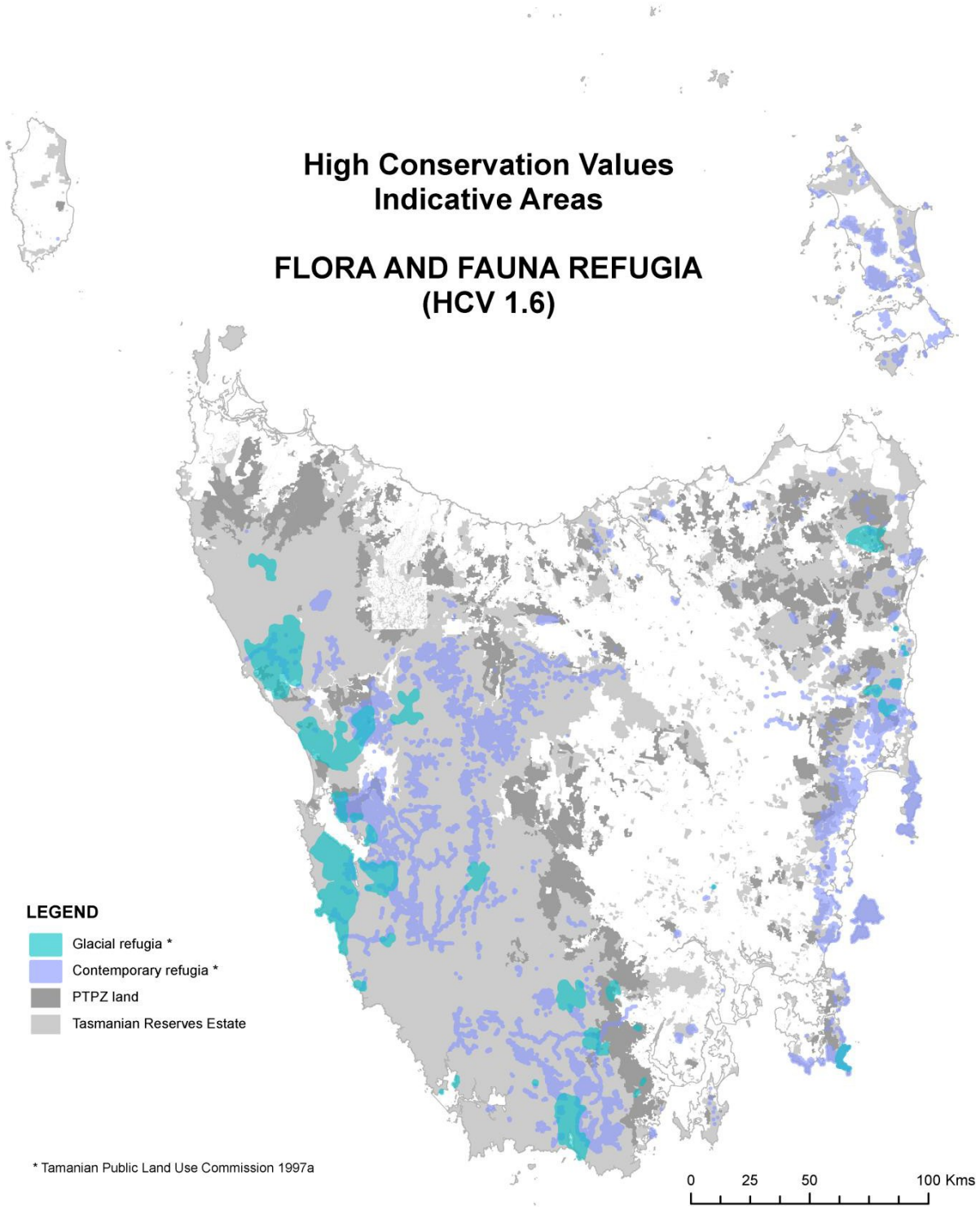


Figure 1.4 Glacial and Contemporary Refugia

HCV 2 – Landscape-level ecosystems and mosaics

Guidance

The full description of this HCV is:

Landscape-level ecosystems and mosaics. Intact Forest Landscapes and large landscape - level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

Annex G of the Australian FSC standard provides the following guidance on the HCV 2 identification:

Values to be assessed for HCV 2.

- *HCV 2.1: Landscape-level native forests with successional stages, forest structures, and species composition that are similar in distribution and abundance to native forests that have experienced minimal human disturbance, excluding traditional Indigenous management regimes.*
- *HCV 2.2: Forests recognised as being regionally significant at the bioregion or larger scale in formally recognised reports or peer-reviewed journals, due to the unusual landscape-scale biodiversity values provided by size and condition of the forest relative to regional forest land cover and land use trends.*
- *HCV 2.3: Forests that provide regionally significant habitat connectivity between larger forest areas and/or refugia.*
- *HCV 2.4: Intact Forest Landscapes, wilderness areas, forests that are roadless, and/or have not been affected by forest management activity.*

The focus of this HCV category is ***regionally significant large landscape-level forests.*** *Under this HCV category, areas that are generally thousands or tens of thousands of hectares in size which contain the above values qualify as HCV 2.*

General approach to analysing HCV 2

The analysis of HCV 2 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

HCVs 2.1, 2.2 and 2.3 were analysed individually. However, the analysis of the multiple values described in HCV 2.4 was not as straight forward. Some of these HCV 2.4 values were deemed to be sufficiently different that they required individual analysis, whilst other values were considered sufficiently similar to HCV2.1 that no additional specific analysis was required. All resulting reclassified values were then assessed through State wide GIS analysis of relevant datasets.

HCV 2.1 Landscape level native forests

Guidance

Annexe G of the *FSC Australia Forest Stewardship Standard* provides the following definition relating to this value:

Definition of 'Large landscape-level native forests': *Relatively contiguous areas of forest (which may be crossed by land management roads or public roads). At the minimum these forests are likely to be thousands or tens of thousands of hectares in size.*

However, "large" is relative to regional landscape context (particularly the size of forested blocks in the bioregion) and might be smaller or larger than this figure as indicated by consultation with regional experts.

In regions where native forests are heavily fragmented by forest type conversion or land use conversion, the increased value of smaller occurrences of remaining natural forest should also be included in the assessment. The forest may be in single or multiple ownerships.

HCV 2 includes areas that are in (or close to) what might be called their 'natural' condition. Such areas have a relatively full complement of the species that are appropriate to the habitat. HCV 2 designation may arise because the intact forest area is unusually large and therefore of high value due to its contribution to wilderness or landscape values.

The general approach in assessing for HCV 2 is to compare forest characteristics (such as extent and intensity of harvest practices, forest communities, successional stages, structures, and species composition and abundance) with native forests that have only been subject to natural disturbance processes or minimal human intervention. Aerial photography or satellite images of the surrounding landscape should also be considered.

Methodology

This analysis focused on an assessment of the lack of disturbance and hence naturalness across Tasmania. The best available information on this value was sourced by updating the High Quality Wilderness mapping undertaken during the Regional Forest Agreement Process (Public Land Use Commission 1997b), with a more current Biophysical Naturalness analysis (Knight, 2014). The areas selected as meeting these criteria were those that had been mapped as unlogged and ungrazed.

Results

The analysis identified that 28% (1.88 million hectares) of Tasmania meets the HCV 2.1 category (Figure 2.1, Figure 2.2). The identified values were largely concentrated on the existing Tasmanian CAR Reserve system and in particular the South Western Wilderness areas. The area identified on PTPZ land (9,400 ha) is less than 1% of the total area identified as having HCV 2.1 (Figure 2.1), with this land all being in the North West.

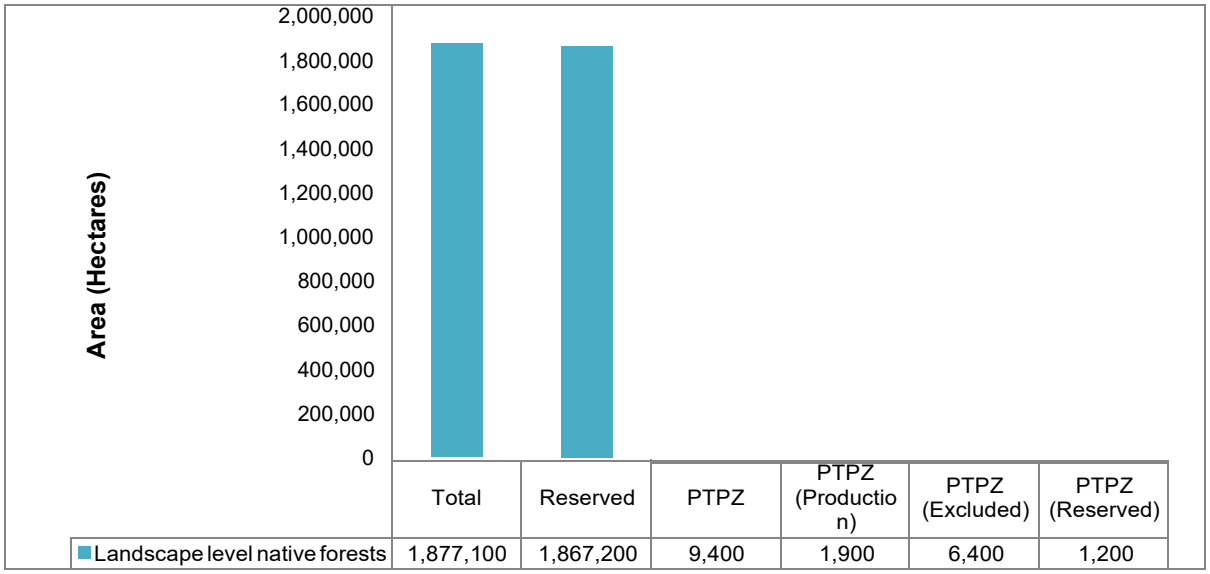


Figure 2.1 Landscape level native forests (HCV 2.1) management status

Management

HCV 2.1 will be maintained and/or enhanced by 99%, (1.87 million ha) of the area assessed as having this value being reserved and protected on other tenures (Figure 2.2). A significant amount of this area is managed as part of the Tasmanian Wilderness World Heritage Area.

The HCV 2.1 PTPZ land area is also located around the boundaries of the larger, contiguous HCV 2.1 areas. Of the 9,400 ha of PTPZ land, only 20% (1,900 ha) of the total area is zoned as production land. It is therefore highly unlikely that management of PTPZ land areas for wood production will affect the landscape level HCV 2.1 value.

Sustainable Timber Tasmania will manage landscape-level native forests with the objective of maintaining and/or enhancing them. Where these areas identified as landscape level native forests intersect areas zoned for production, the following prescriptions will apply:

- An appropriate retention based silvicultural system (non-clearfell) will be employed, unless specifically constrained by safety requirements. An appropriate retention based silvicultural system will depend on the forest type and the values identified within the coupe. This can range from light partial harvest regimes through to aggregated retention or enhanced levels of streamside reservation;

- Where variable retention silviculture or clearfell harvesting is employed, a minimum of 20% of mature forest where it is present and/or potentially mature forest (where mature forest is absent) will be retained for long-term retention within a 1 km radius around each coupe; and

- All harvested coupes will be regenerated appropriately with locally sourced eucalypt seed.

The identified HCV 2.1 area also includes the historically cut over Teepokana plateau where current day operations salvage Huon Pine that was fallen in the early 1900s, providing one of the only sources of this highly prized special timber species. Given that the small area involved has been historically cut over, and regeneration activities are resulting in a higher density of Huon Pine stocking than pre-harvest, these operations have been deemed as being likely to maintain and/or enhance the HCV 2.1 value.

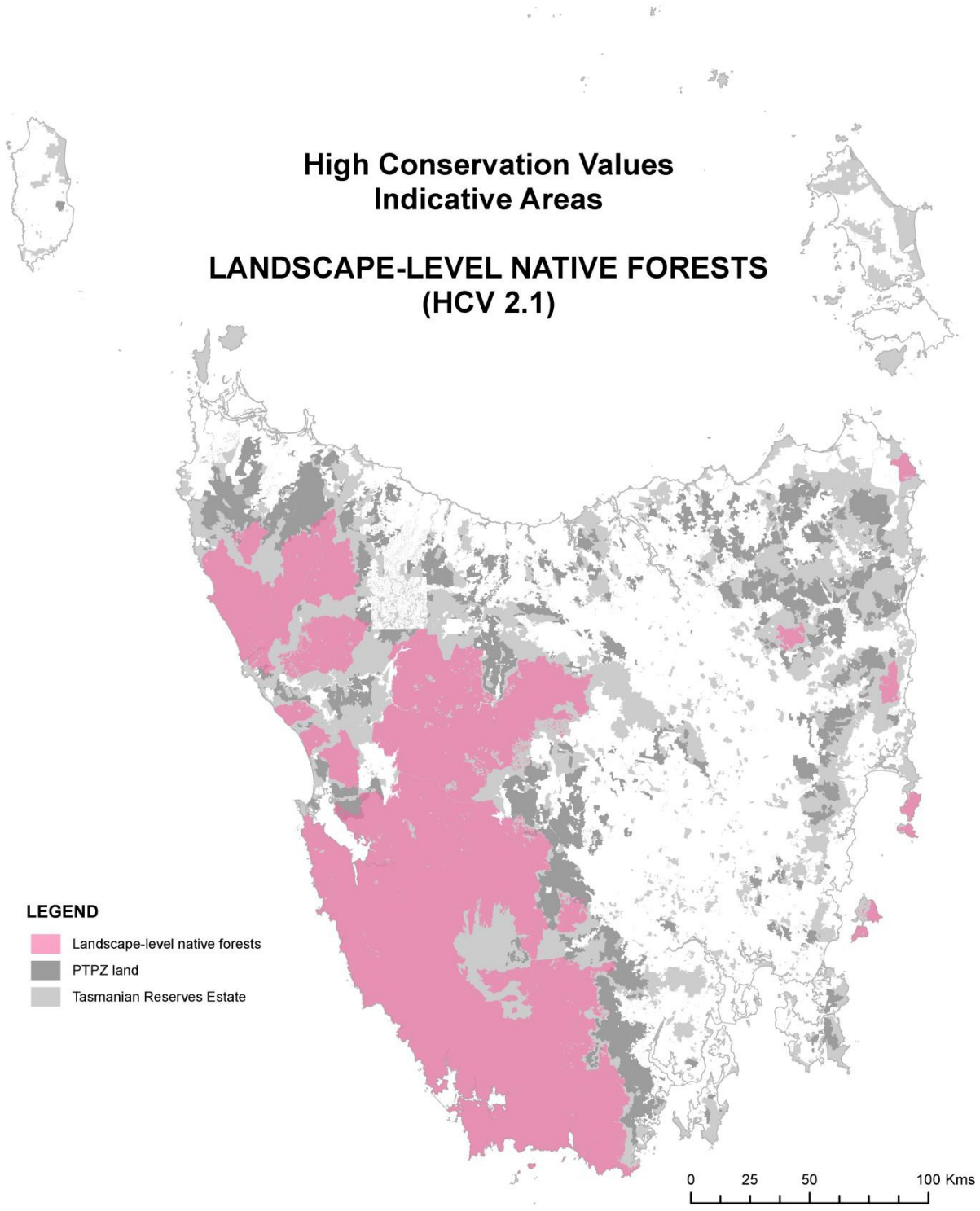


Figure 2.2 Landscape level native forests (HCV 2.1)

HCV 2.2 Forest recognised as being regionally significant at the bioregion or larger scale in formally recognised reports or peer reviewed journals, due to the unusual landscape-scale biodiversity values provided by size and condition of the forest relative to regional forest land cover and land use trends.

Guidance

Annexe G of the *FSC Australia Forest Stewardship Standard* provides the following definition relating to this value:

'Regionally Significant': *The forest is significant in the region due to its size, condition, and/or importance to biodiversity conservation. Factors to consider include:*

- *Rarity of forests of this size and quality within the region;*
- *Less affected by anthropogenic factors than similar areas in the region.*

Methodology

This subvalue was assessed by seeking input from stakeholders regarding areas that they believed met the subvalue criteria. The consultation was largely conducted while seeking feedback on the draft version of the plan. The existence of formally recognised reports or peer reviewed journals relating to the areas was then verified by STT.

Results

Consultation with conservation organisations elucidated four areas that met this HCV subcategory. The areas were Tarkine Region (Figure 2.3), polygons identified during the Tasmanian Forest Agreement Process by Environmental Non Government organisations (Figure 2.4), areas identified by the North East Bioregional Network and swift parrot habitat on Bruny Island and in the Southern Forests. Each of the areas have been verified by STT as being recognised in formally recognised reports or peer reviewed journals (

Table 2.1).

Further research confirmed that areas identified as part of the Linking Landscapes project was considered as input into the Tasmanian Forest Agreement process, and the identified areas were included as a subset of the full TFA nominated reserve area. The two values were therefore considered together.

The Tarkine Region was also identified as meeting this criterion. This area was the subject of a National Heritage Assessment by the Australian Heritage Council, who subsequently recommended the area for listing on the National Heritage register. Despite the whole area not being accepted onto the register for social and economic reasons, STT recognises that the area is considered as High Conservation Value by some stakeholders.

Swift parrot habitats on Bruny Island and in the southern forests were also identified by stakeholders. This value is also recognised as HCV 1.1 and 1.4

Table 2.1 Areas nominated by stakeholders as HCV2.2 areas

Description of suggested area	Report / peer reviewed journal
The Tarkine Region	Australian Heritage Council National Heritage Assessment final Assessment report
The 572,000 ha of proposed reserves identified by Conservation organisations during the Tasmanian Forests Intergovernmental Agreement (TFA).	Mackey (2012), Environment Tasmania (2011)
Areas identified in the Linking Landscapes report.	North East Bioregional Network (2012)
Bruny Island and areas in the Southern Forests that are Swift Parrot Habitat	Saunders, D.L. and Tzaros, C.L. (2011) Stojanovic et al. (2014)

Management

With respect to the TFA areas, The *Tasmanian Forests Agreement Act 2013* resulted in an extension to the Tasmanian Wilderness World Heritage Area and an agreed 493,000 hectares of native forest being removed from State Forest (now referred to as PTPZ land). Although this legislation has now been superseded by the *Forestry (Rebuilding the Forest Industry) Act 2014,* the vast majority of the areas identified for reservation remain excluded from PTPZ land and are now managed by DPIPWE (Figure 2.6). STT will manage the biodiversity values of this HCV on PTPZ land in accordance with existing policy and procedures.

With respect to the Tarkine area, the vast majority (95%) of the assessed area is within the Tasmanian CAR reserve system (Figure 2.5). Approximately 5% of the Tarkine Wilderness Area is located on PTPZ land, and this area is generally around the Northern and Eastern perimeters of the defined Tarkine area. Approximately 45% of the defined Tarkine area on PTPZ land is managed in either reserved or non production areas. STT's existing policy and procedures for managing biodiversity values will apply to the defined Tarkine area that is on PTPZ land. This includes the prescriptions applying to areas identified as HCV 2.1, which has significant overlap with this value.

Refer to HCV 1.4 for STT's management approach to swift parrot.

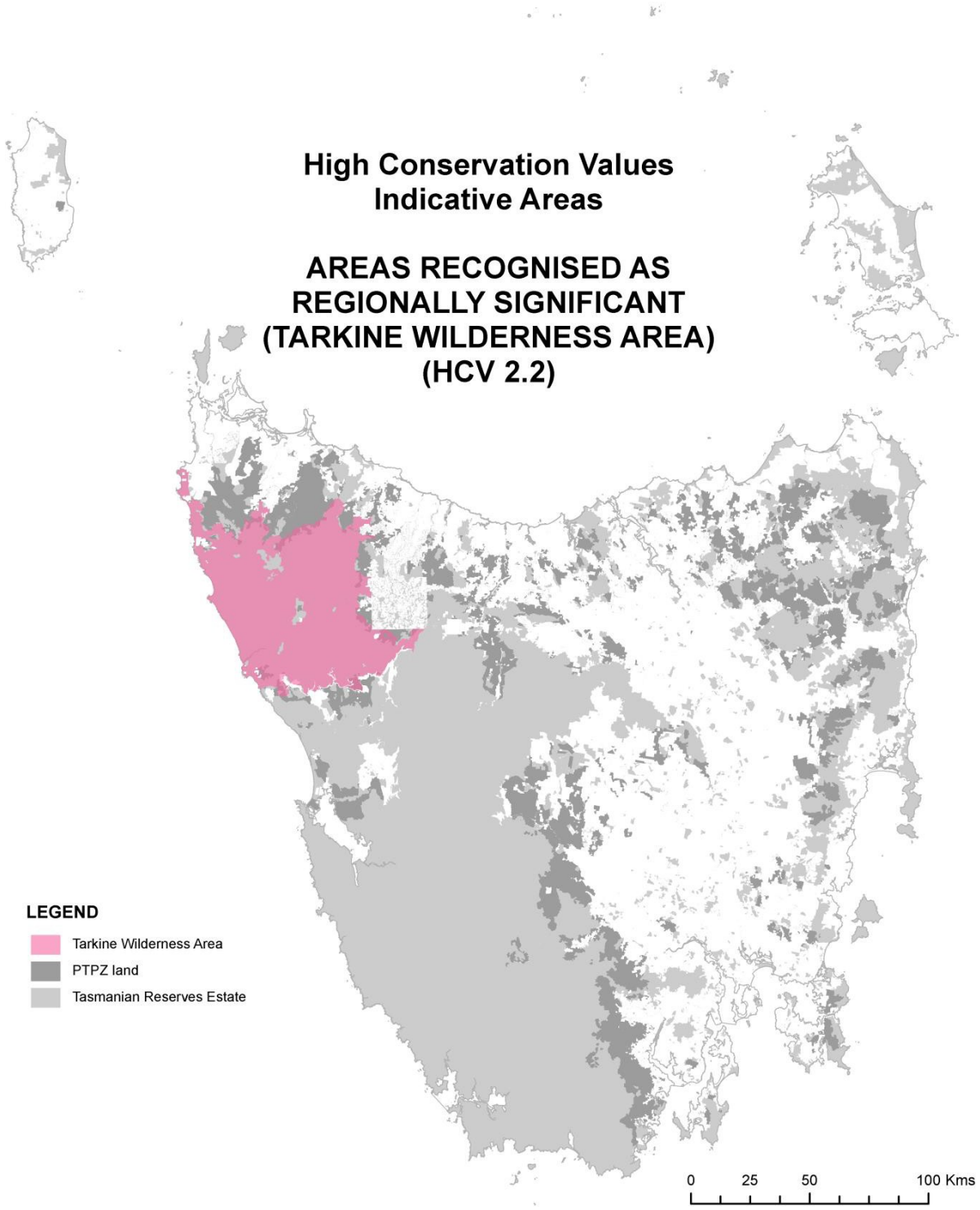


Figure 2.3 Tarkine Wilderness Area (HCV 2.2)

