Australian Government
Department of Agriculture, Water and the Environment

Draft Conservation Advice for the Brogo Wet Vine Forest of the South East Corner Bioregion

This draft document is being released for consultation on the description, listing eligibility and conservation actions of the ecological community.

The purpose of this consultation document is to elicit additional information to better understand the definition and status of the ecological community and help inform conservation actions. The draft assessment below should therefore be considered **tentative** at this stage, as it may change as a result of responses to this consultation process.

This document combines the conservation advice and listing assessment for the threatened ecological community. It provides a foundation for conservation action and further planning.

An example of the Brogo Wet Vine Forest at Brogo Reserve © Nikki Ward

The Brogo Wet Vine Forest occurs within country (the traditional lands) of the Yuin Nation. We acknowledge their culture and continuing link to the ecological community and the country it inhabits.

Proposed Conservation Status

The Brogo Wet Vine Forest of the South East Corner Bioregion is proposed to be listed in the Endangered category of the threatened ecological communities list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)(EPBC Act).

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About this document

This document describes the ecological community and where it can be found (section 1); outlines information to assist in identifying the ecological community and important occurrences of it (section 2); and describes its cultural significance (section 3).

In line with the requirements of section 266B of the EPBC Act, it sets out the grounds on which the ecological community is eligible to be listed as threatened (section 6); outlines the main factors that cause it to be eligible for listing (section 4); and provides information about what could appropriately be done to stop its decline and/or support its recovery (section 5).

CONTENTS

1 Ecological community name and description

1.1 Name

The name of this ecological community is the Brogo Wet Vine Forest of the South East Corner Bioregion, hereafter referred to as "Brogo Wet Vine Forest". The name refers to the geographic area of Brogo in the South East Corner Bioregion within New South Wales, and the unique floristic and structural characteristics of the community. Brogo Wet Vine Forest contains many species associated with mesic forests and vines are typically found in the understorey.

Consultation Questions on the Name

- Do you agree with the proposed name of the ecological community? If not, please propose an alternative and explain your reasoning.

1.2 Description of the ecological community and the area it inhabits

The EPBC Act defines an ecological community as an assemblage of native species that inhabits a particular area in nature. This section describes the species assemblage and area in nature that comprises the Brogo Wet Vine Forest.

The ecological community described in this conservation advice is a type of temperate eucalypt forest best represented in the Brogo area of the South East Corner Bioregion (NSW). It is a sclerophyll forest with a canopy dominated by eucalypts with an occasional substratum of rainforest trees, with an open, shrubby mid-storey and diverse groundcover of forbs, grasses and ferns. A diversity of vines and climbers in the ground layer and mid-storey are a key characteristic of this community. Patches of dry rainforest with fig-dominated canopies are commonly found within or adjacent to Brogo Wet Vine Forest on rocky outcrops.

This section describes the range of natural states of the ecological community. More information to assist in identifying patches of the ecological community is provided in section 2. Because of past loss or degradation, not all current patches of the ecological community are in a completely natural state. Section 2.3 provides information to identify which patches retain sufficient conservation values to be considered a Matter of National Environmental Significance.

1.2.1 Location and physical environment

Brogo Wet Vine Forest occurs in New South Wales within the South East Corner Bioregion between the Moruya River in the north and Nadgee River in the south, although most of the community is found between the Towamba and Tuross Rivers.

The community typically occurs on steep, often rocky slopes with a northerly aspect (Miles, 2021b). Sometimes the community may also occur on relatively flat terrain and infrequently in gullies. The community typically occurs on granite-derived soils, rarely on other volcanic or sedimentary soils. These are primarily Kurosols, Kandosols and Dermosols, with a small proportion in the north of its range occurring on other soils such as Vertosols and Tenesols (DPIE, 2021). The community is found at elevations up to 500 m above sea level (ASL), but the majority occurs between elevations of 200 m to 290 m ASL. The majority of the community occurs in areas with mean annual rainfall of 900 mm to 1050 mm, although it can be found in drier areas (e.g. down to approximately 820 mm) and wetter areas closer to the coast (e.g. up to 1290 mm).

Consultation Questions on the location and physical environment

- Do you agree with the proposed location, physical environment and boundaries for the ecological community? If not please provide your reasons and provide any supporting evidence.
- Does the altitude range, slope profile and described soils accurately capture the full range where this ecological community can be found?

1.2.2 Description of the assemblage

1.2.2.1 VEGETATION STRUCTURE

Brogo Wet Vine Forest typically reaches 15 to 25 metres tall with sparse to moderate canopy cover consisting or *Eucalyptus* or *Angophora* species. Mature trees often form multiple hollows which provide habitat for fauna. Vines and twiners are found in both the shrub and ground layers. A sparse to moderate subcanopy of smaller trees up to 10 m tall is usually present. There is often an open mid-storey of shrubs up to 3 m tall and the species-rich ground layer is typically moderate to dense and comprised of grasses, ferns, small forbs and larger, emergent forbs. Vegetation structure will vary across the extent of the ecological community, particularly following fire or grazing by livestock and with landscape features such as rocky outcrops.

1.2.2.2 FLORA

1.2.2.2.1 Canopy species

The canopy is characterised by the usual dominance of *Eucalyptus tereticornis* or sometimes *Angophora floribunda.* Varying proportions of these species are expected to be present at most sites, in association with less frequently occurring *Eucalyptus* species such as *E. bosistoana*, *E. globoidea and E. maidenii* (see Appendix A - Species lists). Rainforest species such as *Ficus rubiginosa* are not a dominant component of the canopy. Where rainforest species are the dominant component of the canopy layer, this is not considered to be part of the ecological community (See Appendix B - Relationship to other vegetation classification and mapping systems).

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

1.2.2.2.2 Understorey species – subcanopy and mid layer

The understorey shrubs and small trees are linked to the ground cover by a variety of vine species including *Celatrus australis*, *Geitonoplesium cymosum*, *Clematis glycinoides*, *Eustrephus latifolius*, *Marsdenia rostrata* and *Stephania japonica.* Small trees may include *Acacia implexa, Acacia mearnsii, Brachychiton populneus, Ficus rubiginosa and Pittosporum undulatum.* A diverse shrub layer typically includes *Cassinia trinerva, Breynia oblongifolia* and *Melicytus dentatus.* Infrequent but very characteristic species are *Abutilon oxycarpum* and *Deeringia amaranthoides*.

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

1.2.2.2.3 Understorey species – Ground Layer

The ground cover consists of various grasses (*Microlaena stipoides, Echinopogon ovatus* and *Oplismenus imbecillis*), herbs (*Desmodium brachypodum, Dichondra repens* and *Sigesbeckia orientalis*) and ferns (*Cheilanthes sieberi* and *Pellaea falcata*).

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

1.2.2.3 FAUNA

Fauna play key roles in decomposition, nutrient cycling, pollination, seed dispersal and pest control (Gorosábel et al., 2020). Fauna are dependent on the habitat and resources provided by the plant components of the community and other features such as rocky outcrops. Brogo Wet Vine Forest grows in association with grassy woodlands and dry rainforest, containing elements of both, and thus provides habitat for a wide range of mammals, birds, reptiles, amphibians and invertebrates.

Eucalypts provide perching, hunting and nesting sites for birds of prey such as *Ninox strenua* (Powerful Owl) and *Accipiter fasciatus* (Brown Goshawk) and provide habitat for arboreal marsupials such as *Petauroides volans* (Greater Glider) and *Petaurus breviceps* (Sugar Glider). Insectivorous microbats, such as *Nyctophilus geoffroyi* (Lesser Long-eared Bat) and *Vespadelus regulus* (Southern Forest Bat) may be found roosting in tree hollows. Eucalypt flowers also provide food for nectar-feeding fauna such as the threatened *Pteropus poliocephalus* (Grey-headed Flying Fox) and a diverse array of avian honeyeaters. Bark-gleaners such as *Daphoenositta chrysoptera* (Varied Sittella) and *Cormobates leucophaea* (White-throated Treecreeper) may be seen spiralling up or down eucalypt stems.

Smaller trees and shrubs provide further structural complexity and resources. Rainforest species like *Ficus rubiginosa* provide food for fruit-eating birds such as *Lopholaimus antarcticus* (Topknot Pigeon), *Columba leucomela* (White-headed Pigeon) and *Scythrops novaehollandiae* (Channel-billed Cuckoo). The understorey vegetation provides habitat and feeding grounds for small passerines including *Acanthiza spp.* (Thornbills), *Petroica spp.* and *Eopsaltria spp.* (Robins) and *Sericornis spp* (Scrubwrens). *Jalmenus evagoras* (Imperial Hairstreak butterfly) extracts sap from *Acacia* species, some of which is provided to ants that provide protection from predators in exchange. Colonies of *Manorina melanophrys* (Bell Miner) may be found in areas where the understorey is dense, feeding on small insects in the eucalypt canopy.

Native rodents (e.g. *Rattus fuscipes*, *R. lutreolus*) and *Antechinus spp.* (Antechinus) search for food under the protection of long unburnt ground cover. They may be preyed upon by elapid snakes such as *Pseudonaja textilis* (Eastern Brown Snake). Brogo Wet Vine Forest likely supports a diversity of skinks, agamids and amphibians, especially near streams. The leaf litter and soil support a rich diversity of invertebrates, and fungi that are sought out by *Perameles nasuta* (Long-Nosed Bandicoot). Macropods and monotremes are common, while *Phascolarctos cinereus* (Koala) and *Dasyurus maculatus* (Spotted-Tail or Tiger Quoll) are occasionally found within Brogo Wet Vine Forest.

For a period of time following fire, a number of species may be absent due to shortage of resources and/or mortality. For example, nectar and fruit feeding birds and mammals may not return to a site until resprouting plants have completed their secondary juvenile phase and become reproductively active. Species that rely on the resources produced by non-resprouting plants may likewise be rare or absent until such plants reach maturity.

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

Consultation Questions on the species assemblage

- Do you agree with the vegetation description? If not, how can it be clarified?
- Are there any flora species that you think should be removed, added or described differently to accurately represent the proposed ecological community? The focus should be on characteristic, functionally-significant &/or commonly occurring species. Please provide your reasons (and references if available).
- Are there any understorey species that are particularly characteristic? Particularly in comparison to adjacent woodland/forests with *E. tereticornis*?
- Do you agree with the fauna information? If not, how can it be clarified?
- Is there additional information on fauna you would like to see included, particularly commonly encountered fauna, characteristic invertebrates and with relation to the ecological function of the community?
- Are there any narrowly endemic fauna or threatened fauna you know of that may occur in the ecological community?

