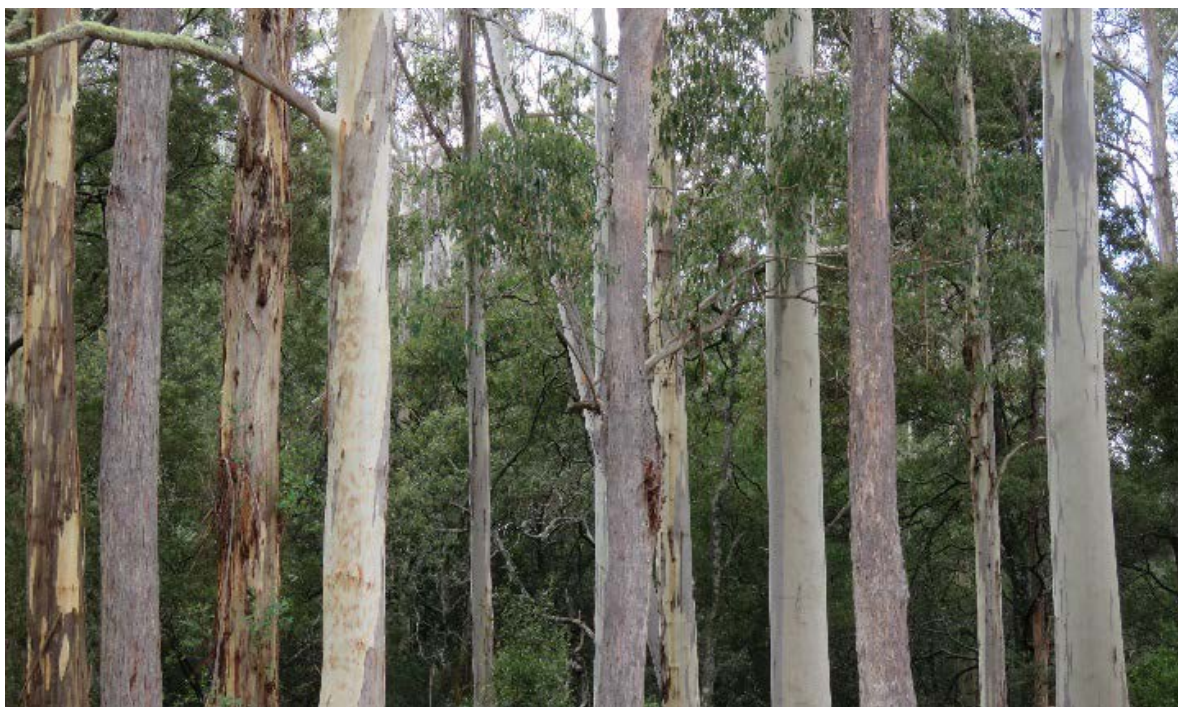


**DRAFT Conservation Advice (incorporating listing advice) for the
Tasmanian white gum (*Eucalyptus viminalis*) wet forest**



The Threatened Species Scientific Committee (the Committee) was established under the EPBC Act and has obligations to present advice to the Minister for the Environment in relation to the listing and conservation of threatened ecological communities, including under sections 189, 194N and 266B of the EPBC Act.

The Committee will provide its advice on the Tasmanian white gum (*Eucalyptus viminalis*) wet forest to the Minister as a draft conservation advice in 2020.

The Minister will decide whether to amend the list of threatened ecological communities under Section 184 of the EPBC Act to include the Tasmanian white gum (*Eucalyptus viminalis*) wet forest.

This draft conservation advice will be made available for expert and public comment for a minimum of 30 business days. The Committee and Minister will have regard to all public and expert comment relevant to the consideration of the ecological community for listing.

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1 CONSERVATION OBJECTIVE

To mitigate the risk of extinction of the Tasmanian white gum (*Eucalyptus viminalis*) wet forest ecological community, and help recover its biodiversity and function through protecting it from significant impacts as a Matter of National Environmental Significance under national environmental law, and by guiding implementation of management and recovery, consistent with the recommended priority conservation and research actions set out in this advice.

This conservation advice contains information relevant to the objective by:

- describing the ecological community and where it can be found ([section 2](#));
- identifying the key threats to the ecological community ([section 3](#));
- summarising the existing protections for the ecological community (section 4);
- presenting evidence to explain why the ecological community merits listing as nationally threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) ([section 5](#)); and
- outlining information to guide its conservation, including the key diagnostic features, condition thresholds and classes, and additional information to identify the ecological community, and the priority conservation and research actions to stop its decline and support its recovery ([section 6](#)).

2 DESCRIPTION

The ecological community described in this conservation advice is a type of eucalypt forest that is found in Tasmania. It is a wet sclerophyll forest with a canopy dominated by *Eucalyptus viminalis* and an understorey generally comprised of broad-leaved shrubs and ferns, occurring mainly on fertile, well-drained sites in the north of the state.

2.1 Name

The name of the ecological community is the **Tasmanian white gum (*Eucalyptus viminalis*) wet forest** (hereafter referred to as the “Tasmanian white gum wet forest” or “the ecological community”). The name refers to the dominant canopy species, typical vegetation structure and geographic area that characterises the ecological community. The ecological community was originally placed on the 2016 Finalised Priority Assessment List as the ‘Tasmanian white gum (*Eucalyptus viminalis*) wet forest on basalt’. At the time, this reflected the name of the forest type used in the Tasmanian *Regional Forest Agreement 1997*, but the reference to basalt has been removed as the ecological community also occurs on other substrates.

2.2 Location and physical environment

The Tasmanian white gum wet forest is limited to Tasmania and occurs in all Tasmanian bioregions, but mainly within the Northern Slopes and Ben Lomond bioregions (Figure 1). It is concentrated in central northern Tasmania, and occurs sporadically elsewhere in the state. Some of the largest stands occur on the flats and lower slopes of the major river valleys in the Northern Slopes bioregion.

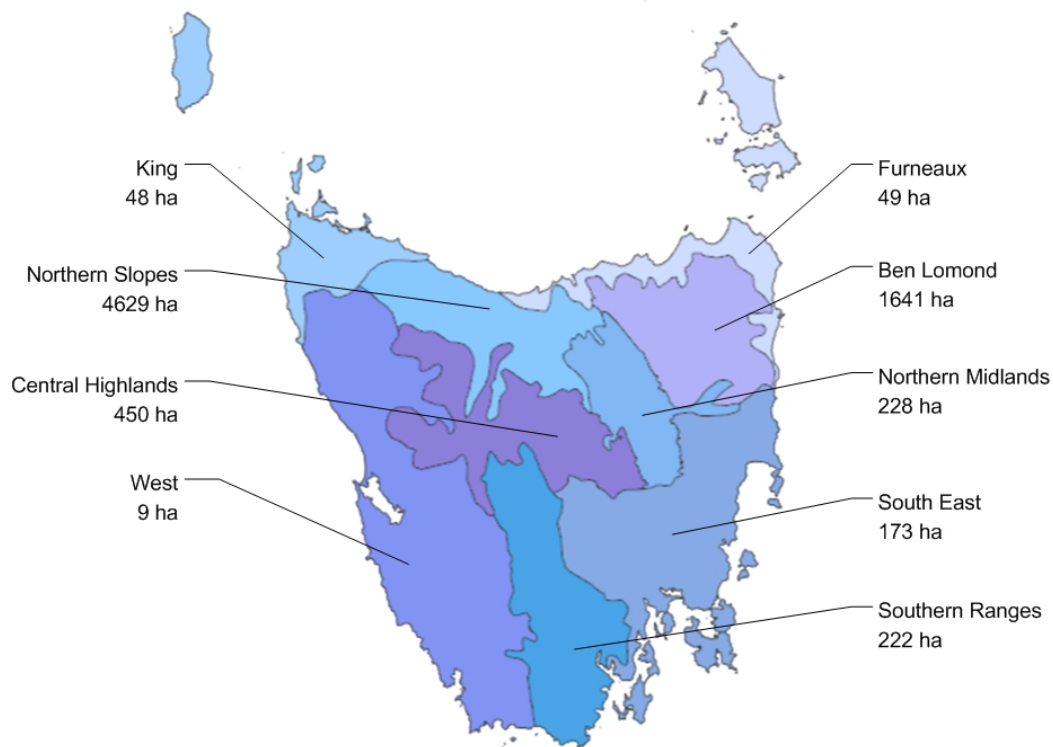


Figure 1: Bioregional distribution of the remaining Tasmanian white gum wet forest
 (Source: Extent of TASVEG unit WVI in DPIPWE 2018a)

Tasmanian white gum wet forest typically occurs on moderately fertile to fertile well-drained soils. It is often present on basalt or alluvium but is also recorded on dolerite, mudstone, sandstone, conglomerate and limestone, all producing fertile soils with appreciable clay content and mineral nutrients.

It occurs where fire is normally infrequent (fire intervals of 100 to 350 years) and rainfall is high. It is usually found in areas where average annual rainfall exceeds 1000mm, though may also occur in drier areas with reliable water supplies, such as river gullies. Its local expression is strongly influenced by disturbance history and fire regime.

The community is limited to the range of its dominant canopy species. White gum (*E. viminalis*) is widespread throughout lowland coastal and inland environments of northern, eastern and southern Tasmania, but is largely absent from the low nutrient environments of the west and south-west (Williams and Potts, 1996). It typically occurs at altitudes up to 600m ASL, but may extend up to 900m ASL in the highlands of the north-east, the Western Tiers and Cluan Tier, and occasionally on Fingal Tier and the adjacent Eastern Tiers. At intermediate altitudes *E. viminalis* can form a morphological cline with the closely-related *E. dalrympleana* (mountain white gum). White gum typically transitions into mountain white gum (*E. dalrympleana*) at around 300-600m ASL, and the two species can be difficult to differentiate in this zone¹ (Williams and Potts 1996; Duncan 1996).

¹ For the purposes of this ecological community, in the absence of clear distinguishing characteristics (typically juvenile leaves), these forests should be treated as if they contain *E. viminalis* below 600 m ASL, and *E. dalrympleana* above this altitude.

2.3 Vegetation structure

Tasmanian white gum wet forest is a wet eucalypt forest, with either a wet sclerophyll or mixed forest understorey. It typically has a tall open forest structure², with a canopy dominated by tall eucalypts over a secondary tree layer and usually broad-leaf shrubs, ferns and graminoids.

Mixed forest understoreys are dominated by secondary tree layers of rainforest species and are associated with long unburnt and infrequently burnt areas (fire intervals of 100 to 350 years). Wet sclerophyll forests have understoreys typically dominated by broad-leaved tall shrubs, with non-rainforest tree species also often present. They can also have a ground layer dominated by ferns (including tree ferns) and/or graminoids. Wet sclerophyll forest can succeed to mixed forest and then to rainforest in the absence of fire.

The canopy generally consists of an even-aged stand of tall and well-formed trees that can exceed 60m on fertile sites. A stand at Evercreech Regional Reserve contains some of Tasmania's tallest trees, originally reaching over 90m, though these trees are now in a state of decline. The shrub understorey is often dense, preventing continuous regeneration of shade-intolerant species such as eucalypts. Thus regeneration in wet eucalypt forest is reliant on disturbance, usually wildfire, to open the canopy, prepare a mineral soil seed bed and initiate seedfall. Stands are therefore usually even-aged because a cohort of regeneration arises from the same disturbance event. In old-growth stands, there may be a cohort of old-growth trees that provided seed for a second cohort of even-aged trees from the most recent fire (or other disturbance event).

A large proportion of the remaining Tasmanian white gum wet forest is mature regrowth. Old-growth stands of Tasmanian white gum wet forest are uncommon - less than 140 ha were recorded in the Tasmanian *Regional Forestry Agreement*. Many stands feature regrowth of about 70 years age or 40m in height (Craven, 2002). Regrowth trees generally lack hollows that are found in older trees and therefore reduce the ecological complexity and functionality of the ecological community for hollow-dependent species.

2.4 Flora

2.4.1 Canopy species

The canopy of this community is dominated by white gum (*Eucalyptus viminalis*)³.

Other canopy species often present include stringybark (*E. obliqua*) and gum-topped stringybark (*E. delegatensis*), with giant ash (*E. regnans*) in the north-east. In poorly drained sites black gum (*E. ovata*) may be present.

A more comprehensive list of canopy species likely to occur in the ecological community, are in Appendix A - Species lists.

² A 'tall open forest' has canopy of trees over 30 meters in height with a foliage cover of 30-70% (Specht 1970).

³ Only the subspecies *E. viminalis* subsp. *viminalis* will occur in Tasmanian white gum wet forest.

2.4.2 Understorey species

Blackwood (*Acacia melanoxylon*) and silver wattle (*A. dealbata*) are widespread secondary tree species in wet sclerophyll forest, and are successively replaced by rainforest trees, predominantly myrtle beech (*Nothofagus cunninghamii*) and sassafras (*Atherosperma moschatum*), in mixed forest.