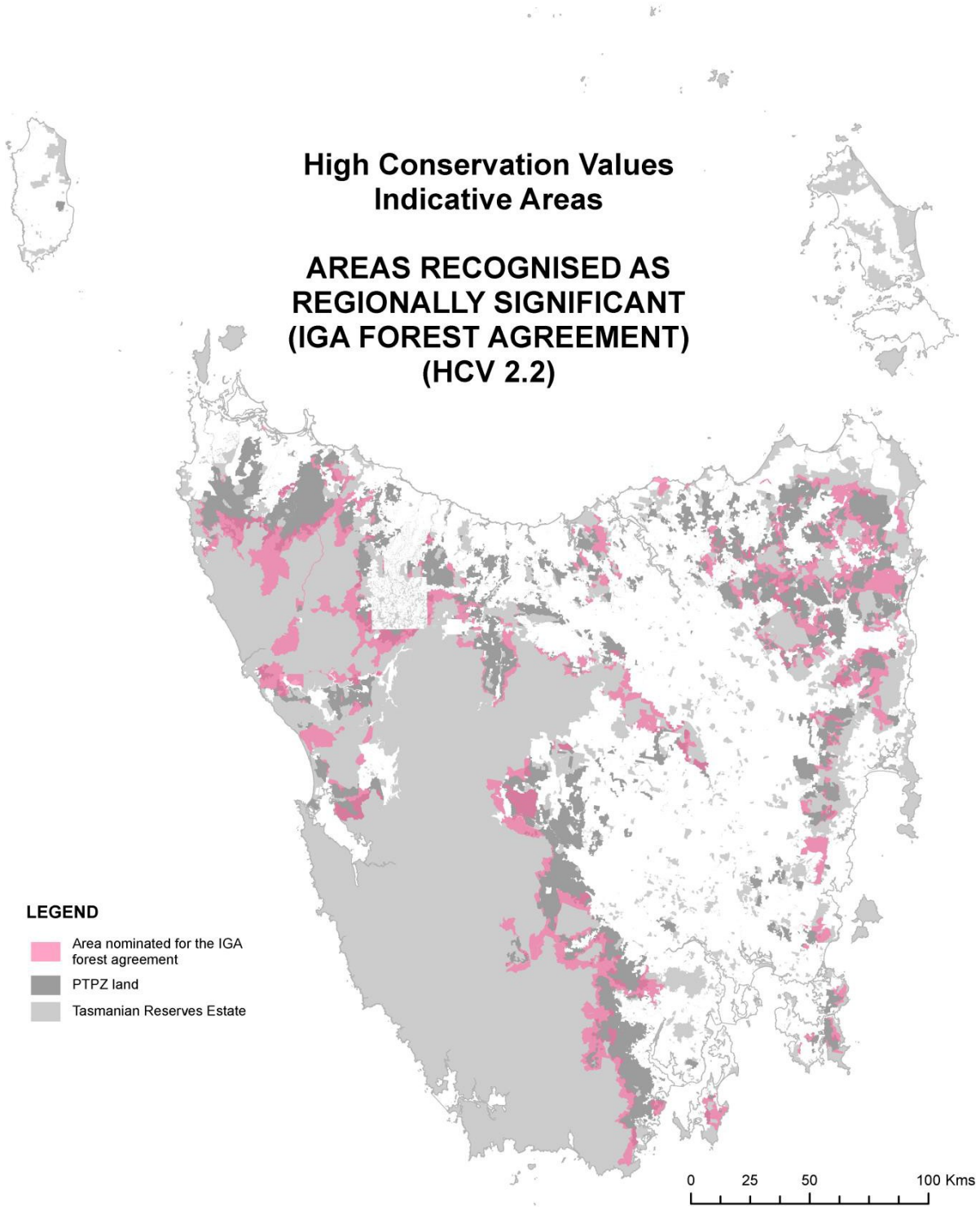


Figure 2.4 Areas nominated for the IGA forest agreement

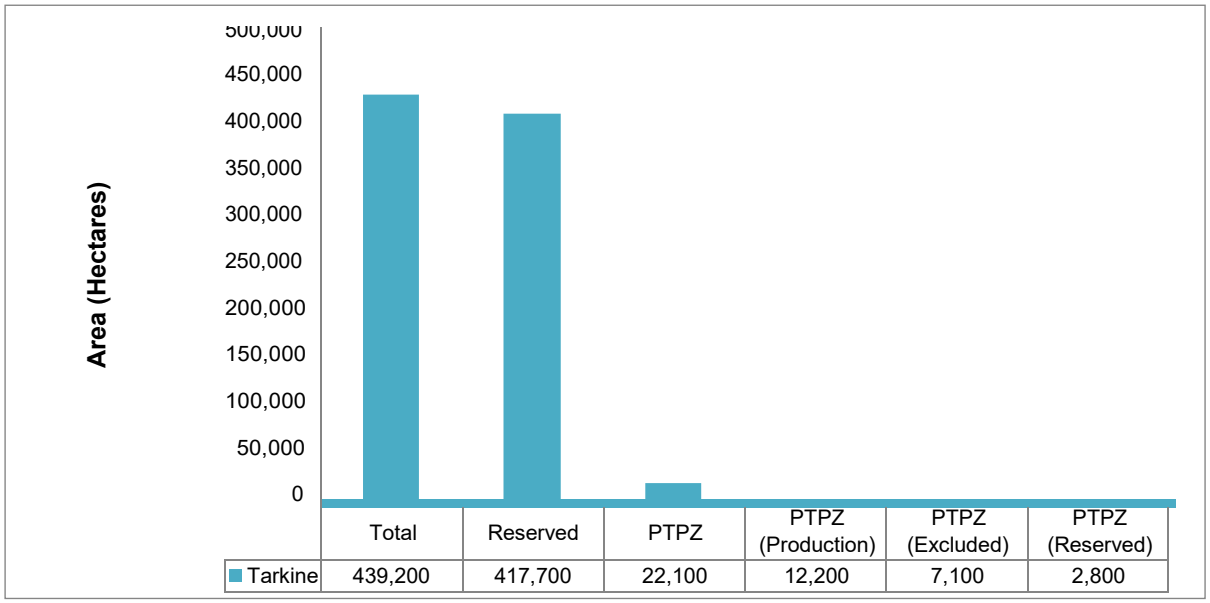


Figure 2.5 Tarkine Wilderness Area (HCV 2.2) management status

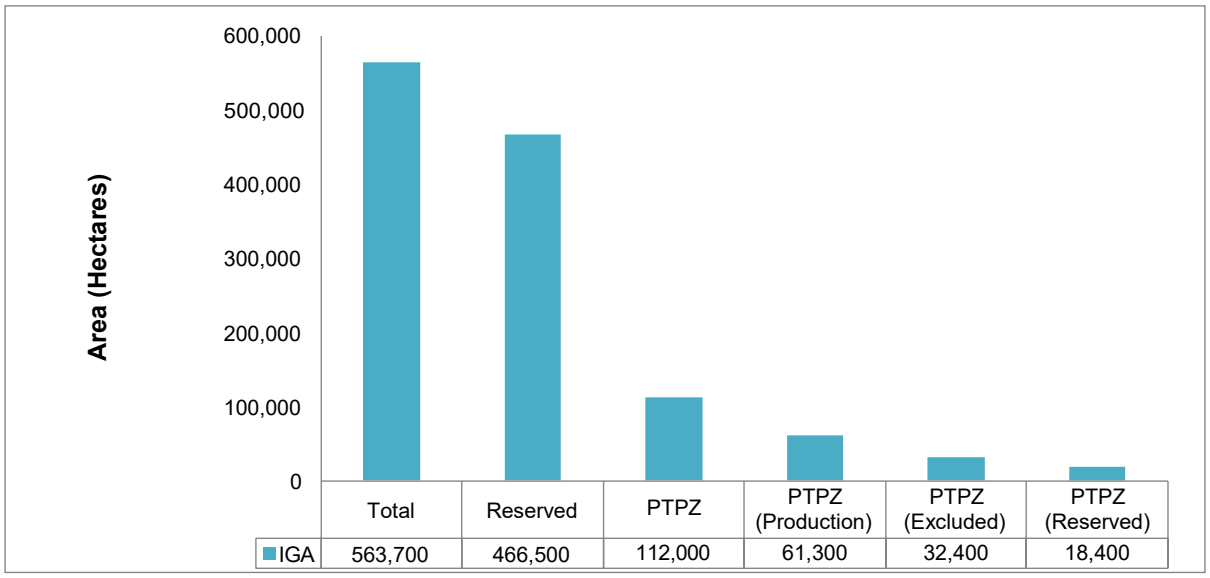


Figure 2.6 Areas nominated for the IGA forest agreement (HCV 2.2) management status

HCV 2.3a Forests that provide regionally significant habitat connectivity between larger forest areas

Methodology

Across all Tasmanian tenures there are many components of the landscape that are important for contributing to regionally significant habitat connectivity between larger forest areas. Indeed, it could be argued that all forest provides for some degree of connectivity. Rather than identifying all forest as meeting this subvalue, this analysis used the approach of identifying areas of the reserve system that have been specifically designed to achieve connectivity.

Results

STT's management activities result in a range of features (e.g. CAR reserves, wildlife habitat strips, long term retention, streamside reserves, wildlife habitat clumps, threatened species set asides) that could be considered as important for connectivity.

In the context of STT's management activities, the most relevant aspect of STT's reserve network that exhibits this HCV value is the long established 44,000 ha network of wildlife habitat strips . The habitat strips are generally comprised of 100m wide mature forest strips spaced every few kilometres through production forest areas. The habitat strips were established to link large areas of reserved or otherwise unharvested forest, and have been shown to maintain biological function (Grove, 2004; Taylor 1991).

Management

STT will continue to maintain the integrity of the established wildlife habitat corridor network by excluding harvesting operations from them.

HCV 2.3b Refugia

Methodology

Refer to HCV 1.6 Refugia

HCV 2.4a Intact Forest Landscapes

Guidance

Annex G of the Australian FSC standard provides the following definitions:

Intact Forest Landscape: *A territory within today's global extent of forest cover which contains forest and non-forest ecosystems minimally influenced by human economic activity, with an area of at least 500 km^2 (50,000 ha) and a minimal width of 10 km (measured as the diameter of a circle that is entirely inscribed within the boundaries of the territory) (Source: Intact Forests / Global Forest Watch. Glossary definition as provided on Intact Forest website. 2006-2014).*

Intact Forest Landscape Core Areas*: The portion of an Intact Forest landscape that contains the most important ecological and cultural values.*

Methodology

An Intact Forest Landscape (IFL) is defined as an unbroken expanse of natural ecosystems within the zone of current forest extent, showing no signs of significant human activity, and large enough that all native biodiversity, including viable populations of wide-ranging species, could be maintained (Potapov et al. 2008).

The IFL concept was developed by a group of non-government organisations who manage a global map of IFL areas. Further information can be obtained from the Intact Forest Landscapes website.

This analysis used the publicly available global IFL map to identify relevant areas of Tasmania.

Results

The analysis confirmed that 777,100 ha of Intact forest Landscapes exist in Tasmania (Figure 2.7, Figure 2.8). Of this area, only 5,900 ha has been identified as being on PTPZ land with only 1,000ha of this available for production.

Management

FSC International (2017) have issued the following advice to Forest Managers on managing Intact Forest Landscapes:

- Do not reduce any IFLs below the 50,000 ha threshold in the landscape.
- Do not impact more than 20% of Intact Forest Landscapes within the Forest Management Unit

Given the relatively large size of the Tasmanian IFL (770,000ha), the secure reservation of the majority of this area, and the small amount of IFL presently zoned for production on PTPZ land, it is highly unlikely that the Tasmanian IFL will be reduced to below 50,000 hectares. The proportion of zoned production forest on PTPZ land is also below the 20% threshold set by FSC International.

The identified IFL area on PTPZ land largely incorporates the historically cut over Teepokana plateau where current day operations salvage Huon Pine that was fallen in the early 1900s, providing one of the only sources of this highly prized special timber species. Given that the small area involved has been historically cut over, and present day regeneration activities are resulting in a higher density of Huon Pine stocking than pre-harvest, these operations have been deemed as being likely to maintain and/or enhance the existing IFL value.

STT's existing policy and procedures for managing biodiversity values will apply to the defined Intact Forest Landscape area that is on PTPZ land. This includes the prescriptions applying to areas identified as HCV 2.1, which has significant overlap with this value.

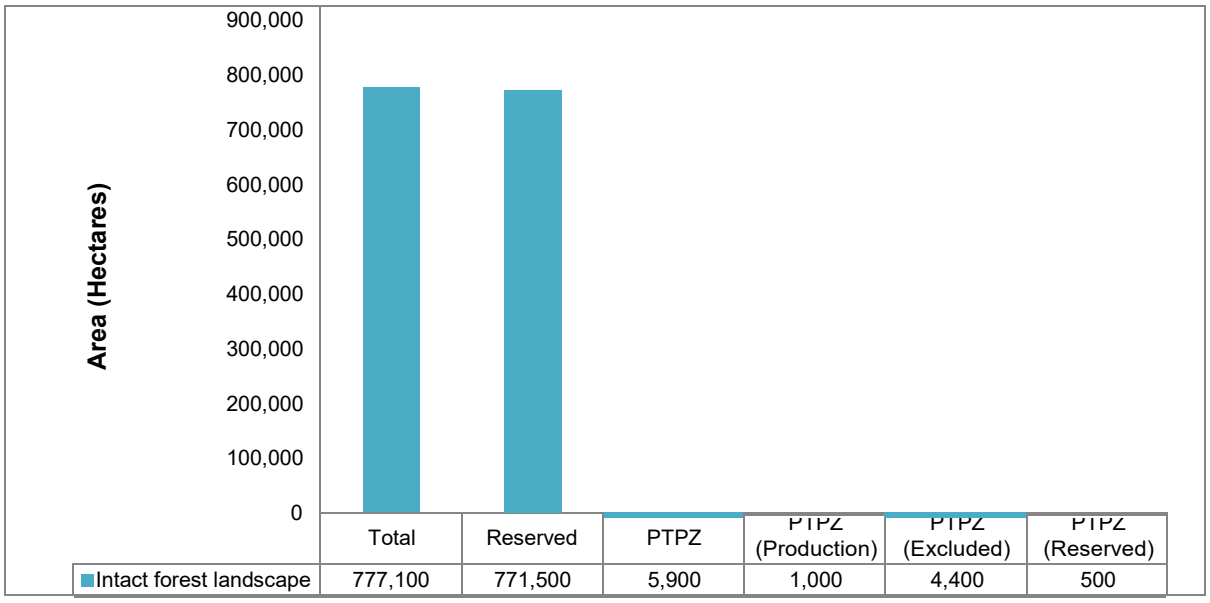


Figure 2.7 Intact Forest Landscape (HCV 2.4a) management status

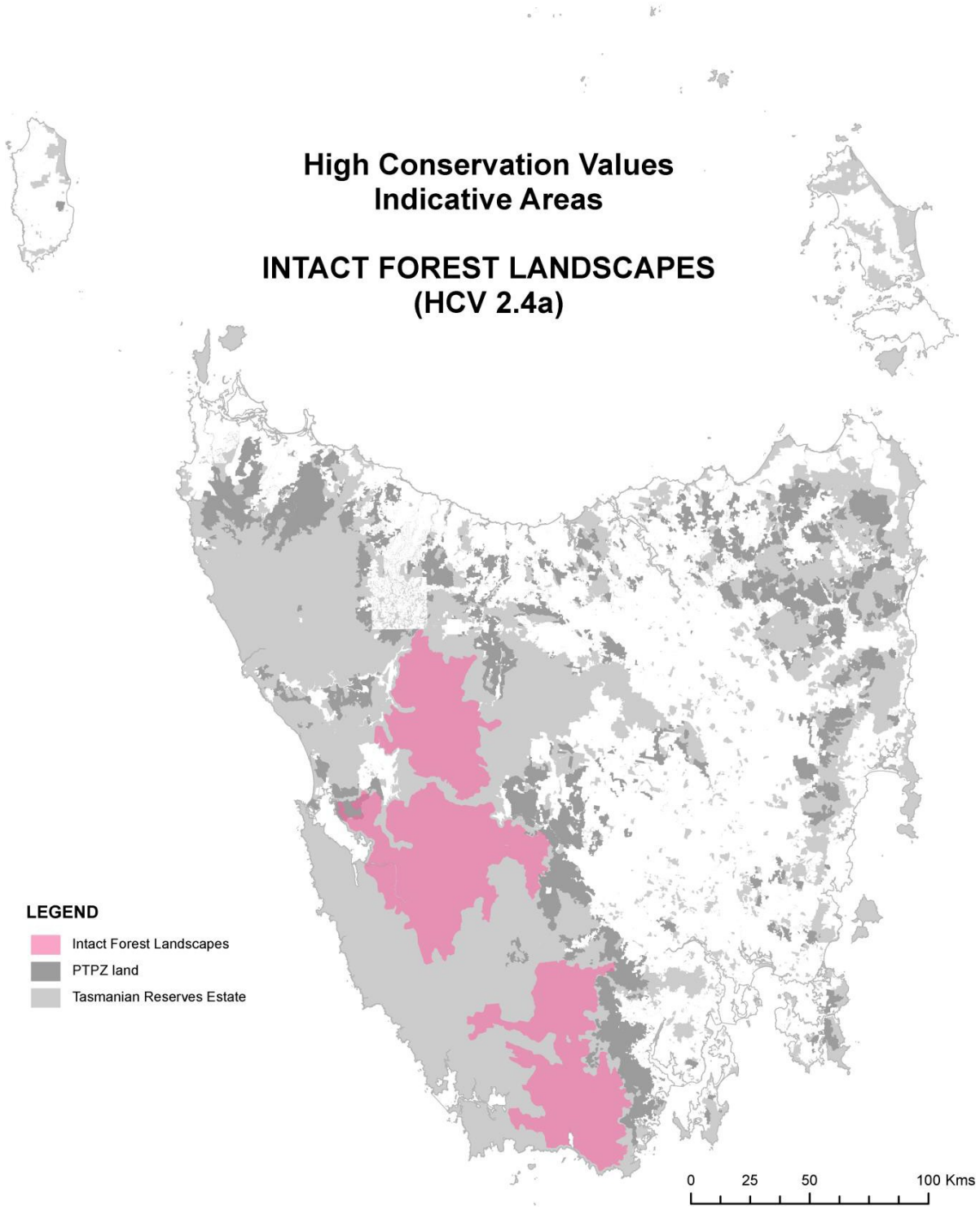


Figure 2.8 Intact Forest Landscapes (HCV2.4a)

HCV 2.4b Wilderness Areas

Methodology

Refer to HCV 2.1 Landscape Level forests

HCV 2.4c Forests that are Roadless

Methodology

This analysis involved using the most current records of road locations available from the STT and Land Information System Tasmania road datasets. A GIS analysis was used to identify specific areas that were larger than 10,000 ha and further than 1,000 m from the nearest road. The analysis was state-wide in scope. The condition of roads was not taken into account as the presence of any road regardless of any state was considered as a disturbance that would result in the HCV criteria not being met. The area thresholds were selected to be consistent with those used in the Regional Forest Agreement and Tasmanian National Estate processes (Public Land Use Commission, 1997). The threshold is significantly smaller than the 50 000 ha suggested by the *Common Guidance* (Brown et al. 2013) but can be justified by Tasmania's highly variable landscape.

Results

The analysis identified that 1.8 million ha of Tasmania meets the defined roadless criteria, with the area concentrated over the South West World Heritage area (Figure 2.9, Figure 2.10). Given the extensive roading activity associated with activities on PTPZ land, less than 1% of this area is on PTPZ land.

Management

A significant proportion of this land is managed by other parties within the Tasmanian Reserve system.

Given the very small proportion of roadless areas on PTPZ land, this HCV value is highly unlikely to be impacted by STT activities at the landscape scale. STT's existing policy and procedures for managing biodiversity values will apply to identified roadless areas that are on PTPZ land. This includes the prescription applying to areas identified as HCV 2.1, which has significant overlap with this value.

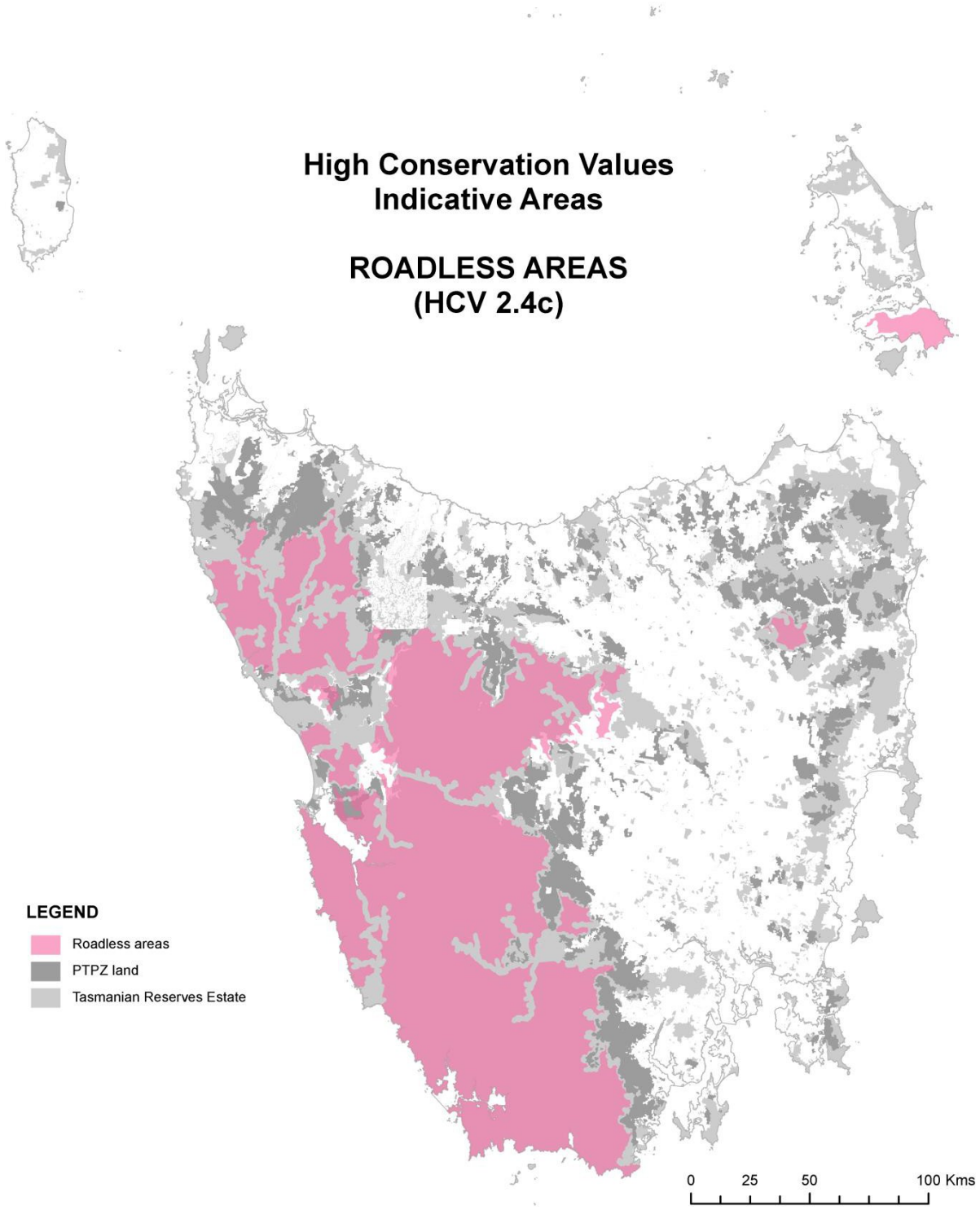


Figure 2.9 Roadless areas (2.4c)

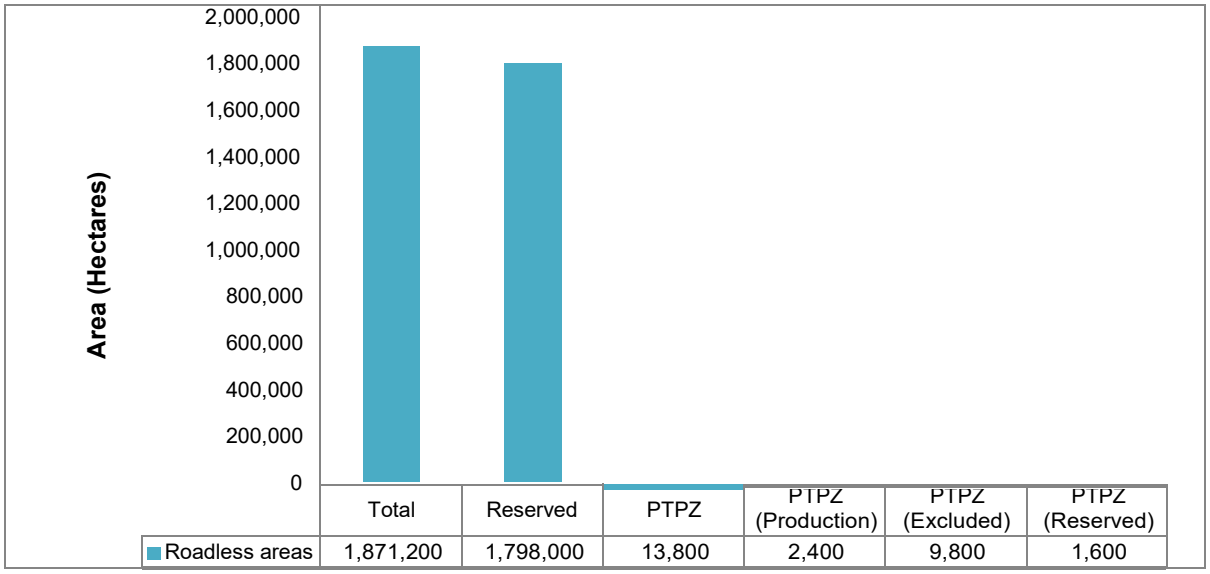


Figure 2.10 Roadless areas (HCV 2.4c) management status

HCV 2.4d Areas not affected by forest management activity

Methodology

Refer to HCV 2.1 Landscape Level Forests.

HCV 3 – Ecosystems and habitats

Guidance

The full description of this HCV is:

Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia.

Appendix G of the Australian FSC standard provides the following guidance on the HCV 1 identification:

Values to be assessed for HCV 3.

- HCV 3.1: *Ecosystems* (including rainforests) that are threatened, depleted or poorly reserved at the IBRA bioregion scale, or are subject to threatening processes predicted to substantially reduce their extent and function.
- HCV 3.2: Areas for *conservation* of important genes or genetically distinct populations.
- HCV 3.3: Old Growth forest
- HCV 3.4: Remnant vegetation in heavily cleared landscapes and mature forest in degraded landscapes.

The focus of this *HCV* category are forests that are in rare, threatened or endangered *ecosystems*, or that contain such *ecosystems*.

General approach to analysing HCV 3

The presence of HCV 3 values were assessed though a GIS-based analysis of Tasmania's forests using best available data. The processes for the individual values were different and are described below. The analysis of HCV 3 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

HCV 3.1 Ecosystems (including rainforests) that are threatened, depleted or poorly reserved at the IBRA bioregion scale, or are subject to threatening processes predicted to substantially reduce their extent and function.

Methodology

This analysis comprised three components, being:

- the identification of vegetation communities that are already recognised as threatened on the Tasmanian context,
- a bioregional analysis of forest community conservation status to determine threatened or depleted communities
- a bioregional analysis of forest community reservation status to determine poorly reserved communities.

The two bioregional analysis (b and c) were undertaken concurrently. Rainforest communities were included within the analysed forest communities, meaning that no additional analysis of their bioregional status was necessary.

Communities recognised as threatened in the Tasmanian context.

There are three legislated mechanisms for threatened community identification in the Tasmanian context. These mechanisms identify the communities that have been formally recognised through nomination processes and/or formal analysis as threatened. The mechanisms are:

- Schedule 3a of the *Nature Conservation Act 2002* lists the native vegetation communities in Tasmania considered to be threatened.

- Attachment 6 of the Tasmanian Regional Forest Agreement describes the forest communities (including old growth components) that will be protected on Public Land wherever prudent and feasible; and

- The *Environment Protection and Biodiversity Conservation Act 1999* identifies the ecological communities that have been listed at the Commonwealth level.

Bioregional analysis of threat and reservation status

To determine the IBRA region conservation and reservation status of Tasmanian native forest communities, STT engaged Natural Resources Planning Pty Ltd (NRP) to conduct an independent analysis. NRP have developed a GIS-based Regional Ecosystem Model (REM) that can be used to identify conservation priorities. The REM has previously been used by several forest managers, councils and other natural resource management groups to objectively identify conservation issues and prioritise management actions. NRP's analysis and results are fully described in the Regional Ecosystem Model report (Knight 2014), and a summary of the analysis is provided below:

- **The analysis was conducted at the Interim Biogeographic Regionalisation for Australia (IBRA) level**. There are nine IBRA 5 bioregions in Tasmania (Figure 3.1). In the Tasmanian context, IBRA 5 is effectively identical to the more recent IBRA 7 map.

- Regional Forest Agreement forest community types were used to define vegetation communities in the analysis. There are 51 forest communities identified by the Regional Forest Agreement.

- **The spatial extent of vegetation communities was based on Tasveg 2.0**. Tasveg is a comprehensive digital map of Tasmania's vegetation that is maintained by DPIPWE. NRP further updated this mapping where better information was available.

- The pre-European extent of each forest community was determined using data developed during the Regional Forest Agreement. This data was further updated by NRP where better information was available.

- **The analysis was tenure-blind.** Analysis of the conservation and reservation status of each community was conducted for all land within the IBRA region.

- **The conservation and reservation status classification was based on the Nationally Agreed criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for forests in Australia (JANIS 1997).** Known as the JANIS criteria, the conservation categories are based on the ecosystem's extant area and relative depletion since 1750 (Table 3.1). NRP used the

JANIS definitions as quantitative rule sets for GIS analysis. Where GIS analysis revealed that individual communities were approaching the threshold, expert opinion was used to decide if the community should be considered for that conservation category.

- **Calculated areas of each forest community are indicative. Data accuracy issues associated** with best available information vegetation mapping and the interim PTPZ land GIS layer result in calculated areas not being exact. However, it is assumed that the data is appropriate for determining threat and reservation status at the IBRA level scale. The interim PTPZ land area used does not affect the bioregional vegetation community conservation assessment which was undertaken at a State-wide level. The indicative presence of all threatened forest communities is confirmed by field checking during operational planning.