1.2.3 Functionally important species within the ecological community

Consultation Questions on the functionally important species

- All species within the ecological community play a role, but do you know of any functionally important species that play a major role in sustaining the ecological community? If so could you please identify them for us and suggest any key references you know of that support their role in the ecological community.

1.2.4 Relevant biology and ecology

1.2.4.1 FIRE ECOLOGY

Species and vegetation types vary in their capacity to survive fire, with species associated with rainforest fringes or mixed forest understories likely to be more susceptible to canopy damage or mortality (Trouvé et al., 2021). Brogo Wet Vine Forest contains several fire sensitive species that may not persist under a frequent fire regime or may fail to recolonise after extensive, severe fire. Further, the presence of species in this community that are typically associated with moist, sheltered sites indicates an infrequent regime of fire in this community.

Brogo Wet Vine Forest is a geographically restricted ecological community that supports the presence of rainforest associated flora. Some rainforest associated flora are sensitive to fire and may not be present in recently or frequently burnt sites. The moderately sheltered physical environment may promote a fire regime that allows for the dry elements of the floristic composition to coexist with rainforest associated species. Brogo Wet Vine Forest may transition into Lowland Grassy Woodland in adjacent exposed sites that experience more frequent and severe fire. By contrast, the community may transition into Dry Rainforest in more sheltered sites that experience less frequent and severe fire. In this way, Brogo Wet Vine Forest can be considered part of an ecological transition from recently disturbed eucalypt woodland to long undisturbed rainforest. Although landscape features, such as rocky outcrops found within Brogo Wet Vine Forest, may influence the fire regime (e.g., discourage the spread of fires, Miles, 2021b) and play an important role in the occurrence of some rainforest-associated species, independent of fire regime (Floyd, 2009).

Variability in vegetation structure is likely to be observed in fire-affected sites for a number of years post-fire, including completely top-killed or partially killed shrubs and trees that may be

regenerating, resulting in variable canopy and understorey cover. Where fire has been less severe, eucalypt tree canopies may be unaffected, while some non-eucalypts may incur higher relative damage (Trouvé et al., 2021). Consideration should be given to disturbance-driven variability of vegetation cover as legacies may persist for one or more decades following disturbance (Collins, Hunter, et al., 2021; Haslem et al., 2016; Karna et al., 2019). The effects of fire regimes and interactions with regional climatic conditions, topoclimatic conditions and edaphic conditions on vegetation composition and structure, will have implications for faunal species composition and population dynamics via effects on resource availability, habitat suitability and predator-prey interactions (DAWE, 2021a).

Many plant species known to occur within Brogo Wet Vine Forest are capable of resprouting following fire (see Appendix A - Species lists). However, resprouting success depends on the level of damage sustained during fire (or accumulated over multiple fires), which is influenced by fire severity, fire frequency and plant characteristics such as stem diameter and bark thickness/bark type (Denham et al., 2016; Nolan, Rahmani, et al., 2020). Severe drought preceding or following fire may result in resource depletion that damages tree canopies and exacerbates the effects of fire (Enright et al., 2015; Matusick et al., 2013).

Brogo Wet Vine Forest contains understorey species that are not known to resprout following fire, including *Abutilon oxycarpum, Cassinia longfolia, Cassinia trinerva, Leucopogon juniperinus, Myoporum bateae, Ozothamnus diosmifolus* (see Appendix A for details). In addition, a high proportion of species are known to resprout from the base-only or from roots or rhizomes, including *Acacia falciformis, Acacia implexa, Clematis glycinoides, Melicytus dentata, Indigofera australis, Eustrephus latifolius, Geitonoplesium cymosum* and *Stephania japonica* (see Appendix A). There are also several species where resprouting status is unknown (see Appendix A). The structure of Brogo Wet Vine Forest therefore varies with time since fire1.2.2.1, as the structural complexity and vertical height of the lower layers increases with time and juvenile plants transition to maturity, culminating in the structural form described in section 1.2.2.1.

Vegetation types that contain mesic, fire-sensitive species are likely at higher risk of local extirpations of species than other vegetation types (Clarke et al., 2009; Fairman et al., 2016). Some understorey components may be unable to persist through frequently recurring fires if low postfire survival is not compensated by recruitment of seedlings. Eucalypt forests, such as Brogo Wet Vine Forest, that contain fire-sensitive elements in their subcanopy and understorey at risk of extirpation via their processes (Clarke et al., 2009; Fairman et al., 2016).

Consultation Questions on the relevant biology and ecology

- Are there any other relevant functional biology and ecology elements you think are important to include in this document? If so please explain your reasons and provide any supporting evidence or references you have.

2 Identifying areas of the ecological community

Section 1.2 describes this ecological community and the area it inhabits. This section provides additional information to assist with the identification of the ecological community and important occurrences of it.

Brogo Wet Vine Forest intergrades with other vegetation types and ecological communities, particularly grassy woodlands in flatter, low-lying areas or lower slopes (see Appendix B -

Relationship to other vegetation classification and mapping systems). Key diagnostic characteristics are used to identify an area of native vegetation as being Brogo Wet Vine 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 1.2) and Appendix A - Species lists.

2.1 Key diagnostic characteristics

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 areas matching the description in section 1.2 that meet the following key diagnostic characteristics:

- Occurs in New South Wales within the South East Corner Bioregion[1].
- Occurs typically on granitic parent material or Ordovician mudstone parent material. The typical relevant Australian Soil Classification (DPIE, 2021) is Kurosols, Kandosols or Dermosols[2].
- Has a canopy[3] dominated by *Eucalyptus* species and sometimes *Angophora floribunda.* At least one of the following species must be present: *Eucalyptus tereticornis, Eucalyptus bosistoana, Eucalyptus globoidea, Eucalyptus maidenii, Angophora floribunda.*
- Has an understorey[4] of small trees, soft-leaved shrubs and vines/climbers, often containing species associated with rainforests or rainforest margins such as *Ficus rubiginosa, Alectryon subcinereus* and *Pittosporum undulatum.* Other small trees such as *Brachychiton populneus*, *Acacia implexa* and *Acacia mearnsii* may also be present. During post-fire regenerative phases, these trees may be evident only as dead remains, seedlings or juveniles.

[1] Interim Biogeographical Regionalisation of Australia Version 7 (DoE 2012)

[2] A small proportion of the community occurs on other soil classifications such as Vertesols, Tenesols or Rudosols. Therefore, if all other diagnostics are met, but the soil classification is not Kurosols, Kandosols, Dermosols, the community may still be present.

[3] Recent disturbance, such as fire, may remove the living canopy and cause a shift to a regenerative state. Under these circumstances, the loss is likely to be a temporary phenomenon, if natural regeneration is not disrupted. This temporary regenerative state is included as part of the ecological community when the other key diagnostic characteristics are met. In these cases, there should be evidence that the canopy species will regenerate from seedlings, saplings, lignotubers or from epicormic regrowth. See section 1.2.2.2 for more information.

[4] Understorey refers to the vegetation strata below the canopy layer but does not include the ground layer (e.g. grasses, forbs, etc.). Note that climbers may be found across multiple strata.

- Has a moderately-dense to open, species-rich ground layer[5] with cover greater than 25% (can be less for some time after a fire, drought or other major disturbance, or approaching 100% following wetter than average periods), comprising a mix of grasses and ferns with vines and creepers extending into the above strata, except in patches where deep leaf litter suppresses ground layer development.

Consultation Questions on the key diagnostic characteristics

- Do you agree that these statements will clearly identify when the ecological community is present?
- Are the key diagnostic characteristics sufficient to differentiate the ecological community from other ecological communities? If not, how should they be modified?
- Is the presence of *F. rubiginosa* or *A. subcinereus* AND a eucalypt dominated canopy sufficient to distinguish from Lowland Grassy Woodland and Dry Rainforest?
- Are some of the grasses that are found in Lowland Grassy Woodland (such as *T. triandra*) absent in Brogo Wet Vine Forest?

2.2 Additional information to assist in identifying the ecological community

The following information should also be taken into consideration when applying the key diagnostic characteristics to assess if a site may include the ecological community.

2.2.1 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 0.1 ha, as the key diagnostics cannot reliably be identified for smaller areas than this. Where a larger area has been mapped or classified as a different vegetation type, localised areas of Brogo Wet Vine Forest greater than 0.1 ha may be present within this larger area.

2.2.2 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, fence lines, tracks, paths, roads, powerline easements or other gaps presenting as areas of water, rocks, exposed soil, leaf litter or cryptogams, and areas of localised variation in vegetation that do not meet the key diagnostics. 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. Such breaks do not significantly alter the overall functionality of the ecological community and form a part of the patch. Watercourses or drainage lines, gaps made by exposed areas of soil or leaf litter, and areas of localised variation in vegetation 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. Tracks, paths, roads or other artificial surfaces should be excluded from the calculation of patch size and

[5] Where ground cover is consistently higher than approximately 60% and canopy tree cover is consistently lower than approximately 15%, cross-checking with descriptions for Lowland Grassy Woodland is required. See 1.2.2.2 and Appendix B - Relationship to other vegetation classification and mapping systems for details.

condition. 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.

2.2.3 Variation within a patch

Patches of the ecological community may contain areas that vary in structural or biological characteristics. For example, the sparse nature of the small tree and shrub layer means that some diagnostic species may not always be present in parts of a patch. Species that are sensitive to disturbance (such as fire sensitive species) may also be absent for a time after disturbance. Variation in vegetation across a patch should not be considered to be evidence of multiple patches, so long as it meets the key diagnostics.

2.2.4 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.

Where ecological restoration is planned, the aim should be for recovery of as many key biodiversity and ecosystem attributes as practical for a particular site, so that the ecological community is on a trajectory to recovery and is self-sustaining. This should be based on identifying appropriate reference site(s) for the ecological community following the *National Standards for the Practice of Ecological Restoration in Australia* (Standards Reference Group SERA 2021) (also see 5.4.2 RESTORE and MANAGE the ecological community).

2.2.5 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) and New South Wales BioNet Vegetation Classification User Manual (NSW Office of Environment and Heritage 2017) may 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 (see Appendix A - Species lists). 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.