Most sites have a typical wet sclerophyll understorey containing tall shrubs and small trees such as common dogwood (*Pomaderris apetala*), musk daisybush (*Olearia argophylla*), blanket leaf (*Bedfordia salicina*) and native currant (*Coprosma quadrifida*). Ferns are common, particularly soft treefern (*Dicksonia antarctica*) but also usually ground ferns (e.g. *Hypolepis rugosula*, *Histiopteris incisa*, *Blechnum* spp. and *Polystichum proliferum*). Graminoids such as cutting grass (*Gahnia grandis*) and swordsedges (*Lepidosperma* spp.) are sometimes prominent. In poorly drained sites, paperbarks (*Melaleuca* spp. particularly *M. squarrosa*) or teatrees (*Leptospermum* spp. particularly *L. lanigerum*) may be common. The community tends to be species-poor with respect to herbs and grasses, mostly due to a thick layer of plant litter.

Alternatively, in mixed forest forms of the ecological community the understorey can be dominated by shrubs and saplings of rainforest tree species, notably myrtle beech (*Nothofagus cunninghamii*) or sassafras (*Atherosperma moschatum*), or occasionally leatherwood (*Eucryphia lucida*) or celerytop pine (*Phyllocladus aspleniifolius*).

In many cases where Tasmanian white gum wet forest occurs as remnants in agricultural regions, it is heavily disturbed (burnt, grazed or cut-over) and an understorey of bracken (*Pteridium esculentum*) dominates (Kitchener and Harris 2013) with sporadic occurrences of other species typical of the wet sclerophyll facies of the community.

Most of these species are common to a range of wet forest types in Tasmania. A more comprehensive list of understorey species likely to occur in the ecological community are in Appendix A - Species lists.

2.5 Fauna

Tasmanian white gum wet forest provides multi-storied habitat for a wide range of fauna, including hollow-dependent fauna and threatened species. Most fauna species are not solely dependent on the ecological community, but may be present in all Tasmanian wet forests, but these faunal components of the ecological community play a critical role in the functioning of the ecological community, for instance, through nutrient cycling and seed dispersal.

The high forest canopy and clear mid-storey of the white gum is typically utilised by bats and birds, such as Gould's long-eared bat (*Nyctophilus gouldi*), the southern forest bat (*Vespadelus regulus*), the little forest bat (*Vespadelus vulturnus*), the masked owl (*Tyto novaehollandiae castanops*) and the striated pardalote (*Pardalotus striatus*), which move and hunt between trees.

Birds of prey utilise the tall canopy trees for roosting and nesting. The Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) is known to nest in riparian vegetation and steep slopes associated with river systems in the Northern Slopes bioregion, including along the Wilmot River. Active nests have been recorded in the ecological community (Craven, 2002). The grey goshawk (*Accipiter novaehollandiae*) prefers blackwood forest as nesting habitat. Blackwood is a common secondary tree species

in the ecological community and blackwood communities often occur in conjunction with the ecological community. The ecological community is therefore often important habitat for the grey goshawk and active nests have been recorded in the ecological community (Craven, 2002).

The lower canopy or shrub layer supports birds and possums, such as the striated pardalote (*Pardalotus striatus*), little pygmy possum (*Cercartetus lepidus*), common brushtail possum (*Trichosurus vulpecula*) and common ringtail possum (*Pseudocheirus peregrinus*). All these arboreal animals use tree hollows and forks to rest or nest, and feed on nectar, flowers, leaves and fruit products of the canopy, as well as invertebrates from leaves, beneath bark or in the air. Consequently, their activities play important ecological roles for pollination, seed dispersal and regulation of insect populations.

The sheltered ground-storey remains damp and comprises a deep litter layer over moist mineral soil. It provides for a mass of invertebrate and other animal life, which helps in the turnover of litter nutrients that become rich plant foods. Invertebrates, including burrowing crayfish (*Engaeus* spp), stag beetles, and velvet worms tunnel and forage in the litter. These invertebrates in turn provide a food source for small, ground insectivores and omnivores, including the smooth frog (*Geocrinia laevis*), scrubtit (*Sericornis magnus*), and southern brown bandicoot (*Isodon obesulus*).

Small to medium-sized omnivores that consume fallen fruit, seeds, leaves and fungi, such as the long-nose potoroo (*Potorous tridactylus*) are also common, as are carnivores such as quolls (*Dasyurus* spp) and Tasmanian devils (*Sarcophilus harrisii*). Burrowing mammals, such as the wombat (*Vombatus ursinus*) function as soil engineers that turn over soil and facilitate nutrient cycling and water infiltration within the ecological community as a result of their burrowing activities.

A more comprehensive list of fauna species likely to occur in the ecological community, including threatened fauna, are in Appendix A - Species lists.

3 THREAT SUMMARY

Tasmanian white gum wet forest has been primarily impacted by historic clearing for agriculture and forestry (conversion to monoculture plantation), and the remnants that remain continue to be under threat from ongoing degradation.

Table 1 outlines the key threats facing the ecological community. The key threats faced by the ecological community are described to help explain why this ecological community merits listing as threatened and supports the assessment against the criteria at [section 5.1](#). Although presented as a list, in reality, these threats often interact, rather than act independently.

These threats are classified according to the IUCN Threats Classification Scheme (Bland et al 2016), which identifies both the threats leading to losses through ecosystem conversion (i.e. total loss of patches of the ecological community and replacement with other vegetation such as crops, or buildings) and those leading to losses through ecosystem degradation (i.e. the loss of patches of the ecological community through direct or indirect damage to its function and character).

Table 1: Summary of threats facing the ecological community⁴

Threat factor	Threat Status/Impact	Summary
Conversion stresses		
Agriculture (including silviculture)	Timing: Mostly Past/Some Ongoing Severity: Slow Scope: Whole	The ecological community has been extensively cleared in Tasmania over a long period since European settlement – particularly in northern Tasmania, primarily for agricultural use, and since about the 1980’s also for plantation establishment. It’s location on fertile soils and on flats and lower slopes in the vicinity of where many rural towns have developed made it a prime target for early clearing for agriculture. Current land clearance associated with agriculture, including for irrigation (including dam developments, pipeline corridors and centre pivots), is also an ongoing threat.
Residential and commercial development	Timing: Ongoing Severity: Slow Scope: Minority	Land clearing is now increasingly due to urban and infrastructure projects (including roads, powerlines, gas pipelines, telecommunications etc). This is a threat to remnants around Hobart, Ulverstone, Devonport, Burnie and Wynyard. This threat involves clearing of entire remnants as well as incremental damage from tree removal or lopping, or removal of native understorey vegetation.
Degradation stresses		
Agriculture (including silviculture)	Timing: Mostly Past/Some Ongoing Severity: Slow Scope: Minority	Degradation resulting from agriculture arises from three main sources (as well as contributing to invasive species below): <i>Fragmentation legacies</i> Historic clearance of the ecological community as well as other surrounding vegetation has resulted in severe fragmentation and invasion by exotic species, which leads to ongoing loss of species diversity and ecological function in remaining patches; and greater vulnerability and reduced resilience of smaller patches to stochastic events. Vegetation communities comprised of many small fragments have a high edge-to-area ratio, which increases potential harm done through threatening processes such as weed invasion and incremental clearing, and overall are more difficult to manage for biodiversity. The ecological community is highly fragmented with the majority of remnants now less than 5 ha in size. <i>Livestock grazing</i> Other impacts occur from inappropriate grazing regimes by domestic stock. <i>Hybridisation of trees related to silviculture</i> Hybridisation of <i>E. viminalis</i> with plantation species, particularly <i>Eucalyptus nitens</i> (shining gum) is also a potential threat (FPA 2011).

⁴ According to the IUCN Threat Impact Scoring System

Timing – the threat occurs in the **past** (and unlikely to return), is **ongoing** (present/continuing), is likely to occur/return in the **future** or timing is **unknown**

Severity – the threat is causing losses or degradation that are **very rapid** (>30% over 10 years), **rapid** (>20% over 10 years), **slow** (<20% over 10 years), **negligible** or **unknown**

Scope – the threat is affecting the **whole** (>90%), a **majority** (>50%), a **minority** (<50%), a **negligible** amount, or **unknown** amount of the ecological community

Threat factor	Threat Status/Impact	Summary
Natural System Modifications - Fire	Timing: Ongoing Severity: Slow Scope: Minority	<p>Wet forests are adapted to infrequent (fire intervals of 100 to 350 years) high intensity fires which result in a total reduction of the forest to an ash bed, followed by mass seedbed germination. More frequent but lower intensity fires are now more common (Kitchener and Harris 2013), and may become more common in the future, in areas where the ecological community occurs. This is a likely consequence of both a changing climate and changing management practices to mitigate fire risk to property.</p> <p>More frequent fires may result in simplification of the understorey and establishment of weeds. In many cases the ecological community occurs as remnants in agricultural regions, it is heavily burnt and a disclimax understorey of bracken can dominate (Kitchener and Harris 2013). Repetitive burning of a site can have dire consequences for wet eucalypt forest communities. A second fire prior to newly regenerated seedlings reaching sexual maturity may entirely eliminate a species from an area due to a lack of propagules (Jackson 1981)</p>
Invasive species	Timing: Ongoing Severity: Slow Scope: Majority	<p>Undisturbed wet forests are generally resistant to weed invasion, although bird dispersed species such as holly (<i>Ilex aquifolium</i>) are capable of invading undisturbed wet forests (FPA 2017). However, if disturbed or fragmented, the ecological community is increasingly vulnerable to weed species. In areas that have been disturbed, or on forest edges, species such as Elisha's tears (<i>Leycesteria formosa</i>), blackberry (<i>Rubus fruticosus</i>), gorse (<i>Ulex europaeus</i>), English broom (<i>Cytisus scoparius</i>) and foxglove (<i>Digitalis purpurea</i>) may be invasive (Kitchener and Harris 2013).</p> <p>The ecological community in the central north often contains infestations of blackberry, with Elisha's tears, broom, radiata pine (<i>Pinus radiata</i>) and hawthorn (<i>Crataegus monogyna</i>) common in some localities. Other weed species recorded in the ecological community include pampas grass (<i>Cortaderia spp</i>), Erica (<i>Erica lusitanica</i>), thistles (<i>Cirsium spp</i>), cotoneaster (<i>Cotoneaster spp</i>), ragwort (<i>Senecio jacobea</i>) and smaller herbs and grasses (Craven, 2002).</p>
Climate change and severe weather	Timing: Ongoing Severity: Rapid Scope: Majority	<p><i>Eucalyptus viminalis</i> is known to be highly susceptible to stress due to climatic factors and climate change projections indicate an increasing frequency and intensity of heat waves.</p> <p>'Ginger tree syndrome' is the term given to a condition affecting eucalypts, often following extreme heat events. Elevated ambient air temperatures can cause water stress and hence shrinkage of the bark and trunk leading to the production of kino (Mitchell 2015). The syndrome is typified by the seeping of kino through the bark, turning the trees 'ginger' and providing a visual means of identifying affected trees. Tree mortality typically follows within 12 months. The loss of canopy trees has the potential to substantially alter the character and function of the ecological community.</p>

3.1 Key threatening processes

The EPBC Act provides for the identification and listing of key threatening processes. A threatening process is defined as a key threatening process if it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community.

The following are EPBC-listed key threatening processes, current at the date of writing, that may be relevant to the ecological community or the plants and animals that comprise it:

- Land clearance;
- Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases;
- Novel biota and their impact on biodiversity;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants;
- Predation by feral cats; and
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis.

Any approved threat abatement plans or advice associated with these items provides information to help landowners manage these threats and reduce their impacts to biodiversity. These can be found at <http://www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl>.

4 EXISTING PROTECTION

4.1 Extent of the community in conservation reserves

The Tasmanian Government provides information for how much of each listed threatened Tasmanian vegetation community occurs within conservation tenure (DPIPWE 2018a). About 977 hectares or 13% of the remaining ecological community occurred in formal public reserves (dedicated and other) (Table 2). About 2466 hectares or 32% of the remaining extent are currently within all forms of conservation tenure, including conservation covenants and stewardship or management agreements on private lands, with 68% of the remaining extent occurring outside reserves. This represents a reserved extent of approximately 3.2% of the original extent of this ecological community.

Table 2: Extent in reserves

Reserve type	ha	% of remaining extent	% of original extent
Reserves on Public Land			
Dedicated formal reserve	180	2.4%	0.2%
Other formal reserve	803	10.8%	1.0%
Informal public reserve	792	10.6%	1.0%
Reserves on Private Land			
Private sanctuary (perpetual)	10	0.1%	0.01%
Conservation Covenant (perpetual)	532	7.1%	0.7%
Conservation Covenant (variable term)	29	0.4%	0.04%
Other private reserves	121	1.6%	0.2%
TOTAL reserved	2465	33.1%	3.2%

Source: Extent of TASVEG unit WVI in DPIPWE (2018a)

4.2 Existing protection under state laws

'*Eucalyptus viminalis* wet forest' is listed as a threatened native vegetation community under Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.