- **The GIS layer of PTPZ land used in the analysis contained an interim area.** This file was provided to NRP in 2013 when there was uncertainty surrounding the exact boundary of PTPZ land. The extent of PTPZ land has been subsequently finalised since NPM completed the analysis.

Table 3.1 Summary of JANIS conservation status criteria and reservation targets of RFA forest communities as applied in the REM.

Conservation status	Conservation Status Description	Rule sets for classification within REM	Reservation Target
Endangered and Rare	Where the conditions for rare and endangered ecosystems are met (refer below).	Where the conditions for rare and endangered ecosystems are met (refer below).	100% of present extent.
Endangered	An endangered ecosystem is one where its distribution has contracted to less than 10% of its former range or the total area has contracted to less than 10% of its former area, or where 90% of its area is in small patches which are subject to threatening processes and unlikely to persist.	Where depletion is > 90% of pre-1750 extent.	100% of present extent.
Vulnerable and Rare	Where the definitions for vulnerable and rare ecosystems are both met (refer below).	Where the conditions for both vulnerable and rare ecosystems are met.	100% of present extent.
Vulnerable	A vulnerable forest ecosystem is one which is: • approaching a reduction in areal extent of 70% within a bioregional context and which remains subject to threatening processes; or • not depleted but subject to continuing and significant threatening processes which may reduce its extent. Vulnerable ecosystems include those where threatening processes have caused significant changes in species composition, loss or significant decline in species that play a major role within the ecosystem, or significant alteration to ecosystem processes.	Where depletion is 70-90% of pre-1750 extent.	60% of present extent.
Rare	A rare ecosystem is one where its geographic distribution involves a total range of generally less than 10,000ha, a total area of generally less than 1000ha or patch sizes of generally less than 100ha, where such patches do not aggregate to significant areas. This criterion is to be applied within a bioregional context having cognisance of distribution in adjoining bioregions. It should be noted that rarity is a naturally occurring phenomenon that does not necessarily imply that the ecosystem is under immediate threat.	Where the extant area is less than 1,000 ha.	100% of present extent.
Not threatened	Ecosystems that do not fall into the above categories		15% of 1750 community.

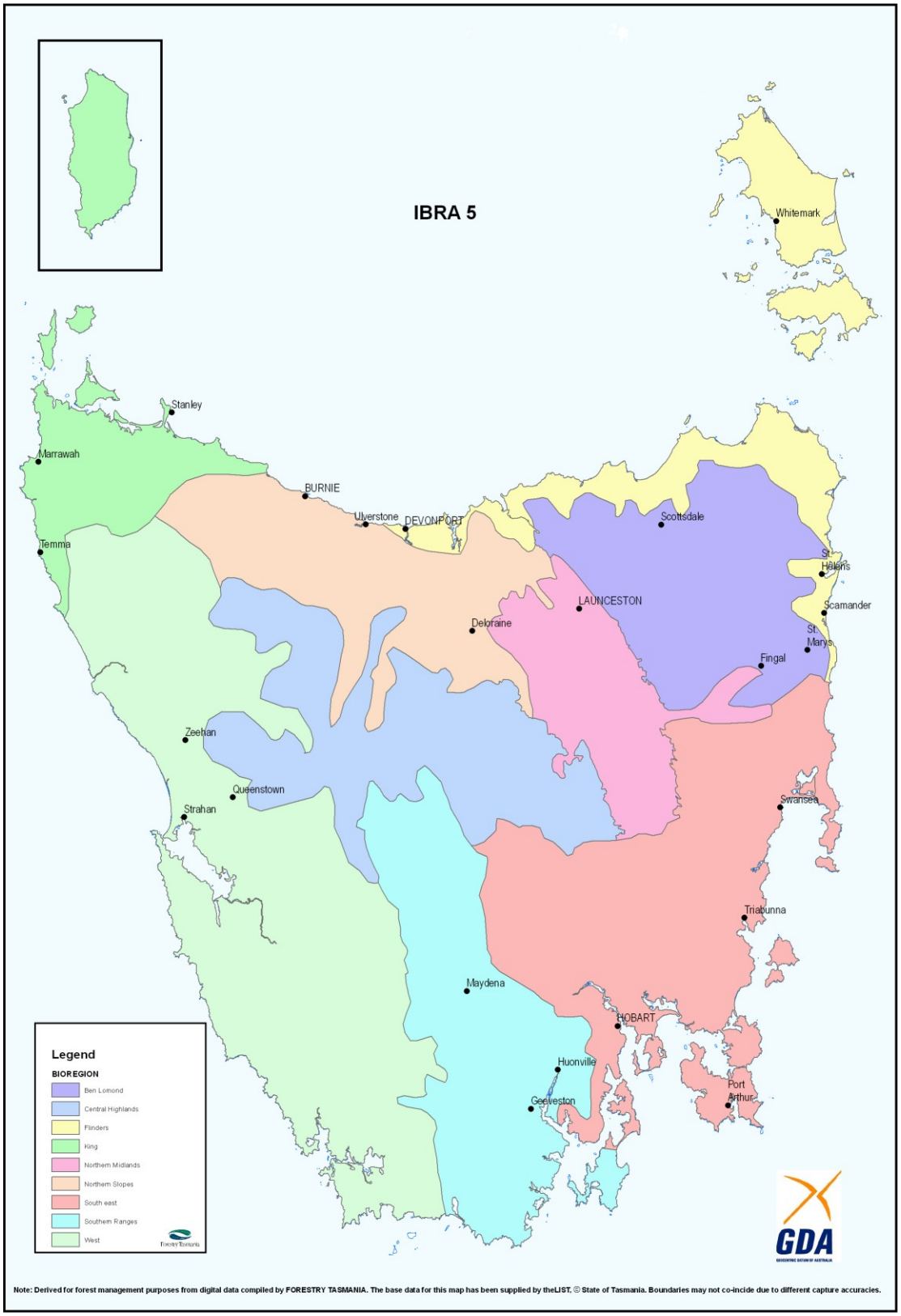


Figure 3.1 IBRA 5 Regions for Tasmania

Results

For a full summary of reservation and conservation status of each forest community by IBRA region, including a list of those legislatively recognised as threatened, see Appendix 2. Furthermore, a list of threatened non-forest communities is provided in appendix 3.

Conservation Status

The vast majority of legislatively recognised threatened forest communities were also identified by the IBRA analysis as being threatened, confirming that the process used in the IBRA analysis was sound.

The IBRA level analysis of forest communities showed that of the 3.5 million ha of forest in Tasmania, 323,300 ha or approximately 9% met the JANIS criteria of a threatened community (Figure 3.2). Less than 5% of this area (16,100 ha) identified as threatened is on PTPZ land. The analysis also identified 113 000 ha of threatened non-forest vegetation communities, with only three percent (3,140 ha) of this area occurring on PTPZ land.

When compared to the entire State, the relatively small proportion of threatened forest communities on PTPZ land reflects the history of forest reservation in Tasmania, where threatened communities were previously identified and reserved, often in tenures not subject to forest operations.

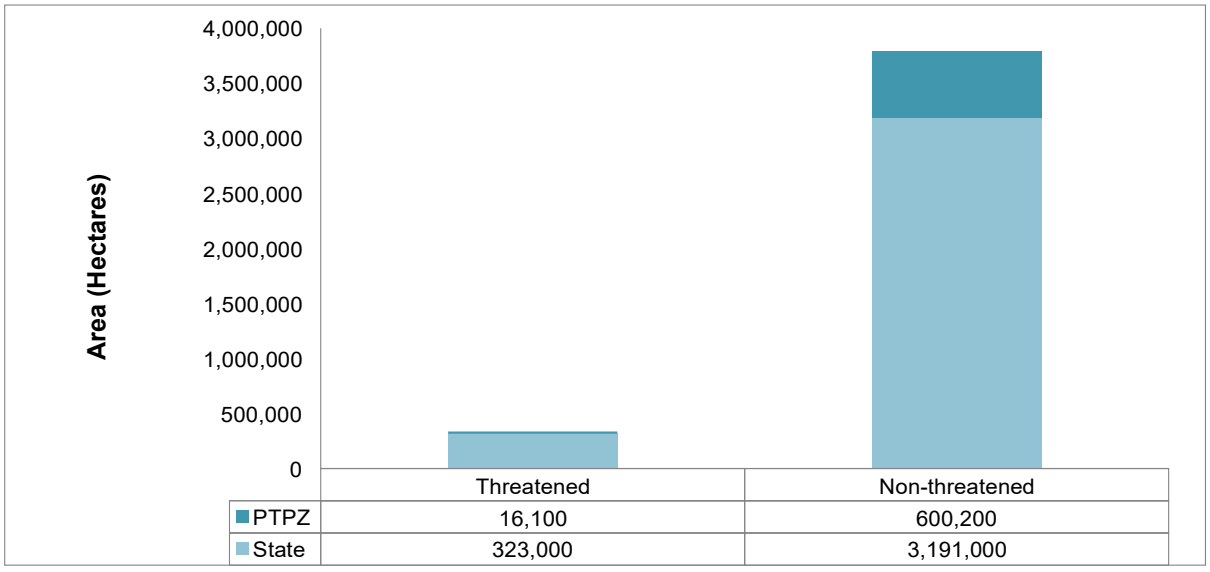


Figure 3.2 Summary of the conservation status of native forest communities in Tasmania [Knight 2014]

IBRA level Reservation Status

The IBRA reservation status analysis confirmed a generally strong association between communities classified as threatened and those that were classified as under-reserved. The analysis identified only 12 forest communities across all IBRAs that were classified as Not Threatened but Under-Reserved. These communities can be categorised as being either:

- requiring a contribution of full protection on PTPZ land in order to achieve their reservation target (Table 3.2); or
- requiring a partial contribution of protection on PTPZ land in order to achieve their reservation targets (Table 3.3).

Table 3.2 Bioregionally under-reserved forest communities that require full protection on PTPZ land [Knight 2014]

Forest Community	Region	Extent (ha)	Target (ha)	Reserved (ha)	Short (ha)	PTPZ (ha)	Management decision
***E. sieberi* forest on other substrates**	Northern Midlands	30	30	0	30	0	protect
***A. melanoxylon* on flats**	West	1,100	1,000	550	450	450	protect
***A. dealbata* forest**	Flinders	190	190	90	100	20	protect
	King	30	30	10	20	0	protect
	Northern Midlands	160	160	40	120	0	protect
	South East	1,900	1,000	760	240	190	protect
***E. amygdalina* forest on dolerite**	Flinders	5,000	1,000	410	590	30	protect
***E. pauciflora* forest on Jurassic dolerite**	Ben Lomond	1,700	1,000	430	570	610	protect
***E. pauciflora* forest on other substrates**	Central Highlands	1,600	1,000	90	910	0	protect

Table 3.3 Bioregionally under-reserved forest communities that require additional management [Knight (2014]

Forest Community	Region	Extent (ha)	Target (ha)	Reserved (ha)	Short (ha)	PTPZ (ha)	Management decision
***E. amygdalina* forest on dolerite**	Central Highlands	2,100	1,000	470	530	220	Protect where feasible up to target of 534 ha
***E. amygdalina* forest on mudstone**	Northern Slopes	3,808	1,000	668	332	886	Protect where feasible up to target of 534 ha
***A. melanoxylon* on rises**	King	4,680	1,000	874	126	2,214	Protect where feasible up to target of 534 ha

Management

A hierarchical approach to managing threatened and under-reserved communities will be adopted:

- All vegetation communities that are legislatively recognised as threatened will continue to be protected under the provisions of the Forest Practices System.
- Other forest vegetation communities that have been identified as threatened in the IBRA level analysis will be managed to maintain and/or enhance the vegetation community. Harvesting of these communities is prohibited, with the exception of areas that have already been silviculturally treated, and where it can be demonstrated that the threatened forest community will be maintained or enhanced by proposed harvesting operations.
- Other forest vegetation communities that have been identified as not threatened but under-reserved in the IBRA level analysis will be managed as per Table 3.2 and Table 3.3 in order to contribute to achieving their respective reservation targets.

These management prescriptions will be applied after coupe level field assessments confirm the respective community's existence.

HCV 3.2 Areas for conservation of important genes or genetically distinct populations

Methodology

There is some duplication between this value and other values in the HCV framework, and as a result, many areas that are likely to be important for conservation of genes or genetically distinct populations have already been identified. Specifically, this includes:

- Threatened species identified as being HCV 1.1; and
- Threatened vegetation communities identified in HCV 3.1

In addition to this, a genetic expert with specific Tasmanian experience was consulted to further elucidate areas that may meet this HCV criterion.

Results

Expert consultation confirmed that some genes and/or specific locations of the genus eucalyptus could be considered as meeting the criteria of this HCV value. The Eucalypt genus was deemed worthy for consideration for several reasons:

- Tasmania has been identified as a site of eucalypt super-endemism (González-Orozco et al. 2016);
- Eucalypts are generally the dominant species of most Tasmanian ecosystems;
- The genus is of global interest due to widespread use in forestry; and
- The genus has been well studied.

The main locations of rare species, hybrids or population outliers of each species of the genus *Eucalyptus* that occur in Tasmania were subsequently identified (

Table 3.4).

Table 3.4 Areas important for conservation of each species of Tasmanian eucalypt

Species	Special locations/ Comments	PTPZ land management implications
E. archerii	Projection Bluff	Not on PTPZ land
E. barberi	Pony bottom Creek (three fruited hybrid with *E. cordata*)	Not on PTPZ land
E. brookeriana	East coast version is a genetically distinct population to on west coast.	Community protected under RFA
E. coccifera	Glacial remnants exist in Eastern tiers	Not a commercial species and therefore highly unlikely to be affected by management activities
E. cordata	Any population is important. Eastern population in Wielangta hills. Mt Seymour contains *E. cordata/E. urnigeria* hybrids	Not a commercial species and therefore highly unlikely to be affected by management activities
E. delegatensis	No specific locations identified	
E. globulus:	West Coast, South west and Researche Bay populations genetically distinct from remaining population. Maintaining wild population genetics is important because it is one of the most important trees in the world from a forestry perspective.	Identified important locations not on PTPZ land. Other populations on PTPZ land. Genetic conservation addressed through management prescriptions for swift parrot feeding habitat.
E. gunnii	Subspecies *divaricata* is threatened. Populations at Snug Tiers, Eastern Tiers and Horse Shoe Marsh.	Exists on PTPZ land. Not a commercial species and therefore highly unlikely to be affected by management activities
E. johnstonni ***E. subcrenulata*** ***E. vernicosa***	Areas where these species exist as an intergrading continuum, on mountains extending above tree line.	May occur on PTPZ land. Only lower end of integration areas are used for timber production.
E. morrisbyi	Very rare. Only two locations. (South Arm)	Not on PTPZ land
E. nebulosa	Recently described from Serpentine soil in North West.	Not on PTPZ land
E. obliqua	No specific locations identified	
E. ovata	Special population at Woods Lake and at Dukes Marsh Potential for Gene flow issue with *E. nitens* plantation	Community protected under RFA Gene flow managed through plantation location rules of Forest Practices system.
E. pauciflora	Any low altitude population	Community protected under RFA
E. perriniana	Any location	Not a commercial species and therefore highly unlikely to be

Species	Special locations/ Comments	PTPZ land management implications
	Gene flow issue with *E. nitens.*	affected by management activities Gene flow managed through plantation location rules of Forest Practices system.
E. pulchella	No specific areas identified	
E. radiata	Tasmanian population is subspecies of mainland species	Not a commercial species and therefore highly unlikely to be affected by management activities Largely reserved
E. regnans	No specific locations identified	Existing conservative management objectives of Sustainable Timber Tasmania seed zone system supports maintenance of phylogeographic structure of full population (Neville 2011).
E. risdonii	Only two locations. Eastern Shore of Hobart. Very rare.	Not on PTPZ land
E. rodwayii	Far north west and Eastern tiers are genetically distinct to central plateau.	Not a commercial species and therefore highly unlikely to be affected by management activities
E. rubida	Population near Lake Echo features juvenile foliage, and tends towards E. Cordata	Not a commercial species and therefore highly unlikely to be affected by management activities
E. tenuramis	Alma Tier peppermint (*E. coccifera* hybrid) Outlying populations at Recherche Bay and on Tasman Peninsula	RFA protected community Not a commercial species and therefore highly unlikely to be affected by management activities
E. urnigeria	Outlying populations on Bruny Island and Tasman Peninsula	Not a commercial species and therefore highly unlikely to be affected by management activities
E. viminalis	A Subspecies *hentiensis* exists on the West Coast	Population is reserved

Management

The vast majority of the significant eucalypt locations identified are either not on PTPZ land, in Sustainable Timber Tasmania reserves and/or highly unlikely to be affected by Sustainable Timber Tasmania management activities due to their non-commercial nature.

All known locations of special eucalypt sites are recorded in the Natural Values Atlas and will be systematically identified during any operational planning that takes place nearby. Appropriate management prescriptions for each value and location will be developed on a case by case basis.

Where identified areas or populations are subjected to forest operations, harvested areas will be regenerated with a eucalypt seed mix that reflects the species on the harvested area

and is sourced from the local area in accordance with seed zoning rules outlined in the Eucalypt seed and sowing Native Forest Technical Bulletin.

Areas containing *E. ovata* and *E. perriniana* communities, which are subject to gene flow risk from *E. nitens* will be managed so that existing plantations have appropriate separation distance from wild populations in accordance with the Forest Practices System Flora Technical Note 12.

HCV 3.3 Old growth forest

Guidance

Annex G of the Australian FSC standard provides the following definition:

'Old-growth forest': *Ecologically mature forest where the effects of disturbances are now negligible.*

Note that this is the same definition as that used during the Regional Forest Agreement old growth mapping process.

Annexe G also provides the following guidance on old growth forest:

Identification and assessment of HCV 3.3 should include considerations of:

- *The degree to which it is rare and/or threatened at a global, national or regional level;*
- *Its distinctiveness in terms of size and quality (including stand structural characteristics and ecological functions) in a landscape level context; and*
- *Geographic range.*

Determining these shall be based on assessments by government agencies, peer reviewed literature, or assessments by recognised experts, and be considered at the landscape level.

It is important to note that the presence of HCV 3.3 old-growth forest in the management unit does not necessarily exclude harvesting. It is the responsibility of The Organisation to demonstrate that its status at a landscape level will be maintained and not threatened as a result of management activities.

Methodology

This analysis comprised three components, being:

- the identification of old growth vegetation communities that are already recognised as threatened in the Tasmanian context,
- a bioregional analysis of old growth forest community conservation status to determine threatened or depleted communities
- a bioregional analysis of old growth forest community reservation status to determine poorly reserved communities.

A bioregional analysis was undertaken as this is the assessment scale that is recommended in Annex G of the Australian FSC standard. The two bioregional analyses (b and c) were undertaken concurrently.

Old growth communities recognised as threatened in the Tasmanian context.

There is one statutory mechanism for old growth threatened community identification in the Tasmanian context. Attachment 6 of the Tasmanian Regional Forest Agreement describes

the forest communities (including old growth components) that will be protected on Public Land wherever prudent and feasible.

Bioregional analysis of Old growth forest community threat and reservation status

To determine the IBRA region conservation and reservation status of Tasmanian old growth forest communities, STT engaged Natural Resources Planning Pty Ltd (NRP) to conduct an independent analysis. The analysis was conducted in conjunction with the broader forest community analysis conducted for HCV 3.1. NRP's analysis and results are fully described in the Regional Ecosystem Model report (Knight 2014), and a summary of the analysis is provided below:

- **The analysis was conducted at the Interim Biogeographic Regionalisation for Australia (IBRA) level**. There are nine IBRA 5 bioregions in Tasmania (Figure 3.1). In the Tasmanian context, IBRA 5 is effectively identical to the more recent IBRA 7 map.

- **The analysis used STT's old growth GIS layer**. This layer was developed during the Regional Forest Agreement process and has been kept updated by STT. NRP also reviewed the layer with these records prior to incorporating the layer into the REM. This is the best available information on old growth in the Tasmanian context.

- Regional Forest Agreement forest community types were used to define vegetation communities in the analysis. There are 51 forest communities identified by the Regional Forest Agreement.

- **The spatial extent of vegetation communities was based on Tasveg 2.0**. Tasveg is a comprehensive digital map of Tasmania's vegetation that is maintained by DPIPWE. NRP further updated this mapping where better information was available.

- The pre-European extent of each old growth forest community was determined using data developed during the Regional Forest Agreement. This data was further updated by NRP where better information was available.

- **The analysis recognised the challenges of identifying 'old growth forest' for some forest communities**. All native conifer communities (Pencil pine, King Billy pine) were deemed to be old growth. *Allocasuarina*, *Banksia*, *Callitris* and *Notelaea* dominated communities do not have recognisable old growth stages, so the study for the RFA from which the current assessment draws considerable data, relied on identifying undisturbed patches of these communities. For *Leptospermum*/*Melaleuca* swamp forest and *Acacia melanoxylon* on flats, expert opinion was used *to identify t*he *least* di*sturbed* and oldest examples of these communities. For *Acacia dealbata* and *Acacia melanoxylon* on rises, a local reference panel advised that these communities were temporal and constitute an early successional phase reflecting disturbance. As such, these communities were excluded from further consideration in the old growth assessment. This approach was agreed during the original Regional Forest Agreement old growth mapping.

- **The analysis was tenure-blind.** Analysis of the conservation and reservation status of each community was conducted for all land within the IBRA region.

- The conservation and reservation status classification was based on the Nationally Agreed criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for forests in Australia (JANIS 1997) The JANIS criteria provide definitions for old growth ecosystem conservation status categories and set associated reservation targets. The classification criteria (Table 3.5) are

based on the respective old growth community's extant area and its abundance relative to the total community area.

- **The GIS layer of PTPZ land used in the analysis contained an interim area.** This file was provided to NRP in 2013 when there was uncertainty surrounding the exact boundary of PTPZ land. The extent of PTPZ land has been subsequently finalised since NPM completed the analysis.

- **Calculated areas of each forest community are indicative. Data accuracy issues associated** with Best Available Information vegetation mapping and the interim PTPZ land GIS layer result in calculated areas not being exact. However, it is assumed that the data is appropriate for determining threat and reservation status at the IBRA level scale. The interim PTPZ land area used does not affect the bioregional vegetation community conservation assessment which was undertaken at a State-wide level. The indicative presence of all threatened forest communities is confirmed by field checking during operational planning.

Table 3.5 Summary of JANIS conservation status criteria and reservation targets of old growth components of RFA forest communities as applied in the Regional Ecosystem Model

Conservation status	Conservation Status Description	Rule sets for classification within REM	Reservation Target
Rare and Depleted	Meeting both the rare and depleted criteria.	Meeting both the rare and depleted criteria.	100% of present extent.
Depleted	Where the proportion of a forest community which is old growth is around 10% of the total community area.	The proportion of a forest community which is old growth is around 10% of the total community area.	100% of present extent.
Rare	A rare ecosystem is one where its geographic distribution involves a total range of generally less than 10,000 ha, a total area of generally less than 1000 ha or patch sizes of generally less than 100 ha, where such patches do not aggregate to significant areas. This criterion is to be applied within a bioregional context having cognisance of distribution in adjoining bioregions. It should be noted that rarity is a naturally occurring phenomenon that does not necessarily imply that the ecosystem is under immediate threat.	Having an extent < 1000 ha.	100% of present extent.
Not Threatened	Ecosystems that do not fall into the above categories.	Not depleted or rare	60% of present extent.

Results

For a full summary of reservation and conservation status of each old growth forest community by IBRA region, including a list of those legislatively recognised as threatened, see Appendix 4.

The results confirmed that a significant proportion of forest in Tasmania meets the definition of old growth forest (Figure 3.4) The analysis identified that of the 3.5 million ha of forest mapped in Tasmania, approximately 35% (1.3 million ha) is classified as old growth. A

relatively small proportion of old growth forest, approximately 8% (98,000 ha), occurs on PTPZ land.

Conservation Status

The vast majority of legislatively recognised threatened forest old growth communities were also identified by the IBRA analysis as being threatened, confirming that the process used in the IBRA analysis was sound.

The IBRA level analysis of old growth forest communities showed that of the 1.3 million ha of old growth forest in Tasmania, approximately 6% (74,000 ha) met the JANIS criteria of a threatened old growth community (Figure 3.3). Less than 10% of this area (6,700 ha) identified as threatened is on PTPZ land.

When compared to the entire State, the relatively small proportion of threatened old growth forest communities on PTPZ land reflects the history of forest reservation in Tasmania, where threatened communities were previously identified and reserved, often in tenures not subject to forest operations.