2.2.6 Consideration of fire effects on community appearance

The fire history of a site should be given consideration during assessment, as Brogo Wet Vine Forest may appear simplified and potentially similar to adjacent vegetation types such as Lowland Grassy Woodland where fires have occurred at short intervals.

Where there is difficulty in distinguishing recently or frequently burnt Brogo Wet Vine Forest from Lowland Grassy Woodland the following points should also be considered:

- Presence of *Ficus rubignosa,* or its burnt remains, indicates that the community is likely to be Brogo Wet Vine Forest, as this species is typically absent from Lowland Grassy Woodland (Tozer et al. 2010).
- Rocky areas and outcrops found within patches of Brogo Wet Vine Forest likely disrupt fire activity and provide refugia for fire-sensitive species. Such species should therefore be comparatively more abundant than within Lowland Grassy Woodland (Miles, 2021a).
- While there is crossover of these two communities on steep granitic slopes, Brogo Wet Vine Forest is less likely to occur on flatter lower-lying terrain, where Lowland Grassy Woodland is predominant (Tozer et al. 2010; NSW Scientific Committee 2011);
- On average, Lowland Grassy Woodland is likely to have a higher proportion of ground cover vegetation than Brogo Wet Vine Forest, e.g. 40 to 90% versus 25 to 75% (Tozer et al. 2011). However, following wetter than average periods there may be little difference as cover may approach 100%.

2.2.7 Mapping and vegetation classifications

There are a number of mapping and vegetation classification schemes used in NSW. Although none directly map areas of the ecological community according to the key diagnostics, 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.

2.2.8 Other listed ecological communities

The ecological community includes the New South Wales listed "Brogo Wet Vine Forest in the South East Corner Bioregion".

There are also other NSW or nationally-listed threatened ecological communities that occur in, or close to, the same areas as the Brogo Wet Vine Forest. These include:

- Araluen Scarp Grassy Forest (currently under assessment) – also listed in NSW as the Araluen Scarp Grassy Forest in the South East Corner Bioregion. This community occurs further north and does not overlap with the known distribution of Brogo Wet Vine Forest.
- Lowland Grassy Woodland in the South East Corner Bioregion (critically endangered) – also listed in NSW. Lowland Grassy Woodland occurs in the flatter valley floors and does not contain the rainforest elements that are characteristic of Brogo Wet Vine Forest.

- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (critically endangered) – Includes the River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions listed in NSW. This community is restricted to alluvial flats, edges of waterways and floodplain margins mostly less than 50 metres ASL.

- Dry Rainforest of the South East Forests in the South East Corner Bioregion - listed in NSW (endangered). Dry Rainforest often intergrade with Brogo Wet Vine Forest but is distinguished by the dominance of *Ficus rubiginosa* rather than eucalypts in the canopy.

Consultation Questions on the additional identification information

- How could we improve on the information provided to assist with identifying the ecological community?
- Is 0.1ha appropriate as a size threshold for the smallest patch size of the ecological community that can be identified?
- Please comment on survey requirements, including post fire survey.
- Is the list of corresponding map units complete and accurate?
- The closest matched Plant Community Type (PCT) is 3108, but there is very little overlap between this PCT and other mapping (e.g. SCIVI) of Brogo Wet Vine Forest. Can you provide any information that would help resolve this difference?
- Have all relevant listed ecological communities been included?

2.3 Condition classes, categories and thresholds

Land use and disturbance history will influence the state and condition in which a patch of the ecological community is currently expressed. National listing focuses legal protection on patches of the ecological community that are the most functional and in comparatively good condition. These patches are identified through *minimum condition thresholds*.

Condition classes are also used to distinguish between patches of the ecological community 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 2.1) AND

- at least the minimum condition thresholds (Table 1).

Table 1 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, B C and D.

Patches that do not meet the minimum condition thresholds for at least Class D are excluded from protection under the EPBC Act. In many cases, the loss and degradation are 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 2.1) and patch definition information (section 2.2).

Recent disturbance by fire is likely to result in the ecological community presenting in a temporarily altered state that may include severely reduced canopy cover, simplified vegetation structure, resprouting trees and shrubs that have been partially or completely topkilled and may lack several obligate seeder species that must complete the primary juvenile phase following fire. This condition is likely to be temporary and if effects are severe consider postponing survey until a later date.

Table 1. Condition categories, classes and thresholds

Patch size threshold → / Biotic threshold ↓	**Large patch** ≥ 1 ha	**Small contiguous patch**[3] ≥ 0.1 ha within an area of native vegetation ≥ 2 ha	**Small patch** ≥ 0.1 ha
High condition Total of ≥ 16 native understorey/ground layer[1] species per plot[2] **AND** Total of ≥ 80% understorey/ground layer[1] plant cover per plot[2] is native species	**CLASS A1** Large or contiguous patch in high condition		**CLASS B1** Small patch in high condition
Good condition Total of ≥ 10 native understorey/ground layer[1] species per plot[2] **AND** Total of ≥ 50% understorey/ground layer[1] plant cover per plot[2] is native species	**CLASS B2** Large of contiguous patch in good condition		**CLASS C1** Small patch in good condition
Moderate condition Total of < 8 native understorey/ground layer[1] species per plot[2] **AND** > 30% total understorey/ground layer[1] plant cover per plot[2] is native species	**CLASS C2** Large of contiguous patch in moderate condition		**Not protected**

[1]Understorey/ground layer is inclusive of all flora below canopy layer, including both the juvenile forms of canopy species and fire-/drought-affected canopy trees that are resprouting.
[2]The minimum acceptable plot size is 0.04 ha.
[3]Patches that are connected to other patches of native vegetation, or are within 30 m of other native vegetation.

Consultation Questions on the condition classes, categories and thresholds

- How can we improve on the proposed condition information?
- Are the proposed *measures* (understorey species richness, weediness, animal trails, and fire/drought/BMAD impacts) appropriate to distinguish between patches of different condition?
- Are the proposed *thresholds* for these measures appropriate to distinguish the different condition classes?

2.4 Habitat critical to the survival of the ecological community

The habitat or areas most critical to the survival of the ecological community are those patches that are in the best condition (i.e. Classes A and B in Table 1). 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, other patches in lower condition classes (i.e. Class C in Table 1) can also be critical to the survival of the ecological community if 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 (see Section 2.5).

Consultation Questions on the habitat critical to the survival

- Can you provide any information on particular locations or habitat that would be *critical* to the survival of this ecological community?
- Does the EC occur within any areas of Commonwealth Land? If so, which of those areas should be considered for the Critical Habitat Register under section 207A of the EPBC Act upon listing of this EC?

2.5 Areas of high value – surrounding environment and 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. 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 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.

The ecological community often occurs in association with other native vegetation types. Patches of the ecological community that remain connected with other native vegetation 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 a larger area to boundary ratio – such patches are more resilient to edge effect disturbances such as weed invasion and human impacts.

- Patches that occur in areas where the ecological community has been most heavily cleared and degraded such as lower slopes or low-lying flatter areas, particularly if they contain large, mature trees.

- 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 adjacent to other vegetation types that contain rainforest/mesic forest elements. Dispersal of rainforest/mesic species into Brogo Wet Vine Forest may be an important ecological process, especially following major or short-interval disturbances where more sensitive species may have been depleted.

- Patches 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 diagnostic native plant species or the presence of a range of age cohorts (including through successful assisted regeneration or management of sites).

- 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 state-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.

- Patches that do not experience grazing or show low-levels of disturbance caused by grazing by domestic livestock or feral herbivores.

- Patches that do not contain evidence of sustained eucalypt canopy dieback.

Consultation Questions on the areas of high value

- Can you provide any information on qualities that would denote areas of particularly high conservation value?

3 Cultural significance

The Brogo Wet Vine Forest occurs within country (the traditional lands) of the Yuin Nation. We acknowledge their culture and continuing link to the ecological community and the country it inhabits.

The significance of the ecological community, particular species, spiritual and other cultural values are diverse and varied for the Indigenous peoples that live in the vicinity and care for Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, all Indigenous people. Such knowledge may be only held by Indigenous groups and individuals who are the custodians of this knowledge.

Consultation is ongoing, and we are seeking feedback from Traditional Owners on Indigenous cultural values, preferred ways to present the information, as well as permissions to include such information. Information included in the Conservation Advice can highlight cultural values and inform future management.

The Yuin people maintain a strong community presence and cultural identity to this day and are engaged in maintaining traditional knowledge and active management of traditional lands, which contains patches of Brogo Wet Vine Forest (NSW NPWS, 2014).

Current evidence of the widespread use of the Bega and far south coast region by the people of the Yuin people dates back at least 20,000 years (NSW NPWS, 2006, 2011b), but may be much longer. The coast, mountains and tablelands are physically, culturally and spiritually linked via pathways, culturally important places, dreaming trails and varied environments, and this interconnected continuum of life, places and history is significant to the Yuin people (NSW NPWS, 2011b). There are numerous significant traditional pathways across the landscape that includes the ecological community, which were historically used for trade east-west/north-south trade, gathering materials and food, and cultural and social reasons (Blay, 2005).

Several plants may be found within Brogo Wet Vine Forest that are utilised as food sources or for materials by First Nations communities, including but not limited to *Geitonoplesium cymosum* (eaten; rope-making), *Lomandra longifolia* (food; basket weaving; animal traps), *Plantago debilis* (medicine), *Ficus rubiginosa* (food), *Einadia* spp. (food, dye, paint) (Caton & Hardwick, 2016).

Consultation Questions on the cultural significance

For Traditional Custodians:

- Do you have any information you are willing to share about the cultural significance of the ecological community, forests in the area generally or the country that supports the ecological community?
- Do you know any people or organisations we could contact in the region who may have information they are willing to share?
- Do you know of any books, articles or online resources about Yuin Peoples relationships with forests or the landscape you think would be sources of appropriate information?

4 Threats

Brogo Wet Vine Forest has been primarily impacted by clearing for agriculture and rural development, overgrazing by feral herbivores and domestic livestock, as well as altered

disturbance regimes and associated invasion of exotic flora. The community is likely to be under pressure from climate change and associated further changes to disturbance regimes.

4.1 Threat table

Table 2 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 0. Although presented as a list, in reality these threats often interact, rather than act independently.