The Tasmanian *Forest Practices Act 1985* places controls on the clearance and conversion of these threatened native vegetation communities. As part of administering the forest practices system, the Forest Practices Authority regulates the clearing and conversion of threatened native vegetation listed under the *Nature Conservation Act 2002*. A certified Forest Practices Plan (FPP) is required to authorise most land clearing, although there are some exemptions. Clearance and conversion of listed threatened native vegetation communities is generally not approved, unless exceptional circumstances exist.

The Tasmanian *Land Use Planning and Approvals Act 1993* (LUPAA) allows local governments to develop planning schemes, which use land zonation and codes to regulate development, land use activities and works. Most planning schemes include permit requirements relating to clearance and conversion or disturbance of threatened native vegetation communities where it is associated with works such as subdivision, infrastructure development, visitor accommodation and residential development.

The protection measures referred to here were valid at the time of writing. It is advisable to check with relevant government agencies (notably the Forest Practices Authority and relevant local councils) for any updated information.

4.3 Existing management plans

There is no existing management plan specifically for this ecological community, but a number of other plans and guidelines for managing bushland and threatened species habitats may be relevant. These include:

- Barnes RW and McCoull CJ (2002). *A land manager's guide for assessing and monitoring the health of Tasmania's forested bush*. *Nature Conservation Report 02/2*. Department of Primary Industries, Water and Environment, Hobart. Available from <https://dpiwwe.tas.gov.au/Documents/Nature-Conservation-Report-02-02.pdf>
- Bryant SL and Jackson J (1999). *Tasmania's threatened fauna handbook*. What, where and how to protect Tasmania's threatened animals. Threatened Species Unit, Parks and Wildlife Service, Hobart. Available from <https://dpiwwe.tas.gov.au/Documents/threatfauna.pdf>
- Kirkpatrick, J.B. & Gilfedder, L.A. (1999). *Tasmanian Bushcare Toolkit*. Department of Primary Industries, Water and Environment. Available from <https://dpiwwe.tas.gov.au/conservation/conservation-on-private-land/bush-information-management/tasmanian-bushcare-toolkit>
- DPIWWE [Department of Primary Industries, Parks, Water and Environment] (2011). *A planning toolkit for managing browsing and grazing losses from wallabies and brushtail possums on farms in Tasmania*. Tasmanian Government. Available from: <http://dpiwwe.tas.gov.au/Documents/Information-booklet-web.pdf>

5 THREATENED SPECIES SCIENTIFIC COMMITTEE RECOMMENDATIONS

5.1 Eligibility for listing against the EPBC Act criteria

On the basis of available information, it is recommended that the Tasmanian white gum (*Eucalyptus viminalis*) wet forest is eligible for listing as **critically endangered**. This was the highest conservation category met at the time of assessment.

5.1.1 Criterion 1 – decline in geographic distribution

Critically endangered.

Prior to European settlement Tasmanian white gum wet forest was mainly found in the central north (and to a lesser extent the north-west and north-east) where soil fertility and rainfall are both high, on deep well-drained soils with a low boulder content which develop along many of the river valleys. Its sporadic occurrence throughout the remainder of the state is most likely to be natural, otherwise remnant stands would be expected to be more common along river system and flats on fertile soils (Craven 2002).

Stands that occurred throughout the alluvial valleys of the midlands and northern coastal hinterlands have been extensively cleared (Williams and Potts 1996). Clearing was high due to the occurrence of this community on fertile soils suitable for agriculture and plantation development and the high quality of the timber for harvesting (Craven 2002).

The Tasmanian State of the Forests reports indicate a pre-European extent of ‘wet *E. viminalis* forest on basalt’ of 78,000 ha (FPA 2017). In 2017 the remaining extent was recorded as 3000 ha (FPA 2017). Tasmanian Native Vegetation Communities mapping indicates 7448 ha of the equivalent ‘*Eucalyptus viminalis* wet forest’ remained as at 2015 (DPIPWE 2018a). This represents a **very severe** decline of 90-95% since 1750.

5.1.2 Criterion 2 – limited geographic distribution coupled with demonstrable threat

Critically endangered.

The estimated total area of occupancy is around 7600 ha and median patch size is 2.5 ha, which is indicative of a **very restricted** distribution.

Table 3: Patch sizes

	Area	Number of patches
Median patch size	2.5 ha	
Patches < 1 ha	109 ha or 1.4%	275 or 30%
Patches 1 ha to < 5 ha	860 ha or 11%	344 or 37%
Patches 5 ha to < 10 ha	911 ha or 12%	125 or 14%
Patches 10 ha to < 20 ha	1098 ha or 14%	78 or 8.5%
Patches 20 ha to < 50 ha	2162 ha or 28%	72 or 8%
Patches over 50 ha	2466 ha or 32%	26 or 3%

Source: TASVEG unit WVI in DPIPWE (2013).

The present distribution of the ecological community is severely fragmented, with 81% of remnants being less than 10 ha and only 3% being above 50 ha, and an average edge density of 686m/ha. This highly fragmented distribution makes it very susceptible to edge effects and to the actions of various threats, particularly invasive species, climate impacts, and cumulative losses of patches. The collective action of these threatening processes have the potential to cause the loss of the ecological community in the **immediate future** (within three generations of *E. viminalis*).

5.1.3 Criterion 3 – decline of functionally important species

Critically endangered

The dominant canopy species, *Eucalyptus viminalis*, has undergone a decline in abundance along with losses of the ecological community. Although as a species it is not considered to be threatened at this time, it is subject to significant losses to ‘rural tree decline’ throughout Tasmania and on the mainland, and white gum trees are subject to significant decline within and without the ecological community due to ‘ginger tree syndrome’. *Eucalyptus viminalis* is known to be highly susceptible to stress due to climatic factors.

The widespread nature of ginger tree syndrome in Tasmania was noticed after high temperatures over several days since the 2012-13 summer (Mitchell 2015). Thousands to millions of trees are currently affected in northern Tasmania and *Eucalyptus viminalis* within the ecological community appears to have been particularly adversely affected, with significant mortality observed.

Climate change projections indicate an increasing frequency and intensity of heat waves in Tasmania (Grose et al 2010) and future climatic suitability modelling for *E. viminalis* (Harrison 2017) indicates that under a high emissions scenario consistent with current trajectories, around half of the ecological community’s current range may be unsuitable for the dominant canopy species by 2050 and around 80% may be unsuitable by 2080 (Table 4).

Table 4: Area of current WVI that remains as suitable habitat for *E. viminalis* under future climate scenarios

	Suitable 2010-2039	Suitable 2040-2069	Suitable 2070-2099
Area (ha)	4494	2629	956
% of current range	83%	49%	18%

Source: Harrison 2017; and TASVEG unit WVI in DPIPWE (2013)

The loss of live white gum trees, the dominant species in the canopy, is likely to substantially alter the character and function of the ecological community. This represents a **very severe decline** in a species that plays a major role in community structure and processes, such that restoration is unlikely to be possible in the immediate future (3 generations of *E. viminalis*).

5.1.4 Criterion 4 – reduction in community integrity

Endangered

The ecological community occurs mainly as scattered remnants, with very few old-growth stands or large stands remaining. Regrowth trees lack hollows that are found in older trees and therefore reduce the ecological complexity and functionality of the ecological community, particularly for hollow-dependant species. The Tasmanian State of the Forests report (FPA 2017) indicates continued losses are primarily of the remaining mature stands (Table 5).

Table 5: Hectares of VW remaining, by growth stage

	2002	2006	2012	2017	Change 2002 - 2017
Regeneration	30	30	0	50	gain of 20 ha (+67%)
Regrowth	1560	1530	1520	1520	loss of 40 ha (-3%)
Mature	1920	1510	1510	1310	loss of 610 ha (-32%)
Unknown	400	650	660	350	loss of 50 ha (-13%)
Total	3910	3720	3690	3230	loss of 680 ha (-17%)

Source: FPA 2017

The remaining ecological community is also highly fragmented, with an average edge density of 686m/ha and with the majority (over 86%) of the ecological community occurring within 100m of the edge of a patch and subject to edge effects. Over 80% of patches adjoin agricultural land, and over 37% of patches adjoin silviculture plantations (Source: TASVEG unit WVI in DPIPWE (2013)).

Patches often contain infestations of invasive species and relatively few patches of the ecological community can be considered viable in the long term without active management (Craven, 2002). The loss of canopy trees to ‘ginger tree syndrome’, and degradation of the understorey through too-frequent fire also contribute to a **severe** reduction in the integrity of the ecological community.

5.1.5 Criterion 5 – rate of continuing detrimental change

Critically endangered.

The five-yearly Tasmanian State of the Forests reports show the rate of continuing losses (from all causes) of this ecological community (Table 6).

Table 6: Percentage change in area of ‘wet *E. viminalis* forest on basalt’ as at 2017

Change in area since 2011	Change in area since 2006	Change in area since 2001	Change in area since 1996
-15%	-15.9%	-21.6%	-25.2%

Source: FPA 2017

These changes represent a continuing loss of around 1.5% a year since 1996. Since 2011 this loss has been around 2.5% per annum. This represents a loss of 15% to 25% over ten years. This equates to a **very severe** rate of detrimental change over the immediate past (3 generations of *E. viminalis*). The projected loss of climatic habitat, as discussed under Criterion 3, also represents a **very severe** disruption of important community processes over the immediate future (3 generations of *E. viminalis*). Thus the ecological community merits listing as **critically endangered** under this criterion.

5.1.6 Criterion 6 – quantitative analysis showing probability of extinction

Not eligible.

No quantitative analysis has been undertaken showing likelihood of extinction for this ecological community. Therefore there is insufficient information to determine eligibility against any category for this criterion.

5.2 Recovery plan recommendation

A recovery plan is not recommended for this ecological community at this time.

The main threats to the ecological community and the priority actions required to address them are largely understood.

The Conservation Advice sufficiently outlines the priority actions needed for this ecological community and many of the threats affecting the ecological community are best managed at a landscape scale, coordinated with management of other ecological communities. In addition, a number of existing documents are relevant to the management and/or recovery of this ecological community or the threats to it, outlined in section 3.

6 CONSERVATION OF THE ECOLOGICAL COMMUNITY

6.1 Identification of the ecological community

Tasmanian white gum wet forest intergrades with other vegetation types and ecological communities (see [section 6.1.2.6](#)). Key diagnostic characteristics are used to identify an area of native vegetation as being Tasmanian white gum wet forest, and define the features that distinguish it from other communities, noting that additional information to assist with identification is provided in the other sections of this document, particularly the description ([section 2](#)) and Appendix A - Species lists.

6.1.1 Key diagnostics

The key diagnostic characteristics are designed to allow identification of the ecological community irrespective of the season.

Areas of vegetation that do not meet the key diagnostics are not the nationally listed ecological community.

The ecological community is defined as patches of native vegetation that meet the following key diagnostic characteristics:

- Occurs within Tasmania, including the Furneaux group of islands.
- The tree canopy has a crown cover⁵ of 5% or more;
- The tree canopy is dominated⁶ by *Eucalyptus viminalis*.
- Has a wet forest understorey⁷, which is typically dominated⁸ by either:
 - ferns or broad-leaved (soft-leaved) trees or shrubs; or
 - tall tea-trees (*Leptospermum* spp) or paperbarks (*Melaleuca* spp); or
 - rainforest species;
 - and is NOT dominated⁸ by grasses, heaths or narrow-leaved shrubs.

6.1.2 Additional information to assist in identifying the ecological community

The following information should also be taken into consideration when applying the key diagnostic characteristics and condition classes and thresholds to assess a site that may include the ecological community. Landuse history, particularly fire history, will influence the state in which a patch of the ecological community is currently expressed.

⁵ Crown cover is measured as the projective foliage cover (area occupied by the vertical projection of foliage and branches) of all canopy species, not just *E. viminalis*.

⁶ A canopy dominated by *E. viminalis* occurs where *E. viminalis* is the most abundant tree in the canopy in terms of cover and/or stem density.

⁷ The understorey consists of all vegetation below the eucalypt canopy, including juvenile trees.

⁸ The dominant component of the understorey is the species (or group of species) that supply most of the cover.

6.1.2.1 IDENTIFYING A PATCH

A patch is a discrete and mostly continuous area of the ecological community, as defined by the key diagnostics, but can include small-scale variations, gaps and disturbances within this area. The smallest patch size that can be identified is 0.5 ha, as canopy and understorey dominance cannot reliably be identified for smaller areas than this. Where a larger forest area has been classified as a different forest type, localised areas of Tasmanian white gum wet forest greater than 0.5 ha may be present within this larger area (see Table 7).