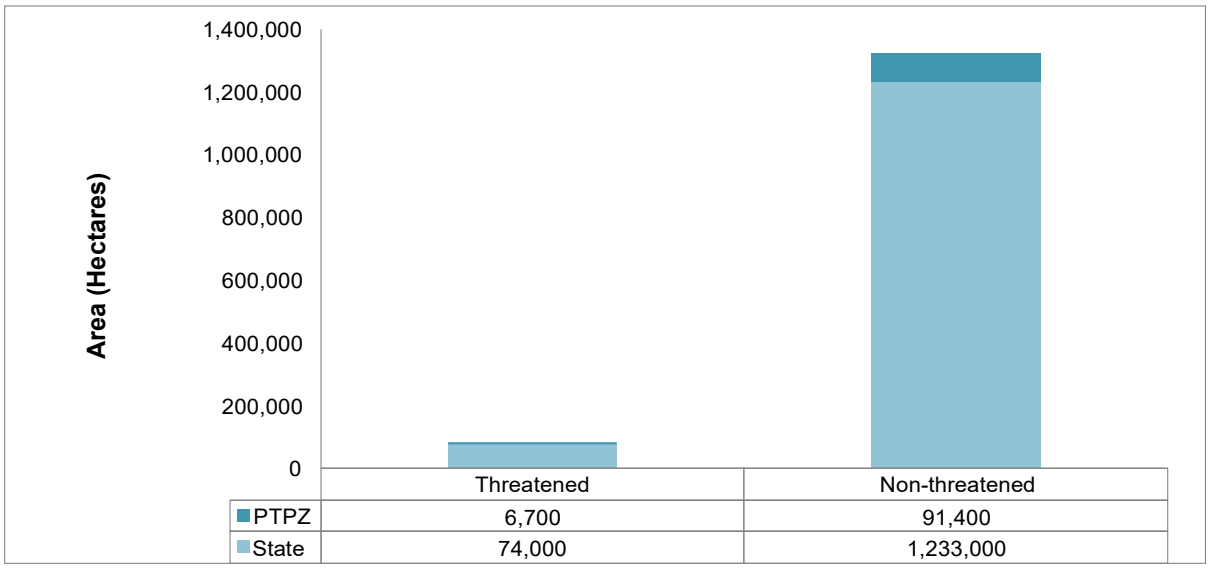


Figure 3.3 Old growth forest conservation status in Tasmania [Knight 2014]

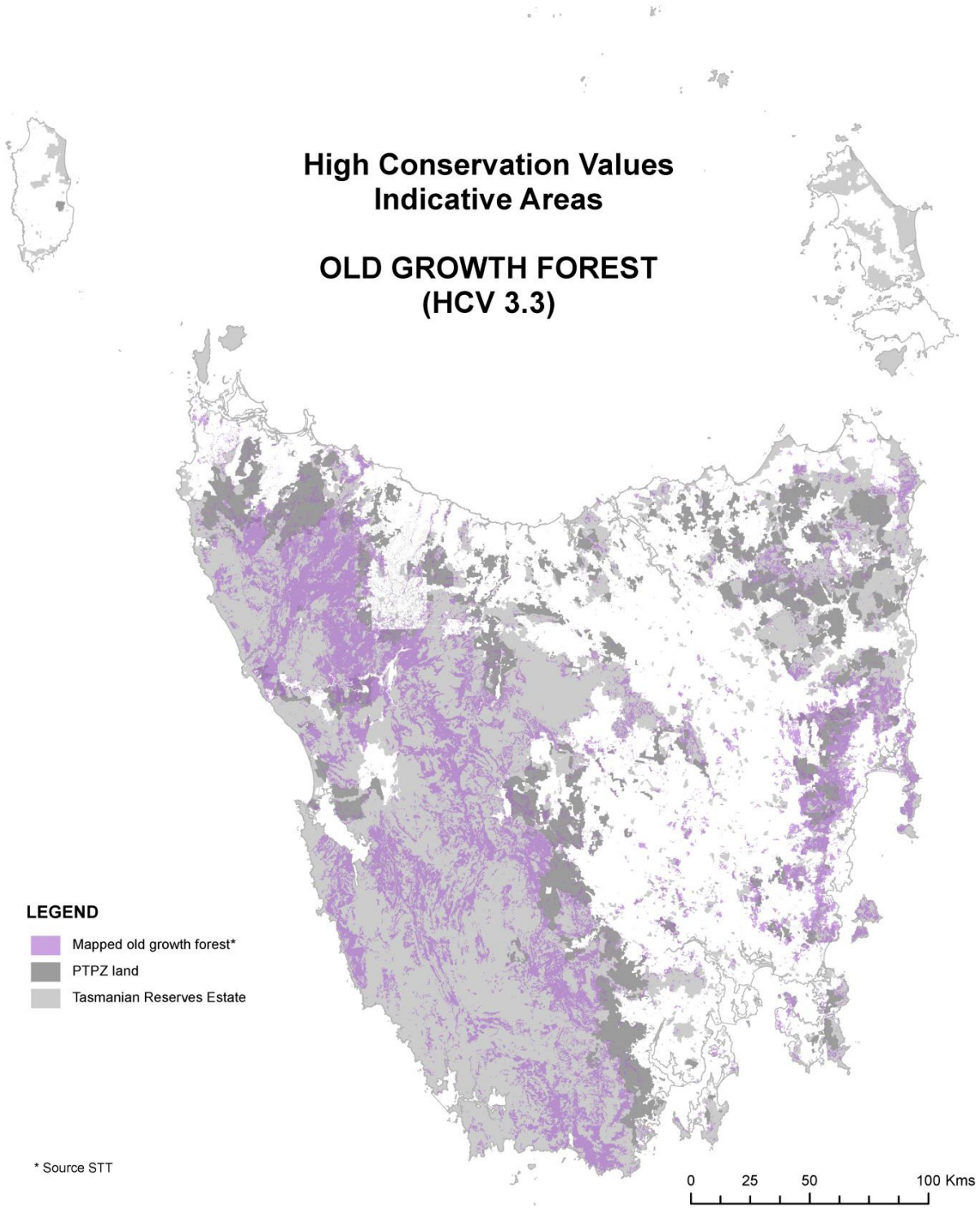


Figure 3.4 Old growth forest in Tasmania

IBRA level Reservation Status

The IBRA reservation status analysis confirmed a generally strong association between old growth forest communities classified as threatened and those that were classified as under-reserved. The analysis identified only 7 old growth forest communities across all IBRAs that were classified as Not Threatened but Under-Reserved. These communities can be categorised as being either:

- requiring a contribution of full protection on PTPZ land in order to achieve their reservation target (Table 3.6); or
- requiring a partial contribution of protection on PTPZ land in order to achieve their reservation targets (Table 3.7).

Table 3.6 Regionally significant old growth forest communities that require protection [Knight 2014]

Old Growth Forest community	Region (ha)	Extent (ha)	Target (ha)	Reserved (ha)	Short (ha)	PTPZ (ha)	Management decision
E. amygdalina forest on mudstone	South East	1,800	1,100	800	280	0	protect
E. nitida dry forest	King	4,900	2,900	2,300	630	340	protect

Table 3.7 Regionally significant old growth forest communities that require additional management [Knight 2014]

Old Growth Forest community	Region (ha)	Extent (ha)	Target (ha)	Reserved (ha)	Short (ha)	PTPZ (ha)	Management decision
E. obliqua tall forest	King	6,700	4,000	3,300	690	3,400	Identify a further 690 ha for reservation
E. delegatensis tall forest	Ben Lomond	7,900	4,800	4,200	580	2,000	Identify a further 580 ha for reservation
Thamnic rainforest on less fertile sites	King	6,800	4,100	2,900	1,200	3,900	Identify a further 1200 ha for reservation
E. obliqua dry forest	King	2,100	1,300	900	370	380	Identify a further 370 ha for reservation
E. delegatensis dry forest	South East	17,900	10,800	9,800	960	4,600	Identify a further 960 ha for reservation

Management

The majority of old growth forest in Tasmania is either reserved or excluded from production. Analysis identified that approximately 1.1 million ha (87%) of old growth forest in Tasmania is reserved. On PTPZ land, a further 25,000 ha (1.9%) is presently excluded from production due to operational constraints, leaving 34800 ha (2.6%) available for the production and supply of the high quality sawlogs and special timbers (Figure 3.5).

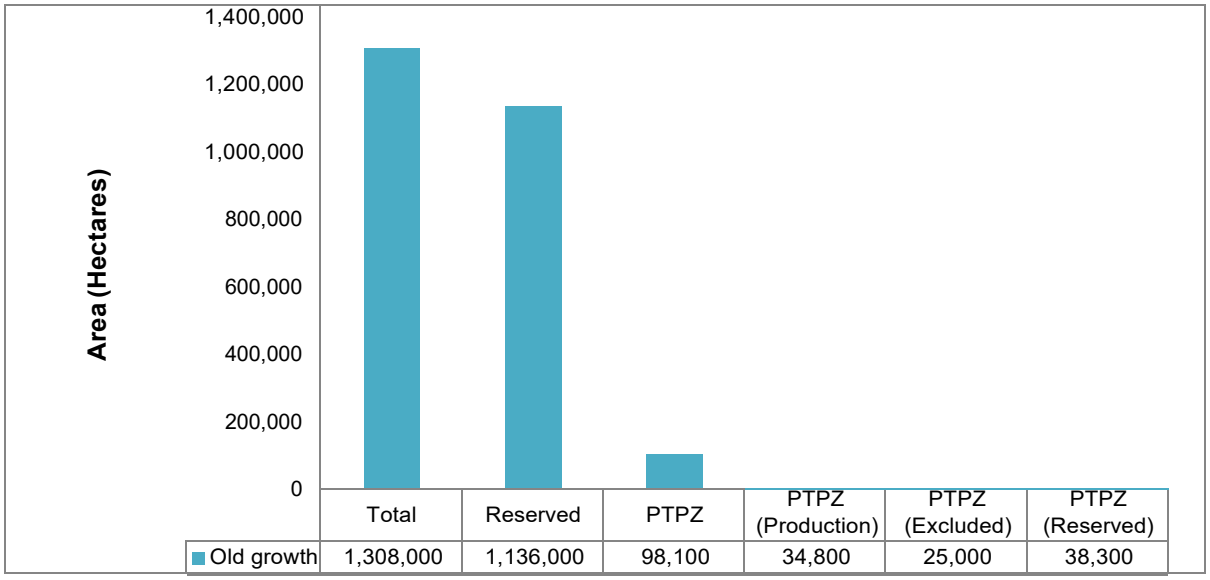


Figure 3.5 Old growth forest reservation status in Tasmania [Knight 2014]

A hierarchical approach to managing old growth forest communities in production areas will be adopted:

- Old growth forest that consists of forest communities that have been identified as threatened or under reserved will be managed in accordance with the prescriptions for vegetation communities outlined in HCV 3.1.

- All old growth forest communities that are recognised as RFA priority communities will continue to be protected under the provisions of the Forest Practices System.

- Other old growth forest vegetation communities that have been identified as threatened in the IBRA level analysis will be managed to maintain and/or enhance the old growth vegetation community. Harvesting of these communities is prohibited, with the exception of areas that have already been silviculturally treated, and where it can be demonstrated that the threatened old growth forest community will be maintained or enhanced by proposed harvesting operations.

- Other old growth forest vegetation communities that have been identified as not threatened but under-reserved in the IBRA level analysis will be managed as per tables 3.6 and 3.7 in order to contribute to achieving their respective reservation targets.

- Old growth forest on PTPZ land, regardless of conservation or reservation status, will be managed with the objective of maintaining old growth forest within the Tasmanian forest landscape. This will be achieved through:

- Partial harvesting of Coupes Containing Old Growth to minimise disturbance and retain old growth elements within the forest landscape. The term Coupe Containing Old Growth refers to coupes that have greater than 25% component. This threshold is used to distinguish significant patches of old growth forest from smaller patches scattered throughout non-old growth forest.

- Protection of giant trees in accordance Sustainable Timber Tasmania's giant tree policy; and

- Implementation of the *Forest Practices Code* provisions for mature habitat management.

These management prescriptions will be applied after coupe level field assessments confirm the respective community's existence.

HCV 3.4 a Remnant vegetation in heavily cleared landscapes

Methodology

There are several definitions of remnant vegetation that have been developed for the Tasmanian context (Biodiversity Review Panel 2008; Forest Practices Authority 2005; Kitchener and Harris 2013). The definitions are generally similar in defining remnants but differ in their emphasis on size, context and distance from larger tracts or other remnants. Kitchener and Harris (2013) define remnant vegetation as:

> *"The native vegetation remaining from the 'original' forest or non-forest vegetation in a landscape after land clearance/alteration. A native vegetation remnant can be of any size or condition, but excludes modified forest, modified non-forest or paddock trees"*

The Biodiversity Review Panel (2008) has a similar definition but incorporates a minimum remnant size threshold of 1 ha. The definition also clarifies that the context of the remnant in relation to the presence of other surrounding vegetation affects the value of the remnant.

The Forest Practices Authority (2005) defines remnants as being:

> *"[...] separated by more than 2 kilometres from the closest area of native [vegetation] that exceeds 20 ha in area."*

None of the definitions provide guidance on an upper size threshold for remnants. However, Knight (2014) used a size threshold of 200 ha, which was based on categorisations conducted during the Regional Forest Agreement.

The above definitions were used to develop a rule set (Table 3.8) that could be used to conduct a spatial analysis of the existence of remnants on PTPZ land. The rule set was then applied to the TASVEG 3.0 GIS layer (Department of Primary Industries, Parks, Water and Environment 2013b), which provides the most up to date spatial information on the extent and location of native vegetation in Tasmania.

Table 3.8 Rule set used for the GIS spatial analysis of remnant vegetation on PTPZ land

Remnant characteristic	Rule adopted
Minimum size	1 ha
Maximum size	200 ha
Separation distance from larger native vegetation tracts	Greater than 2km from a tract greater than 20 ha

Results

The GIS analysis did not identify any patches of native vegetation that intersected PTPZ land and met the Tasmanian definitions of remnant vegetation in heavily cleared landscapes.

This result is expected given that PTPZ land largely consists of native vegetation. Furthermore, areas of concentrated non-native vegetation (e.g. plantations) on PTPZ land have been established with consideration towards maintaining connectivity links between nearby retained native vegetation areas.

The result is also consistent with the Tasmanian Public Land Use Commission (1997a), where identified remnant areas were largely located on heavily cleared agricultural land.

Management

Analysis did not identify any areas of PTPZ land that met the Tasmanian definition of remnant vegetation. However, the Forest Practices System requires that all native forest areas being planned for harvesting be assessed for the existence of remnant vegetation. Where field surveys confirm that remnants exist, Sustainable Timber Tasmania will implement management actions to avoid potential or indirect negative disturbances. In developing management actions, Sustainable Timber Tasmania will liaise with the biodiversity experts at the Forest Practices Authority.

HCV 3.4b Mature forest in degraded landscapes.

Guidance

Annexe G of the Australian FSC Standard provides the following definitions relating to this HCV value:

Mature forest: *"forests that contain overstorey trees typically greater than 100 years old and beginning to develop structural features typically found in older forests, including large spreading crowns, tree hollows and stages of senescence"*

Mature forest in degraded landscapes*: "A forest area containing mature forest where mature forest is rare in the surrounding landscape and/or is reduced in extent such that it is inadequate in maintaining landscape or ecological functions. Thresholds for determining rareness and degradation shall be based on assessments by government agencies, peer reviewed literature, or assessments by recognised experts, and be considered at the landscape* level."*

Methodology

The best available information on mature forest locations in Tasmania is the Forest Practices Authority's Mature Habitat Availability Map, Figure 3.6 (FPA, 2016).This map, which is based on up-to-date photo interpretation and forest change data across public and private land, categorises areas based on the density of mature eucalypt crown cover and the presence of senescent trees (Table 3.9).

Table 3.9 Mature Habitat availability classes used in the FPA's Mature Habitat Availability Map (FPA, 2016)

Mature habitat availability class	Mature eucalypt crown cover	Senescence
High	>40%	Unknown or >nil
Medium	20-40%	Unknown or >nil
Low	1-20%	All categories
Negligible	0%	All categories
All categories	Areas that currently are or historically were comprised of native vegetation types without a substantial eucalypt component.	

Identifying areas of mature forest that best reflect the definition of HCV 3.4b required a methodology that assessed the extent and quality of mature habitat in the context of the broader landscape. The analysis methodology used is described below:

- The unit of analysis was the forest block. The whole of Tasmania is divided into 233 forest blocks, with the majority of blocks varying from 5,000 ha to 50,000 ha in size. Forest blocks are separated by a range of natural and artificial boundaries, such as watersheds, rivers, coastlines, roads and other administrative boundaries (Refer

appendix 5). A forest block scale analysis was used because it represents an optimal geographical unit for mid-scale biodiversity planning and tactical wood planning (Koch and Chuter 2012), and has been deemed as the most appropriate scale for assessing landscape scale/ecosystem function processes, such as ecosystem diversity, forest fragmentation and catchment level processes.

- The assessment used the photo interpretation data that formed the basis for the development of the Mature Habitat Availability Layer. The photo interpretation data includes information on the presence and density of mature eucalypt crowns.
- The assessment has been carried out in the context of the public land estate only. That is, forest on PTPZ land as well as forest on tenures such as National Parks and other conservation areas have been included. Forest on private land has not been considered because PI data is insufficient and landholder future management intentions are largely unknown. Given that mature forest is likely to be present in private land, this represents a conservative approach.
- For each block, the extent of all mapped mature habitat as a proportion of total public land forest cover (including native forest and plantations) was determined.
- For each block, the extent of eucalypt crown density that is considered high or medium classed mature habitat availability (Table 3.9) as a proportion of total public land forest cover was determined. This figure provided a surrogate for the quality of the existing mature habitat.
- Each forest block was assigned to a *Mature Habitat contest category* based on the extent and quality metrics described above (table 3.10).

Table 3.10 Mature Habitat Context categories

<table>
<tr><td></td><td colspan="4">Mature Habitat Quality
(% of public forest* comprising native forest with >20% mature eucalypt crown cover)</td></tr>
<tr><td>Mature Habitat Extent
(% of public forest* with any mature eucalypt crown cover)</td><td><10%</td><td>10-20%</td><td>20-30%</td><td>>30%</td></tr>
<tr><td><20%</td><td>VERY LOW (HCV3.4b)</td><td></td><td></td><td></td></tr>
<tr><td>20-30%</td><td colspan="2">LOW (HCV 3.4b)</td><td></td><td></td></tr>
<tr><td>30-40%</td><td colspan="3" rowspan="3">MEDIUM</td><td></td></tr>
<tr><td>40-50%</td><td rowspan="2">HIGH</td></tr>
<tr><td>>50%</td></tr>
</table>

Results

The results verified that a significant proportion of forest in Tasmania meets the definition of mature habitat (Figure 3.6). The analysis identified that of the 3.5 million ha of forest mapped in Tasmania, approximately 53% (1.9 million ha) contain varying levels of mature habitat availability (Figure 3.8). Approximately 16% (304,700 ha) of the current extent of mature habitat in Tasmania occurs on PTPZ land.

With respect to the forest block scale analysis, the proportion of public forest cover comprising mature habitat was highly variable. This is to be expected as there is significant variation in the intensity and frequency of the natural and human disturbance patterns that influence mature habitat presence across the State. Several forest blocks fall into the low or very low mature habitat context category (Figure 3.7). This may have arisen from natural or human influences, or a combination of both. It could be argued that only those blocks that have low context category due to human disturbances have been degraded. However, STT has taken a precautionary approach and identified any block as having a low or very low mature habitat context category as meeting the HCV3.4b definition.

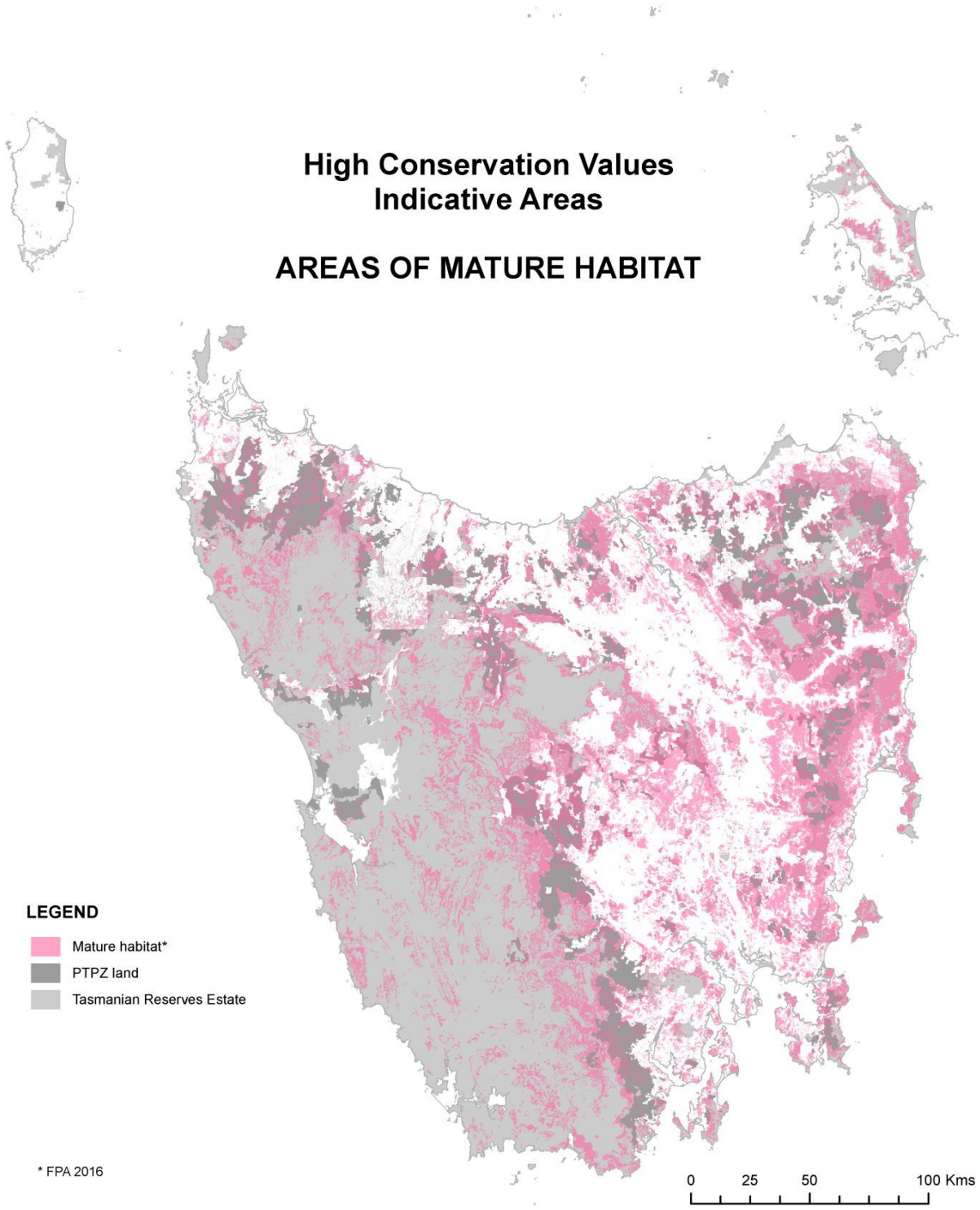


Figure 3.6 Areas of Mature Habitat

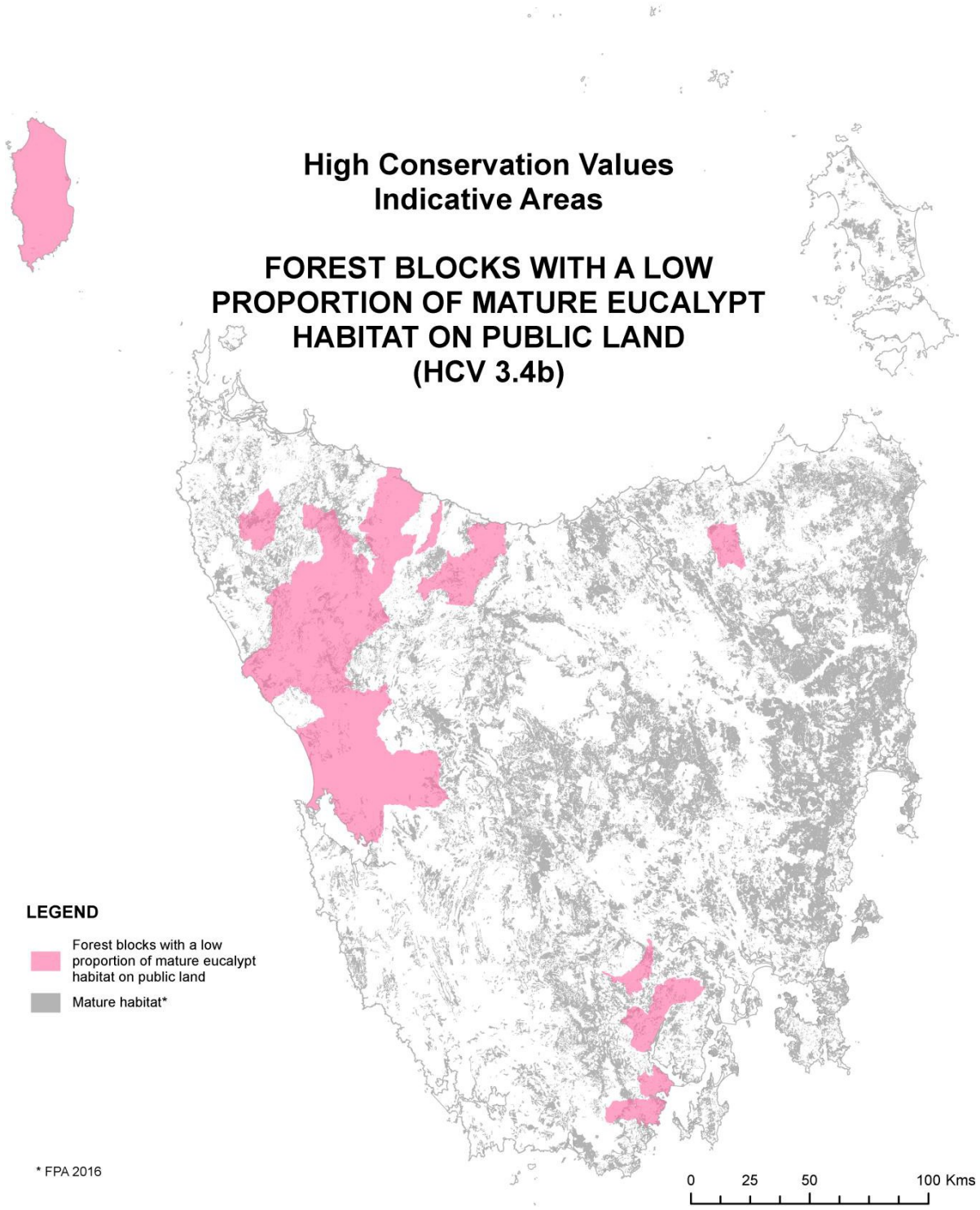


Figure 3.7 Forest blocks with a low level Mature habitat context category

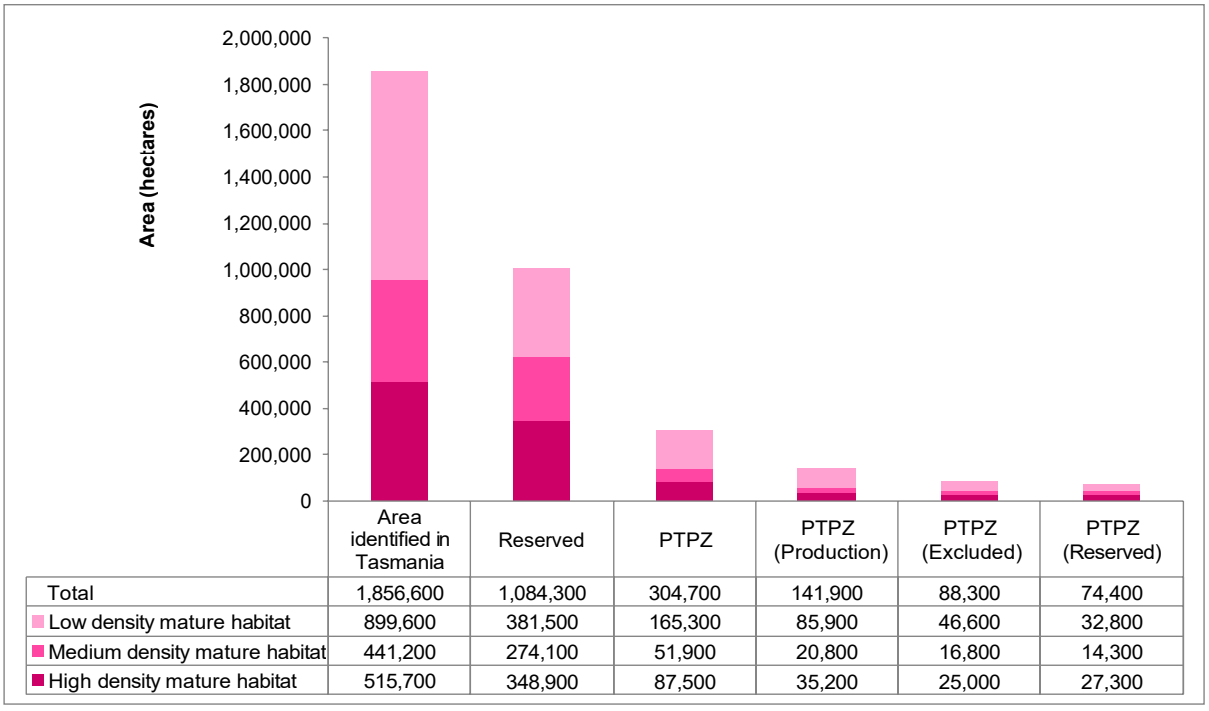
Management

The management of the mature forest that meets the HCV3.4b definition needs to be put into the context of the broader approach to mature forest management.