Table 2: Summary of threats facing the ecological community

Threat	Threat Status*	Threat impacts
Inappropriate fire regimes (including fires which cause decline in biota)	Timing: ongoing Severity: extreme / major Scope: whole	Inappropriate fire regimes or changes to fire frequency are known threats facing Brogo Wet Vine Forest (NSW Scientific Committee, 2011). Inappropriate fire regimes may threaten the persistence of the mesic, rainforest-associated flora that characterise the community (NSW Scientific Committee, 2011). It is likely that consecutive short intervals fires have the capacity to fundamentally alter the community composition and vegetation structure of temperate eucalypt forests such as Brogo Wet Vine Forest, in particular, loss or decline of understorey elements (DAWE, 2021a; Fairman et al., 2016; Keith, 1996; Kenny et al., 2004; Nolan, Collins, et al., 2021; NSW NPWS, 2011a). Other climate-change related changes to fire regimes may increase pressures on biodiversity, such as expansion of the fire season (e.g. potential for fires earlier and later than normal), changes to the dominant fire type (e.g. a shift from low severity understorey fires toward higher severity crown fires) and changes to the spatial patterns of fire in the landscape (DAWE, 2021a). For example, the highly spatially restricted nature of the ecological community also places it at risk of being entirely burnt within a single fire event. Mega-fires, such as those experienced in the 2019-2020 fire season, can burn a significant proportion of the ecological community (an estimated 45% of the ecological community was within the extent of the 2019-20 bushfires (DAWE 2020) and the surrounding vegetation in a single event, which compounds these detrimental impacts. Fires also have effects on biotic interactions, such as herbivore-plant interactions (e.g. altering resource availability), predator-prey interactions (e.g. facilitating easier access for feral predators to native fauna) and abiotic interactions, such as combined drought and fire, which may have compounding effects on rates of plant mortality and regenerative capacity (DAWE, 2021a).

Threat	Threat Status*	Threat impacts
Climate change and severe weather	Timing: ongoing Severity: extreme / major Scope: whole	Increases in drought severity and the number of severe fire weather days are predicted for southeastern NSW within coming decades (DECCW, 2010; OEH, 2014). Severe drought can cause mass canopy dieback in eucalypt forests and may decrease the capacity for forests to regenerate following fire (Blackman et al., 2019; Choat et al., 2018; Nolan, Gauthey, et al., 2021). Severe drought may also increase the likelihood of large and severe wildfires (Andrade et al., 2019; Nolan, Boer, et al., 2020). Drought may interact with overgrazing to exacerbate negative effects on this community, e.g. reduced availability of palatable ground layer vegetation during drought is likely to lead to increased browsing of woody shrubs and trees, potentially inhibiting plant recruitment (Pahl, 2019; Tasker & Bradstock, 2006). Current and future drought episodes are occurring within the context of rising global temperatures, with predictions that drought and heatwave severity will increase for southeastern Australia (Kirono et al., 2020). Some models predict that the frequency of severe drought will also increase in this region (Herold et al., 2021). Specifically, the South East and Tablelands Region of NSW is predicted to experience higher severity drought in future, along with a 10–50% increase in the number of severe fire weather days (DECCW, 2010; OEH, 2014). For this region, OEH (2014) also predicts that: • Maximum temperatures are predicted increase by 0.5–1°C within the next 20 years and by 1.8–2.5°C within 40–60 years; • Minimum temperatures are predicted to increase by 0.4–0.7°C within the next 20 years and by 1.4–2.3°C within the next 40–60 years; • The number of days >35°C will increase and the number of nights <2°C will decrease; • Rainfall will decrease in spring and winter, while rainfall will increase in summer and autumn.
Clearing for agricultural activities and rural dwellings	*Timing*: mostly past / some ongoing *Severity*: extreme *Scope*: majority	European settlement and subsequent land clearing for agriculture on the NSW south coast and hinterland began as early as the late 1820s (Keith & Bedward, 1999). Land clearing for agricultural activities such as dairy farms and small holdings, and subdivisions resulting in land clearing for houses and fence lines are known threats currently facing some areas of Brogo Wet Vine Forest (Miles, 2006, 2021b; NSW Scientific Committee, 2011; Quartermain & Lambert, 2020). Clearing for fire protection may also be relevant in these areas.
Invasive plant species	Timing: ongoing Severity: major Scope: majority	Invasive plant species are a known issue within Brogo Wet Vine Forest (Miles, 2006; NSW Scientific Committee, 2011; Quartermain & Lambert, 2020). Weed invasion, and its interaction with overgrazing and erosion is likely to be resulting in habitat degradation and reducing the ecological function of Brogo Wet Vine Forest (e.g. Miles 2006). Known invasive species within the greater Bega region that may be impacting Brogo Wet Vine Forest include (but are not limited to): *Eragrostis curvula, Hypericum perforatum, Lantana spp., Nassella trichotoma, Rubus* spp. (BVSC, 2016), *Echium plantagineum, Cirsium vulgare* (NSW NPWS, 2006), *Ailanthus altissima, Ligustrum spp.* (NSW NPWS, 2011b), *Opuntia* spp., *Bidens pilosa*, *Tagetes minuta*, *Verbena* spp., *Verbascum* spp. and *Senecio madagascariensis* (Miles, 2021b).

Threat	Threat Status*	Threat impacts
Overgrazing and trampling by feral herbivores and domestic livestock	Timing: ongoing Severity: major / minor Scope: majority	Overgrazing by feral animals including deer, goats and rabbits, and heavy grazing by domestic livestock are known threats currently facing Brogo Wet Vine Forest (Miles, 2006; NSW Scientific Committee, 2011; Quartermain & Lambert, 2020). Pigs (*Sus scrofa*) are also known to occur within reserves that contain Brogo Wet Vine Forest (NSW NPWS, 2006, 2011b). Issues likely to be associated with overgrazing and trampling by feral herbivores and domestic livestock in this community include loss of key plant species, reduced community structure, erosion, weed invasion, changes to soil nutrients and negative impacts on the habitat of threatened native fauna. Within the Eurobodalla Shire Council LGA, overgrazing and trampling by feral herbivores and domestic livestock has resulted in a lack of tree regeneration, loss of small tree or shrub layer, weed invasion or reduced ground layer diversity and erosion (Miles, 2006). Overgrazing and trampling from overabundant native fauna has been described as a potential threat to Brogo Wet Vine Forest, but evidence of the severity or extent of impacts is not available nor are impacts on the community clearly understood.
Invasive predators	Timing: ongoing Severity: minor Scope: unknown	Feral predator species known to occur within National Park estate that contains patches of Brogo Wet Vine Forest include: Cat (*Felis catus*) and European red fox (*Vulpes vulpes*) (NSW NPWS, 2006, 2011b).
Disease	Timing: future Severity: unknown Scope: unknown	Infection by myrtle rust (*Austropuccinia psidii*) is also potentially a threat to trees and shrubs in the Myrtaceae family in the ecological community, including some of the characteristic and structurally significant canopy and understorey species (Makinson, 2018). Chytrid fungus is also a potential threat to the various frogs of the ecological community.
Dieback	Timing: future Severity: unknown Scope: unknown	Dieback of the dominant eucalypt species, which is often associated with overabundant psyllids, linked to Bell Miner (*Manorina melanophys*) colonies (Bell Miner Associated Dieback; BMAD) has been described as a potential threat to Brogo Wet Vine Forest (Quartermain & Lambert, 2020). There is concern that loss of habitat associated with the 2019-2020 bushfires may lead to BMAD spreading further into Brogo Wet Vine Forest (Quartermain & Lambert, 2020). BMAD is listed as a key threatening process in NSW and is a known issue in the South East Corner Bioregion (DPIE, 2008).

*__***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 causes or has the potential to cause impacts that are **extreme** (leading to loss or transformation of affected patches/occurrences), **major** (leading to degradation of affected patches/occurrences), **minor** (impacting some components of affected patches/occurrences), **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

4.1.1 Key threatening processes

The EPBC Act provides for the identification and listing of key threatening processes. A 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 specific plants and animals that comprise it:

- Loss of plant species and erosion caused by overgrazing by feral animals and domestic livestock.

- Competition and land degradation by unmanaged goats
- Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs
- Predation by feral cats
- Predation by European red fox
- Competition and land degradation by rabbits
- Land clearance
- Novel biota and their impact on biodiversity

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.

Consultation Questions on the threats

- Do you agree with the information in the Threats table?
- Are any of the listed threats more, or less, severe or of different timing or scope than currently proposed for this ecological community?
- Are any threats (current or potential) missing, and if so please specify?
- Please provide additional examples of threat impacts, including potential threats.

5 Conservation of the ecological community

5.1 Primary conservation objective

To prevent the extinction of Brogo Wet Vine Forest 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.

5.2 Existing protection management plans

5.2.1 Existing protections

Brogo Wet Vine Forest in the South East Corner Bioregion is listed as an endangered ecological community in NSW, under the *NSW Biodiversity Conservation Act 2016.*

Patches of the community are known to exist within NPWS reserves, NSW State Forest reserves and Bush Heritage Australia reserves, which have varying levels of regulation, active management and public access, and include South East Forest National Park, Wadbilliga National Park, Biamanga National Park, Brogo Reserve, Bodalla State Forest and Mumbulla State Forest.

Around 26% of the community currently lies within land reserved for nature conservation.

5.2.2 Existing management plans

The following list may not be comprehensive. It is intended to help guide where some other information relevant to the management of the ecological community and broader landscape may be found.

- Bush Heritage Australia. (2021). *Brogo*. Bush Heritage Australia. Retrieved 29/09/21 from https://www.bushheritage.org.au/places-we-protect/new-south-wales/brogo
- Miles, J. (2006). *Recognition and Management of Endangered Ecological Communities in the South East Corner of N.S.W*. S. R. C. M. Authority.
- NSW NPWS. (2006). *South East Forest National Park and Egan Peaks Nature Reserve Plan of Management*. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Parks-plans-of-management/south-east-forests-national-park-egan-peaks-reserve-plan-of-management-060645.pdf
- NSW NPWS. (2011). *Far South Coast Escarpment Parks Plan of Management*. https://www.environment.nsw.gov.au/resources/planmanagement/final/20110159FarSthCoastFinal.pdf
- NSW NPWS. (2014). *Plan of Management Yuin Bangguri (Mountain) Parks*. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Parks-plans-of-management/yuin-bangguri-mountain-parks-plan-of-management-150003.pdf

Consultation Questions on existing protections and management plans

- Are there other existing protections you know of that are not covered in the above sections?
- Do you know of any other management plans relevant to the ecological community or the broader landscape?