6.1.2.2 BREAKS IN A PATCH

When it comes to defining a patch of the ecological community allowances are made for “breaks” up to 30 metres between areas that meet the key diagnostics. Such breaks may be the result of watercourses or drainage lines, tracks, paths, roads, gaps made by exposed areas of soil, leaf litter or cryptogams, and areas of localised variation in vegetation that do not meet the key diagnostics. Such breaks do not significantly alter the overall functionality of the ecological community and form a part of the patch. They should be included in the calculation of the size of the patch, and be taken into account when determining the overall condition of the patch.

For example, a single patch could include two areas of the ecological community that meet the key diagnostics, but which are separated by a narrow strip of riparian vegetation lining a watercourse.

Where there is a break in the ecological community of 30 metres or more (e.g. due to permanent artificial structures, wide roads or other barriers, water bodies or other types of vegetation) then the gap indicates that separate patches are present.

6.1.2.3 VARIATION WITHIN A PATCH

Patches of the ecological community may contain areas that vary in structural or biological characteristics. For example, one part of a patch may consist of mostly rainforest species, whereas another part of the same patch may be dominated by tree-ferns; or one part of a patch may have been more recently burnt and therefore at a different stage of regeneration. Variation in vegetation across a patch should not be considered to be evidence of multiple patches, so long as it meets the key diagnostics and minimum condition thresholds.

6.1.2.4 REVEGETATION AND REGROWTH

Revegetated or replanted sites or areas of regrowth are not excluded from the listed ecological community so long as the patch meets the key diagnostic characteristics and minimum condition thresholds above.

6.1.2.5 SURVEY REQUIREMENTS

Patches of the ecological community can vary markedly in their shape, size, condition and features. Thorough and representative on-ground surveys are essential to accurately assess the extent and condition of a patch. The Australian Soil and Land Survey Field Handbook (National Committee on Soil and Terrain, 2009), Forest Botany Manual (FPA 2005) and TASVEG vegetation condition manual (Michaels, 2006) provide guidance.

The size, number and spatial distribution of plots or transects must be adequate to represent variation across the patch. Sampling should address likely variation in species composition and significant variation in the vegetation (including areas of different condition), landscape qualities and management history (where known) across the patch.

Recording the search effort (identifying the number of person hours spent per plot/transect and across the entire patch; along with the surveyor's level of expertise and limitations at the time of survey) is useful for future reference.

Whilst identifying the ecological community and its condition is possible at most times of the year, consideration must be given to the role that season, rainfall and disturbance history may play in an assessment. For example, after a fire one or more vegetation layers, or groups of species (e.g. obligate seeders), may not be evident for a time. Timing of surveys should allow for a reasonable interval after a disturbance (natural or human-induced) to allow for regeneration of species to become evident, and be timed to enable diagnostic species to be identified. At a minimum, it is important to note climate conditions and what kind of disturbance may have happened within a patch, and when that disturbance occurred, as far as possible.

6.1.2.6 MAPPING AND VEGETATION CLASSIFICATIONS

There are a number of mapping and vegetation classification schemes used in Tasmania. Although none directly map areas of the ecological community according to the key diagnostics and minimum condition thresholds, they can still provide useful information on the likely occurrence of the ecological community. Appendix B - Relationship to other vegetation classification and mapping systems outlines the map units or classifications from a number of common mapping and classification systems that best relate to the ecological community.

Tasmanian white gum wet forest is not necessarily a discrete forest unit, but more commonly intergrades with other forest types. Wet forests form a continuum with rainforests following a gradient of increasing time since the last fire. Where drainage is impeded and soils infertile and poorly developed, wet forests form a continuum with wet scrubs dominated by sclerophyllous shrubs including tea-tree and paperbark. As moisture availability decreases wet forests intergrade with dry sclerophyll forests.

Patches of the ecological community are also often adjacent, or in close proximity, to other wet forest types. These other types of wet forest are typically distinguished from the ecological community by the dominance of eucalypt species other than *E. viminalis* in the tree canopy. Although other eucalypt tree species do occur in the ecological community alongside *E. viminalis*, they are not a dominant component of the tree canopy. For example, giant ash (*Eucalyptus regnans*) forest occupies similar sites and at higher altitudes mountain white gum (*E. dalrympleana*) replaces *E. viminalis* as the dominant eucalypt in the canopy. In the mid-altitudes, typically between 300 m and 600 m ASL, there can be a gradation between *E. viminalis* and *E. dalrympleana*, with intermediate forms common (Williams and Potts, 1996; Duncan, 1996).

E. viminalis also occurs as a dominant canopy species in other types of forests and woodlands in Tasmania. The ecological community does not occur as a grassy woodland and other forest types are distinguished from the ecological community by the understorey. The ecological community has a wet forest understorey that is dominated by ferns, broad-leaved shrubs or rainforest species. Other forests dominated by *E. viminalis* typically have dry sclerophyll understoreys dominated by narrow-leaved shrubs (or an equal mix of broad-leaved and narrow-leaved shrubs), grasses, sedges or heaths. Dry eucalypt forests with *E. viminalis* canopies also typically contain trees of numerous age classes, instead of the typical even-aged

canopy of the Tasmanian white gum wet forest. Table 7 outlines how the ecological community can be distinguished from a number of similar forest types in Tasmania.

Table 7: Key features distinguishing Tasmanian white gum wet forest from other forest types

TasVeg Code	Name	Key distinguishing features
The ecological community		
WVI	<i>Eucalyptus viminalis</i> wet forest	<ul style="list-style-type: none"> • Does not occur on King Island or the Furneaux islands • Canopy dominated by <i>E. viminalis</i>; <i>E. obliqua</i>, <i>E. delegatensis</i> or <i>E. regnans</i> may be subdominant • Canopy tall (>40 m) • Understorey mostly rainforest or broad-leaved trees or large shrubs, or ferns and/or graminoids • Equivalent to the ecological community
Other forest types that contains patches of the ecological community		
DVF	Furneaux <i>Eucalyptus viminalis</i> forest and woodland	<ul style="list-style-type: none"> • Only occurs on Furneaux Islands • Includes all types of <i>E. viminalis</i> dominated forest and woodland in the Furneaux Group • Patches with a wet sclerophyll understorey may be included in the ecological community
DOV	<i>Eucalyptus ovata</i> forest and woodland	<ul style="list-style-type: none"> • Typically dominated by <i>E. ovata</i>, but occasionally <i>E. viminalis</i> on more well-drained sites • Understorey is sedgy or scrubby and commonly dominated by tea-trees or paperbarks • Patches dominated by <i>E. viminalis</i> may be included in the ecological community
DSC	<i>Eucalyptus amygdalina</i> – <i>Eucalyptus obliqua</i> damp sclerophyll forest	<ul style="list-style-type: none"> • <i>E. amygdalina</i>, <i>E. obliqua</i>, <i>E. ovata</i> and <i>E. viminalis</i> common in the canopy, but no clear dominant eucalypt species • Depending on the mapping scale, patches of DSC may contain areas clearly dominated by <i>E. viminalis</i> that may be included in the ecological community when mapped at a finer scale.
Other wet eucalypt forests with significant <i>Eucalyptus viminalis</i> in the canopy		
WOB	<i>Eucalyptus obliqua</i> forest with broadleaf shrubs	<ul style="list-style-type: none"> • Canopy dominated by <i>E. obliqua</i>; <i>E. viminalis</i> may be co-dominant but not dominant in the canopy
WDB	<i>Eucalyptus delegatensis</i> forest with broadleaf shrubs	<ul style="list-style-type: none"> • Canopy dominated by <i>E. delegatensis</i>; <i>E. viminalis</i> may be sub-dominant, but not dominant in the canopy.
WGK	<i>Eucalyptus globulus</i> King Island Forest	<ul style="list-style-type: none"> • Only occurs on King Island
WDA	<i>Eucalyptus dalrympleana</i> forest	<ul style="list-style-type: none"> • Canopy dominated by <i>E. dalrympleana</i>, usually with <i>E. delegatensis</i> subdominant • <i>E. dalrympleana</i> grades into <i>E. viminalis</i> and may be difficult to differentiate the species. In the absence of clear distinguishing characteristics (typically juvenile leaves), these species should be treated as <i>E. viminalis</i> below 600 m ASL, and <i>E. dalrympleana</i> above this altitude

TasVeg Code	Name	Key distinguishing features
Dry eucalypt forests with significant <i>Eucalyptus viminalis</i> in the canopy		
DVG	<i>Eucalyptus viminalis</i> grassy forest and woodland	<ul style="list-style-type: none"> • Canopy dominated by <i>E. viminalis</i>. • Canopy low to medium height (<25m). • Understorey grassy, few understorey trees or large shrubs. • Areas of the ecological community that are subject to frequent fires, may have an open understorey dominated by <i>Pteridium esculentum</i>, which could appear similar to DVG. However, the ecological community has a low abundance of grasses and generally tall and straight trees, which distinguish it from DVG.
DVC	<i>Eucalyptus viminalis</i> – <i>E. globulus</i> coastal forest and woodland	<ul style="list-style-type: none"> • Canopy dominated by either <i>E. viminalis</i> or <i>E. globulus</i>. • Canopy low (<20m). • Understorey typically ground ferns, shrubs and sedges, few understorey trees or large shrubs.
DMW	Midlands woodland complex	<ul style="list-style-type: none"> • Canopy may be dominated by <i>E. viminalis</i>, <i>E. ovata</i> or <i>E. pauciflora</i>. • Canopy low to medium (<25m) and sparse (<20% cover). • Understorey grassy, few understorey trees or large shrubs.
DKW	King Island eucalypt woodland	<ul style="list-style-type: none"> • Only occurs on King Island • Canopy dominated by <i>E. viminalis</i> and/or <i>E. globulus</i> • Understorey scrub or tall heath

Source: Kitchener & Harris (2013)

6.1.2.7 OTHER NEARBY LISTED ECOLOGICAL COMMUNITIES

There are several other nationally listed threatened ecological communities that occur in or close to the same area as the Tasmanian white gum wet forest. Table 8 outlines these ecological communities and their status at the time of listing.

Table 8: Nationally listed threatened ecological communities

EPBC-listed ecological community	Status
Alpine Sphagnum Bogs and Associated Fens	Endangered
Eucalyptus ovata – Callitris oblonga Forest	Vulnerable
Lowland native grasslands of Tasmania	Critically endangered
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (<i>Eucalyptus ovata</i>/<i>E. brookeriana</i>)	Critically endangered

6.2 Regulated areas of the ecological community

National listing focuses legal protection on patches of the ecological community that are the most functional, relatively natural and in comparatively good condition. These patches are identified through *minimum condition thresholds*.

Condition classes are also used to distinguish between patches of Tasmanian white gum wet forest of different qualities, to aid environmental management decisions.

In order to be protected as a matter of national environmental significance areas of the ecological community must meet both:

- the key diagnostic characteristics ([section 6.1.1](#)) AND
- at least the minimum condition thresholds ([section 6.2.1](#)).

Table 9 outlines the different condition classes that apply to the ecological community. The minimum condition thresholds are designed to identify those patches that retain sufficient conservation values to be considered a matter of national environmental significance, to which the referral, assessment, approval and compliance provisions of the EPBC Act apply. These include all patches in Classes A and B.

Patches that do not meet the minimum condition thresholds (Class C) are excluded from protection under the EPBC Act. In many cases, the loss and degradation is irreversible because natural characteristics have been permanently removed. However, although not protected under the EPBC Act, many of these patches may still retain important natural values and may be protected through state and local laws or planning schemes.

In addition, patches that can be restored should not be excluded from recovery and other management actions. Suitable recovery and management actions may improve a patch's condition, such that it subsequently can be included as part of the ecological community fully protected under the EPBC Act. Management actions should be designed to restore patches to high quality condition where practical.

When assessing condition of a patch of the ecological community it is important to also consider the key diagnostics ([section 6.1.1](#)) and patch definition ([section 6.1.2.1](#)).

6.2.1 Condition classes and thresholds

The TASVEG *Vegetation Condition Manual* (Michaels, 2006) and vegetation community benchmarks (DPIPWE, 2016) provide a framework for assessing the condition of ecological communities in Tasmania. This framework provides the basis of the condition classes and thresholds that apply to this ecological community.