The majority of areas with mature habitat in Tasmania are either reserved or excluded from wood production (Figure 3.8). Analysis identified that just over 1M ha (54%) of mature habitat in Tasmania occurs within CAR reserves, including reserves on PTPZ land. On PTPZ land, a further 87,500 ha (5% of all mature forest) is also generally excluded from wood production due to operational constraints Only 8% (141,900 ha) of the mapped area of mature forest is available for the production and supply of high quality sawlogs.

In addition to the CAR reserve system, STT several mechanisms in place to maintain mature forest in the landscape. These include:

- prescriptions for old growth management, which are a significant subset of mature forest, (refer HCV 3.3);
- specific management prescriptions for mature forest dependant threatened species, such as swift parrot and masked owl (refer HCV 1.1); and
- Contextual management of mature forest (discussed below).



	Area identified in Tasmania	Reserved	PTPZ	PTPZ (Production)	PTPZ (Excluded)	PTPZ (Reserved)
Total	1,856,600	1,084,300	304,700	141,900	88,300	74,400
Low density mature habitat	899,600	381,500	165,300	85,900	46,600	32,800
Medium density mature habitat	441,200	274,100	51,900	20,800	16,800	14,300
High density mature habitat	515,700	348,900	87,500	35,200	25,000	27,300

Figure 3.8 Summary of Mature habitat in Tasmania by public land management status

Context based Management

Maintaining sufficient mature forest in proximity to harvested areas allows many mature forest dependent species to persist and recolonise harvested areas (Baker *et al.* 2013). A recent study in Tasmanian wet eucalypt forests found many mature forest dependent species recolonised and persisted in harvested areas in landscapes when at least 15% of the local landscape (at the 1 km scale) was mature (Wardlaw *et al.* 2018). In recognition of this research, STT has developed management objectives to maintain/and or enhance mature forest habitat at both the forest block and coupe scales.

Forest block scale mature habitat management objective

The block scale mature habitat management objective aims to both recruit and maintain appropriate levels of mature habitat. The objective sets mature habitat maintenance thresholds and forest retention targets based on the mature habitat context category of the respective block (Table 3.11). The block scale mature habitat management objective has been pragmatically set to provide a risk based approach to mature habitat management in a wood production landscape. It should be noted that in many blocks, the configuration of existing reserves and proposed management activities will result in significantly higher mature forest retention levels than the minimum target.

Table 3.11 Mature habitat management objective for PTPZ land at a forest block scale.

Mature habitat context category	Thresholds for maintenance of 2017 extent of mature habitat on public land	Targets of PTPZ forest in reserves, long term retention or exclusion zones
VERY LOW (HCV3.4b)	>= 90%	>= 30%
LOW (HCV3.4b)	>= 80%	>= 30%
MEDIUM	>= 65%	>= 20%
HIGH	>= 50%	>= 20%

With respect to the forest blocks where mature forest meets the definition of HCV 3.4b, a minimum of 80% of the mature habitat as mapped in 2017 will be retained. Future recruitment of mature habitat in these areas will be facilitated by requiring a minimum 30% of the block being allocated to long term retention areas. Over time, these reserves and retained areas will develop mature forest characteristics and thereby provide for the restoration of mature habitat.

Coupe scale long term retention objective

The long-term retention objective, applied at a local landscape scale, aims to provide for the maintenance and future recruitment of mature habitat immediately adjacent to and within the local surrounds of a forest operation. This objective sets a target to retain for the long term (in reserves or for at least 100 years) at least 20% of the public natural forest within a 1 km radius surrounding the centre of each native forest coupe harvested by clearfell or aggregated retention. STT recognises that it may not be possible to achieve this target in all cases due to previous land use decisions and configurations, and aims to meet this target for at least 90 per cent of coupes harvested annually.

STT has had the coupe scale retention target in place since 2014.

HCV 4 - Critical ecosystem services

Guidance

The full description of this HCV is:

Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

Annexe G of the FSC Australia Forest Stewardship Standard provides the following specific guidance on this HCV:

*"HCV 4 is focused on basic ecosystem services in **critical situations**. Substantial alteration of these forests is likely to result in an unacceptable impact on the delivery of ecosystem services."*

Values to be assessed for HCV 4:

- *HCV 4.1: Areas that provide protection from flooding*
- *HCV 4.2 Areas that provide protection from erosion.*
- *HCV 4.3 Areas that provide barriers to the spread of destructive fires*
- *HCV 4.4 Areas that provide clean water catchments.*

HCV 4 Definitions

***'Critical situations':** An ecosystem service is considered to be 'critical' where a disruption of that service is likely to cause, or poses a threat of, severe negative impacts on the welfare, health or survival of local communities, on the environment, on High Conservation Values, or on the functioning of significant infrastructure (roads, dams, buildings, etc.). The notion of criticality here refers to the importance and risk for natural resources and environmental and socioeconomic values.*

General approach to analysing HCV 4

Each HCV 4 value was evaluated separately, as they are very different. The details of each value analysis are found in the sub-sections below.

The analysis of HCV 4 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

HCV 4.1 Forest that provide protection from flooding

Methodology

Sustainable Timber Tasmania engaged a hydrologist to assist in the analysis of the presence of this value. The consultant's report (Roberts, 2014):

- lists locations in Tasmania where flooding has the potential to damage infrastructure according to the Department of Primary Industries, Parks, Water and Environment (DPIPWE);
- assesses the area of PTPZ land occurring in the catchments of each of these locations;

- reviews literature on the levels of harvesting that are generally required to exacerbate flooding;
- reaches conclusions about the likely effects, if any, of harvesting on flooding at the listed locations based on the proportion of the catchment that is PTPZ; and
- provides a detailed study of harvesting levels in the most vulnerable identified catchment.

Results

The literature review identified that there is a general scientific consensus that forests provide flood protection at a local level (<10 km^2) during small to moderate rainfall events (Burton, 1997; Alila et al., 2009). However, there is little evidence to suggest that this protection extends to the regional level during severe meteorological events. Bosch and Hewlett (1982) studied 94 catchment experiments and concluded that the presence or absence of forest did not appreciably influence the magnitude of the largest flow events. During major rainfall events, the amount, intensity and extent of rainfall combined with catchment and river morphology are by far the greatest determinants of the amount of flooding downstream. Forests cannot stop catastrophic large scale floods commonly caused by severe meteorological events (FAO and CIFOR, 2005).

The Department of Primary Industries Water and Environment (DPIPWE) have identified 12 floodplains in Tasmania where there is significant risk of economic loss or loss of life from flooding (Table 4.1). The catchments of these floodplains are the likely locations of forests that prevent flooding in critical situations if they were to exist.

Table 4.1 Floodplains identified as significant risks (Source: DPIPWE)

Location	Total Catchment Area (km^2)	Catchment Area on PTPZ land (%)
Derwent River through New Norfolk	789	16
Tamar and North Esk Rivers	1,064	24
Huon River at Huonville	2,462	13
Huon Catchment at Mountain River		0
South Esk River at Longford	7,435	12
Jordan River below Pontville		0
Mersey River at Latrobe	1,700	18
Bagdad Rivulet		0
Elizabeth River at Campbell Town	405	9
Macquarie River at Ross	1,542	7
Coal River at Richmond	538	3
Meander River at Deloraine	384	5

Roberts (2014) provided a conservative estimation that flood protection from forests could be diminished if more than 20% of the area of a catchment of a defined floodplain was harvested within a 5 year period. The proportion of PTPZ land in the catchments of concern are unlikely to result in this threshold being realised (Table 4.1). Furthermore, assessment of forest age classes and planned management regimes on PTPZ land in the catchment with the largest proportion of PTPZ land area (Tamar and North Esk Rivers) confirmed that regenerating (i.e. less than five years) forest cover was likely to comprise 3% of the catchment at any one time.

Based on the Roberts (2014) analysis, it was concluded that:

- Factors such as rainfall amount, and catchment and stream morphology are more likely to influence extreme flooding events than the extent of forest cover; and
- The area of PTPZ land and associated management regimes are highly unlikely to result in alterations to age class structures that may influence the ability of forests to provide protection from flooding.

No areas that meet the HCV 4 criteria for protection from floods in critical situations have therefore been identified on PTPZ land.

Management

As no HCV4.1 values have been identified within Tasmania, no specific management prescriptions have been identified.

HCV 4.2 Areas that provide protection from erosion

Methodology

Analysis of existing soil management guidelines and expert consultation were used to assess this value.

Results

There are several landforms in Tasmania that have been identified as posing a significant erosion risk if site disturbance activities are managed inappropriately (Table 4.2). These landforms can occur on PTPZ land and are confirmed during operational planning.

Table 4.2 Landforms posing significant erosion risk if managed inappropriately.

Landform at risk of erosion	Guidance for minimising erosion risks
Class 4 streams with visible erosion features	Guidelines for the Protection of Class 4 streams
Karst features	Forest Sinkhole Manual
Coastal dune systems near Strahan	Prescriptions and guidelines for sustainable harvest of plantations on high and very high erodibility west coast dunesands
Moderately or highly erosive soils on steep slopes	Forest Practices Code specifies machinery use restrictions and road/snig track design to minimise risks.

Management

The Forest Practices System recognises the risks of conducting forest operations on or near the significant erosion risk landforms. Management guidelines have therefore been developed to minimise potential adverse effects (Table 4.2), and are incorporated into operational planning documentation.

It should be noted that the existing management prescriptions for these landforms and for soil and water values in general has generally resulted in minimal erosion where these risks occur. Based on existing management arrangements, it is unlikely that disruption to the ecosystem service of erosion prevention on these landforms will reach the critical situation level required to trigger consideration as HCV 4.2.

HCV 4.3 Areas that provide barriers to the spread of destructive fires.

Methodology

This analysis was undertaken in two parts:

- Analysing the flammability of Tasmanian vegetation communities; and
- Analysing State Fire Management Council Fire Protection Plans in order to identify areas that are a priority for fire mitigation treatment.

Vegetation flammability analysis

This analysis was based on the work of Pyrke and Marsden-Smedley (2005): *Fire-attributes categories, fire sensitivity, and flammability of Tasmanian vegetation communities.* The work associated with this paper allocated flammability and fire sensitivity ratings to each Tasmanian vegetation type. Flammability was assigned based on expert general knowledge of the dynamics of fuel dryness for each vegetation type, but also on published research for buttongrass moorland.

Priority fire mitigation areas

This analysis relied on the extensive work carried out by the State Fire Management Council (SFMC 2014) and Fire Area Management Committees to identify and prioritise bushfire risks in the landscape and strategically identify work that can be done to mitigate that risk.

Fire Protection Plans have been prepared for each of the ten fire management areas in Tasmania in accordance with the requirements of the Fire Service Act 1979. These plans were developed for the first time in 2014 in a collaborative effort by members of Fire Management Area Committees made up of local stakeholders. The objective of the Fire Protection Plans are to effectively manage bushfire related risk within the respective Fire Management Area in order to protect people, assets and other things valuable to the community. This information has been considered by fire management experts as the best available information on fire risk and behaviour in the landscape.

Results

Vegetation flammability

The flammability of Tasmanian vegetation at any time is influenced by factors such as vegetation type and age, time since last fire, topography, soil dryness and weather conditions (Table 4.3). Many of Tasmania's vegetation communities are actually dependent upon fire in order to maintain ecological processes, and the long-established fire environment has ensured that every vegetation type is highly likely to eventually burn (Tony Mount 2017, pers. comm.).

There are some vegetation communities that are naturally lower in flammability than other vegetation types. However, there is no guarantee that low flammability vegetation will not burn under extreme conditions. In addition, the spatial arrangement of the areas containing these vegetation types may not be relevant to the prevention of fires that will potentially cause significant environmental, social or economic damage. No specific vegetation types have therefore been identified as being capable of providing barriers to the spread of destructive fires. The consideration of spatial location is however incorporated into the priority fire mitigation area analysis

Priority fire mitigation areas

The ***SFMC Fire Protection Plans*** document the areas identified during the strategic assessment process as being high risk and having a priority for mitigation actions (Figure 4.1). The Fire Protection Plans further identify areas that are of potential strategic importance for bushfire risk mitigation.

The identification of areas and communities at risk from bushfire together with the identification of areas of potential strategic value for undertaking risk mitigation activities was undertaken without regard to land tenure/ownership. In taking this approach, Fire Management Area Committees have recognised that strategic fuel management needs to occur across public and private property boundaries in order to be effective. Many of these areas are therefore located on or within the vicinity of PTPZ land.

Mitigation activities to reduce the risk of fire for the identified risk areas are outlined in the respective Fire Protection Plans and include:

- Fuel Reduction burning
- Fire trail and fire break construction/maintenance
- Mechanical fuel reduction through slashing, trittering or mulching
- Community education
- Other prescribed activities specific to community needs

Many of these management activities create barriers to the spread of destructive fire as per the HCV 4.3 criteria. However, ongoing treatment must be implemented to maintain their effectiveness. That is, without maintenance these areas would not provide barriers to destructive fire.

Management

As alluded to earlier, management of bushfire risk requires a cross-tenure approach by multiple stakeholders to be effective. Fire Management Area Committees, of which STT is key contributor, have been established to facilitate this approach and to prioritise and implement mitigation works across the respective management areas.

STT will continue to contribute to mitigation activities that aim to reduce the impact of wildfire on people, assets and other important values to the community. Areas that are or have been subject to mitigation works are also considered during harvest planning processes, with the aim of maintaining appropriate mitigation effectiveness during and after harvesting activities.

Further information on bushfire prevention and mitigation activities in Tasmania can be found at the State Fire Management Council Website.

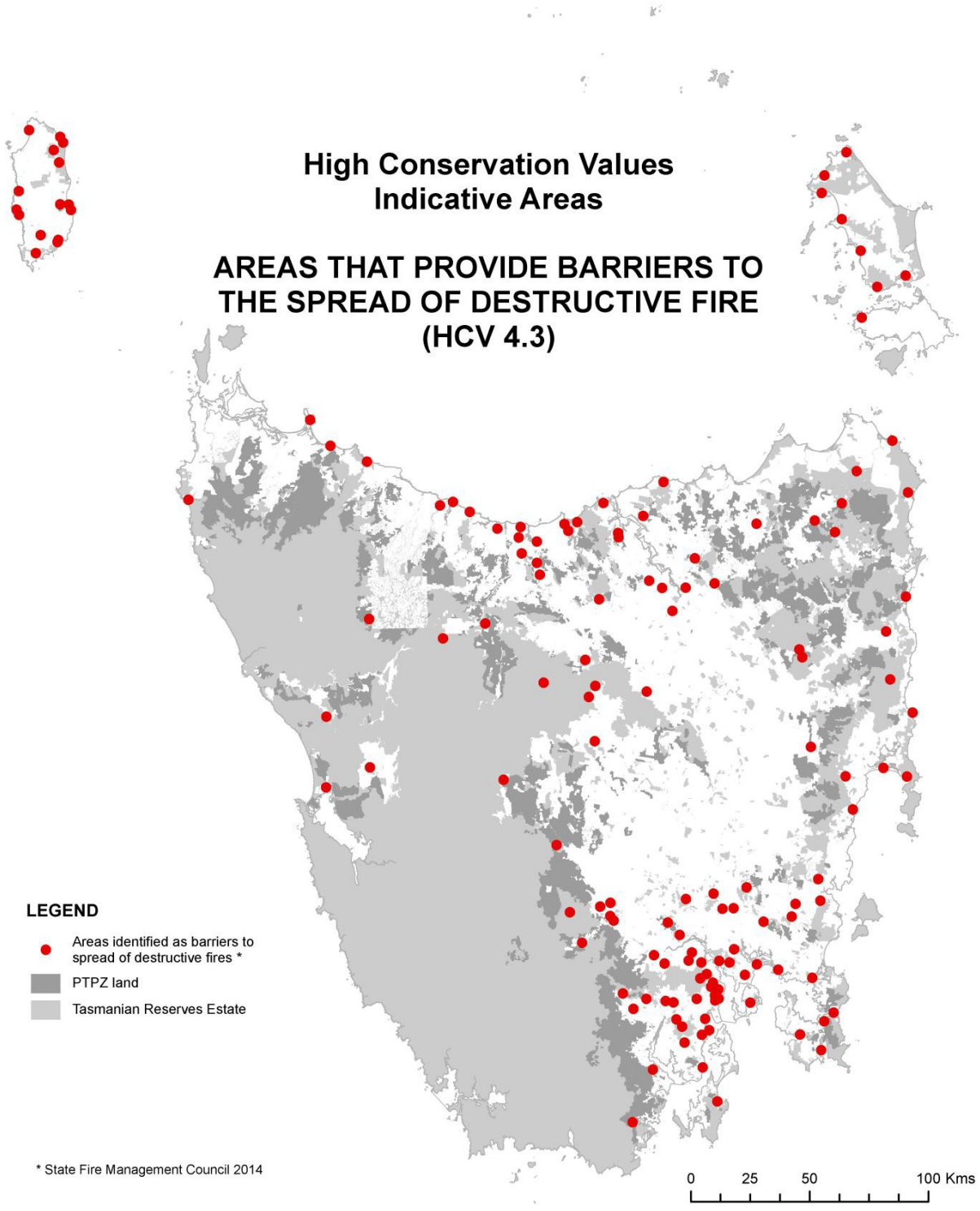


Figure 4.1 Areas identified as having potential strategic importance for bushfire risk mitigation

Table 4.3 Flammability classification of Tasmanian vegetation (source: Pyrke and Marsden-Smedley (2005)

Flammability	Description	Vegetation Types
Very high	Will burn readily throughout the year even under mild weather conditions, except after recent rain (i.e. less than 2–7 days ago).	Buttongrass moorland; flammable weeds and bracken; heathland
High	Will burn readily when fuels are dry enough but will be too moist to burn for lengthy periods, particularly in winter. Fuels will be dry enough to burn on most days from late spring to early autumn.	Alpine and subalpine sedgy and grassy; dry sclerophyll; dry sclerophyll woodland; dry scrub and coastal scrub; native grassland; wet scrub
Moderate*	Extended periods without rain (i.e. two weeks at least) and/or moderate or stronger winds are required for these communities to burn	Agricultural land and miscellaneous types; alpine and sub alpine heathland with conifers and/or deciduous beech2 alpine and subalpine heathland without conifers or deciduous beech1 damp sclerophyll forest; mixed forest; plantation; wet sclerophyll forest; wet sclerophyll woodland
Low*	These communities will burn only after extended drought (i.e. four weeks without rain) and/or under severe fire weather conditions (i.e. forest fire danger rating > 40).	Alpine and subalpine heathland with conifers and/or deciduous beech rainforest with conifers and/or deciduous beech; rainforest without conifers or deciduous beech; sphagnum; swamp and wetland

*recently burnt stands of low or moderate flammability classes may have a higher flammability rating

HCV 4.4 Areas that provide clean water catchments

Methodology

This analysis aimed to objectively identify the existing water catchment types that would be classified as HCV 4. It did this by:

- Identifying the main uses of water catchments in Tasmania, and identifying which of these require clean water.
- Aligning these water uses with the definition of “critical situations” provided in Annexe G of the FSC Australia Forest Stewardship Standard.
- Assessing the scale of the impact arising from a significant disruption of the supply of the respective water uses.

- Assessing the likelihood that the water use will be affected by a significant or permanent removal of forest cover.
- Making an overall assessment on whether the water use is an ecosystem service HCV based on the above information.

The methodology has attempted to achieve the intent of the Australian HCV framework of identifying critical situation 'thresholds', which are the situations at which the ecosystem service may be considered as HCV. However, the guidance provided on what constitutes this HCV is opaque and has required considerable interpretation. As a result, the outcome of this analysis has been subjective. It is important to note however, that water values on the PTPZ land are managed consistently regardless of HCV status.

Results

The catchments of many Tasmanian rivers and streams are utilised as water sources for a variety of anthropogenic uses and as such they can be considered to be providing an ecosystem service (Table 4.4 Main uses of water and their proposed HCV status.

Catchment use	Potential Critical situation	Require clean water	Scale of impact	Likelihood of unacceptable impact with substantial forest alteration	HCV
Hydroelectricity	significant infrastructure	No	Widespread	Low - Catchments are generally large.	No
Town water supplies (including drinking water)	**welfare, health or survival of local communities**	**Yes**	**Local communities and larger towns.**	**Low - large catchments.** **Medium or high for smaller catchments**	**Yes**
Individual domestic intakes (including drinking water)	Critical source for remote locations.	Yes	Isolated properties only	Low - can be replaced by tank water.	No
Irrigation for agriculture	Significant infrastructure. Maintain viable agricultural land for commercial purposes	No	Nearby farms	Low	No
Environmental flows	Protection of threatened aquatic species	No	Downstream of alteration	Low	No

).

Of the identified uses, only catchments for town water supplies have been identified as meeting the HCV criteria. Other catchment uses are excluded from HCV consideration because they either do not require treatment for human consumption (i.e. 'clean water') or would have only minor magnitude and/or isolated impact if a disruption to the service occurred.

Town water catchments comprise a significant proportion of Tasmanian land and the majority of PTPZ land falls within town water catchments (Figure 4.2).

Table 4.4 Main uses of water and their proposed HCV status.

Catchment use	Potential Critical situation	Require clean water	Scale of impact	Likelihood of unacceptable impact with substantial forest alteration	HCV
Hydroelectricity	significant infrastructure	No	Widespread	Low - Catchments are generally large.	No
Town water supplies (including drinking water)	**welfare, health or survival of local communities**	**Yes**	**Local communities and larger towns.**	**Low - large catchments.** **Medium or high for smaller catchments**	**Yes**
Individual domestic intakes (including drinking water)	Critical source for remote locations.	Yes	Isolated properties only	Low - can be replaced by tank water.	No
Irrigation for agriculture	Significant infrastructure. Maintain viable agricultural land for commercial purposes	No	Nearby farms	Low	No
Environmental flows	Protection of threatened aquatic species	No	Downstream of alteration	Low	No

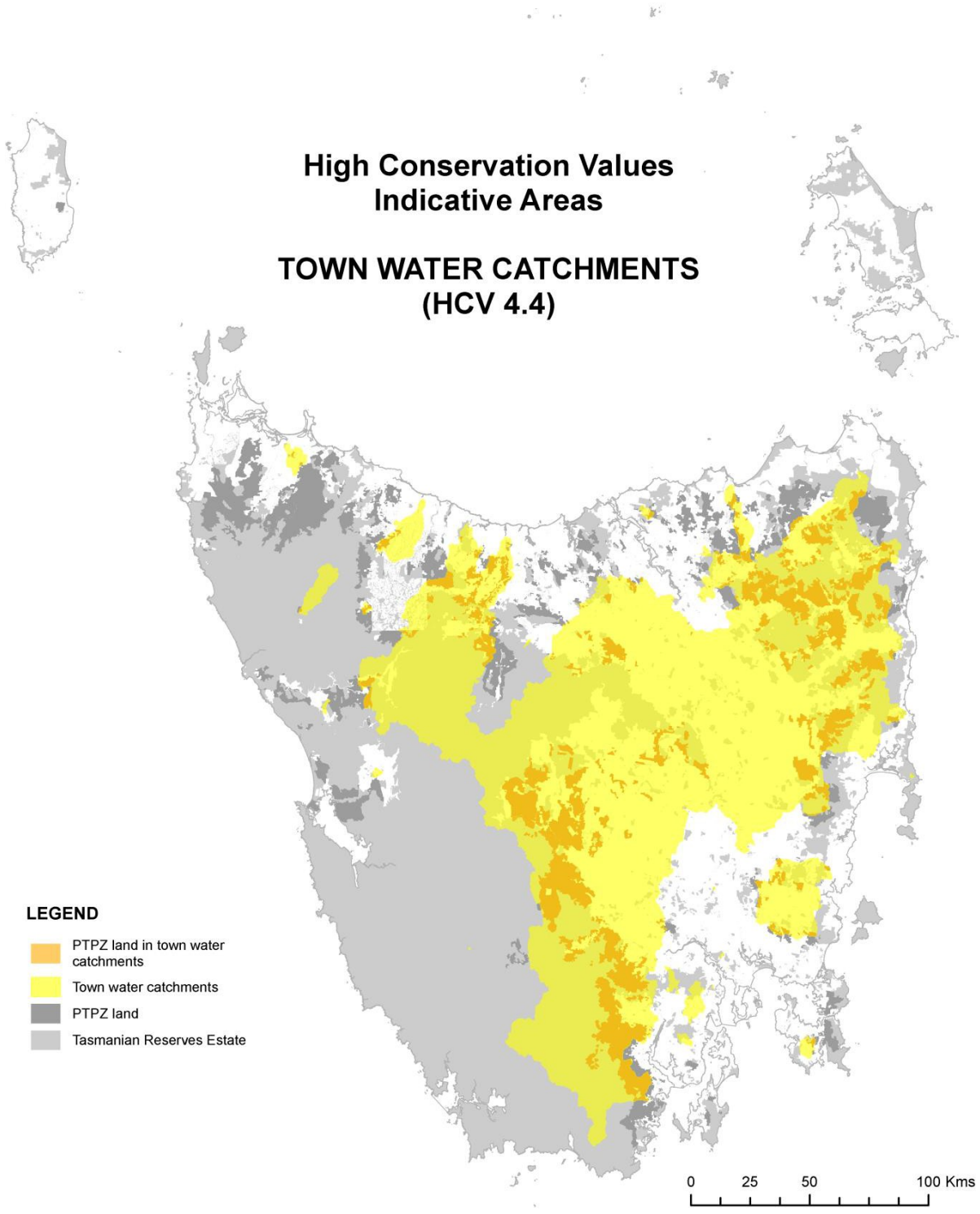


Figure 4.2 Tasmanian Town Water catchments and PTPZ land

Management

Sustainable Timber Tasmania manages operations in town water catchment areas by abiding by the Code of Forest Practice, and through cooperation with TasWater, the organisation responsible for the provision of town water in Tasmania.