5.3 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, 2021):

> ***"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."*
>
> *Standards Reference Group SERA (2021) – 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 (2021). They outline the principles that convey the main ecological, biological, technical, social and ethical underpinnings of ecological restoration practice.

5.4 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 state agencies, landholders, Traditional custodians, NRM and community groups and other land managers;
- conditions of approval for relevant controlled actions under national environment law (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 at the time this conservation advice was developed are listed in section 5.2.

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;

- 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.

5.4.1 PROTECT the ecological community

This key approach includes priorities intended to protect the ecological community by preventing further losses of occurrences.

- The ecological community 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, to protect it from clearing and degradation..

- 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. including fire management, road works, developments).

- Environmental assessments should address impacts that extend beyond the immediate footprint of developments, including the needs for asset protection works that involve removal, modification or burning of the Ecological Community.

- Undertake activities to mitigate future climate change and therefore reduce the impacts on this ecological community.

5.4.1.1 CONSERVE REMAINING PATCHES

There should be no further clearance and/or deliberate damage to patches of this ecological community that meet the minimum condition thresholds because it has already been greatly reduced in extent and integrity.

- Protect and conserve remaining areas 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) and provide for recognition of the alternate states of the community post-disturbance.

- Protect mature and over-mature trees and stags, particularly with hollows. Large and old trees typically have numerous hollows or fissures that provide shelter and support a diversity of animals, particularly insects and their predators.

5.4.1.2 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 and due diligence has been demonstrated, approvals should be predicated on impact minimisation by:

    - retaining and avoiding damage to high quality patches, which should be managed to retain their high quality state;

    - commitments to ongoing mitigation of residual impacts; and

    - protecting important habitat features, such as large mature trees or stags with hollows as these take many decades to develop, cannot be quickly replaced including by nest boxes or other artificial structures which mimic but do not replace habitat.

- 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:

    - 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 avoiding the use of 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;

    - 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);

- maintain a register of offsets for the ecological community which should be used to avoid the re-use of offset sites for multiple projects; 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.

- Prior to removal of any trees or use of heavy machinery that may also damage the understorey, ensure comprehensive flora and fauna surveys have identified threatened or locally important species on site and their potential shelter and nesting sites (for example hollows, burrows, rocks and tree crevices, as well as visible nests). Damage to these should be avoided altogether, but if approved for removal, care should be taken to appropriately relocate or otherwise protect fauna, and avoid undertaking the works during important times, such as during breeding seasons.

5.4.1.3 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 built asset protection zones do not typically provide a suitable buffer and should be additional to a vegetated buffer.

- The recommended minimum buffer zone is 50 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. Judgement should be exercised to determine an appropriate buffer distance, depending on circumstances and how a patch may be detrimentally impacted.

5.4.1.4 Prevent the introduction and spread of exotic species

- Support strong border biosecurity and avoid importing or accidentally introducing invasive species and pathogens that may have a serious adverse impact on this ecological community.

- Prevent planting of known or potentially invasive species in gardens, farms, developments and landscaping near the ecological community.

- Prevent dumping of garden and farm waste into bushland, especially in or near patches of the ecological community.
- Avoid the sale and planting of known invasive species in areas where the ecological community occurs. Review the planting schedule for new developments and landscaping to ensure that potential weeds or other inappropriate plants (e.g. native plants likely to contaminate the local gene pool) are not included.
- Control runoff during nearby construction activities to prevent movement of weeds and pathogens into the ecological community.
- 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.
- If new invasive species incursions do occur, detect and control them early, as small infestations are more likely to be eradicated.
- Limit or prevent access of grazing animals to patches of the ecological community (e.g. construct fences) where practicable. Provide advice and support to landholders to assist with this.
- Limit or prevent access of vehicles to patches of the ecological community.
- Prevent further incursions of feral animals into the ecological community and, where possible, contain pets in nearby residential areas.

5.4.2 RESTORE and MANAGE the ecological community

This key approach includes priorities to restore and maintain the remaining occurrences 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 halt threats such as land clearing, grazing, inappropriate fire regimes, weed invasion, Bell Miner-Associated Dieback or human disturbance.
- Identify and prioritise other specific threats and undertake appropriate on-ground site management strategies where required.
- Undertake restoration which meets national standards to increase condition above thresholds for protection.

5.4.2.1 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.

- 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 or adjacent native vegetation or waterbodies.
- Control introduced pest animals through coordinated landscape-scale control programs.

5.4.2.2 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. These activities should cease.

5.4.2.3 MANAGE ACTIVITIES AND ACCESS

- Cease/prohibit and monitor wood collection, such as for firewood or fencing, that leads to the loss and damage of trees, stags, logs or disturbs the natural litter layer.
- Cease/prohibit and monitor bush rock collection, movement or damage, that leads to the loss and damage of rocky habitat that is required by many vertebrate and invertebrate fauna.
- Cease/prohibit and monitor destructive activities such as off-road trail bike, quad bike, four-wheel-driving and construction of unauthorised bicycle trails.
- Cease/prohibit and monitor wildflower, invertebrate and other fauna collection.
- Cease/prohibit and monitor rubbish dumping.
- Cease/prohibit access by domestic pets, by containing them in nearby residential areas or keeping them on leashes.

5.4.2.4 MANAGE APPROPRIATE FIRE REGIMES

- Implement appropriate fire management regimes for the ecological community and for the landscapes surrounding the ecological community. Take into account Indigenous knowledge and scientific research results.
- Where hazard reduction burns or prescribed fires are undertaken in areas near to the ecological community, ensure that the potential for the fire to escape is appropriately risk assessed and management responses are in place to protect the ecological community.
- Use a landscape-scale approach and available local knowledge on fire histories to identify sites that would benefit from reinstating appropriate fire frequency to prevent further declines of patches affected by either too low, or too high, fire frequency.
    - For areas of the ecological community affected by too high fire frequency, identify options for reducing the frequency of fires and protecting important features, such as habitat trees.

- Fire management strategies at each location should take into account patch size, habitat features (e.g. protect hollow-bearing trees and large logs), vegetation structure and the surrounding landscape (including property protection) to minimise damage, maintain refuges for fauna (during and after fire) and increase habitat variability

- Fires (including planned burns nearby) must be managed to: maintain the integrity of the ecological community and avoid disruption of the life cycles of the component species; support rather than degrade the habitat; avoid invasion of exotic species; and avoid increased detrimental impacts of other threats such as drought, grazing or predation by feral predators. Isolated faunal populations, the rainforest understorey, and threatened plants are particularly vulnerable to local extinction following intense fires combined with other threats.
    - Ensure that an invasive species risk assessment and management program is planned and budgeted for ahead of proposed burning.
    - Use available ecological information to avoid detrimental fire impacts on key and susceptible species in the ecological community. For instance, do not undertake planned burns in areas adjacent to the ecological community when key, threatened or functionally important flora and fauna (that may be adversely impacted) are flowering, nesting or otherwise reproducing.
    - Consider weather conditions. Do not burn adjacent to the ecological community when soil moisture is low, or dry conditions are predicted for the coming season because flora and fauna will already be stressed, recovery will be too slow and erosion may occur; or, weeds may become established while vegetation cover is reduced.
    - Monitor the outcomes of fire and the consequences of other threats. Manage these within an appropriate timescale (e.g. immediately: put in place erosion control measures; limit access by feral predators and grazers; control weeds as they first appear with follow up treatments as necessary, until native vegetation has regenerated); consider shelter and food needs of native fauna. Ensure monitoring results are taken into account when planning and implementing future fire regimes.

5.4.2.5 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 1).
    - Restoration to improve the condition of degraded patches should aspire to the 5 Star Standard of the SERA Standards. Land managers should aim for the highest and best recovery of the ecological community to maximise biodiversity and ecological function based on appropriate metrics for each site (see Condition Thresholds at Table 1 and SERA (2021) for guidance on implementing appropriate standards). This is particularly the case for sites that are being restored or reconstructed from highly altered states (see also Section 2.2.4).

- Work with landholders to restore and reconnect patches of the ecological community and other adjacent or nearby native vegetation (including buffer areas)
- Maintain stags, logs, and mature and old-growth trees with hollows as they provide important habitat for fauna.
- If necessary, supplement, (but do not replace) habitat as part of restoration projects by placing hollow logs, large rocks or other habitat features (such as artificial hollows or various sized nest boxes) in or near to, the ecological community. This may be particularly important after disturbance such as a severe fire event.
- 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. Take into account key plant species' growing seasons to successfully achieve seed set.
- Ensure commitment to maintenance 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.
- Close and rehabilitate unnecessary roads and tracks and otherwise control access to restored patches.

5.4.3 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.

5.4.3.1 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 during recreational activities such as walking and bicycle

riding and of minimising pollution, littering and damage to habitat via informative and explicit 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.

5.4.3.2 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, bush rock removal, dumping garden waste and other rubbish, creating informal paths and tracks, and the use of off-road vehicles in patches of the ecological community. Signage should include a section that describes the damaging effects of these activities and the relevant associated penalties for engaging in these activities.

- 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.

5.4.3.3 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 this and other threatened ecological communities and species.

- Develop coordinated incentive projects to encourage conservation and stewardship of the ecological community on private land, and link with other programs and activities, especially those managed by regional Natural Resource Management groups.

- Support opportunities for traditional owners/custodians 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; infrastructure or development works involving substrate or vegetation disturbance do not adversely impact the ecological community; maintenance activities (e.g. roads and roadsides) avoid the introduction or spread of weeds; with due regard to principles for long-term conservation; land owners and developers, to minimise threats associated with land conversion and development.

5.4.4 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.

5.4.4.1 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 map the 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.
    - Continue to track spatially the fire interval status of the ecological community and surrounding fire-dependent and/or fire sensitive vegetation;
    - Collate existing information on populations of fauna characteristic of the ecological community across its range.

5.4.4.2 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.
- Improve understanding of fire survival and reproductive responses, and relevant traits of plant and animal species to predict community responses to alternative fire regimes.
- Assess the appropriateness and efficacy of fire management regimes and fire management infrastructure (e.g. fire trails) that exist for patches of the ecological community.
- Assess the appropriateness and efficacy of fire management regimes that employed by landholders that hold/own/lease property that contains patches of the ecological community.