Table 9: Condition classes and thresholds

Condition class	Site Components	Minimum patch size
Class A – high quality Patches with close to or above the benchmark level for most measures.	Sites with 3 or more site components rated as Category 3	0.5 ha
Class B – moderate quality Patches approaching the benchmark level for most measures.	Sites not meeting Class A and with 3 or more site components rated as Category 2	2 ha
Class C – poor quality Patches with somewhat less than the benchmark level for most measures.	Sites with less than 3 site components rated as Category 2 or 3	Not included

Site component categories

Site Components	Category 1	Category 2	Category 3
Understorey ^A <i>Number of major life forms present</i>	Largely absent: <4 lifeforms present	Limited structural diversity: 4-5 lifeforms present	Obvious structural diversity: ≥6 lifeforms present
Recruitment ^B <i>Proportion of species present with immature specimens</i>	Absent: <30% of species showing adequate recruitment	Uncommon: 30% - 70% of species showing adequate recruitment	Common: >70% of species showing adequate recruitment
Lack of weeds ^C <i>% exotic cover</i>	Visually dominated by exotics: >25% cover	Easily observed exotics: 5% to 25% cover	Very rarely observed exotics: <5% cover
Large Trees ^D <i>Number/ha</i>	Largely absent: <5/ha	Few: 5-17/ha	Many: ≥18/ha
Tree canopy cover ^E <i>% cover</i>	Absent: <3% canopy cover	Scattered and sparse: 3% - 15% canopy cover	Complete: >15% canopy cover
Organic litter ^F <i>% cover</i>	Absent or <7% cover	low cover: 7%-35% cover	high cover: >35% cover
Logs ^G <i>m/ha</i>	Absent: <4m/0.1ha	Uncommon (occasional logs and/or stumps): 4-20m/0.1ha	Common (many large logs – large logs easily seen): >20m/0.1ha

Notes:

All site component measurements should be assessed as per the *TASVEG Vegetation Condition Manual* (Michaels, 2006).

^A Lifeforms are considered present when the following are met: Subcanopy trees and large shrubs (T) ≥4%cover; Medium and small shrubs (S) ≥1%cover; Herbs and orchids (H) ≥1specimen found; Large sedge/rush/sagglily (LSR) ≥1specimen found; Ground fern and fern allies (GF) ≥2%cover; Scrambler/Climber and Ephemerals (SCE) ≥1specimen found; Mosses and lichens (ML) ≥1specimen found.

^B Recruitment is assessed for medium and small shrubs (S), subcanopy trees and large shrubs (T), and canopy trees only. Adequate recruitment for a species is indicated by a number of recruits ≥10% the number of mature specimens. A recruit is defined as an immature plant that contains no evidence of flowering or fruiting material.

^C Exotics are measured as projective foliage cover of all non-indigenous species.

^D Large trees are trees with a DBH (diameter at breast height) of ≥80cm.

^E The canopy includes all trees >32m in height. Canopy cover is measured as projective foliage cover.

^F Litter is defined as dead organic material detached from the parent plant, including both coarse and fine plant debris, and material such as fallen leaves, twigs and small branches less than 10 cm diameter present at ground level.

^G Logs are defined as any dead timber fallen to the with a diameter ≥10 cm. Stumps ≥10 cm in diameter at the base and less than 1.3 m tall are also included. The total length includes all logs and stumps measured individually and added together.

6.2.2 Area critical to the survival

The habitat or areas most critical to the survival of the ecological community are those patches that are in the best condition (i.e. Class A in Table 9), and those patches with no sign of 'ginger tree syndrome' or other canopy dieback. These represent those parts of the ecological community closest to the benchmark state of the ecological community; they are the patches that retain the highest diversity and most intact structure and ecological function, and have the highest chance of persisting in the long-term.

However, this does not mean that areas that otherwise meet the minimum condition thresholds (i.e. Class B in Table 9) are unimportant for the survival of the ecological community. Many of these patches occur in locations or landscape positions that are particularly important for biodiversity or function and/or may contain suites of species or habitat features that are important in a regional or local context. Hence these areas can still be critical to the survival of the ecological community.

6.2.3 Areas of high value - surrounding environment and landscape context

Patches of the ecological community do not occur in isolation. The surrounding vegetation and other landscape considerations will also influence how important a patch is to the ecological community as a whole. Patches that are larger and less disturbed are likely to provide greater biodiversity value. Patches that are spatially linked, whether ecologically or by proximity, are particularly important as wildlife habitat and to the viability of those patches of the ecological community into the future. However, this still does not necessarily consider the full landscape context. For natural resource management activities or actions that may have 'significant impacts' and require approval under the EPBC Act, it is important to consider the whole environment surrounding patches of the ecological community.

For example, in heavily cleared areas, some patches that meet the minimum condition thresholds occur in isolation. Such patches require protection, and could benefit from revegetation activities to link them with other patches. In other areas, patches that are interconnected to other native vegetation may not, in their current state, meet the minimum condition thresholds, but have high conservation value. Such patches could benefit from restoration works to improve their condition so that they do meet the minimum condition thresholds.

Tasmanian white gum wet forest often occurs in association with other forest types. Patches of the ecological community that remain connected with other native forests have a better chance of future survival and restoration success, because connected patches are buffered from disturbance by the surrounding native vegetation.

The following indicators of high-value should be considered when assessing the impacts of proposed actions under the EPBC Act, or when determining priorities for protection, recovery, management and funding.

- Patches that meet, or are closest to the high quality (Class A) condition for this ecological community. These may be based on on-site observations or known past management history.
- Patches with no sign of 'ginger tree syndrome' or other canopy dieback, or in areas likely to be resilient to the impacts of climate change.

- Patches with a larger area to boundary ratio – such patches are more resilient to edge effect disturbances such as weed invasion and human impacts.
- Patches within or near to a larger native vegetation remnant and that contribute to a mosaic of vegetation types present at a site. Areas of mosaic native vegetation provide a wider range of habitats that benefit flora and fauna diversity. Other patches are important as linkages among remnants, acting as ‘stepping stones’ of native remnants in the landscape. Connectivity includes actual or potential connectivity to restoration works (e.g. native plantings).
- Patches that occur in areas where the ecological community has been most heavily cleared and degraded, or that are at the natural edge of its range, particularly where there is genetic distinction, or absence of some threats. These may include unique variants of the ecological community, e.g. with a unique flora and/or fauna composition, or a patch that contains flora or fauna that have largely declined across the broader ecological community or region.
- Patches that show evidence of recruitment of key native plant species or the presence of a range of age cohorts (including through successful assisted regeneration or management of sites). It is acknowledged, however, that the recruitment of many species, particularly *Eucalyptus viminalis*, may not occur in this community unless there is some disturbance, such as a fire.
- Patches with good faunal habitat as indicated by diversity of landscape, diversity of plant species and vegetation structure, diversity of age class, presence of movement corridors, mature trees (particularly those with hollows), logs, watercourses, etc.
- Patches containing nationally or Tasmanian-listed threatened species.
- Patches with high species richness, as shown by the variety of native understorey plant species, or high number of native fauna species (vertebrates and/or invertebrates).
- Patches with relatively low levels of weeds and feral animals or areas where these can be managed efficiently.

6.3 Principles and standards for conservation

To undertake priority actions to meet the conservation objective, the overarching principle is that it is preferable to maintain existing areas of the ecological community that are relatively intact and of high quality. There are good, practical reasons to do so. It is typically more cost-effective to retain an intact remnant than to allow degradation and then attempt to restore it or another area. The more disturbed and modified a patch of the ecological community, the greater the recovery effort that is required. Also, intact remnants are likely to retain a fuller suite of native plant and animal species, and ecological functions. Certain species may not be easy to recover in practice, if lost from a site.

This principle is highlighted in the *National Standards for the Practice of Ecological Restoration in Australia* (Standards Reference Group SERA, 2016):

“Ecological restoration is not a substitute for sustainably managing and protecting ecosystems in the first instance.

The promise of restoration cannot be invoked as a justification for destroying or damaging existing ecosystems because functional natural ecosystems are not transportable or easily rebuilt once damaged and the success of ecological restoration cannot be assured. Many projects that aspire to restoration fall short of reinstating reference ecosystem attributes for a range of reasons including scale and degree of damage and technical, ecological and resource limitations.”

Standards Reference Group SERA (2016) – Appendix 2.

The principle discourages ‘offsets’ where intact remnants are removed with an undertaking to set aside and/or restore other, lesser quality, sites. The destruction of intact sites represents a net loss of the functional ecological community because there is no guarantee all the species and ecological functions of the intact site can be replicated elsewhere.

Where restoration is to be undertaken, it should be planned and implemented with reference to the *National Standards for the Practice of Ecological Restoration in Australia*. These Standards guide how ecological restoration actions should be undertaken and are available online from the Standards Reference Group SERA (2016)⁹. They outline the principles that convey the main ecological, biological, technical, social and ethical underpinnings of ecological restoration practice.

6.4 Priority conservation and research actions

Priority actions are recommended for the abatement of threats and supporting recovery of the ecological community. They are designed to provide guidance for:

- planning, management and restoration of the ecological community by landholders, NRM and community groups and other land managers;
- conditions of approval for relevant controlled actions under the EPBC Act; and
- prioritising activities in applications for Australian Government funding programs.

Detailed advice on actions may be available in specific plans, such as management plans for weeds, fire or certain parks or regions. The most relevant are listed in section 4.3.

This conservation advice identifies priority conservation actions under the following key approaches:

- PROTECT the ecological community to prevent further losses;
- RESTORE the ecological community by active abatement of threats, appropriate management, restoration and other conservation initiatives;

⁹ Society for Ecological Restoration: www.seraustralasia.com/standards/contents.html

- COMMUNICATE, ENGAGE WITH AND SUPPORT people to increase understanding of the value and function of the ecological community and encourage their efforts in its protection and recovery; and
- RESEARCH AND MONITORING to improve our understanding of the ecological community and the best methods to aid its management and recovery.

These approaches overlap in practice; and form part of an iterative approach to management that includes research, planning, management, monitoring and review.

The actions below do not necessarily encompass all actions in detail that may benefit the ecological community. They highlight general but key actions required to at least maintain survival of the ecological community at the time of preparing this Conservation Advice.

6.4.1 *PROTECT the ecological community*

This key approach includes priorities intended to protect the ecological community by preventing further losses to extent and integrity.

- Remnants should be properly taken into account during the early stages of zoning and development planning decisions, including strategic planning documents at state, regional and local levels.
- Liaise with local councils and State authorities to ensure that cumulative impacts on the ecological community are reduced as part of broader strategic planning or large projects (e.g. road works, developments).
- Undertake activities to mitigate future climate change and therefore reduce the impacts of climate stress on this ecological community.

6.4.1.1 *CONSERVE REMAINING PATCHES*

There should be no further clearance and damage to this ecological community because it has been greatly reduced in its extent.

- Protect and conserve remaining areas of the ecological community.
- Avoid further clearance and destruction of the ecological community.
- Retain other native vegetation remnants, near patches of the ecological community, where they are important for connectivity, diversity of habitat and act as buffer zones between the ecological community and threats or development zones.
- Protect patches identified as of regional importance in formal conservation reserves. Consider other remnants for less formal conservation tenures, preferably ones that aim for protection over the long-term. This includes investigating formal conservation arrangements, management agreements and covenants to protect patches on private land. This is particularly important for larger patches or areas that link to other patches of native vegetation.
- Where regeneration is occurring, provide measures that will support the regeneration to maturity (e.g. provide fencing to minimise damage risk).
- Protect mature and over-mature trees and stags, particularly with hollows. Large and old trees may have numerous fissures that provide shelter; support diverse insects and their predators.

6.4.1.2 MANAGE ACTIONS TO MINIMISE IMPACTS

Apply the mitigation hierarchy to avoid, then mitigate, then offset potential impacts on the ecological community from development or other actions. The priority is to avoid further clearance and fragmentation of remnants with offsetting as the last resort.

- Plan projects to avoid the need to offset, by avoiding significant impacts to the ecological community.
- In circumstances where impacts cannot be totally avoided, then they should be minimised by:
 - retaining and avoiding damage to high quality patches, which should be managed to retain their benchmark state; and
 - protecting important habitat features, such as large mature trees or stags with hollows as these take many decades to develop and cannot be quickly replaced.
- Where impacts are unavoidable, offsets should be used as a last resort to compensate for the adverse impacts of the action deemed unavoidable. The outcomes of offsetting activities are generally highly uncertain. Any proposals considering offsets for this ecological community should aim to:
 - minimise the need to offset the ecological community by designing development around the ecological community and applying buffers;
 - retain medium and higher quality patches of the ecological community, rather than offset them (particularly with lower quality offset sites);
 - manage and protect offset areas in perpetuity in areas dedicated for conservation purposes - avoid risks that reduce may their size, condition and ecological function in the future;
 - select offset sites as close as possible to the impact site, to allow for local and regional variation in the ecological community;
 - increase the area and improve ecological function of existing patches, for example by enhancing landscape connectivity, habitat diversity and condition;
 - focus on the restoration of lower quality patches of the ecological community to achieve high quality condition (see Table 9);
 - extend protection to otherwise unprotected sites (e.g. sites that are currently too small or degraded to meet the minimum condition thresholds, but can reasonably be restored to a better, more intact condition that does meet the thresholds); and
 - monitor offset areas and the outcomes they deliver over the long-term, to manage them adaptively and improve understanding of the best ways to manage offsets to delivery biodiversity benefits.
- Minimise the risk of indirect impacts to the ecological community from actions outside but near to patches of the ecological community, for example avoid building fire-sensitive infrastructure in or immediately adjacent to patches of the community that will encourage fire-hazard reduction activities.