The process of water provision involves collecting water in catchment areas, treating to meet the health-based Australian Drinking Water Quality Guidelines, and piping to storage areas such as reservoir storage. The water is then distributed to customers through a reticulated network of underground pipes and pump stations.

TasWater conducts a rigorous water quality testing program for each of its managed water catchments. Full details of the sampling program and data and results can be located on TasWater's website. Generally, supplied water is of high quality but there are several catchments where water supply is sub standard. TasWater notifies affected residents appropriately and continues to invest in water infrastructure with the objective of all customers receiving safe drinking water that meets Australian standards.

It is well known that irresponsible land or chemical use can potentially affect water quality. However, TasWater have informed STT that the communication mechanisms between the two organisations, and operational prescriptions employed within town water catchments, are generally sufficient to appropriately manage drinking water inputs from PTPZ land.

The key consultation between Sustainable Timber Tasmania and TasWater is an annual briefing on Sustainable Timber Tasmania's rolling Three Year Wood Production Plan. This provides for the identification of any potential forthcoming issues, enables further negotiations, and the subsequent development of management prescriptions during operational planning. If requested, Sustainable Timber Tasmania also notifies TasWater of the commencement of harvesting operations in town water catchments so that TasWater can monitor and respond to any unusual fluctuations in quality and quantity.

Sustainable Timber Tasmania applies a comprehensive range of on-ground management strategies aimed at maintaining water quality, including but not limited to:

- Maintenance of 40% of PTPZ land for reservation or non production purposes;
- Protection of soil and water values through implementation of Forest Practices Code provisions for:
- all harvesting operations;
- road construction ; and
- post-operational landing and snig track restoration works.
- Implementation of additional Forest Practices Code restrictions on operations within town water catchments
- Consultation with the FPA soil and water specialist to confirm that identified management prescriptions are appropriate for maintaining the soil and water values. Hydrocarbon management, including storage and emergency spills procedures;
- Implementation of strict chemical management and spraying protocols.
- Regular monitoring during and after operations to confirm soil and water values are being managed appropriately.

Further information on Sustainable Timber Tasmania's management of water and soil values can be found in Sustainable Timber Tasmania's Forest Management Plan.

HCV 5 - Community needs

Guidance

The full description of this HCV is:

Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).

Annexe G of the FSC Australia Forest Stewardship Standard provides the following guidance on this HCV:

A site or resource is fundamental for satisfying basic needs if the services it provides are irreplaceable (i.e., if alternatives are not readily accessible or affordable), and if its loss or damage would cause serious suffering to affected stakeholders. HCV 5 is most likely to be more important in areas where whole communities or significant portions of them are heavily dependent on those ecosystems for their livelihoods, and where there is limited availability of alternatives. In general, if local people are dependent on Indigenous or traditionally managed ecosystems, HCV 5 may be present.

The values to be assessed for HCV 5 are:

- *HCV 5.1 Unique/main sources of water fundamental for drinking and other daily use*
- *HCV 5.2 Unique/main sources of water fundamental for the irrigation of subsistence food crops.*
- *HCV 5.3 Food and medicines fundamental for local traditional Indigenous uses*

HCV 5 Definitions:

'Basic human needs': *Local people use the area to obtain resources on which they are critically dependent. Potential fundamental basic needs include, but are not limited to: unique sources of water for drinking and other daily uses; food, medicine, fuel, building and craft resources; the production of food crops and subsistence cash crops; protection of "agricultural" plots against adverse microclimate, and traditional farming practices.*

'Fundamental': *Loss of the resources from this area would have a significant impact in the supply of the resource and decrease local community well-being.*

Methodology

The analysis of HCV 5 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

The presence of this HCV was assessed by:

- Summarising the lifestyles of those people who live in Tasmania and near PTPZ land;
- Documenting the use and availability of potential HCV 5 resources in the Tasmanian context; and
- Additional review of other published guidance relating to HCV 5.

Note that to avoid duplication, the eligibility for water values to be considered as HCV is only considered under HCV 4.

Results

The following observations are made regarding the Tasmanian social and economic context:

- Tasmania is a First World mixed economy where basic goods and services are readily available and affordable. The population is supported by extensive social welfare and health services, with dwellings generally connected to well-developed communication, utility and transport infrastructure.
- The majority of the population live in townships and built-up areas that are not adjacent to PTPZ land. There is also a significant rural population that live on privately held land that in some cases borders PTPZ land.
- The Indigenous population are generally integrated within the general community.
- Subsistence-based lifestyles generally do not exist.

The resources that are potential HCV 5s in the Tasmanian context are identified in Table 5.1. When examining the context of each resource's respective presence, use and/or availability, it is difficult to classify any of them as HCV 5.

The indicative finding that no HCV 5s are present in the Tasmanian context is supported by other HCV literature. *The Common Guidance for the identification of HCVs* provides the following indicators of a high likelihood of HCV 5 in an area:

- Access to health centres or hospitals is difficult,
- Most houses are built from, and household tools made from, locally available traditional/natural materials,
- There is little or no water and electricity infrastructure
- People have a low capacity to accumulate wealth (i.e. living "day to day")
- Farming and livestock raising are done on a small or subsistence scale
- Indigenous hunter-gatherers are present
- There is presence of permanent or nomadic pastoralists
- Hunting and/or fishing is an important source of protein and income.
- A wild food resource constitutes a significant part of the diet, either throughout the year or only during critical seasons

None of these indicators exist in the Tasmanian context.

The analysis concludes that HCV 5 does not exist in the Tasmanian context.

Management

As no HCV5 values have been identified within Tasmania, no specific management prescriptions have been identified.

Table 5.1 Comments on potential HCV 5 resources in the Tasmanian context

Resource/Basic Human need	Availability /use/Comments
Unique/main sources of water fundamental for drinking and other daily uses (HCV 5.1).	• This consideration is addressed in HCV 4.
Unique/main sources of water fundamental for the for irrigation of subsistence food crops (HCV 5.2)	• Subsistence based communities do not exist in Tasmania.
Meat (HCV 5.3)	• Meat products from non-PTPZ land sources are widely available. • Hunting on PTPZ land is generally recreational and therefore a discretionary source of meat. • Hunting is allowed on PTPZ land with appropriate permits.
Nectar for honey (HCV 5.3)	• This consideration is addressed in HCV 6.4 • Honey products from non-PTPZ land sources are widely available. • Production of honey on PTPZ land is largely commercial in nature and does not constitute a fundamental need. • Sustainable Timber Tasmania manages a permit system to allow honey production on PTPZ land.
Medicine (HCV 5.3)	• No significant medicinal products sourced from PTPZ land have been identified.
Production of food crops	• No food crop production exists on PTPZ land
Fuel for heating/ cooking	• Electricity/gas/firewood products from non-PTPZ land are widely available. • Sustainable Timber Tasmania manages a permit system to allow collection of firewood for domestic use.
Building and craft resources	• Harvesting of forest products from PTPZ land is subject to formal contracts, permits, or licences that are issued by Sustainable Timber Tasmania in accordance with the Forest Management Act 2013. These are commercial arrangements, and the rights are limited to explicit quantities, specifications, locations, and time periods. • The processed wood products sourced from PTPZ land are commercially available to the public. • Building materials from non-PTPZ land sources are abundant and are commercially available.
Subsistence cash crops	• Subsistence based lifestyles do not exist on PTPZ land.
Protection of agricultural crops	• No agricultural crops grown in Tasmania were identified that specifically require protection that would be provided by areas of PTPZ land
Traditional farming practices	• Prior to European settlement, Tasmanian Aborigines were nomadic and did not practice agriculture.

HCV 6 - Cultural values

Guidance

The full description of this HCV is:

Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples.

Appendix G of the Australian FSC Standard provides the following Guidance on HCV 6:

'Cultural significance': *This Annex has adopted the ICOMOS Burra Charter definition (ICOMOS 2000) of Cultural Significance which is recognised at all levels of government and in legislation in Australia:*

"Cultural significance' means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups."

Values to be assessed for HCV 6:

- HCV 6.1: Aesthetic values
- HCV 6.2: Historic values of Global or National cultural significance or archaeological significance
- HCV 6.3: Long Term Research Sites
- HCV 6.4: Social (including economic) values
- HCV 6.5: Spiritual and cultural values

General approach to analysing HCV 6

The analysis of HCV 6 was completely reviewed in response to FSC auditor and stakeholder comments on the 2014 version of Sustainable Timber Tasmania's HCV Assessment and Management Plan.

Many of the values that may constitute social values have already been identified as constituting other high conservation values. Specifically:

- Biodiversity values such as threatened species habitats and ecosystems (HCV 1 and 3)
- Landscape level forests (HCV 2)
- Water catchment values (HCV 4)

To avoid duplication, these values have not been further identified as specifically relating to HCV 6.

The general approach to identification of these values was to consult relevant databases and reports, and review existing processes that are presently used to identify and manage the relevant values.

HCV 6.1 Aesthetic Values

Methodology

This HCV was assessed by conducting a review of the relevant literature and consulting with ecological experts.

Results

A systematic strategic level assessment of the aesthetic and social values relating to forests in Tasmania was undertaken during the Regional Forest Agreement (Public Land Use Commission, 1997a). The work culminated in a list of places that were agreed as worthy of consideration to be listed on the Register of the National Estate. However, a review of the National Estate list confirms that the Forest Practices Authority's more recently developed visual analysis processes provide for a more comprehensive assessment of aesthetic values on PTPZ land. This is because the majority of the areas identified in the National Estate process are not located on PTPZ land.

The FPA visual analysis processes require identification and management of aesthetic values to be carried out during operational planning of individual coupes. The process is therefore more comprehensive and capable of identifying aesthetic values at a finer scale than the National Estate Register.

Management

Sustainable Timber Tasmania manages visual amenity to comply with *Forest Practices System* requirements. This is facilitated by implementing the Forest Practices System Manual for Landscape Management.

The Visual Management System, which was developed by visual management experts, provides a systematic framework for making an inventory and risk-based evaluation of visual resources in order to prioritise efforts in management of significant aesthetic values.

A brief summary of the identification system is provided below:

- The scenic quality of an area is assessed and recorded. The assessment is based on landscapes character types such as naturalness, scenic variety, distinctiveness, uniqueness and/or prominence.
- Public viewpoints are identified and recorded. The viewpoints are categorised into sensitivity classes that are based on the level and types of public exposure from those points.
- An assessment of the seen areas from the viewpoints is made.
- Computer software is employed to conduct for further visual modelling (including view shed analysis) that may identify other potential aesthetic values.
- The above information is used to determine the landscape priority zone and subsequent landscape management objective of each area. The landscape management objective recommends the degree to which alterations in the landscape may be visually evident to the casual observer.
- Prescriptions are developed that are sensitive to the landscape management objective which aim to reduce the impacts of forest operations on aesthetic values.

HCV 6.2 Historic values of Global, National or State cultural or archaeological significance

Methodology

There are several data sources that record the locations of significant historic sites in Tasmania. Best available information on historic values varied with the scale of assessment. The Globally significant historic or cultural values were assessed using the United Nation's World Heritage List. Nationally significant historic or cultural values were assessed using the Australian Heritage List and the Commonwealth Heritage List. These databases were accessed using the Australian Heritage Database. Values of State significance were assessed using the Tasmanian Heritage Register.

Another key source of data for the HCV assessment is the "Conserve" database, which is managed by STT for the Forest Practices Authority. This register records the locations of both Aboriginal and Historic Cultural Heritage values that have been identified through field assessments and a range of regional inventories. The register also contains the relevant records from the Tasmanian Aboriginal Heritage Register, which is maintained by Aboriginal Heritage Tasmania.

Results

Globally significant values

Three Tasmanian items are presently identified on the UNESCO World Heritage list as having outstanding Universal value:

- The Tasmanian Wilderness World Heritage Area (TWWHA);
- Australian Convict Sites (specifically: Port Arthur, Cascades, Darlington, Coal Mines and Estates); and
- Macquarie Island.

The only World Heritage Area that intersects with PTPZ land is the TWWHA. The total area of PTPZ land that is the TWWHA is 942.3 ha.

Nationally Significant Values

The National Heritage List identifies 13 sites in Tasmania that are of natural, historic and Indigenous places of outstanding significance to the nation. The list includes convict sites, some historical estates the Tasmanian Wilderness and the Western Tasmania Aboriginal Cultural Landscape. None of the sites identified are present on PTPZ land.

The Commonwealth Heritage Register lists 19 sites in Tasmania that are natural, Indigenous and historic heritage places owned or controlled by the Australian Government. These include places connected to defence, communications, customs and other government activities that also reflect Australia's development as a nation. None of the sites identified are located on PTPZ land.

Values of State significance

The Tasmanian Heritage Register presently contains approximately 10,000 listed sites. A spatial analysis identified that only four of these sites are present on PTPZ land. These are:

- Garibaldi Miners township
- Moorina Hydro-electricity Power Development

- Chatsworth Convict station (Perth Nursery)
- Clennett's Top Mill.

Aboriginal cultural heritage

Sites of Aboriginal cultural heritage are located across Tasmania, including PTPZ land. Sites can include stone artefacts, quarries, caves and rock shelters, stone arrangements, rock markings, modified trees, shell middens, burials and cultural landscapes. Within Tasmanian wood production forests, a large amount of tangible cultural heritage can be found; there are over 6600 recorded Aboriginal sites in forests, and new sites are continually being recorded (FPA 2015a). The existence and locations of many of these sites needs to remain confidential, and as such no specific detail on the locations of these sites is provided in this plan.

Historic cultural heritage

There are over 2500 recorded Historic Cultural Heritage sites in wood production forests (FPA 2015b) with over 1,100 sites recorded on PTPZ land. Examples include convict ruins, access routes, mine workings, timber harvesting infrastructure, settlements and dwellings. Some of these sites are quite dramatic in the surviving remains while others are barely visible in the undergrowth.

Management

PTPZ land occurs within the TWWHA because at the time of the 2013 minor boundary extension nomination there were a number of coupes subject to existing Forest Practices Plans. These were mostly 'transitional coupes' where it was understood they would be harvested. The transitional coupes have now been harvested in accordance with certified Forest Practices Plans and have been or will be regenerated. There are also a small number of plantation coupes in PTPZ land within the TWWHA. These plantation coupes require ongoing management, including thinning, and are expected to be harvested and regenerated to native forest. The existence of these coupes was explained in the documentation provided to the World Heritage Committee and noted in the report of the 2015 Reactive Monitoring Mission. Additional areas of PTPZ land were also retained in the TWWHA during the reservation process under the Tasmanian Forest Agreement Act 2013; these areas consist of standing forest. A minor area has been retained around road infrastructure on Mt Tim Shea. STT will work with the TWWHA manager to identify and develop strategies for managing any property boundary issues in accordance with the TWWHA Management Plan.

Where Sustainable Timber Tasmania operations are undertaken within the vicinity of the four identified Tasmanian Heritage register sites, they will be planned and conducted to avoid and minimise impacts on these areas. A review of the above information has confirmed that the significant sites that are relevant to PTPZ land and forest management are all captured in the Conserve historic sites database.

Sustainable Timber Tasmania manages cultural heritage in accordance with the *Historic Cultural Heritage Act 1995*. Compliance with the Act is incorporated into the Forest Practices System. The presence and significance of historic cultural heritage is assessed when planning forest operations. The assessment involves trained staff confirming the existence of already known sites and conducting surveys for unknown sites. The level of significance of the site is determined using expert advice and published reports. Prescriptions for management are developed in accordance with the Procedures for managing historic cultural heritage when preparing forest practices plans.

Sustainable Timber Tasmania manages Aboriginal heritage in accordance with the *Aboriginal Heritage Act 1975*, which includes legislative protection for all Aboriginal sites.

This is facilitated by implementing the Forest Practices System manual: Procedures for managing Aboriginal cultural heritage when preparing forest practices plans. When planning operations, archaeological surveys by trained assessors are also required where the likelihood of finding new sites is high.

Further information on Sustainable Timber Tasmania's approach to Aboriginal cultural site management and policies on allowing access to PTPZ land by Aboriginal people can be found in Sustainable Timber Tasmania's Forest Management Plan.

HCV 6.3 Long Term Research Sites

Methodology

The best available information on long term research sites on PTPZ land is STT's Forest Operations Database (FOD), which contains the spatial locations of known sites that are or have been used for research purposes.

Results

There are many sites within Tasmania and on PTPZ land that provide ongoing contributions to scientific knowledge. The most concentrated scientific research site on PTPZ land is the 19,500 ha Warra site in the Southern forests, which was established in 1995 to encourage long-term ecological research and monitoring in wet eucalypt forests in Tasmania. Since Warra was established more than 200 research projects have been undertaken at the site.

Management

The Warra site crosses land tenures. Part of the Warra site is within the Tasmanian Wilderness World Heritage Area, which is managed for conservation by DPIPWE while the remainder of the site is PTPZ land managed by Sustainable Timber Tasmania.

The Warra Research Site is managed and authorised by a Policy Committee, which is comprised of the Site's respective land managers and relevant research groups. Research at the site may involve silvicultural disturbance activities in order to investigate the ecology of the ecosystem in relation to forest management practices.

Warra continues to provide a significant source of knowledge the management of Tasmania's forests and is still actively used by the research community. Sustainable Timber Tasmania uses the results of research at Warra and its surrounds to improve its management practices across PTPZ land. More information on Warra can be found at the Australian Supersite Network website.

The locations of other known research sites are also checked during operational planning. Site specific management prescriptions are developed as appropriate.

HCV 6.4 Social (including economic) Values

Methodology

Many of the values identified in other parts of this HCV assessment plan could be considered to have social values. To avoid duplication, they have not been identified as having specific social values. However, further analysis of STT's planning systems and GIS databases identified some additional values considered during operational planning that have not yet been identified in this plan that may qualify as significant social values.

Results

The following values may be considered as meeting this HCV criteria:

- Recreational values such as the Tahune Airwalk site, Hollybank Forest Park, picnic areas, camping areas, walking and mountain biking tracks. Such sites may also have economic value by contributing to tourism activities. It should be noted that recent changes in land management responsibilities in Tasmania have resulted in a very small number of recreational sites now being located on PTPZ land.

- Giant Trees, which are individual trees that are sufficiently large to be considered as significant in their own right. These trees have been defined as being at least 85 meters tall or at least 280 cubic meters estimated stem volume.

- Leatherwood apiary resource, stands of the understorey leatherwood (*Eucryphia lucida*) provides a source of nectar unique to Tasmania that is used to produce a significant proportion of Tasmania's honey. The resource is also important as it sustains hives during winter periods when there is a scarcity of food for bees that also provide significant agricultural pollination services. A significant area of the leatherwood resource occurs on PTPZ land.

Management

A number of the remaining recreational sites on PTPZ land have been identified as important to local stakeholders. Sustainable Timber Tasmania will work with relevant stakeholders, including the Tasmanian Government on the ongoing care and maintenance of such sites.

Sustainable Timber Tasmania's Giant Tree Policy requires that all identified Giant Trees be protected. Sustainable Timber Tasmania implements this policy by actively searching for Giant Trees with LiDAR, and by protecting them from harvesting in reserves with boundaries at least 100 metres from the tree.

Sustainable Timber Tasmania provides access to the leatherwood resource to beekeepers under a license system and works actively with the peak apiary organisation to minimise the impact of forestry operations on the leatherwood resource. This approach is documented in planning guidelines and includes:

- the identification of apiary special management zones;

- liaison with beekeepers around planned harvesting operations;

- the exclusion of commercial leatherwood patches where possible; and

- the protection of leatherwood patches from fire.

HCV 6.5 Spiritual Values and Cultural values

Methodology

Many of the values that may constitute spiritual and Cultural values have already been identified as constituting other High Conservation Values. Specifically:

- HCV 1 and 3 Biodiversity values such as threatened species habitats and ecosystems

- HCV 2 Landscape level forests and other reserved areas

- HCV 6.1: Aesthetic values

- HCV 6.2: Historic values of Global or National cultural significance or archaeological significance

- HCV 6.4: Social (including economic) values

In the Tasmanian context, some stakeholders would perceive Aboriginal cultural heritage to be considered *spiritual values*. However, in accordance with the desires of Aboriginal Heritage Tasmania, these sites have been classified as *historic values* (HCV 6.2) in this plan.

To avoid duplication, these values have not been further identified as specifically relating to HCV 6.5.

No other HCV 6.5 values were identified during the consultation phase of the HCV plan development.

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Appendixes

Appendix 1. Threatened species relevant to PTPZ land

Tas status: x: extinct, e: endangered, v: vulnerable, r: rare. **Commonwealth status:** EN = Endangered, CR: Critically Endangered, VU: Vulnerable

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Limnodynastes peroni	Striped Marsh Frog	vertebrate	amphibian	e	
Litoria raniformis	Green and Gold Frog	vertebrate	amphibian	v	VU
Dasyurus viverrinus	Eastern Quoll	vertebrate	terrestrial mammal		VU
Dasyurus maculatus	Spotted-tailed quoll	vertebrate	terrestrial mammal	r	VU
Perameles gunnii	Eastern-barred Bandicoot	vertebrate	terrestrial mammal		VU
Pseudomys novaehollandiae	New Holland Mouse	vertebrate	terrestrial mammal	e	VU
Sarcophilus harrisii	Tasmanian devil	vertebrate	terrestrial mammal	e	EN
Vombatus ursinus	Common Wombat (Bass Strait)	vertebrate	terrestrial mammal		VU
Acanthiza pusilla archibaldi	Brown Thornbill (King Island)	vertebrate	terrestrial non-coastal bird	e	EN
Acanthornis magna greeniana	Scrubtit (King Island)	vertebrate	terrestrial non-coastal bird	e	CR
Accipiter novaehollandiae	Grey Goshawk	vertebrate	terrestrial non-coastal bird	e	
Aquila audax fleayi	Wedge-tailed Eagle	vertebrate	terrestrial non-coastal bird	e	EN
Ceyx azureus diemenensis	Tasmanian Azure Kingfisher	vertebrate	terrestrial non-coastal bird	e	EN
Haliaeetus leucogaster	White-bellied Sea-Eagle	vertebrate	terrestrial non-coastal bird	v	
Lathamus discolor	swift parrot	vertebrate	terrestrial non-coastal bird	e	EN

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Neophema chrysogaster	Orange-bellied parrot	vertebrate	terrestrial non-coastal bird	e	CR
Pardalotus quadragintus	Forty-spotted Pardalote	vertebrate	terrestrial non-coastal bird	e	EN
Platycercus caledonicus brownii	King Island Green Rosella	vertebrate	terrestrial non-coastal bird	v	VU
Tyto novaehollandiae castanops	masked owl	vertebrate	terrestrial non-coastal bird	e	VU
Pseudemoia pagenstecheri	Tussock Skink	vertebrate	terrestrial reptile	v	
Pseudemoia rawlinsoni	Glossy Grass Skink	vertebrate	terrestrial reptile	r	
Phylloglossum drummondii	pygmy clubmoss	Invertebrate	annual fern	r	-
Castiarina insculpta	Miena Jewel Beetle	Invertebrate	beetles or weevil	e	
Catadromus lacordairei	Green-lined Ground Beetle	Invertebrate	beetles or weevil	v	
Enchymus sp.nov.	Weldborough Forest Weevil	Invertebrate	beetles or weevil	r	
Goedetrechus mendumae	Blind Cave Beetle	Invertebrate	beetles or weevil	v	
Goedetrechus parallelus	Slender Cave Beetle (Junee-Florentine)	Invertebrate	beetles or weevil	v	
Hoplogonus bornemisszai	Bornemissza's Stag Beetle	Invertebrate	beetles or weevil	e	CR
Hoplogonus simsoni	Simson's Stag Beetle	Invertebrate	beetles or weevil	v	VU
Hoplogonus vanderschoori	Vanderschoor's Stag Beetle	Invertebrate	beetles or weevil	v	VU
Idacarabus cordicollis	Cave Beetle (Hastings Cave)	Invertebrate	beetles or weevil	r	
Idacarabus troglodytes	Ida Bay Cave Beetle	Invertebrate	beetles or weevil	r	

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Lissotes latidens	Broad-toothed Stag Beetle	Invertebrate	beetles or weevil	e	EN
Lissotes menalcas	Mt. Mangana Stag Beetle	Invertebrate	beetles or weevil	r	
Tasmanotrechus cockerilli	Cave Beetle (Mole Creek)	Invertebrate	beetles or weevil	r	
Engaeus granulatus	Central North Burrowing Crayfish	Invertebrate	burrowing crayfish	e	EN
Engaeus martigener	Furneaux Burrowing Crayfish	Invertebrate	burrowing crayfish	v	EN
Engaeus orramakunna	Mt. Arthur Burrowing Crayfish	Invertebrate	burrowing crayfish	v	VU
Engaeus spinicaudatus	Scottsdale Burrowing Crayfish	Invertebrate	burrowing crayfish	e	EN
Engaeus yabbimunna	Burrowing Crayfish (Burnie)	Invertebrate	burrowing crayfish	v	VU
Antipodia chaostola leucophaea	Tasmanian Chaostola Skipper	Invertebrate	butterflies or moth	e	EN
Chrysolarentia decisaria	Tunbridge Looper Moth	Invertebrate	butterflies or moth	e	
Oreisplanus munionga larana	Marrawah Skipper	Invertebrate	butterflies or moth	e	VU
Oreixenica ptunarra	Ptunarra Brown Butterfly	Invertebrate	butterflies or moth	v	EN
Pseudalmenus chlorinda myrsilus	Tasmanian Hairstreak (butterfly)	Invertebrate	butterflies or moth	r	
Theclinesthes serpentata lavara	Chequered blue	Invertebrate	butterflies or moth	r	
Ecnomina vega	Caddis Fly (Macquarie River)	Invertebrate	caddisfly	r	
Hydrobiosella sagitta	Caddis Fly (St. Columba Falls)	Invertebrate	caddisfly	r	
Hydroptila scamandra	Caddis Fly (Upper Scamander River)	Invertebrate	caddisfly	r	