- 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.

5.4.4.3 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. Bell Miner-Associated Dieback, 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.

Consultation Questions on the priority actions

- Is this list of proposed priority actions to conserve this ecological community complete and appropriate?
- Is there any evidence to inform fire management that would maintain the ecological community? Do you have an opinion about appropriate fire-regimes that would maintain both the understorey and canopy layer?
- The Committee and Department would appreciate any additional information or advice to improve this section, including an indication of what are the highest priorities and why.

6 Listing assessment

The Threatened Species Scientific Committee has provided this draft assessment for consultation.

6.1 Reason for assessment

This assessment follows prioritisation of a nomination from the public in response to the impacts of the 2019-2020 bushfires.

6.2 Eligibility for listing

This assessment uses the criteria set out in the EPBC Regulations and TSSC Guidelines for Nominating and Assessing Threatened Ecological Communities, as in force at the time of the assessment.

6.2.1 Criterion 1 – decline in geographic distribution

Eligible under Criterion 1 for listing as **Vulnerable.**

	Category		
	Critically Endangered	**Endangered**	**Vulnerable**
Its decline in geographic distribution is:	very severe	severe	substantial
decline relative to the longer-term/1750 timeframe	*≥90%*	*≥70%*	***≥50%***
decline relative to the past 50 years	*≥80%*	*≥50%*	*≥30%*

Source: TSSC 2017

Evidence:

Estimates of the decline in extent since 1750 of Brogo Wet Vine Forest have included 42% (Keith & Bedward, 1999), 45 to 50% (Tozer et al. 2010) and approximately half (NSW Scientific Committee, 2011).

Largely, clearing has likely been associated with historical conversion to agricultural land, but analysis of recent (1991–2015) woody vegetation change data (DEE, 2017) suggests that up to 8% of Brogo Wet Vine Forest may have been recently cleared for either agriculture or rural development, although this could also indicate that these areas have not recovered from drought/fire/BMAD during the period 1991–2015.

Additionally, many remaining patches have experienced degradation, due to the multitude of interacting factors that are detailed in Section 4. Therefore, some proportion of the remaining Brogo wet vine forest is likely to no longer meet the key diagnostics and condition thresholds in Table 1.

On balance, taking into account historic estimates, recent losses, and that the condition of the remaining patches of Brogo wet vine forest have been severely degraded such that many patches may no longer meet the key diagnostics and condition thresholds for the ecological community, the geographic distribution of the ecological community is likely to have declined by more than 50% since 1750.

This represents a **substantial** decline in geographic distribution. Following preliminary assessment, the Committee therefore considers that the ecological community is likely to meet the relevant elements of Criterion 1 to make it eligible for listing as **Vulnerable**.

6.2.2 Criterion 2 – limited geographic distribution coupled with demonstrable threat

Eligible under Criterion 2 for listing as **Endangered.**

Its geographic distribution is:		**very restricted**	**restricted**	**limited**
Extent of occurrence (EOO)		*< 100 km2 = <10,000 ha*	*<1,000 km2 = <100,000 ha*	***<10,000 km2 = <1,000,000 ha***
Area of occupancy (AOO)		*< 10 km2 = <1,000 ha*	***<100 km2 = <10,000 ha***	*<1,000 km2 = <100,000 ha*
Average patch size		***< 0.1 km2 = <10 ha***	*< 1 km2 = <100 ha*	-
AND the nature of its distribution makes it likely that the action of a threatening process could cause it to be lost in:				
the immediate future	*10 years or 3 generations (up to a maximum of 60 years)*	Critically endangered	Endangered	Vulnerable
the near future	***20 years or 5 generations (up to a maximum of 100 years)***	**Endangered**	**Endangered**	**Vulnerable**
the medium term future	*50 years or 10 generations (up to a maximum of 100 years)*	Vulnerable	Vulnerable	Vulnerable

Source: TSSC 2017

Evidence:

The geographic distribution for this ecological community has been calculated from the NSW SCIVI: Southeast NSW Native Vegetation Classification and Mapping (NSW DPIE, version 14; Tozer et al. 2010) units that most closely match the description of the ecological community, being the map units representing the NSW-listed EEC.

The estimated Extent of Occupancy (EoO) for the ecological community is 408,616 ha or 4086 km^2. This represents a **limited** geographic distribution. The estimated Area of Occupancy (AoO) for the ecological community is 5294 ha or 53 km^2. This represents a **restricted** geographic distribution. The median patch size for patches is 2.12 ha or 0.02 km^2. This represents a **very restricted** geographic distribution. Around 92% of the ecological community exists as patches smaller than 10 ha in size.

The ecological community's highly patchy distribution makes management initiatives and actions difficult to coordinate across its range and increases the ecological community's susceptibility to immediate threats such as clearing or degradation through inappropriate management. The small patch size of the community also makes it vulnerable to edge effects such as weed invasion, changes to microclimate, changes to species richness and abundance and changes to vegetation structure (Laurance et al., 2002). Only around 26% of the community currently lies within land reserved for nature conservation. Further loss of patches may reduce connectivity and therefore the ability of some species to disperse between patches (Fischer & Lindenmayer, 2007; Opdam & Wascher, 2004). Intensified disturbance regimes, such as those being experienced within southeastern Australia (Boer et al., 2020; Collins, Bradstock, et al., 2021), will likely compound the risks that many small patches face, making them less likely to persist in the landscape.

Severe drought has the potential to cause mass tree mortality and destabilise temperate forest ecosystems (see **Error! Reference source not found.**). Severe drought is also a known driver of large and severe wildfires (Andrade et al., 2019; Nolan, Boer, et al., 2020). Severe drought

episodes are likely to interact with fire regimes that cause biodiversity decline in a number of ways detrimental to fauna and flora (see **Error! Reference source not found.**). Intensified fire regimes, such as those being experienced within south-eastern Australia (Boer et al., 2020; Collins, Bradstock, et al., 2021), will likely compound the risks that many small patches face, making them less likely to persist in the landscape. The ability of the species that represent the community to persist and disperse between patches will likely become more difficult if conditions become less suitable for them in future (Fischer & Lindenmayer, 2007; Opdam & Wascher, 2004).

Large-scale wildfires occurring at short intervals have the capacity to fundamentally change the ecology of Brogo Wet Vine Forest, e.g. via extirpation of fire-sensitive mesic elements, to the point where patches of the community may no longer meet the description in 1.2 or the key diagnostics in 2.1. Dramatic shifts in fire regimes that may be conducive to this scenario are recognised to be occurring globally and are linked to anthropogenic climate change (Bowman et al., 2020; Kirchmeier-Young et al., 2019).

The fire history of Brogo wet vine forest suggests that an increase in fire frequency could be detrimental to the persistence of the ecological community. Considering the period from 1988 to 2021, the maximum size of areas affected by contiguous high severity fire in the region containing the ecological community can be up to approximately 149,000 ha, averaging around 38,000 ha, while the median size of fires overall is approximately 7400 ha (Collins, Bradstock, et al., 2021). Thus, the median fire size within this region exceeds the Area of Occupancy for Brogo Wet Vine Forest (5294 ha), and vastly exceed the average patch size for the community (2.12 ha). Further, predicted increases in drought severity and frequency across southeastern Australia (Herold et al., 2021; Kirono et al., 2020) are likely to lead to increased occurrence of large and severe wildfires in this region (Andrade et al., 2019; Nolan, Boer, et al., 2020). A 10–50% increase in the number of severe fire weather days is predicted for the South East and Tablelands region specifically within the next 60 years (DECCW, 2010; OEH, 2014).

In the last 20 years, around 43% of the ecological community has burned once and 18% burned twice (Table 3). Around 45 per cent of the TEC burnt during the 2019–2020 fire season, with over half of this burning at high or very high fire severity (Table 3).

Table 3. Fire frequency and fire severity statistics for Brogo Wet Vine Forest. Spatial extent of vegetation was Shoalhaven EEC data (DPIE, 2013).

Fire frequency 1950 – 2021		
Number of fires	**Area (ha)**	**Percentage of total**
0	525	10
1	1896	36
2	1616	30
3	644	12
4	484	9
5	113	2
6	19	<1
Number of fires since 2000		
0	2037	38
1	2270	43
2	962	18
3	33	1
Fire severity 2019 – 2020 season		
Severity class	**Area (ha)**	**Percentage of total**
Not burnt in 2019/20	2948	56
1 (no data)	108	2
2 (unburnt)	142	3
3 (low to moderate)	662	12

4 (high)	793	15
5 (very high)	646	12

Sources: NPWS (2021), AUS GEEBAM (2020)

Additionally, around 3% of TEC lies within commercial production forests, with some of these patches included within the harvest area of Forestry Corporation harvest plans (Forestry Corporation, 2015).

Bell Miner-Associated Dieback has been described as a potential threat to the community integrity of Brogo Wet Vine Forest. Bell Miner-Associated Dieback is a syndrome of canopy defoliation associated with overabundant psyllids and has been linked to complex relationships between colonies of the Bell Miner (*Manorina melanophys*), densities of other bird species and disturbance processes (Hall et al., 2015; Kemmerer et al., 2008). Such outbreaks can result in significant loss of canopy over wide geographic areas (Hall et al., 2015; Haywood & Stone, 2011), potentially interacting with other threats such as drought and fire to exacerbate ecosystem degradation.

The cumulative impact of these threatening processes has the potential to cause the loss of the ecological community within 100 years (5 generations of the dominant canopy species)**.**

This represents a **very restricted** geographic distribution, and the nature of this distribution makes it likely that the action of a threatening process could cause it to be lost in the **near future**. Following preliminary assessment, the Committee therefore considers that the ecological community is likely to meet the relevant elements of Criterion 2 to make it eligible for listing as **Endangered**.

6.2.3 Criterion 3 – decline of functionally important species

There is insufficient data to determine eligibility under Criterion 3.

	Category		
	Critically Endangered	**Endangered**	**Vulnerable**
For a population of a native species that is likely to play a major role in the community, there is a:	very severe decline	severe decline	substantial decline
Estimated decline over the last 10 years or three generations, whichever is longer	*80%*	*50%*	*20%*
to the extent that restoration of the community is not likely to be possible in:	the immediate future	the near future	the medium-term future
timeframe	*the immediate future (10 years or 3 generations up to a maximum of 60 years)*	*the near future (20 years or 5 generations up to a maximum of 100 years)*	*the medium-term future (50 years or 10 generations up to a maximum of 100 years)*

Source: TSSC 2017

Evidence:

The ecological relationships between member species of this community are important for maintaining its ecological function, but specific data related to the decline of individual key species or their functional importance within this ecological community are not available.