- Minimise the risk of gene pollution of *Eucalyptus viminalis* via hybridisation with plantation eucalypts (see FPA 2011) by appropriate planning and monitoring of plantations near to the ecological community.

6.4.1.3 APPLY BUFFER ZONES

- Protect and apply appropriate buffers, particularly of other native vegetation, around patches of the ecological community to minimise off-site impacts. A buffer zone is a contiguous area adjacent to a patch that is important for protecting the integrity of the ecological community. As the risk of indirect damage to an ecological community is usually greater where actions occur close to a patch, the purpose of the buffer zone is to minimise this risk by guiding land managers to be aware that the ecological community is nearby and take extra care. For instance, the buffer zone will help protect the root zone of edge trees and other components of the ecological community from spray drift (fertiliser, pesticide or herbicide sprayed in adjacent land), weed invasion, polluted water runoff and other damage. The best buffer zones are typically comprised of other native vegetation. Fire breaks and other asset protection zones do not typically provide a suitable buffer and should be additional to a vegetated buffer.
- The recommended minimum buffer zone is 30 m from the outer edge of the patch as this distance accounts for likely influences upon the root zone. A larger buffer zone (e.g. 100 m) should be applied, where practical, to protect patches that are of very high conservation value.

6.4.1.4 PREVENT THE INTRODUCTION AND SPREAD OF EXOTIC SPECIES

- Support strong border biosecurity and avoid importing or accidentally introducing invasive species and pathogens into Tasmania that may have a serious adverse impact on this ecological community.
- Prevent planting of known or potentially invasive species in gardens, developments and landscaping near the ecological community.
- Avoid the sale of known invasive species in areas where the ecological community occurs.
- When conducting activities in or around the ecological community, practice good biosecurity hygiene to avoid spreading weeds or pathogens (see DoE, 2015).
- Minimise unnecessary soil disturbance that may facilitate weed establishment.
- Prevent dumping of garden waste into bushland, especially in or near patches of the ecological community.
- If new incursions do occur, detect and control them early, as small infestations are more likely to be eradicated. This applies to weeds already present in Tasmania but new to a site, for example, spread of gorse, brooms, or blackberry. It also applies to weeds not yet present within Tasmania but likely to become an environmental problem if introduced.
- Limit or prevent access of grazing animals to patches of the ecological community (e.g. construct fences) where practicable.
- Prevent further introduction of feral animals and, where possible, contain pets in nearby residential areas.

6.4.2 RESTORE and MANAGE the ecological community

Because of the limited extent and remnant nature of this ecological community, relatively few patches can be considered to be viable in the long term without active management (Craven, 2002). The majority of stands are regrowth of 60-70 years, but with appropriate management and protection from fire at least some of the remaining stands should develop into old-growth forest in the future.

This key approach includes priorities to restore and maintain the remaining patches of the ecological community by active abatement of threats, appropriate management, restoration and other conservation initiatives.

- Liaise with landholders and undertake and promote programs that ameliorate threats such as grazing and human disturbance.
- Identify and prioritise other specific threats and undertake appropriate on-ground site management strategies where required.

6.4.2.1 MANAGE WEEDS, PESTS AND DISEASES

Implement effective integrated control and management techniques for weeds, pests and diseases affecting the ecological community and manage sites to prevent the introduction of new, or further spread of, invasive species.

- Implement strategic responses to rural tree dieback, in particular, implement preventative measures.
- Identify potential new weed incursions early and manage for local eradication, where possible.
- Prioritise weeds and patches for which management is most urgent.
- Target control of key weeds that threaten the ecological community using appropriate methods that avoid impacts to non-target species.
- Encourage appropriate use of local native plant species in developments in the region through local government and industry initiatives and best practice strategies.
- Ensure chemicals, or other mechanisms used to manage weeds, do not have significant adverse, off-target impacts on the ecological community.
- Control introduced pest animals through coordinated landscape-scale control programs

6.4.2.2 MANAGE TRAMPLING, BROWSING AND GRAZING

- Any grazing which may be occurring in the ecological community should cease and fencing may be required for exclusion of stock.
- Low level grazing, firewood cutting and other uses which may be acceptable in dry forests are not appropriate in this ecological community.
- Wet forest is of little use to graziers because it has little fodder, although it may be valuable for shelter in some situations. Heavy grazing can open up the understorey and allow the invasion of weeds such as blackberry (*Rubus* spp) that impact both the ecological community and adjacent agricultural land.

6.4.2.3 AVOID FIRE

- Being a wet forest, active burning of any kind would be inappropriate. Wet forest needs a fire every few hundred years to enable regeneration of the

eucalypts. However, frequent fire may eliminate broad-leaved understories, altering the composition of the ecological community.

6.4.2.4 UNDERTAKE RESTORATION

- Undertake restoration, including bush regeneration and revegetation, of poorer and medium quality patches to restore them to high quality, including restoration of patches that don't currently meet the minimum condition thresholds for protection to a condition that does (see Table 9).
 - Maintain stags, logs, and mature and old-growth trees with hollows as they provide important habitat for fauna.
 - Use local native species in restoration/revegetation projects for the ecological community and restore understorey vegetation to a structure and diversity appropriate to the site.
 - In general, use locally collected seeds, where available, to revegetate native plant species. However, choosing sources of seed closer to the margins of their range may increase resilience to climate change.
 - Ensure commitment to follow up after planting, such as the care of newly planted vegetation by watering, mulching, weeding and use/removal of tree guards.
 - Consider the landscape context and other relevant species and communities when planning restoration works. For example, ensure adjacent ecological communities and threatened and migratory species are not adversely impacted by tree planting or other restoration activities for the ecological community.
- Implement effective adaptive management regimes using information from available research and management guidelines, for example, see the *National Standards for the Practice of Ecological Restoration in Australia* (Standards Reference Group SERA, 2016), relevant research or advice from local authorities.

6.4.3 COMMUNICATE, engage with and support

This key approach includes priorities to promote the ecological community to build awareness and encourage people and groups to contribute to its recovery. This includes communicating, engaging with and supporting the public and key stakeholders to increase their understanding of the value and function of the ecological community and to encourage and assist their efforts in its protection and recovery. Key groups to communicate with include landholders, land managers, land use planners, researchers, community members and Indigenous communities.

6.4.3.1 RAISE AWARENESS

- Communicate with landholders/managers, relevant agencies and the public to emphasise the value of the ecological community, the key threats, its significance, and appropriate management. Encourage landholders to talk with local NRM organisations and other knowledgeable groups.
- Undertake effective community engagement and education to highlight the importance of minimising disturbance (e.g. during recreational activities) and of minimising pollution and littering (e.g. via signage).

- Inform landholders about incentives, such as conservation agreements, stewardship projects, funding and government NRM programs etc. that may apply to help look after sites on private lands.

6.4.3.2 *PROVIDE INFORMATION*

- Develop education programs, information products and signage to help the public recognise the presence and importance of the ecological community, and their responsibilities under state and local regulations and the EPBC Act.
- Install signage to discourage damaging activities such as the removal of dead timber, dumping garden waste and other rubbish, creating informal paths and tracks, and the use of off-road vehicles in patches of the ecological community.
- Install significant vegetation markers along roads to designate areas of the ecological community to protect and prevent inappropriate road side maintenance from occurring.
- Promote knowledge about local weeds and what garden plants to avoid planting. Recommend local native species for revegetation and landscaping or safe alternative garden plants.

6.4.3.3 *COORDINATE EFFORTS*

- Encourage local participation in restoration and 'landcare' efforts through local conservation groups, creating 'friends of' groups, field days and planting projects, etc.
- Liaise with local fire management authorities and agencies and engage their support in fire management of the ecological community. Ensure land managers are given information about how to manage fire risks to conserve any threatened species and ecological communities.
- Support opportunities for traditional owners or other members of the Indigenous community to manage the ecological community.
- Promote awareness and protection of the ecological community with relevant agencies and industries. For example with:
 - state and local government planning authorities, to ensure that planning takes the protection of remnants into account, with due regard to principles for long-term conservation;
 - land owners and developers, to minimise threats associated with land conversion and development;
 - local councils and state authorities, to ensure infrastructure or development works involving substrate or vegetation disturbance do not adversely impact the ecological community. This includes avoiding the introduction or spread of weeds;

6.4.4 *RESEARCH and monitoring*

This key approach includes priorities for research into the ecological community, and monitoring, to improve understanding of the ecological community and the best methods to aid its recovery through restoration and protection. Relevant and well-targeted research and other information gathering activities are important in informing the protection and management of the ecological community.

6.4.4.1 GINGER TREE SYNDROME

- Undertake research into the causes of 'ginger tree syndrome' and possible methods to limit its damage, or to restore affected patches.
- Undertake surveys to measure and monitor the extent of 'ginger tree syndrome'.

6.4.4.2 MAPPING

- Collate existing vegetation mapping information and associated data for this ecological community and identify gaps in knowledge.
- Comprehensively map the extent and condition of the ecological community across its range:
 - support field survey and interpretation of other data such as aerial photographs and satellite images to more accurately document current extent, condition, threats, function, presence and use by regionally significant or threatened species.
 - support and enhance existing programs to model the pre-1750 extent across the entire range of the ecological community to inform restoration;
 - identify the most intact, high conservation value remnants and gain a better understanding of variation across the ecological community.
- Undertake or support and enhance survey programs to:
 - Improve mapping of sites where the ecological community is known or likely to be present.
 - Conduct targeted field surveys and ground-truth to fill data gaps and clarify the presence and condition of remnants.
 - Identify where the best, high quality remnants of the ecological community occur.

6.4.4.3 OPTIONS FOR MANAGEMENT

- Investigate key ecological interactions, such as the role of fauna in pollination, seed dispersal and nutrient cycling.
- Research into appropriate and integrated methods to manage pests and weeds that affect the ecological community.
- Assess the vulnerability of the ecological community to climate change and investigate ways to improve resilience through other threat abatement and management actions.
- Conduct research leading to the development of effective landscape-scale restoration techniques for the ecological community. Investigate the interaction between disturbance types, such as fire and invasion by weeds and feral animals, to determine how an integrated approach to threat management can be implemented.
- Investigate the most cost-effective options for restoring landscape function, including re-vegetation or assisted regeneration of priority areas, potentially buffering, connecting and protecting existing remnants.

6.4.4.4 MONITORING

- It is important that any monitoring is planned before management commences and considers what data are required to address research questions. Monitoring must also be resourced for management activities, especially for those using a novel approach, and applied during and following the management action.
 - Monitor for signs of decline, in terms of known problems e.g. ‘ginger tree syndrome’, and new incursions, e.g. myrtle rust.
 - Monitor changes in the condition, composition, structure and function of the ecological community, including response to all types of management actions and use this information to increase understanding of the ecological community and inform recommendations for future management.

7 REFERENCES

- Aboriginal Heritage Tasmania (2019). *Aboriginal Diet*. Available from: <https://www.aboriginalheritage.tas.gov.au/cultural-heritage/aboriginal-diet>
- ABS [Australian Bureau of Statistics] (2000) *Feature Article: Palawa Story*. Tasmania Year Book. Available from: <http://www.abs.gov.au/ausstats/abs@.nsf/7d12b0f6763c78caca257061001cc588/3f2a34f97b0d1729ca256c32002417b6!OpenDocument>
- AIATSIS [Australian Institute of Aboriginal and Torres Strait Islander Studies] (1996). *AIATSIS map of Indigenous Australia*. Available from: <http://aiatsis.gov.au/explore/articles/aiatsis-map-indigenous-australia>
- Australian National Botanic Gardens (2000). *Aboriginal Plant use and Technology*. Available from http://www.anbg.gov.au/gardens/education/programs/pdfs/aboriginal_plant_use_and_technology.pdf
- Barnes RW and McCoull CJ (2002). *A land manager’s guide for assessing and monitoring the health of Tasmania’s forested bush*. *Nature Conservation Report 02/2*. Department of Primary Industries, Water and Environment, Hobart. Available from <https://dpiwve.tas.gov.au/Documents/Nature-Conservation-Report-02-02.pdf>
- Bland, L., Keith, D., Miller, R., Murray, N. and Rodriguez, J. (eds) (2016). *Guidelines for the application of IUCN Red List of Ecosystem Categories and Criteria, Version 1*. IUCN, Switzerland. Available from <https://www.iucn.org/es/content/guidelines-application-iucn-red-list-ecosystems-categories-and-criteria>
- Bryant SL and Jackson J (1999). *Tasmania’s threatened fauna handbook*. What, where and how to protect Tasmania’s threatened animals. Threatened Species Unit, Parks and Wildlife Service, Hobart. Available from <https://dpiwve.tas.gov.au/Documents/threatfauna.pdf>
- Craven, B (2002). *Revised distribution and conservation status of Eucalyptus viminalis wet forest in Tasmania – report to the Scientific Advisory Group for the Private Forest Reserves Program*. Department of Primary Industries, Water and the Environment, Hobart.