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Oecetis gilva	Caddis Fly (South Esk River)	Invertebrate	caddisfly	r	
Orphninotrichia maculata	Caddis Fly (Wedge River)	Invertebrate	caddisfly	r	
Orthotrichia adornata	Caddis Fly (Derwent River)	Invertebrate	caddisfly	r	
Oxyethira mienica	Caddis Fly (Ouse River)	Invertebrate	caddisfly	r	
Ramiheithrus kocinus	Caddis Fly (Corinna)	Invertebrate	caddisfly	r	
Stenopsychodes lineata	Caddis Fly (Bluff Hill Creek)	Invertebrate	caddisfly	r	
Tasimia drepana	Caddis Fly (Huon & Picton Rivers)	Invertebrate	caddisfly	r	
Hickmanoxyomma cavaticum	Ida Bay Cave Harvestman	Invertebrate	cave fauna	r	
Hickmanoxyomma gibbergunyar	Cave Harvestman (Mole Creek)	Invertebrate	cave fauna	r	
Micropathus kiernani	Cave Cricket	Invertebrate	cave fauna	e	CR
Olgania excavata	Cave Spider (Bubs Hill Cave)	Invertebrate	cave fauna	r	
Pseudotyrannochthonius typhlus	Cave Pseudoscorpion (Mole Creek)	Invertebrate	cave fauna	r	
Astacopsis gouldi	Giant Freshwater Crayfish	Invertebrate	freshwater crayfish	v	VU
Galaxias auratus	Golden Galaxias	Invertebrate	freshwater fish	r	EN
Galaxias fontanus	Swan Galaxias	Invertebrate	freshwater fish	e	EN
Galaxias johnstoni	Clarence Galaxias	Invertebrate	freshwater fish	e	EN
Galaxias parvus	Swamp Galaxias	Invertebrate	freshwater fish	v	VU

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Galaxias tanycephalus	Saddled Galaxias	Invertebrate	freshwater fish	v	VU
Galaxiella pusilla	Dwarf Galaxias	Invertebrate	freshwater fish	v	VU
Paragalaxias dissimilis	Shannon Paragalaxias	Invertebrate	freshwater fish	v	VU
Paragalaxias eleotroides	Great Lake Paragalaxias	Invertebrate	freshwater fish	v	VU
Paragalaxias mesotes	Arthurs Paragalaxias	Invertebrate	freshwater fish	e	EN
Prototroctes maraena	Australian Grayling	Invertebrate	freshwater fish	v	VU
Beddomeia angulata	Hydrobiid Snail (Rapid River)	Invertebrate	freshwater snail	r	
Beddomeia averni	West Gawler Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia bellii	Bells Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia bowryensis	Bowry Creek Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia briansmithi	Fern Creek Freshwater Snail	Invertebrate	freshwater snail	v	
Beddomeia camensis	Cam River Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia capensis	Hydrobiid Snail (Table Cape Freshwater Snail)	Invertebrate	freshwater snail	e	
Beddomeia fallax	Heathcote Creek Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia forthensis	Hydrobiid Snail (Wilmot River)	Invertebrate	freshwater snail	r	
Beddomeia franklandensis	Frankland River Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia fromensis	Frome River Freshwater Snail	Invertebrate	freshwater snail	e	

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Beddomeia fultoni	Farnhams Creek Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia gibba	Lerunna Road Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia hallae	Buttons Rivulet Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia hermansi	Viking Creek Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia hullii	Hydrobiid Snail (Heazlewood River)	Invertebrate	freshwater snail	r	
Beddomeia inflata	Hydrobiid Snail (Heathcote Creek)	Invertebrate	freshwater snail	r	
Beddomeia kershawi	Macquarie River Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia krybetes	St. Pauls River Freshwater Snail	Invertebrate	freshwater snail	v	
Beddomeia launcestonensis	Cataract Gorge Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia lodderae	Hydrobiid Snail (Upper Castra Rivulet)	Invertebrate	freshwater snail	v	
Beddomeia mesibovi	Arthur River Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia minima	Scottsdale Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia petterdi	Hydrobiid Snail (Blyth River)	Invertebrate	freshwater snail	e	
Beddomeia phasianella	Keddies Creek Freshwater Snail	Invertebrate	freshwater snail	v	
Beddomeia protuberata	Emu River Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia ronaldi	St. Patricks River Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia salmonis	Salmon River Freshwater Snail	Invertebrate	freshwater snail	r	

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Beddomeia tasmanica	Blue Tier Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia topsiae	Williamson Creek Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia trochiformis	Hydrobiid Snail (Bowry Creek)	Invertebrate	freshwater snail	r	
Beddomeia tumida	Great Lake Freshwater Snail	Invertebrate	freshwater snail	e	
Beddomeia turnerae	Minnow River Freshwater Snail	Invertebrate	freshwater snail	r	
Beddomeia waterhouseae	Hydrobiid Snail (Clayton's Rivulet)	Invertebrate	freshwater snail	e	
Beddomeia wilmotensis	Hydrobiid Snail (Wilmot River)	Invertebrate	freshwater snail	r	
Beddomeia wiseae	Blizzards Creek Freshwater Snail	Invertebrate	freshwater snail	v	
Beddomeia zeehanensis	Hydrobiid Snail (Little Henty River)	Invertebrate	freshwater snail	r	
Phrantela annamurrayae	Waratah Road Freshwater Snail	Invertebrate	freshwater snail	r	
Phrantela conica	Hydrobiid Snail (Little Henty River)	Invertebrate	freshwater snail	r	
Phrantela marginata	Hydrobiid Snail (Heazlewood River)	Invertebrate	freshwater snail	r	
Phrantela pupiformis	Hydrobiid Snail (Tyenna River)	Invertebrate	freshwater snail	r	
Benthodorbis pawpela	Hydrobiid Snail (Great Lake)	Invertebrate	Great Lake species	r	
Costora iena	Caddis Fly (Great Lakes)	Invertebrate	Great Lake species	x	
Mesacanthotelson setosus	Isopod (Great Lake)	Invertebrate	Great Lake species	r	
Mesacanthotelson tasmaniae	Isopod (Great Lake)	Invertebrate	Great Lake species	r	

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Onchotelson brevicaudatus	Isopod (Great Lake & Shannon Lagoon)	Invertebrate	Great Lake species	r	
Onchotelson spatulatus	Isopod (Great Lake)	Invertebrate	Great Lake species	e	
Tasniphargus tyleri	Amphipod (Great Lake)	Invertebrate	Great Lake species	r	
Uramphisopus pearsoni	Isopod (Great Lake)	Invertebrate	Great Lake species	r	
Haloniscus searlei	Salt Lake Slater	Invertebrate	other invertebrate	e	
Schayera baiulus	Schayer's Grasshopper	Invertebrate	other invertebrate	e	
Migas plomleyi	Plomleys Trapdoor Spider	Invertebrate	spider	e	
Plesiothele fentoni	Lake Fenton Trapdoor Spider	Invertebrate	spider	e	
Charopidae"Skemps"	Skemps Snail	Invertebrate	terrestrial snail	r	
Chloritobadistes victoriae	Southern Hairy Red Snail	Invertebrate	terrestrial snail	v	
Discocharopa vigens	Ammonite Snail	Invertebrate	terrestrial snail	e	CR
Helicarion rubicundus	Burgundy Snail	Invertebrate	terrestrial snail	r	
Pasmaditta jungermanniae	Cataract Gorge Snail	Invertebrate	terrestrial snail	v	
Tasmaphena lamproides	Keeled Snail	Invertebrate	terrestrial snail	r	
Tasmanipatus anophthalmus	Blind Velvet Worm	Invertebrate	velvet worm	e	EN
Tasmanipatus barretti	Giant Velvet Worm	Invertebrate	velvet worm	r	
Bunodophoron notatum*	lichen	non-vascular plant	lichen	e	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Erioderma sorediatum	lichen	non-vascular plant	lichen	e	-
Hypotrachyna laevigata **	lichen	non-vascular plant	lichen	v	-
Melanelia piliferella	lichen	non-vascular plant	lichen	v	-
Menegazzia minuta*	lichen	non-vascular plant	lichen	e	-
Parmelina pallida*	lichen	non-vascular plant	lichen	e	-
Parmelina whinrayi*	lichen	non-vascular plant	lichen	r	-
Parmotrema crinitum	lichen	non-vascular plant	lichen	r	-
Roccellinastrum neglectum **	lichen	non-vascular plant	lichen	e	-
Xanthoparmelia amphixantha	lichen	non-vascular plant	lichen	e	-
Xanthoparmelia jarmaniae*	lichen	non-vascular plant	lichen	v	-
Xanthoparmelia mannumensis	lichen	non-vascular plant	lichen	v	-
Xanthoparmelia molliuscula	lichen	non-vascular plant	lichen	e	-
Xanthoparmelia oleosa	lichen	non-vascular plant	lichen	r	-
Xanthoparmelia vicaria*	lichen	non-vascular plant	lichen	r	-
Xanthoparmelia vicariella*	lichen	non-vascular plant	lichen	r	-
Xanthoparmelia willisii	lichen	non-vascular plant	lichen	e	-
Pseudocephalozia paludicola	liverwort	non-vascular plant	liverwort	-	VU

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Aphelia gracilis	Slender fanwort	Vascular plant	annual herb	r	-
Aphelia pumilio	Dwarf fanwort	Vascular plant	annual herb	r	-
Barbarea australis*	Riverbed wintercress	Vascular plant	annual herb	e	-
Brachyscome perpusilla	Tiny daisy	Vascular plant	annual herb	r	-
Brachyscome radicata**	Spreading daisy	Vascular plant	annual herb	r	-
Brachyscome rigidula	Cutleaf daisy	Vascular plant	annual herb	v	-
Calandrinia granulifera	Pygmy purslane	Vascular plant	annual herb	r	-
Callitriche sonderi	Matted waterstarwort	Vascular plant	annual herb	r	-
Callitriche umbonata	Winged waterstarwort	Vascular plant	annual herb	r	-
Centrolepis pedderensis*	Pedder bristlewort	Vascular plant	annual herb	e	EN
Colobanthus curtisiae	Grassland cupflower	Vascular plant	annual herb	r	VU
Damasonium minus	Starfruit	Vascular plant	annual herb	r	-
Hyalosperma demissum	Moss sunray	Vascular plant	annual herb	e	-
Isoetopsis graminifolia	Grass cushion	Vascular plant	annual herb	v	-
Lobelia rhombifolia	Tufted lobelia	Vascular plant	annual herb	r	-
Myosurus australis	Southern mousetail	Vascular plant	annual herb	e	-
Myriophyllum integrifolium	Tiny watermilfoil	Vascular plant	annual herb	v	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Phyllangium distylis	Tiny mitrewort	Vascular plant	annual herb	r	-
Phyllangium divergens	Wiry mitrewort	Vascular plant	annual herb	v	-
Ranunculus pumilio var. pumilio	Ferny buttercup	Vascular plant	annual herb	r	-
Schenkia australis	Spike centaury	Vascular plant	annual herb	r	-
Scutellaria humilis	Dwarf scullcap	Vascular plant	annual herb	r	-
Siloxerus multiflorus	Small wrinklewort	Vascular plant	annual herb	r	-
Stackhousia subterranea	Grassland candles	Vascular plant	annual herb	e	-
Stylidium beaugleholei	Blushing triggerplant	Vascular plant	annual herb	r	-
Stylidium despectum	Small triggerplant	Vascular plant	annual herb	r	-
Stylidium perpusillum	Tiny triggerplant	Vascular plant	annual herb	r	-
Taraxacum aristum	Mountain dandelion	Vascular plant	annual herb	r	-
Thismia rodwayi	Fairy lanterns	Vascular plant	annual herb	r	-
Triglochin minutissima	Tiny arrowgrass	Vascular plant	annual herb	r	-
Triptilodiscus pygmaeus	Dwarf sunray	Vascular plant	annual herb	v	-
Trithuria submersa	Submerged watertuft	Vascular plant	annual herb	r	-
Utricularia tenella	Pink bladderwort	Vascular plant	annual herb	r	-
Isoetes elatior*	Tall quillwort	Vascular plant	aquatic fern	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Isoetes humilior*	Veiled quillwort	Vascular plant	aquatic fern	r	-
Stuckenia pectinata	Fennel pondweed	Vascular plant	aquatic herb	r	-
Utricularia australis	Yellow bladderwort	Vascular plant	aquatic herb	r	-
Vallisneria australis	River ribbons	Vascular plant	aquatic herb	r	-
Anogramma leptophylla	Annual fern	Vascular plant	fern	v	-
Asplenium hookerianum	Maidenhair spleenwort	Vascular plant	fern	e	-
Asplenium trichomanes subsp. trichomanes	Dolerite spleenwort	Vascular plant	fern	v	-
Blechnum cartilagineum	Gristle fern	Vascular plant	fern	v	-
Blechnum neohollandicum	Prickly raspfern	Vascular plant	fern	e	-
Blechnum rupestre	Small raspfern	Vascular plant	fern	r	-
Cheilanthes distans	Bristly rockfern	Vascular plant	fern	e	-
Hypolepis distans **	Scrambling groundfern	Vascular plant	fern	e	EN
Hypolepis muelleri	Harsh groundfern	Vascular plant	fern	r	-
Isoetes drummondii subsp. drummondii	Plain quillwort	Vascular plant	fern	r	-
Pellaea calidirupium	Hotrock fern	Vascular plant	fern	r	-
Pilularia novae-hollandiae	Australian pillwort	Vascular plant	fern	r	-
Pneumatopteris pennigera	Lime fern	Vascular plant	fern	e	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Caesia calliantha	Blue grasslily	Vascular plant	graminoid	r	-
Dianella amoena	Grassland flaxlily	Vascular plant	graminoid	r	EN
Sowerbaea juncea	Purple rushlily	Vascular plant	graminoid	v	-
Tricoryne elatior	Yellow rushlily	Vascular plant	graminoid	v	-
Xanthorrhoea arenaria*	Sand grasstree	Vascular plant	graminoid	v	VU
Xanthorrhoea bracteata*	Shiny grasstree	Vascular plant	graminoid	v	EN
Agrostis australiensis	Southern bent	Vascular plant	grass	r	-
Amphibromus fluitans	Floating swampgrass	Vascular plant	grass	-	VU
Amphibromus macrorhinus	Longnose swampgrass	Vascular plant	grass	e	-
Amphibromus neesii	Southern swampgrass	Vascular plant	grass	r	-
Australopyrum velutinum	Velvet wheatgrass	Vascular plant	grass	r	-
Austrostipa bigeniculata	Doublejointed speargrass	Vascular plant	grass	r	-
Austrostipa blackii	Crested speargrass	Vascular plant	grass	r	-
Austrostipa scabra	Rough speargrass	Vascular plant	grass	r	-
Deyeuxia apsleyensis*	Apsley bentgrass	Vascular plant	grass	r	-
Deyeuxia brachyathera	Short bentgrass	Vascular plant	grass	r	-
Deyeuxia decipiens	Trickery bentgrass	Vascular plant	grass	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Deyeuxia minor	Small bentgrass	Vascular plant	grass	r	-
Hierochloe rariflora	Cane holygrass	Vascular plant	grass	r	-
Lachnagrostis punicea subsp. punicea	Bristle blowngrass	Vascular plant	grass	r	-
Poa mollis*	Soft tussockgrass	Vascular plant	grass	r	-
Rytidosperma indutum	Tall wallabygrass	Vascular plant	grass	r	-
Alternanthera denticulata	Lesser joyweed	Vascular plant	herb	e	-
Asperula minima	Mossy woodruff	Vascular plant	herb	r	-
Asperula scoparia subsp. scoparia	Prickly woodruff	Vascular plant	herb	r	-
Asperula subsimplex	Water woodruff	Vascular plant	herb	r	-
Austrocynoglossum latifolium	Forest houndstongue	Vascular plant	herb	r	-
Brunonia australis	Blue pincushion	Vascular plant	herb	r	-
Calocephalus citreus	Lemon beautyheads	Vascular plant	herb	r	-
Calocephalus lacteus	Milky beautyheads	Vascular plant	herb	r	-
Centipeda cunninghamii	Erect sneezeweed	Vascular plant	herb	r	-
Desmodium gunnii	Southern ticktrefoil	Vascular plant	herb	v	-
Desmodium varians	Slender ticktrefoil	Vascular plant	herb	e	-
Epilobium pallidiflorum	Showy willowherb	Vascular plant	herb	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Eryngium ovinum	Blue devil	Vascular plant	herb	v	-
Euphrasia collina subsp. deflexifolia*	Eastern eyebright	Vascular plant	herb	r	-
Euphrasia collina subsp. gunnii*	Gunns eyebright	Vascular plant	herb	r	-
Euphrasia fragosa*	Shy eyebright	Vascular plant	herb	e	CR
Euphrasia scabra	Yellow eyebright	Vascular plant	herb	e	-
Euphrasia semipicta*	Peninsula eyebright	Vascular plant	herb	e	EN
Glossostigma elatinoides	Small mudmat	Vascular plant	herb	r	-
Glycine latrobeana	Clover glycine	Vascular plant	herb	v	VU
Glycine microphylla	Small-leaf glycine	Vascular plant	herb	v	-
Gratiola pubescens	Hairy brooklime	Vascular plant	herb	v	-
Haloragis aspera	Rough raspwort	Vascular plant	herb	v	-
Haloragis heterophylla	Variable raspwort	Vascular plant	herb	r	-
Haloragis myriocarpa	Prickly raspwort	Vascular plant	herb	r	-
Lepidium hyssopifolium	Soft peppercress	Vascular plant	herb	e	EN
Leptorhynchos elongatus	Lanky buttons	Vascular plant	herb	e	-
Leucochrysum albicans var. tricolor	Grassland paperdaisy	Vascular plant	herb	e	EN
Liparophyllum exaltatum	Erect marshflower	Vascular plant	herb	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Lobelia pratioides	Poison lobelia	Vascular plant	herb	v	-
Lotus australis	Australian trefoil	Vascular plant	herb	r	-
Lythrum salicaria	Purple loosestrife	Vascular plant	herb	v	-
Mentha australis	River mint	Vascular plant	herb	e	-
Parietaria debilis	Shade pellitory	Vascular plant	herb	r	-
Persicaria decipiens	Slender waterpepper	Vascular plant	herb	v	-
Persicaria subsessilis	Bristly waterpepper	Vascular plant	herb	e	-
Plantago debilis	Shade plantain	Vascular plant	herb	r	-
Plantago glacialis	Small-star plantain	Vascular plant	herb	r	-
Ranunculus jugosus*	Twinned buttercup	Vascular plant	herb	r	-
Ranunculus prasinus*	Midlands buttercup	Vascular plant	herb	e	EN
Rhodanthe anthemoides	Chamomile sunray	Vascular plant	herb	r	-
Rumex bidens	Mud dock	Vascular plant	herb	v	-
Scaevola aemula	Fairy fanflower	Vascular plant	herb	e	-
Scleranthus brockiei	Mountain knawel	Vascular plant	herb	r	-
Scleranthus diander	Tufted knawel	Vascular plant	herb	v	-
Scleranthus fasciculatus	Spreading knawel	Vascular plant	herb	v	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Senecio psilocarpus	Swamp fireweed	Vascular plant	herb	e	VU
Stenopetalum lineare	Narrow threadpetal	Vascular plant	herb	e	-
Velleia paradoxa	Spur velleia	Vascular plant	herb	v	-
Veronica plebeia	Trailing speedwell	Vascular plant	herb	r	-
Viola caleyana	Swamp violet	Vascular plant	herb	r	-
Viola cunninghamii*	Alpine violet	Vascular plant	herb	r	-
Vittadinia burbidgeae	Smooth new-holland-daisy	Vascular plant	herb	r	-
Vittadinia cuneata var. cuneata	Fuzzy new-holland-daisy	Vascular plant	herb	r	-
Vittadinia gracilis	Woolly new-holland-daisy	Vascular plant	herb	r	-
Vittadinia muelleri	Narrowleaf new-holland-daisy	Vascular plant	herb	r	-
Xerochrysum palustre	Swamp everlasting	Vascular plant	herb	v	VU
Caladenia anthracina*	Blacktip spider-orchid	Vascular plant	orchid	e	CR
Caladenia campbellii*	Thickstem fairy fingers	Vascular plant	orchid	e	CR
Caladenia caudata*	Tailed spider-orchid	Vascular plant	orchid	v	VU
Caladenia congesta	Blacktongue finger-orchid	Vascular plant	orchid	e	-
Caladenia filamentosa	Daddy longlegs	Vascular plant	orchid	r	-
Caladenia lindleyana*	Lindleys spider-orchid	Vascular plant	orchid	e	CR

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Caladenia pallida*	Rosy spider-orchid	Vascular plant	orchid	e	CR
Caladenia patersonii	Patersons spider-orchid	Vascular plant	orchid	v	-
Caladenia pusilla	Tiny fingers	Vascular plant	orchid	r	-
Caladenia tonellii*	Robust fingers	Vascular plant	orchid	e	CR
Chiloglottis trapeziformis	Broadlip bird-orchid	Vascular plant	orchid	e	-
Corunastylis brachystachya*	Shortspike midge-orchid	Vascular plant	orchid	e	EN
Corunastylis firthii*	Firths midge-orchid	Vascular plant	orchid	e	CR
Corunastylis morrisii	Bearded midge-orchid	Vascular plant	orchid	e	-
Corunastylis nuda	Tiny midge-orchid	Vascular plant	orchid	r	-
Cyrtostylis robusta	Large gnat-orchid	Vascular plant	orchid	r	-
Diuris palustris	Swamp doubletail	Vascular plant	orchid	e	-
Hydrorchis orbicularis	Swamp onion-orchid	Vascular plant	orchid	r	-
Microtidium atratum	Yellow onion-orchid	Vascular plant	orchid	r	-
Orthoceras strictum	Horned orchid	Vascular plant	orchid	r	-
Prasophyllum apoxychilum*	Tapered leek-orchid	Vascular plant	orchid	v	EN
Prasophyllum crebriflorum*	Crowded leek-orchid	Vascular plant	orchid	e	EN
Prasophyllum incorrectum*	Golfers leek-orchid	Vascular plant	orchid	e	CR

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Prasophyllum robustum*	Robust leek-orchid	Vascular plant	orchid	e	CR
Prasophyllum secutum*	Northern leek-orchid	Vascular plant	orchid	e	CR
Prasophyllum sp. Arthurs Lake*	Mountain leek-orchid	Vascular plant	orchid	e	-
Prasophyllum stellatum*	Ben Lomond leek-orchid	Vascular plant	orchid	e	CR
Prasophyllum taphanyx*	Graveside leek-orchid	Vascular plant	orchid	e	CR
Prasophyllum tunbridgense*	Tunbridge leek-orchid	Vascular plant	orchid	e	EN
Pterostylis atriola*	Snug greenhood	Vascular plant	orchid	r	-
Pterostylis commutata*	Midlands greenhood	Vascular plant	orchid	e	CR
Pterostylis falcata	Sickle greenhood	Vascular plant	orchid	e	-
Pterostylis grandiflora	Superb greenhood	Vascular plant	orchid	r	-
Pterostylis lustra	Small sickle greenhood	Vascular plant	orchid	e	-
Pterostylis pratensis*	Liawenee greenhood	Vascular plant	orchid	v	VU
Pterostylis squamata	Ruddy greenhood	Vascular plant	orchid	v	-
Pterostylis wapstrarum*	Fleshy greenhood	Vascular plant	orchid	e	CR
Pterostylis ziegeleri*	Grassland greenhood	Vascular plant	orchid	v	VU
Thelymitra bracteata	Leafy sun-orchid	Vascular plant	orchid	e	-
Thelymitra holmesii	Bluestar sun-orchid	Vascular plant	orchid	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Thelymitra jonesii*	Skyblue sun-orchid	Vascular plant	orchid	e	EN
Thelymitra malvina	Mauvetuft sun-orchid	Vascular plant	orchid	e	-
Thelymitra mucida	Plum sun-orchid	Vascular plant	orchid	r	-
Juncus amabilis	Gentle rush	Vascular plant	rush	r	-
Juncus fockei	Slender jointleaf rush	Vascular plant	rush	r	-
Juncus prismatocarpus	Branching rush	Vascular plant	rush	r	-
Juncus vaginatus	Clustered rush	Vascular plant	rush	r	-
Baumea articulata	Jointed twigsedge	Vascular plant	sedge	r	-
Baumea gunnii	Slender twigsedge	Vascular plant	sedge	r	-
Carex capillacea	Yellowleaf sedge	Vascular plant	sedge	r	-
Carex gunniana	Mountain sedge	Vascular plant	sedge	r	-
Carex longebrachiata	Drooping sedge	Vascular plant	sedge	r	-
Caustis pentandra	Thick twistsedge	Vascular plant	sedge	r	-
Chorizandra enodis	Black bristlesedge	Vascular plant	sedge	e	-
Isolepis habra	Wispy clubsedge	Vascular plant	sedge	r	-
Isolepis stellata	Star clubsedge	Vascular plant	sedge	r	-
Lepidosperma forsythii	Stout rapiersedge	Vascular plant	sedge	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Lepidosperma tortuosum	Twisting rapiersedge	Vascular plant	sedge	r	-
Lepidosperma viscidum	Sticky swordsedge	Vascular plant	sedge	r	-
Schoenoplectus tabernaemontani	River clubsedge	Vascular plant	sedge	r	-
Schoenus latelaminatus	Medusa bogsedge	Vascular plant	sedge	e	-
Tricostularia pauciflora	Needle bogsedge	Vascular plant	sedge	r	-
Uncinia elegans **	Handsome hooksedge	Vascular plant	sedge	r	-
Acacia axillaris*	Midlands wattle	Vascular plant	shrub	v	VU
Acacia siculiformis	Dagger wattle	Vascular plant	shrub	r	-
Acacia ulicifolia	Juniper wattle	Vascular plant	shrub	r	-
Bertya tasmanica subsp. tasmanica*	Tasmanian bertya	Vascular plant	shrub	e	EN
Boronia gunnii*	River boronia	Vascular plant	shrub	v	VU
Boronia hemichiton*	Mt Arthur boronia	Vascular plant	shrub	e	VU
Boronia hippopala*	Velvet boronia	Vascular plant	shrub	v	VU
Bossiaea tasmanica	Spiny bossiaea	Vascular plant	shrub	r	-
Brachyloma depressum	Spreading heath	Vascular plant	shrub	r	-
Cassinia rugata	Wrinkled dollybush	Vascular plant	shrub	e	VU
Centropappus brunonis*	Tasmanian daisytree	Vascular plant	shrub	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Comesperma defoliatum	Leafless milkwort	Vascular plant	shrub	r	-
Conospermum hookeri*	Tasmanian smokebush	Vascular plant	shrub	v	VU
Cryptandra amara	Pretty pearlflower	Vascular plant	shrub	e	-
Cyathodes platystoma*	Tall cheeseberry	Vascular plant	shrub	r	-
Cyphanthera tasmanica*	Tasmanian rayflower	Vascular plant	shrub	r	-
Discaria pubescens	Spiky anchorplant	Vascular plant	shrub	e	-
Epacris apsleyensis*	Apsley heath	Vascular plant	shrub	e	EN
Epacris curtisiae*	Northwest heath	Vascular plant	shrub	r	-
Epacris exserta*	South Esk heath	Vascular plant	shrub	e	EN
Epacris glabella*	Smooth heath	Vascular plant	shrub	e	EN
Epacris limbata*	Bordered heath	Vascular plant	shrub	e	CR
Epacris moscaliana	Seepage heath	Vascular plant	shrub	r	-
Epacris virgata* Beaconsfield	Twiggy heath	Vascular plant	shrub	v	EN
Epacris virgata* Kettering	Pretty heath	Vascular plant	shrub	v	EN
Gynatrix pulchella	Fragrant hempbush	Vascular plant	shrub	r	-
Gyrostemon thesioides	Broom wheelfruit	Vascular plant	shrub	r	-
Hibbertia basaltica*	Basalt guineaflower	Vascular plant	shrub	e	EN