The Committee considers that there is insufficient information to determine the eligibility of the ecological community for listing in any category under Criterion 3.

6.2.4 Criterion 4 – reduction in community integrity

Eligible under Criterion 4 for listing as **Endangered.**

	Category		
	Critically Endangered	**Endangered**	**Vulnerable**
The reduction in its integrity across most of its geographic distribution is:	very severe	**severe**	substantial
as indicated by degradation of the community or its habitat, or disruption of important community processes, that is:	very severe	**severe**	substantial
such that restoration is unlikely (even with positive human intervention) within	*the immediate future (10 years or 3 generations up to a maximum of 60 years)*	*the near future (**20 years** or 5 generations up to a maximum of 100 years)*	*the medium-term future (50 years or 10 generations up to a maximum of 100 years)*

Source: TSSC 2017

Evidence:

Complex and detrimental interactions involving past land clearing, overgrazing, feral animal impacts, drought and fire impacts (see Criterion 2 – limited geographic distribution coupled with demonstrable threat), and weed invasion has occurred within Brogo Wet Vine Forest, causing severe reductions in integrity and degradation of ecological functions across most of its range. The ecological community has undergone severe changes in structure and function as a result of the threats outlined in Section 4. The ecological community has experienced a reduction in integrity across most of its extent primarily because of domestic and feral animals and invasive plants.

Domestic and feral animals

Currently around 70% of the remaining ecological community may be subject to grazing by domestic livestock. Feral goats, deer and domestic livestock are known to preferentially browse grasses, followed by forbs will also browse woody shrubs and trees when resources become scare, e.g. during drought (Davis et al., 2008; Pahl, 2019). Rabbits can reduce vegetation cover, reduced or prevent plant recruitment, increase soil erosion and have been implicated in the extinction of native fauna (DSEWPC, 2011; Eldridge et al., 2006; Hobbs, 2001). Overgrazing in this community is likely to result in simplification of understorey vegetation (e.g. reduced plant species abundance and diversity), long term impacts on recruitment of canopy species, removal of shrubs, changes to species dominance, changes in nutrient concentrations, damage to soils and increased erosion (Tasker & Bradstock, 2006; Yates et al., 2000). Presence of introduced herbivores can also negatively impact fauna, e.g. via trampling effects and changes to critical habitat (Denmead et al., 2015; Hansen et al., 2019). Interactions between severe fires and heavy rainfall, i.e., post-fire erosion of bare soils (Tulau et al., 2018), may further exacerbate degradation by overgrazing. Such changes may reduce the effectiveness of future restoration projects (Sims et al., 2019). Livestock are also efficient vectors of transmission for introduced plants species and noxious weeds throughout landscapes, and facilitate the transport of weeds beyond edges and into forest interiors (Castillo-Flores & Calvo-Irabién, 2003; Hogan & Phillips, 2011).

In the NSW south coast and tablelands region, the distribution of feral deer was either patchy or absent in 2009, but had become almost continuous by 2020 (DPI, 2021a). Feral goat distribution has been largely stable and patchy in this region between 2009 to 2016, with mostly low

abundance in the Bega Valley region (DPI, 2021b). Feral pig distribution has been mostly stable in this region between 2009 to 2016, being either absent or present at low to medium densities across the majority of areas containing Brogo Wet Vine Forest (DPI, 2021c). Foxes are present in all areas containing Brogo Wet Vine Forest (DPI, 2021d). Rabbit distribution has remained largely stable in this region between 2009 to 2016, with continuous low-density coverage across the areas containing Brogo Wet Vine Forest (DPI, 2021e).

Invasive plants

Invasive plants are a known issue within the community (see Threat table for species list). Invasive species have the capacity to transform ecosystems and inhibit ecological function (Vilà et al., 2011). Invasion of natural ecosystems by introduced plants species is most likely to occur on edges where land conversion has taken place (Vilà & Ibáñez, 2011).

Conclusion

The combination of these threat impacts has impacted the structure, species assemblage and ecological function across the range of the ecological community.

This represents a **severe** reduction in integrity across most of its geographic distribution, as indicated by a **severe** degradation of the community of its habitat. Following preliminary assessment, the Committee therefore considers that the ecological community is likely to meet the relevant elements of Criterion 4 to make it eligible for listing as **Endangered**.

6.2.5 Criterion 5 – rate of continuing detrimental change

Insufficient data to determine eligibility under Criterion 5.

	Category		
	Critically Endangered	**Endangered**	**Vulnerable**
Its rate of continuing detrimental change is: as indicated by:	very severe	severe	substantial
(a) rate of continuing decline in its geographic distribution, or a population of a native species that is believed to play a major role in the community, that is: OR	very severe	severe	serious
(b) intensification, across most of its geographic distribution, in degradation, or disruption of important community processes, that is:	very severe	severe	serious
an observed, estimated, inferred or suspected detrimental change over the immediate past, or projected for the immediate future (10 years or 3 generations, up to a maximum of 60 years), of at least:	*80%*	*50%*	*30%*

Source: TSSC 2017

Evidence:

Although continuing detrimental change is occurring within this ecological community, data on the rate of this change is not available to support specific analysis against Criterion 5 and its indicative thresholds.

The Committee considers that there is insufficient information to determine the eligibility of the ecological community for listing in any category under Criterion 5.

6.2.6 Criterion 6 – quantitative analysis showing probability of extinction

Insufficient data to determine eligibility under Criterion 6.

	Category		
	Critically Endangered	**Endangered**	**Vulnerable**
A quantitative analysis shows that its probability of extinction, or extreme degradation over all of its geographic distribution, is:	at least 50% in the immediate future	at least 20% in the near future	at least 10% in the medium-term future
timeframes	*10 years or 3 generations (up to a maximum of 60 years)*	*20 years or 5 generations (up to a maximum of 100 years)*	*50 years or 10 generations (up to a maximum of 100 years)*

Source: TSSC 2017

Evidence:

Quantitative analysis of the probability of extinction or extreme degradation over all its geographic distribution has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the ecological community for listing in any category under this criterion.

Consultation Questions on the listing assessment

- Do you agree with the draft conclusions against the listing criteria? If not, why not?
- How could the analysis against each of the criteria be improved?
- Please provide any additional data or evidence to support the assessment against the criteria?

Appendix A - Species lists

This Appendix lists the assemblage of native species that characterises the ecological community throughout its range at the time of listing, particularly characteristic and frequently occurring vascular plants at Table 4 and macroscopic animals at Table 5. The ecological community also includes fungi, cryptogamic plants and other species; however, these are relatively poorly documented.

The species listed may be abundant, rare, or 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.

Species presence and relative abundance varies naturally across the range of the ecological community based on factors such as historical biogeography, soil properties (e.g. moisture, chemical composition, texture, depth and drainage), topography, hydrology and climate. They also change over time, for example, in response to disturbance (by logging, fire, or grazing), or to the climate and weather (e.g. seasons, floods, drought and extreme heat or cold). The species recorded at a particular site can also be affected by sampling scale, season, effort and expertise. In general, the number of species recorded is likely to increase with the size of the site.

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

A1 Flora

Table 4: Flora that are known to occur within the ecological community.

Scientific name	Common name/s	Fire response[1]	EPBC status[2]	State status[3]	Source
Canopy tree species					
Angophora floribunda	Rough-barked Apple	R	Not listed	Not listed	NSW Scientific Committee (2011)
Eucalyptus baueriana	Blue Box	R	Not listed	Not listed	NSW Scientific Committee (2011)
Eucalyptus bosistoana	Coast Grey Box	R	Not listed	Not listed	NSW Scientific Committee (2011)
Eucalyptus globoidea	White Stringybark	R	Not listed	Not listed	Tozer et al. (2010)
Eucalyptus maidenii	Maiden's Blue Gum	R	Not listed	Not listed	NSW Scientific Committee (2011)
Eucalyptus tereticornis	Forest Red Gum	R	Not listed	Not listed	NSW Scientific Committee (2011)
Understorey trees and shrubs					
Acacia implexa	Hickory Wattle	R; B only	Not listed	Not listed	NSW Scientific Committee (2011)
Abutilon oxycarpum	Flannel Weed	OS	Not listed	Not listed	Miles (2006)
Acacia falciformis	Broad-leaved Hickory	R; B only	Not listed	Not listed	Miles (2006)
Acacia maidenii	Maiden's Wattle	R	Not listed	Not listed	Miles (2006)
Acacia mearnsii	Black Wattle	R; seedlings > 1 yr	Not listed	Not listed	NSW Scientific Committee (2011)