- DoE [Department of the Environment] (2012). *Interim Biogeographic Regionalisation for Australia (Subregions - States and Territories) v. 7*. Available from <http://intspat01.ris.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7BB052189-DBEC-49C0-B735-71818899DA01%7D>
- DoE [Department of the Environment] (2015). *Arrive Clean, Leave Clean. Guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems*. Commonwealth of Australia. Available from <https://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean>
- DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2011). *A planning toolkit for managing browsing and grazing losses from wallabies and brushtail possums on farms in Tasmania*. Tasmanian Government. Available from: <http://dpiipwe.tas.gov.au/Documents/Information-booklet-web.pdf>
 DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2013) *TASVEG 3.0*, Released November 2013. Tasmanian Vegetation Monitoring and Mapping Program, Resource Management and Conservation Division.
- DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2016). *Vegetation Benchmarks – Wet eucalypt forest and woodland*. Tasmanian Government. Available from https://dpiipwe.tas.gov.au/Documents/All_Wet_forest_benchmarks_R3.pdf
- DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2018a). *General Vegetation Reserve Report June 2018 including Threatened Communities*. Tasmanian Government. Available from <https://dpiipwe.tas.gov.au/conservation/development-planning-conservation-assessment/planning-tools/tasmanian-reserve-estate-spatial-layer>
- DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2018b). *Tasmanian Threatened Native Vegetation Communities – Eucalyptus viminalis wet forest*. Tasmanian Government. Available from <https://dpiipwe.tas.gov.au/Documents/25.%20Eucalyptus%20viminalis%20wet%20forest.pdf>
- DPIPWE [Department of Primary Industries, Parks, Water and Environment] (2019) *Natural Values Atlas*, Authoritative, comprehensive information on Tasmania's natural values. Tasmanian Government. <https://www.naturalvaluesatlas.tas.gov.au/>
- DPIWE [Department of Primary Industries, Water and Environment] (2000) *Threatened Species Strategy for Tasmania*. Tasmanian Government. Available from <https://dpiipwe.tas.gov.au/Documents/threatspstrat.pdf>
 Duncan, F. (1996). *A field key to Tasmanian species of eucalypts*. *Tasforests* 8: 27-38.
- FPA [Forest Practices Authority] (2005). *Forest Botany Manual*. Forest Practices Authority, Tasmania. Available from https://www.fpa.tas.gov.au/fpa_services/planning_assistance/advisory_planning_tools/forest_botany_manual

- FPA [Forest Practices Authority] (2011). *Flora Technical Note No 12 Management of gene flow from plantation eucalypts*. Forest Practices Authority, Tasmania.
- FPA [Forest Practices Authority] (2012). *Review of Threatened Fauna Adviser. Background Report 2 Review of Information on Species and Management Approach*. Forest Practices Authority & Threatened Species Section (DPIPWE), Hobart. Available from: https://www.fpa.tas.gov.au/data/assets/pdf_file/0019/111493/Background_document_2_for_TFA_2012.pdf
- FPA [Forest Practices Authority] (2017) *State of the Forests Tasmania 2017*. Tasmanian Government. Available from http://www.fpa.tas.gov.au/data/assets/pdf_file/0005/163418/State_of_the_Forests_Report_2017_-_erratum_Feb_2018.pdf
- Grose, M., Barnes-Keoghan, I., Corney, S., White, C., Holz, G., Bennet, J, Gaynor, S. and Bindoff, N (2010). *Climate Futures for Tasmania: general climate impacts technical report*. Antarctic Climate & Ecosystems Cooperative Research Centre, Hobart, Tasmania.
- Harrison, P. A. (2017). *Integrating climate change into conservation and restoration strategies: the case of the Tasmanian eucalypts*. (Doctor of Philosophy PhD thesis), University of Tasmania, Hobart, Tasmania.
- Jackson, W.D. (1981) *Fire patterned vegetation*. In: W.D. Jackson (ed.) *The vegetation of Tasmania*. University of Tasmania, Hobart, pp 17-35.
- Kirkpatrick, J.B. & Gilfedder, L.A. (1999). *Tasmanian Bushcare Toolkit*. Department of Primary Industries, Water and Environment. Available from <https://dPIPWE.tas.gov.au/conservation/conservation-on-private-land/bush-information-management/tasmanian-bushcare-toolkit>
- Kirkpatrick, J.B., Peacock, R.J., Cullen, P.J. and Neyland, M.G. (1988). *The Wet Eucalypt Forests of Tasmania*. Tasmanian Conservation Trust.
- Kitchener, A. & Harris, S. (2013). *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation*. Edition 2. Department of Primary Industries, Parks, Water and Environment, Tasmania. Available from <http://dPIPWE.tas.gov.au/conservation/flora-of-tasmania/from-forest-to-fjaeldmark-descriptions-of-tasmanias-vegetation>
- Low, T. (1988). *Wild Food Plants of Australia*.
- Mesibov, R. & Ruhberg, H. (1991). *Ecology and Conservation of Tasmanipatus barretti and T. anophthalmus, parapatric onychophorans (Onychophora: Peripatopsidae) from northeastern Tasmania*. Papers and Proceedings of the Royal Society of Tasmania, Volume 125 pp11-16. Available from <https://eprints.utas.edu.au/13753/1/1991-mesibov-ecology-and-conservation.pdf>
- Michaels, K. (2006). *A Manual for Assessing Vegetation Condition in Tasmania, Version 1.0*. Resource Management and Conservation, Department of Primary Industries, Water and Environment, Hobart.
- Mitchell, I. (2015). *Ginger tree syndrome*. In: The Running Postman December 2015 – Newsletter of the Private Land Conservation Program. Department of Primary Industries, Parks, Water and Environment, Tasmania.

- National Committee on Soil and Terrain (2009). The Australian Soil and Land Survey Field Handbook. CSIRO.
- Proceedings of the Royal Society of Tasmania. pp. 279-305. Available from: <http://eprints.utas.edu.au/16495/>
- Plants of Tasmania Nursery (2019). *Edible Plants*. Available from http://www.potn.com.au/edible_plants.html. Viewed June 2019.
- Standards Reference Group SERA (2016). *National Standards for the Practice of Ecological Restoration in Australia*. Standards Reference Group. Available from <http://www.seraustralia.com/pages/standards.html>
- Specht, R.L. (1970) Vegetation. Pages 44–67 in Leeper, G.W. (ed.), "Australian Environment", 4th edn. Melbourne University Press, Melbourne
- Taroon Environment Network (2019). Native plants. Available from: <http://www.ten.org.au/native-plants>
- Williams, KJ and Potts, BM (1996) *The natural distribution of Eucalyptus species in Tasmania*. *Tasforests* 8, p39-165.

8 APPENDIX A - SPECIES LISTS

Scientific names are nationally accepted names as per the Atlas of Living Australia, as at the time of writing.

These species are considered to be characteristic or frequent based on the sources cited. The species listed may not necessarily be present in any given patch of the ecological community, and other native species not listed here may be present. The total list of species that may be found in the ecological community is considerably larger than the species listed here.

8.1 Flora

Table 10: Characteristic, frequently occurring or threatened flora

Scientific name	Common name/s	EPBC status ¹⁰	Tasmanian status ¹¹
Canopy tree species			
<i>Eucalyptus viminalis</i>	White gum, manna gum		
<i>Eucalyptus amygdalina</i>	Black peppermint		
<i>Eucalyptus dalrympleana</i>	Mountain white gum		
<i>Eucalyptus delegatensis</i>	Gumtopped stringybark		
<i>Eucalyptus obliqua</i>	Stringybark		
<i>Eucalyptus ovata</i>	Black gum		
<i>Eucalyptus regnans</i>	Giant ash		
Understorey tree and shrub species			
<i>Acacia dealbata</i>	Silver wattle		
<i>Acacia melanoxylon</i>	blackwood		
<i>Acacia verticillata</i>	Prickly moses		
<i>Atherosperma moschatum</i>	Sassafras		
<i>Bedfordia salicina</i>	Tasmanian blanketleaf		
<i>Bursaria spinosa</i>	Prickly box		
<i>Cassinia aculeata</i>	Dollybush		
<i>Coprosma quadrifida</i>	Native currant, prickly currant-bush		
<i>Exocarpos cupressiformis</i>	Native cherry		
<i>Leptospermum lanigerum</i>	Woolly teatree		
<i>Leptospermum scoparium</i>	Common teatree		
<i>Lomatia tinctoria</i>	Guitarplant		
<i>Melaleuca ericifolia</i>	Coast paperbark		
<i>Melaleuca squarrosa</i>	Scented paperbark		
<i>Monotoca glauca</i>	Goldey wood		
<i>Nothofagus cunninghamii</i>	Myrtle beech		
<i>Olearia argophylla</i>	Musk daisybush		
<i>Olearia lirata</i>	Forest daisybush		
<i>Pittosporum bicolor</i>	Cheesewood		
<i>Pomaderris apetala</i>	Common dogwood		
<i>Pultenaea juniperina</i>	Prickly beauty		
<i>Sambucus gaudichaudiana</i>	white elderberry		
<i>Zieria arborescens</i>	stinkwood		
Fern species			
<i>Asplenium appendiculatum</i> subsp <i>appendiculatum</i>	Ground spleenwort		
<i>Asplenium bulbiferum</i>	Mother spleenwort		

¹⁰ Species listed under the EPBC Act at the time this document was prepared. Source: <https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

¹¹ Species listed under the Tasmanian *Threatened Species Protection Act 1995* at the time this document was prepared. Source: <https://dpipwe.tas.gov.au/conservation/threatened-species-and-communities/lists-of-threatened-species>

Scientific name	Common name/s	EPBC status ¹⁰	Tasmanian status ¹¹
<i>Asplenium flabellifolium</i>	Butterfly fern; necklace fern		
<i>Blechnum cartilagineum</i>	Gristle fern		Vulnerable
<i>Blechnum nudum</i>	Fishbone waterfern		
<i>Blechnum watsii</i>	hard water fern		
<i>Crepidomanes venosum</i>	bristle filmyfern		
<i>Cyathea australis</i>	rough tree fern		
<i>Dicksonia antarctica</i>	Soft treefern		
<i>Histiopteris incisa</i>	bat's wing fern		
<i>Hymenophyllum australe</i>	southern filmyfern		
<i>Hymenophyllum cupressiforme</i>	common filmy fern		
<i>Hymenophyllum flabellatum</i>	shiny filmy fern		
<i>Hymenophyllum rarum</i>	narrow filmyfern		
<i>Hypolepis rugosula</i>	ruddy ground fern		
<i>Microsorium pustulatum</i>	Kangaroo fern		
<i>Notogrammitis billardi</i>	Common finger fern; strap fern		
<i>Polystichum proliferum</i>	Mother shieldfern		
<i>Pteridium esculentum</i>	Bracken		
<i>Rumohra adiantiformis</i>	leather fern; iron fern; leathery shieldfern		
Herb and orchid and sedge/graminoid species			
<i>Acaena novae-zelandiae</i>	Common buzzy		
<i>Gahnia grandis</i>	cutting grass		
<i>Gahnia sieberiana</i>	redfruit sawsedge		
<i>Gonocarpus teucroides</i>	Forest raspwort		
<i>Hydrocotyle hirta</i>	Hairy pennywort		
<i>Lepidosperma ensiforme</i>	arching sword-sedge		
<i>Lepidosperma elatius</i>	tall sword-sedge		
<i>Lomandra longifolia</i>	sagg		
<i>Oxalis perennans</i>	Grassland woodsorrel		
<i>Stellaria spp</i>	starwort		
<i>Urtica incisa</i>	scrub nettle; stinging nettle		
Scrambler/climber/epiphyte species			
<i>Clematis aristata</i>	Mountain clematis (climber)		

Sources: Kitchener and Harris (2013), Kirkpatrick & Gilfedder (1999), DPIPWE (2018b), DPIPWE (2016), FPA (2005), Kirkpatrick et al (1988)