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Hibbertia calycina	Lesser guineaflower	Vascular plant	shrub	v	-
Hibbertia rufa	Brown guineaflower	Vascular plant	shrub	r	-
Hibbertia virgata	Twiggy guineaflower	Vascular plant	shrub	r	-
Hovea corrickiae	Glossy purplepea	Vascular plant	shrub	r	-
Hovea montana	Mountain purplepea	Vascular plant	shrub	r	-
Hovea tasmanica*	Rockfield purplepea	Vascular plant	shrub	r	-
Lasiopetalum micranthum*	Tasmanian velvetbush	Vascular plant	shrub	r	-
Leucopogon virgatus var. brevifolius	Shortleaf beardheath	Vascular plant	shrub	r	-
Lycopus australis	Australian gypsywort	Vascular plant	shrub	e	-
Melaleuca pustulata*	Warty paperbark	Vascular plant	shrub	r	-
Micrantheum serpentinum*	Western tridentbush	Vascular plant	shrub	r	-
Monotoca submutica var. autumnalis*	Roundleaf broomheath	Vascular plant	shrub	r	-
Muehlenbeckia axillaris	Matted lignum	Vascular plant	shrub	r	-
Odixia achlaena*	Golden everlastingbush	Vascular plant	shrub	r	-
Olearia hookeri*	Crimsontip daisybush	Vascular plant	shrub	r	-
Ozothamnus lycopodioides*	Clubmoss everlastingbush	Vascular plant	shrub	r	-
Pentachondra ericifolia*	Fine frillyheath	Vascular plant	shrub	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Persoonia muelleri subsp. angustifolia*	Narrowleaf geebung	Vascular plant	shrub	r	-
Phebalium daviesii*	Davies waxflower	Vascular plant	shrub	e	CR
Pimelea curviflora var. gracilis	Slender curved riceflower	Vascular plant	shrub	r	-
Pimelea flava subsp. flava	Yellow riceflower	Vascular plant	shrub	r	-
Pimelea sp. Tunbridge	Grassland riceflower	Vascular plant	shrub	e	-
Pomaderris elachophylla	Small-leaf dogwood	Vascular plant	shrub	v	-
Pomaderris intermedia	Lemon dogwood	Vascular plant	shrub	r	-
Pomaderris oraria subsp. oraria	Bassian dogwood	Vascular plant	shrub	r	-
Pomaderris paniculosa subsp. paralia	Shining dogwood	Vascular plant	shrub	r	-
Pomaderris phylicifolia subsp. ericoides	Narrowleaf dogwood	Vascular plant	shrub	r	-
Pomaderris phylicifolia subsp. phylicifolia	Narrowleaf dogwood	Vascular plant	shrub	r	-
Pomaderris pilifera subsp. talpicutica*	Moleskin dogwood	Vascular plant	shrub	e	VU
Prostanthera rotundifolia	Roundleaf mintbush	Vascular plant	shrub	v	-
Pultenaea humilis	Dwarf bushpea	Vascular plant	shrub	v	-
Pultenaea mollis	Soft bushpea	Vascular plant	shrub	v	-
Pultenaea prostrata	Silky bushpea	Vascular plant	shrub	v	-
Pultenaea sericea	Chaffy bushpea	Vascular plant	shrub	v	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Rhytidosporum inconspicuum	Alpine appleberry	Vascular plant	shrub	e	-
Solanum opacum	Greenberry nightshade	Vascular plant	shrub	e	-
Spyridium lawrencei*	Small-leaf dustymiller	Vascular plant	shrub	v	EN
Spyridium obcordatum*	Creeping spyridium	Vascular plant	shrub	v	VU
Spyridium parvifolium var. molle*	Soft dustymiller	Vascular plant	shrub	r	-
Spyridium parvifolium var. parvifolium	Coast dustymiller	Vascular plant	shrub	r	-
Spyridium vexilliferum var. vexilliferum	Helicopter bush	Vascular plant	shrub	r	-
Stenanthemum pimeleoides*	Propeller plant	Vascular plant	shrub	v	VU
Stonesiella selaginoides*	Clubmoss bushpea	Vascular plant	shrub	e	EN
Tetratheca ciliata	Northern pinkbells	Vascular plant	shrub	r	-
Tetratheca gunnii*	Shy pinkbells	Vascular plant	shrub	e	EN
Teucrium corymbosum	Forest germander	Vascular plant	shrub	r	-
Thryptomene micrantha	Ribbed heathmyrtle	Vascular plant	shrub	v	-
Westringia angustifolia*	Narrowleaf westringia	Vascular plant	shrub	r	-
Acacia pataczekii*	Wallys wattle	Vascular plant	shrub/tree	r	-
Allocasuarina duncanii*	Conical sheoak	Vascular plant	tree	r	-
Banksia serrata	Saw banksia	Vascular plant	tree	r	-

Species	Common Name	Life form	Life form (additional)	Tas	Comm
Callitris oblonga subsp. oblonga*	South Esk pine	Vascular plant	tree	v	EN
Eucalyptus barberi*	Barbers gum	Vascular plant	tree	r	-
Eucalyptus gunnii subsp. divaricata*	Miena cider gum	Vascular plant	tree	e	EN
Eucalyptus perriniana	Spinning gum	Vascular plant	tree	r	-
Eucalyptus radiata subsp. radiata	Forth river peppermint	Vascular plant	tree	r	-
Eucalyptus risdonii*	Risdon peppermint	Vascular plant	tree	r	-
Cyathea cunninghamii	Slender treefern	Vascular plant	trunked fern	e	-
Cyathea x marcescens	Skirted treefern	Vascular plant	trunked fern	e	-

Appendix 2. Forest community IBRA level conservation and reservation analysis

	Listed	Ben Lomond	Central Highlands	Flinders	King	Northern Midlands	Northern Slopes	South East	Southern Ranges	West
Dry eucalypt forest and woodland										
Coastal E. amygdalina sclerophyll forest		N(M) 14693	*R(M)*	N(M) 7823	*R(U)*	*VR(U)* 14	N(M) 738	N(M) 80	*R(U)*	
E. amygdalina forest on Cainozoic sediments	NCA, RFA	*ER(U)* 86				*V(U)* 26	*V(U)* 136	*VR(U)*		
E. amygdalina forest on dolerite		N(M) 2087	***N(U)*** 221	***N(U)*** 29		N(M) 296	N(M) 2587	N(M) 5416	N(M) 617	
E. amygdalina forest on mudstone		N(M) 5363		N(M) 20		N(M) 54	***N(U)*** 886	N(M)	*R(U)* 23	
E. amygdalina forest on sandstone	NCA, RFA	*V(U)* 302		*VR(U)*		*V(U)* 13	*V(U)* 1491	*V(U)* 3026	*VR(U)* 1	
E. brookeriana forest	NCA, RFA	*VR(U)* 20			*V(U)* 1224		*R(U)* 10	*R(U)*		*VR(U)* 34
E. coccifera forest		N(M) 25	N(M) 1922					*R(U)* 145	N(M) 854	*R(M)*
E. delegatensis dry forest		N(M) 19602	N(M) 17967			*ER(U)*	N(M) 4182	N(M) 21304	N(M) 16398	N(M) 79
E. morrisbyi forest	NCA							*ER(U)*		
E. nitida dry forest			N(M) 240		N(M) 1224		N(M) 794	*R(U)*	N(M) 126	N(M) 1919
E. obliqua dry forest		N(M) 11019		N(M) 1523	N(M) 3152	*ER(U)* 5	N(M) 9790	N(M) 8631	N(M) 6203	N(M) 770
E. pauciflora forest on Jurassic dolerite		***N(U)*** 606	N(M) 960			*R(U)* 2	*R(M)*	N(M) 27	N(M) 4146	
E. pauciflora forest on other substrates		*V(U)* 269	***N(U)***	*ER(U)*		*ER(U)*	*ER(U)*	*V(U)* 10	*VR(U)* 71	
E. pulchella – E. globulus – E. viminalis grassy shrubby dry sclerophyll forest		*R(U)* 39						N(M) 5901	N(M) 980	
E. risdonii forest	NCA, RFA							*R(U)*		
E. rodwayi forest	RFA	*R(U)* 503	***N(U)*** 178			*R(U)*	*ER(U)* 15	***N(U)*** 219	***N(U)*** 567	
E. sieberi forest on granite		N(M) 4881		N(M) 3069				*R(U)*		*R(U)*

E. sieberi forest on other substrates		N(M) 5904		N(M) 4053		***N(U)***		N(M)		
E. tenuiramis forest on dolerite								N(M) 1056	*R(U)*	
E. tenuiramis forest on granite								N(M)		
Inland *E. tenuiramis* forest	NCA, RFA							*V(U)* 1085	*R(U)*	*R(M)*
E. viminalis – E. ovata – E. amygdalina – E. obliqua damp sclerophyll forest		N(M) 4811		*R(U)* 113		*ER(U)* 128	N(M) 8483	*R(U)* 50		
E. viminalis and/or *E. globulus* coastal shrubby forest	NCA, RFA			*V(U)*	*VR(U)*		*ER(U)*	*VR(U)* 3	*ER(M)*	*VR(U)* 13
E. viminalis grassy forest	RFA	N(M) 314		*VR(U)*	*R(U)* 7	*V(U)* 1	*R(U)* 4	***N(U)*** 1110	*VR(U)* 12	
Furneaux *E. nitida* forest				*V(M)*						
Furneaux *E. viminalis* forest	NCA,			*ER(U)*						
Grassy E. globulus forest	NCA, RFA	*VR(U)* 4		*VR(U)*				*V(U)* 362	*VR(U)* 69	
Shrubby *E. ovata – E. viminalis* forest	NCA, RFA	*E(U)* 405		*E(U)*	*ER(U)*	*E(U)* 10	*E(U)* 249	*E(U)* 46	*V(U)* 1	*ER(U)*

Wet eucalypt forest and woodland

E. delegatensis tall forest		N(M) 18368	N(M) 17367				N(M) 8557	N(M) 8305	N(M) 32308	N(M) 716
E. nitida wet forest			N(M) 954		N(M) 1240				N(M) 599	N(M) 3938
E. obliqua tall forest		N(M) 13559		N(M) 682	N(M) 42961		N(M) 32175	N(M) 8154	N(M) 52331	N(M) 8889
E. regnans forest		N(M) 13388			*R(U)*		*V(U)* 644	N(M) 1273	N(M) 24849	
E. subcrenulata forest		*VR(U)*	N(M) 34						N(M) 318	*R(M)*
E. viminalis wet forest on basalt	NCA, RFA	*E(U)* 356		*ER(U)*	*ER(U)*	*ER(U)*	*E(U)* 1018	*ER(U)* 1	*ER(U)*	*ER(U)*
King Island *E. globulus – E. brookeriana – E. viminalis* forest	NCA, RFA				*ER(U)* 272					

Rainforest

Callidendrous and thamnic rainforest on fertile sites		N(M) 6954	N(M) 4516		N(M) 3806		N(M) 7693	*R(U)* 26	N(M) 1197	N(M) 11546
Thamnic rainforest on less fertile sites		N(M) 630	N(M) 1807	*R(M)*	N(M) 9410		N(M) 6484	*R(U)* 1	N(M) 2233	N(M) 12976
Huon pine			*R(M)*						*R(U)*	N(M)

									18	1600
King Billy pine			V(M) 572						V(M)	V(M) 838
King Billy pine with deciduous beech			V(M) 175						VR(M)	
Pencil pine	NCA		V(M)						VR(M) 9	
Pencil pine with deciduous beech	NCA		V(M)						VR(M)	

Non eucalypt forest and woodland

Acacia dealbata forest		N(M) 3046	N(M) 717	N(U) 22	N(U) 2	N(U)	N(M) 6630	N(U) 190	N(M) 1660	R(U) 131
Acacia melanoxylon on flats		R(U) 156		R(U)	N(M) 4597	R(U)	ER(U)	R(U)	R(U)	N(U) 445
Acacia melanoxylon on rises		VR(U) 79	N(M) 206		N(U) 2214		N(M) 862	R(U) 2	R(U)	N(M) 1259
Allocasuarina verticillata forest		R(U) 4		N(M)	R(U)	R(U)	R(U)	N(M)	R(U) 17	
Banksia serrata woodland	NCA,			ER(M)	ER(U)					
Callitris rhomboidea forest	NCA, RFA			VR(U)				R(U)		
Leptospermum lanigerum - Melaleuca squarrosa swamp forest		VR(U) 17	R(U) 2	ER(U)	V(U) 1290		VR(U) 196	VR(U) 20	R(U) 168	N(M) 572
Melaleuca ericifolia swamp forest	NCA, RFA	ER(U) 6		E(U) 1	E(U) 2	ER(U)	ER(U) 2	ER(U)		ER(U)
Notolaea ligustrina and/or *Pomaderris apetala* forest	NCA, RFA	ER(U) 61			ER(U)		ER(U) 15	ER(U)	ER(U) 2	ER(U)

RFA = priority forest community identified in Regional Forest Agreement.

NCA = community listed as threatened on schedule 3a of Nature Conservation Act 2002

E = Endangered, R = Rare, V=Vulnerable, N= Not threatened, M = Meets Reservation target, U = Under-reserved. Classifications are as per JANIS criteria.

Number = indicative mapped area in hectares of forest community on PTPZ land

Analysis conducted using IBRA 5.0.

Appendix 3. Threatened non-forest communities in Tasmania

Non-forest community	Total State (ha)	PTPZ land (ha)
Alkaline pans	522	
***Banksia marginata* wet scrub**	2,629	
Cushion moorland	3,163	
Heathland on calcareous substrates	446	
Heathland scrub complex at Wingaroo	1,466	
Highland *Poa* grassland	26,098	1,146
Highland grassy sedgeland	18,673	823
Lowland *Poa labillardierei* grassland	13,617	72
Lowland *Themeda triandra* grassland	7,535	
***Athrotaxis selaginoides* subalpine scrub**	6,293	39
***Melaleuca pustulata* scrub**	345	
Rainforest fernland	1,707	285
Riparian scrub	3,032	131
Seabird rookery complex	775	
***Sphagnum* peatland**	3,478	309
Subalpine rushland	1,247	136
Subalpine *Leptospermum nitidum* woodland	3,762	
Spray zone coastal complex	323	
Wetlands	17,936	200

Source: Schedule 3a of Nature Conservation Act (2003).

Appendix 4. Old Growth Forest community IBRA level conservation and reservation analysis

	Listed	Ben Lomond	Central Highlands	Flinders	King	Northern Midlands	Northern Slopes	South East	Southern Ranges	West
Dry eucalypt forest and woodland										
Coastal *E. amygdalina* sclerophyll forest		N(M) 333		N(M) 289	*R(U)*	*R(M)*	*R(U)* 17	N(M) 8	*RD(U)*	
E. delegatensis dry forest		N(M) 955	N(M) 2359				N(M) 283	N(U) 4607	N(M) 3449	*R(U)* 56
E. amygdalina forest on Cainozoic sediments	NCA, RFA	*RD(U)*				*D(U)*	*RD(U)*	*R(U)*		
E. amygdalina forest on dolerite		*D(U)* 114	*RD(U)* 85	*RD(U)*		*RD(U)* 59	*RD(U)* 96	N(M) 2328	*R(U)* 91	
E. amygdalina forest on mudstone		*D(U)* 216		*RD(U)*		*RD(U)*	*RD(U)* 5	N(U)	*R(U)*	
E. amygdalina forest on sandstone	NCA, RFA	*RD(U)* 35				*RD(U)* 6	*RD(U)* 64	N(M) 757	*RD(U)*	
E. coccifera forest		*RD(M)*	N(M) 447					*R(U)* 56	N(M) 60	*RD(M)*
E. nitida dry forest			*R(U)* 37		N(U) 344		*R(U)* 83		N(M) 3	N(M) 678
E. obliqua dry forest		*D(U)* 408		N(M) 82	N(U) 379		N(M) 935	N(M) 1828	N(M) 1291	N(M) 215
E. pauciflora forest on Jurassic dolerite	RFA	*RD(U)* 8	N(M) 73			*RD(U)*		*R(U)* 6	N(M) 788	
E. pauciflora forest on other substrates		*RD(U)*	*RD(U)*	*R(U)*				*RD(U)* 4	*R(M)*	
E. pulchella – E. globulus – E. viminalis grassy shrubby dry sclerophyll forest		*RD(U)* 5						N(M) 2072	*RD(U)* 22	
E. risdonii forest	NCA, RFA							*RD(U)*		
E. rodwayi forest	RFA 9	*RD(U)* 21	*RD(U)*			*RD(U)*	*RD(U)* 111	*R(U)* 84	*RD(U)*	
E. sieberi forest on granite	RFA	*D(U)* 149		*RD(U)* 113				*R(U)*		
E. sieberi forest on other substrates	RFA	*D(U)* 330		*RD(U)* 60				*R(U)*		
E. tenuiramis forest on								N(M)	*R(M)*	

dolerite							372		
E. tenuiramis forest on granite							N(M)		
Inland *E. tenuiramis* forest	NCA, RFA						N(U) 179	*RD(U)*	*R(M)*
E. viminalis – E. ovata – E. amygdalina – E. obliqua damp sclerophyll forest	RFA	*RD(U)* 153	*RD(U)* 1		*R(U)* 1	*D(U)* 410	*R(U)* 18		
E. viminalis and/or *E. globulus* coastal shrubby forest	NCA, RFA			*RD(U)*			*R(U)*		*R(U)* 13
E. viminalis grassy forest	RFA	*RD(U)* 3		*RD(M)*	*D(U)* 1	*RD(U)*	*D(U)* 164	*RD(U)* 2	
Grassy *E. globulus* forest	NCA, RFA	*RD(M)*	*RD(M)*				N(U) 84	*RD(U)* 4	
Shrubby *E. ovata – E. viminalis* forest	NCA, RFA	*RD(U)* 12	*RD(U)*	*R(U)*	*RD(U)*	*RD(U)* 1	*R(U)* 22	*R(U)*	*R(M)*
Wet eucalypt forest and woodland									
E. brookeriana forest	NCA, RFA	*RD(M)*		*R(U)* 29		*RD(M)* 1	*R(U)*		*R(U)* 2
E. delegatensis tall forest		N(U) 2014	N(M) 1878			N(M) 468	N(M) 3407	N(M) 6291	N(M) 370
E. nitida wet forest			N(M) 250	*R(U)* 106		N(M)		N(M) 5	N(M) 506
E. obliqua tall forest		*D(U)* 1148		*R(U)* 13	N(U) 3441	*D(U)* 2120	N(M) 1287	N(M) 4995	N(M) 1980
E. regnans forest		N(M) 1420	*R(U)*			*RD(U)* 6	*R(U)* 20	N(M) 2040	*R(M)*
E. subcrenulata forest		*R(M)*	N(M) 12					N(M) 130	*R(M)*
E. viminalis wet forest on basalt	NCA, RFA	*RD(U)* 6		*R(U)*	*R(U)*	*RD(U)* 51	*R(U)* 1		
Rainforest									
Callidendrous and thamnic rainforest on fertile sites		N(M) 6305	N(M) 3944		N(M) 3447	N(M) 3730	*R(U)* 29	N(M) 1126	N(M) 10502
Thamnic rainforest on less fertile sites		N(M) 539	N(M) 1580		N(U) 6278	N(M) 4809	*R(U)* 1	N(M) 1940	N(M) 8684
Huon pine			*R(M)*					*R(M)* 19	N(M) 499
King Billy pine			N(M) 479					N(M)	N(M) 194
King Billy pine with deciduous beech			N(M) 168					*R(M)*	
Pencil pine	NCA		*R(M)*					*R(M)*	

									5	
Pencil pine with deciduous beech	NCA		N(M)						*R(M)*	
Non eucalypt forest and woodland										
Allocasuarina verticillata forest		*RD(U)*		*RD(U)*		*RD(M)*		*R(U)*	*R(U)*	
Banksia serrata woodland	NCA, RFA				*R(U)*					
Callitris rhomboidea forest	NCA, RFA							*R(U)*		
Leptospermum lanigerum - Melaleuca squarrosa swamp forest		*R(M)* 3	*R(U)*	*R(M)*	*RD(U)* 31		*R(U)* 7	*R(U)*	*R(U)* 6	N(M) 86
Melaleuca ericifolia swamp forest	NCA, RFA	*RD(U)*		*RD(U)*	*RD(U)*		*RD(M)*	*R(M)*		*R(U)*
Notolaea ligustrina and/or *Pomaderris apetala* forest	NCA, RFA	*R(U)*			*R(U)*		*R(U)* 11	*R(M)*		*R(U)*

RFA = priority forest community identified in Regional Forest Agreement.

NCA = community listed as threatened on schedule 3a of Nature Conservation Act 2002

R = Rare, D=Depleted, N= Not Threatened, M = Meets Reservation target, U = Under-reserved. Classifications are as per JANIS criteria.

Number = indicative mapped area in hectares of forest community on PTPZ land

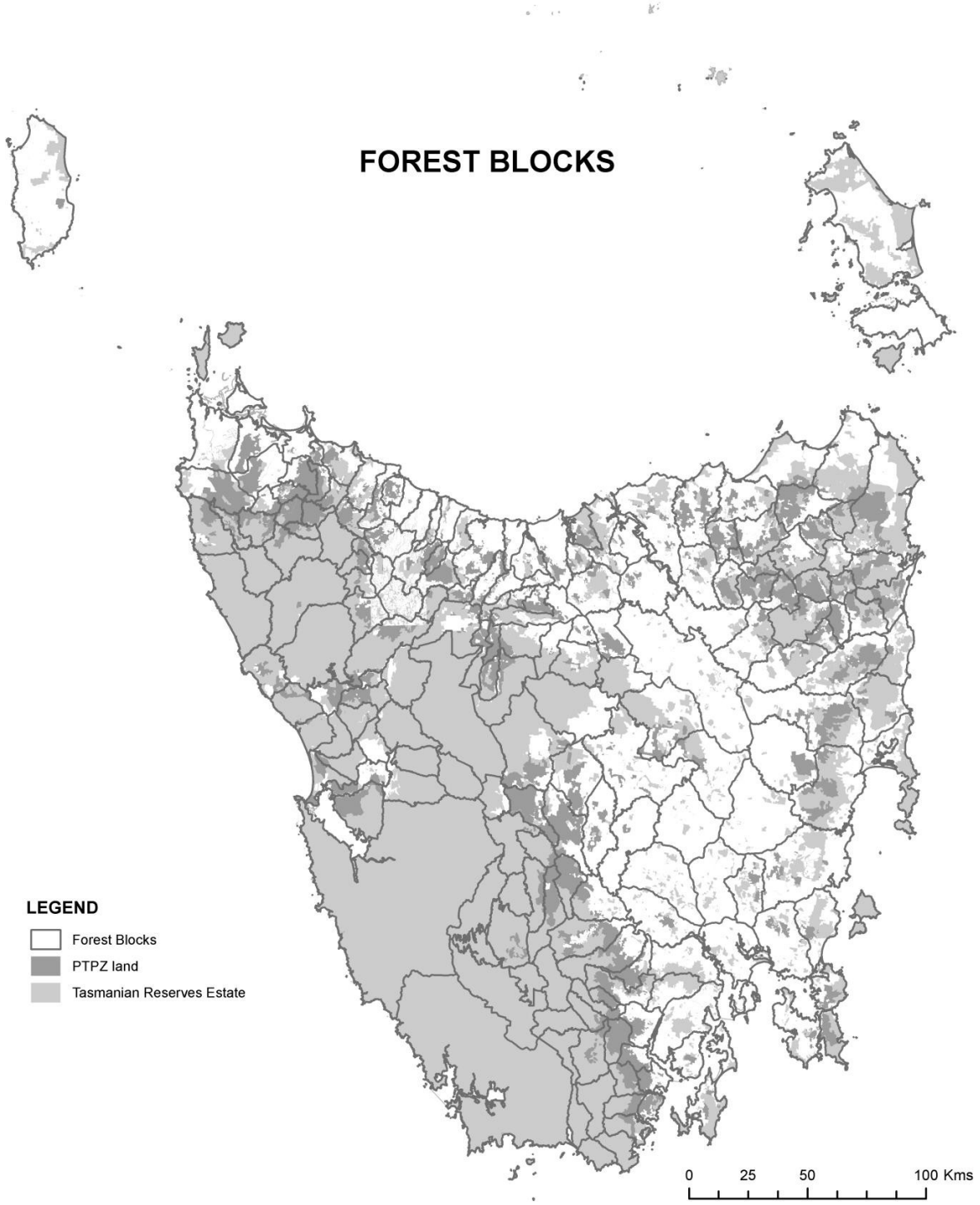
Analysis conducted using IBRA 5.0.

Appendix 5. Alignment of FSC defined High Conservation Values to AFS defined Significant Biodiversity Values

The Australian Forestry Standard (AFS) requires the identification and management of significant biodiversity values (SBVs). The AFS provides eight SBV categories, and these values correspond with many of the HCVs identified in this plan.

SBV No	Description	Alignment to HCVs identified in this plan
1	Known or likely known occurrences of threatened, vulnerable, rare or endangered species, populations and their known and potential habitat; and/or as listed on current schedules of relevant legislation.	1.1
2	Threatened, vulnerable, rare and endangered ecological communities or ecosystems and/or as listed on current schedules of relevant legislation.	3.1a, 3.1b
3	Regionally or nationally significant concentrations of biodiversity	1, 2 & 3.
4	Disjunct or outlier populations, refugia and centres of endemism.	3.2, 1.6, 1.2
5	Old-growth forest which is rare or depleted within the forest type (generally less than 10% of the extant distribution).	3.3
6	Ecosystems that are currently reserved at less than 15% of their pre-European distribution or equivalent benchmark.	3.1a,3.1b
7	Forest types or ecosystems and old growth forest which are rare, depleted or under-represented in the regional conservation reserve system.	3.1, 3.2, 3.3
8	Habitat of migratory species listed under the relevant legislation. *(Note: EPBC Act identifies migratory species as those that travel across international border. Tasmanian legislation does not refer to migratory species).*	3.3
9	Natural Heritage Places	6.2

Appendix 6. Tasmanian Forest Blocks



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