8.2 Fauna

Table 11: Fauna recorded in Tasmanian white gum wet forest

Scientific name	Common name/s	EPBC status ¹⁰	Tasmanian status ¹¹
Mammals and monotremes			
<i>Bettongia gaimardi</i>	Tasmanian bettong		
<i>Cercartetus lepidus</i>	Tasmanian pygmy possum		
<i>Chalinolobus morio</i>	chocolate wattled bat		
<i>Dasyurus maculatus</i>	spotted-tail quoll	Vulnerable	Rare
<i>Dasyurus viverrinus</i>	eastern quoll	Endangered	
<i>Hydromys chrysogaster</i>	water rat		
<i>Isodon obesulus</i>	southern brown bandicoot		
<i>Notamacropus rufogriseus</i>	red-necked wallaby		
<i>Nyctophilus geoffroyi</i>	lesser long-eared bat		
<i>Nyctophilus gouldi</i>	Gould's long-eared bat		
<i>Ornithorhynchus anatinus</i>	platypus		
<i>Perameles gunnii</i>	eastern barred bandicoot		
<i>Potorous tridactylus</i>	long-nosed potoroo		

Scientific name	Common name/s	EPBC status ¹⁰	Tasmanian status ¹¹
<i>Pseudocheirus peregrinus</i>	common ringtail possum		
<i>Sarcophilus harrisi</i>	Tasmanian devil	Endangered	Endangered
<i>Tachyglossus aculeatus</i>	Short-Beaked Echidna		
<i>Thylogale billardierii</i>	Tasmanian pademelon		
<i>Trichosurus vulpecula</i>	common brushtail possum		
<i>Vespadelus regulus</i>	southern forest bat		
<i>Vespadelus vulturnus</i>	little forest bat		
<i>Vombatus ursinus</i> subsp. <i>tasmaniensis</i>	wombat		
<i>Vombatus ursinus</i> subsp. <i>ursinus</i>	Flinders Island wombat		
Birds			
<i>Acanthornis magna</i>	scrubtit		
<i>Accipiter novaehollandiae</i>	grey goshawk, white goshawk		Endangered
<i>Alcedo azurea</i>	azure kingfisher	Endangered	Endangered
<i>Aquila audax</i> subsp. <i>fleayi</i>	Tasmanian wedge-tailed eagle	Endangered	Endangered
<i>Calyptorhynchus funereus</i>	yellow-tailed black cockatoo		
<i>Falco peregrinus</i>	peregrine falcon		
<i>Ninox novaeseelandiae</i>	southern boobook		
<i>Pardalotus quadragintus</i>	forty spotted pardalote	Endangered	Endangered
<i>Pardalotus striatus</i>	striated pardalote		
<i>Petroica rodinogaster</i>	pink robin		
<i>Tyto novaehollandiae</i> subsp. <i>castanops</i>	masked owl	vulnerable	endangered
Reptiles and Amphibians			
<i>Carinascincus pretiosus</i>	Tasmanian tree skink		
<i>Geocrinia laevis</i>	Tasmanian smooth frog		
<i>Litoria ewingii</i>	brown tree frog		
Invertebrates			
<i>Anoglypta launcestonensis</i>	north east forest snail		
<i>Astacopsis gouldi</i>	giant freshwater crayfish		
<i>Charopidae 'Skemps'</i>	Skemps snail		
<i>Engaeus granulatus</i>	Central North burrowing crayfish	Endangered	Endangered
<i>Engaeus orramakunna</i>	Mt Arthur burrowing crayfish	Vulnerable	Vulnerable
<i>Engaeus fossor</i>	a burrowing crayfish		
<i>Engaeus tayatea</i>	a burrowing crayfish		
<i>Engaeus yabbimunna</i>	Burnie burrowing crayfish	Vulnerable	Vulnerable
<i>Helicarion rubicundus</i>	Burgundy snail		rare
<i>Ooperipatellus cryptus</i>	northwest velvet worm		
<i>Parvotettix goedei</i>	a cave cricket		
<i>Styloniscus nicholli</i>	a woodlice		
<i>Tasmanipatus barretti</i>	giant velvet worm		Rare

Sources: Bryant and Jackson (1999), Mesibov & Ruhberg (1991), FPA (2012), Kirkpatrick & Gilfedder (1999), DPIPWE (2019)

9 APPENDIX B - RELATIONSHIP TO OTHER VEGETATION CLASSIFICATION AND MAPPING SYSTEMS

Ecological communities are complex to classify. Tasmania applies its own system to classify vegetation communities. Reference to vegetation and mapping units as equivalent to the ecological community, at the time of listing, should be taken as indicative rather than definitive. A unit that is generally equivalent may include elements that do not meet the key diagnostics and minimum condition thresholds. Conversely, areas mapped or described as other units may sometimes meet the key diagnostics for Tasmanian white gum wet forest. Judgement of whether the ecological community is present at a particular site should focus on how the site meets the description (section 2), the key diagnostic characteristics (section 6.1.1) and minimum condition thresholds (section 6.2.1).

Tasmanian vegetation mapping units are not the ecological community being listed. However, for many sites (but not all) certain vegetation map units will correspond sufficiently to provide indicative mapping for the national ecological community, where the description matches.

On-ground assessment is vital to finally determine if any patch is part of the ecological community.

9.1 TASVEG classification

Tasmania has a comprehensive state-wide vegetation classification system. The vegetation community descriptions for the system are outlined in Kitchener and Harris (2013), and these units are mapped, generally at a scale of 1:25 000, for the Tasmanian vegetation map known as TASVEG. TASVEG groups vegetation into about nine broad categories, each of which is divided into several separate ecological communities. It includes a modified lands category that identifies those areas converted to agricultural production, forestry, urban and similar land uses. Many of the eucalypt forest and woodland communities are identified primarily by the eucalypt species that is dominant in the tree canopy, supplemented by the general structure of the understorey.

The Tasmanian white gum wet forest corresponds best to the TASVEG unit identified as:

- WVI – *Eucalyptus viminalis* wet forest.

This unit is classified within the 'wet eucalypt forest and woodland' category.

The ecological community may also include (see Table 7):

- the wet forest components of DVF - *Eucalyptus viminalis* Furneaux forest and woodland;
- the *E. viminalis*-dominated components of DOV - *Eucalyptus ovata* forest and woodland; and
- locally *E. viminalis*-dominant patches in DSC - *Eucalyptus amygdalina* - *Eucalyptus obliqua* damp sclerophyll forest.

Discrete patches dominated by particular tree species can be hard to distinguish within complex mosaic vegetation, and many potential sites remain to be ground-truthed. Some patches of the ecological community may be currently classified as another TASVEG unit because the patch was too small or the vegetation mosaic

sufficiently complex to allow reclassification. In short, the key TASVEG unit WVI likely comprise most of the ecological community's extent. Areas mapped as other units are likely to collectively account for mostly smaller patches and only a low proportion of the ecological community's total extent.

9.2 Regional Forest Agreement forest types

The TASVEG system built upon earlier vegetation studies and classifications, as detailed by Kitchener and Harris (2013). The most relevant previous system, in terms of practical application for forestry purposes, is that prepared for the Tasmanian *Regional Forest Agreement* (RFA) in the mid-1990s. The Tasmanian RFA identified the forest types that required protection from further clearing and areas to be reserved. The status of the identified forest types are reported on in Forest Practices Authority annual reports and five-yearly *State of the Forests* reports. The forest type included in these reports that most closely aligns with the ecological community is the:

- Wet *Eucalyptus viminalis* forest on basalt (VW).

This comprises five floristic communities, as defined by earlier classification systems and later adopted by the forest practices system in the Forest Botany Manual (FPA 2005):

- WET-VIM0011 – *Eucalyptus viminalis* – *Bedfordia salicina* – *Pultenaea juniperina* wet sclerophyll forest
- WET-VIM0100 – *Eucalyptus viminalis* – *Acacia dealbata* – *Pomaderris apetala* wet sclerophyll forest
- WET-VIM0101- *Eucalyptus viminalis* – *Acacia dealbata* – *Dicksonia antarctica* wet sclerophyll forest
- WET-VIM111 – *Eucalyptus viminalis* – *Nothofagus cunninghamii* – *Atherosperma moschatum* – *Dicksonia antarctica* mixed forest
- WET-VIM2 - *Eucalyptus viminalis* – *Melaleuca* spp. – *Leptospermum* spp. wet sclerophyll forest (where *E. viminalis* is dominant in the canopy)

9.3 Tasmanian threatened native vegetation communities

Tasmania recognises and lists threatened native vegetation communities under Schedule 3A of the Tasmanian Government's *Nature Conservation Act 2002*. The listed native vegetation community that most closely corresponds to the ecological community is:

- *Eucalyptus viminalis* wet forest.

10 APPENDIX C - INDIGENOUS INFORMATION

Humans have been present in Tasmania for at least 35,000 years and recent evidence from a site on the Jordon River suggests they may have arrived more than 40,000 years ago. The interaction of humans, climate, vegetation and soils has been profound, with the frequency and intensity of fires changing throughout the period since human colonisation. The current broad vegetation pattern is attributed largely to a pattern of fire use maintained throughout the period of Aboriginal occupation of the island (Jackson 1981).

10.1 Traditional owners

The Indigenous peoples of Tasmania (Palawa and Lia Pootah communities) understood and managed their natural landscapes sustainably for many thousands of years. They established diverse and dynamic cultures, with eight language groups recognised by AIATSIS (1996). Aboriginal places and landscapes have a strong and continuing significance to the Tasmanian Aboriginal community. The present day Palawa population maintains a strong connection with the land, successfully petitioning for the return of twelve significant places under the Tasmanian *Aboriginal Lands Act 1995* (ABS 2000).

10.2 Traditional Indigenous use of resources from the ecological community

A wide variety of plant and animal resources from within the Tasmanian white gum wet forest were used for food and materials by the Indigenous peoples of Tasmania, some of which were described by Noetling (1910). The known Indigenous uses in Tasmania of some plants that occur in wet forests are given in [Table 12](#). The animal resources likely to occur in the ecological community that were used for food, hides and other resources include possums, wombat, bandicoot, bettong and potoroo, which were often cooked whole on open fires or coals.

Table 12: Known Indigenous uses of plant species that occur in the ecological community.

Species	Indigenous uses in Tasmania
<i>Acacia dealbata</i> (silver wattle)	Aboriginal people ground silver wattle seeds to make flour and ate the sticky gum which weeps from the tree when insects attack.
<i>Acacia melanoxylon</i> (blackwood)	Tasmanian Aboriginal people used its timber for waddies (clubs) and digging sticks (for digging up roots and tubers). They soaked the bark in water for an infusion to treat arthritic joint pain. They also found food value in blackwood gum soaked in water, and probably ate its seeds. Blossom from this and other acacia trees, hung near where they slept, was thought to induce sleep.
<i>Acacia verticillata</i> (prickly moses)	Aboriginal people ate the seeds of prickly mimosa, which are high in protein and carbohydrates, and hung the blossoms near where they slept to help induce sleep.
<i>Acaena</i> (buzzy)	Leaves can be infused for tea.
<i>Bursaria spinosa</i> (prickly box)	Aboriginal people found its timber made good waddies (clubs). They also sucked nectar from its flowers.
<i>Coprosma quadrifida</i> (currant bush)	The female plants can be laden with shiny orange berries in autumn.
<i>Cyathea australis</i> (rough tree-fern)	Aboriginal people used the soft, starchy pith from the top part (0.5m) of the stem. They split the stem, scooped out the pith and ate it raw or roasted in ashes. Preferred to the soft tree-fern because it tasted better.

Species	Indigenous uses in Tasmania
<i>Dicksonia antarctica</i> (soft tree-fern)	Aboriginal people used the soft, starchy pith from the top part (0.5m) of the stem. They split the stem, scooped out the pith and ate it raw or roasted in ashes.
<i>Eucalyptus viminalis</i> (white gum)	Aboriginal people used white gum timber to make waddies (clubs), ate the manna from the foliage, and used moistened bark and leaves to relieve sore eyes.
<i>Exocarpos cupressiformis</i> (native cherry)	Fruits eaten. Wood used to make bull roarers.
<i>Leptospermum spp</i> (tea tree)	Used for tea and food flavouring.
<i>Lomandra longifolia</i> (spiny-head mat-rush)	Stems split while fresh and dried in the sun, then later soaked in water to make them pliable to provide fibre to make string, bags, rope, baskets and mats.
<i>Melaleuca spp</i> (paperbarks)	Pollen from flowers can be eaten.
<i>Pittosporum bicolor</i> (cheesewood)	The wood was used by Tasmanian aborigines for waddies (clubs).
<i>Pomaderris apetala</i> (common dogwood)	
<i>Pteridium esculentum</i> (bracken fern)	Roots used for food - chewed or beaten to obtain a sticky starch.
<i>Pultenaea juniperia</i> (prickly beauty)	
<i>Urtica incisa</i> (scrub nettle)	Leaves eaten, after baking them between hot stones.

Source: Taroona Environment Network (2019); Plants of Tasmania Nursery (2019); Aboriginal Heritage Tasmania (2019); Australian National Botanic Gardens (2000); Low (1998).