Scientific name	Common name/s	Fire response[1]	EPBC status[2]	State status[3]	Source
Alectryon subcinereus	Native Quince	U	Not listed	Not listed	NSW Scientific Committee (2011)
Brachychiton populneus	Kurrajong	R	Not listed	Not listed	NSW Scientific Committee (2011), Tozer (2010)
Breynia oblongifolia	Coffee Bush	R	Not listed	Not listed	Tozer et al. (2010)
Bursaria spinosa	Blackthorn	R	Not listed	Not listed	Tozer et al. (2010)
Cassinia longifolia	Dogwood	OS; seedlings > 1 yr	Not listed	Not lsted	Miles (2006)
Cassinia trinerva	Three-veined Cassinia	OS	Not listed	Not listed	Tozer et al. (2010)
Deeringia amaranthoides	Deeringia	U	Not listed	Not listed	Miles (2006)
Exocarpos cupressiformis	Native Cherry	R	Not listed	Not listed	Miles (2006)
Ficus rubiginosa	Port Jackson Fig	R	Not listed	Not listed	NSW Scientific Committee (2011)
Indigofera australis	Austral Indigo	R; B only; seedlings < 1 yr	Not listed	Not listed	Tozer et al. (2010)
Leucopogon juniperinus	Prickly Beard Heath	OS	Not listed	Not listed	Miles (2006)
Melicytus dentata	Tree Violet	R; B only	Not listed	Not listed	Tozer et al. (2010)
Myoporum bateae		U	Not listed	Not listed	Miles (2006)
Myrsine howittiana	Muttonwood	U	Not listed	Not listed	Miles (2006)
Notelaea venosa	Veined Mock Olive	R	Not listed	Not listed	Miles (2006)
Ozothamnus diosmifolius	Tickbush	OS	Not listed	Not listed	Miles (2006)
Pimelea axiflora ssp axiflora	Bootlace Bush	U	Not listed	Not listed	Miles (2006)
Pittosporum revolutum	Large-fruited Pittosporum	R	Not listed	Not listed	Miles (2006)
Pittosporum undulatum	Sweet Pittosporum	R	Not listed	Not listed	NSW Scientific Committee (2011)
Ferns					
Asplenium flabellifolium	Necklace Fern		Not listed	Not listed	Tozer et al. (2010)
Cheilanthes distans	Bristly Cloak Fern		Not listed	Not listed	Miles (2006)
Cheilanthes sieberi	Poison Rock Fern		Not listed	Not listed	NSW Scientific Committee (2011)
Doodia aspera	Prickly Rasp Fern		Not listed	Not listed	Miles (2006)
Pellaea falcata	Sickle Fern		Not listed	Not listed	NSW Scientific Committee (2011)
Pteridium esculentum	Bracken Fern		Not listed	Not listed	Miles (2006)
Pteris tremula	Tender Brake		Not listed	Not listed	Miles (2006)
Pyrrosia rupestris	Rock Felt Fern		Not listed	Not listed	Miles (2006)
Herb and orchid and sedge/graminoid species					
Ajuga australis	Austral Bugle		Not listed	Not listed	Miles (2006)
Arthopodium milleflorum	Pale Vanilla Lily		Not listed	Not listed	Miles (2006)
Dysphania carinatum	Green Crumbweed		Not listed	Not listed	Miles (2006)
Dysphania pumilio	Small Crumbweed		Not listed	Not listed	Miles (2006)
Commelina cyanea	Scurvy Weed		Not listed	Not listed	Miles (2006)
Cymbonotus spp.	Bear's Ear		Not listed	Not lsted	Miles (2006)

Scientific name	Common name/s	Fire response[1]	EPBC status[2]	State status[3]	Source
Carex appressa	Tall Sedge		Not listed	Not listed	NSW Scientific Committee (2011)
Carex breviculmis	Short-stem Sedge		Not listed	Not listed	Tozer et al. (2010)
Carex inversa	Knob Sedge		Not listed	Not listed	Tozer et al. (2010)
Carex longebrachiata	Drooping Sedge		Not listed	Not listed	Tozer et al. (2010)
Cyperus gracilis					Miles (2006)
Cyperus laevis					Miles (2006)
Cyperus trinervis			Not listed	Not listed	Miles (2006)
Cynoglossum australe	Australian Hound's-tongue		Not listed	Not listed	Tozer et al. (2010)
Daucus glochidiatus	Australian Carrot		Not listed	Not listed	Tozer et al. (2010)
Dendrobium speciosum	Rock orchid		Not listed	Not listed	Miles (2006)
Desmodium brachypodum	Large Tick-trefoil		Not listed	Not listed	NSW Scientific Committee (2011)
Desmodium gunii	Slender Tick-trefoil		Not listed	Not listed	Miles (2006)
Desmodium varians	Slender Tick-trefoil		Not listed	Not listed	Tozer et al. (2010)
Dichondra repens	Kidney Weed		Not listed	Not listed	NSW Scientific Committee (2011)
Einadia hastata	Berry Saltbush		Not listed	Not listed	Tozer et al. (2010)
Einada nutans	Climbing Saltbush		Not listed	Not listed	Miles (2006)
Einada trigonos	Fishweed		Not listed	Not listed	Miles (2006)
Euchiton japonicus	NA		Not listed	Not listed	Tozer et al. (2010)
Galium leiocarpum	Bedstraw		Not listed	Not listed	Miles (2006)
Geranium solanderi var. solanderi	Austral Crane's-bill		Not listed	Not listed	Tozer et al. (2010)
Gahnia aspera	Red-fruited Saw-sedge		Not listed	Not listed	Miles (2006)
Hackelia latifolia	Forest Hound's Tongue		Not listed	Not listed	Tozer et al. (2010)
Hydrocotyle laxiflora	Stinking Pennywort		Not listed	Not listed	NSW Scientific Committee (2011)
Hypericum gramineum	Native St John's Wort		Not listed	Not listed	Miles (2006)
Mentha diemenica	Native Mint		Not listed	Not listed	Miles (2006)
Opercularia aspera	Stinkweed		Not listed	Not listed	Miles (2006)
Lepidosperma laterale	Variable Sword Sedge		Not listed	Not listed	Tozer et al. (2010)
Lomandra longifolia	Mat Rush		Not listed	Not listed	Tozer et al. (2010)
Oxalis perennans	Grassland Wood-sorrel		Not listed	Not listed	Tozer et al. (2010)
Parietaria debilis	Native Pellitory		Not listed	Not listed	Miles (2006)
Plantago debilis	Shade Plantain		Not listed	Not listed	Tozer et al. (2010)
Plectranthus graveolens			Not listed	Not listed	Miles (2006)
Plectranthus parviflorus	Cockspur Flower		Not listed	Not listed	Tozer et al. (2010)
Lobelia purpurascens	Whiteroot		Not listed	Not listed	Miles (2006)
Rumex brownii	Swamp Dock		Not listed	Not listed	Tozer et al. (2010)
Scleria mackaviensis			Not listed	Not listed	Miles (2006)
Senecio bipinnatisectus			Not listed	Not listed	Miles (2006)
Senecio linearfolius	Fireweed Groundsel		Not listed	Not listed	Miles (2006)

Scientific name	Common name/s	Fire response[1]	EPBC status[2]	State status[3]	Source
Sigesbeckia orientalis subsp. orientalis			Not listed	Not listed	Tozer et al. (2010)
Solanum prinophyllum	Forest Nightshade		Not listed	Not listed	Miles (2006)
Solanum pungetium	Eastern Nightshade		Not listed	Not listed	Tozer et al. (2010)
Stellaria flaccida	Forest Starwort		Not listed	Not listed	NSW Scientific Committee (2011)
Urtica incisa	Stinging Nettle		Not listed	Not listed	Tozer et al. (2010)
Veronica calycina	Hairy Speedwell		Not listed	Not listed	Miles (2006)
Veronica plebeia	Common Speedwell		Not listed	Not listed	Miles (2006)
Wahlenbergia gracilis	Sprawling Bluebell		Not listed	Not listed	Tozer et al. (2010)
Xerochrysum bracteatum	Golden Everlasting		Not listed	Not listed	Tozer et al. (2010)
Scramblers, climbers, vines, epiphytes					
Celastrus australis	Staff Climber	U	Not listed	Not listed	Tozer et al. (2010)
Clematis glycinoides	Headache Vine	R; B only	Not listed	Not listed	DPIE (2011)
Eustrephus latifolius	Wombat Berry	R; B only	Not listed	Not listed	Tozer et al. (2010)
Geitonoplesium cymosum	Scrambling Lily	R; B only	Not listed	Not listed	NSW Scientific Committee (2011)
Glycine clandestina	Twining Glycine	R	Not listed	Not listed	NSW Scientific Committee (2011)
Glycine tabacina	Variable Glycine	R	Not listed	Not listed	Tozer et al. (2010)
Marsdenia rostrata	Milk Vine	R	Not listed	Not listed	Tozer et al. (2010)
Gynochthodes jasminoides	Sweet Morinda	U	Not listed	Not listed	Tozer et al. (2010)
Pandorea pandorana	Wonga Wonga Vine	R	Not listed	Not listed	Tozer et al. (2010)
Rubus parvifolius	Native Raspberry	R	Not listed	Not listed	Tozer et al. (2010)
Sarcopetalum harveyanum	Pearl Vine	R	Not listed	Not listed	Tozer et al. (2010)
Smilax australis	Wait-a-while	Unknown; possibly OS	Not listed	Not listed	Miles (2006)
Sicyos australis	Star Cucumber		Not listed	Not listed	Tozer et al. (2010)
Stephania japonica var. *discolor*	Snake Vine	R; B only	Not listed	Not listed	Tozer et al. (2010)
Tylophora barbata	Bearded Tylophora	R	Not listed	Not listed	Miles (2006)
Grasses					
Rytidosperma pilosum	Velvet Wallaby Grass		Not listed	Not listed	Tozer et al. (2010)
Austrostipa ramosissima			Not listed	Not listed	Miles (2006)
Cenchrus caliculatus	Hillside Burrgrass		Not listed	Not listed	Tozer et al. (2010)
Cymbopogon refractus	Barbed Wire Grass		Not listed	Not listed	Miles (2006)
Digitaria ramularis			Not listed	Not listed	Miles (2006)
Echinopogon ovatus	Forest Hedgehog Grass		Not listed	Not listed	Tozer et al. (2010)
Anthosachne scabra	Common Wheat Grass		Not listed	Not listed	Tozer et al. (2010)
Entolasia stricta	Wiry Panic		Not lsted	Not listed	Miles (2006)
Entolasia leptostachya	Paddock Lovegrass		Not listed	Not listed	Miles (2006)
Imperata cylindrica	Blady Grass		Not listed	Not listed	Tozer et al. (2010)

Scientific name	Common name/s	Fire response[1]	EPBC status[2]	State status[3]	Source
Microlaena stipoides	Weeping Grass		Not listed	Not listed	Tozer et al. (2010)
Rytidosperma longifolium	Long-leaved Wallaby Grass		Not listed	Not listed	Tozer et al. (2010)
Oplismenus imbecillis	Creeping Beard Grass		Not listed	Not listed	Tozer et al. (2010)
Panicum effusum	Hairy Panic		Not listed	Not listed	Miles (2006)
Poa labillardierei var. labillardierei	Common Tussock-grass		Not listed	Not listed	Tozer et al. (2010)
Sporobolus elongatus	Slender Rat's Tail Grass		Not listed	Not lsted	Miles (2006)

[1] For woody species, the likely fire response is given as: R = resprouter, St = stem resprouter only, B = basal resprouter only, OS = non-respouter, U = resprouter-type unknown. Species of conservation concern are indicated with *. Species marked with † are predicted to occur within the ecological community but may not have been observed. Sources for fire responses: (Benson & McDougall, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001; Miles, 2021b; Nicolle, 2006).
[2] 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
[3] Species listed under the State Act at the time this document was prepared. Source: https://www.environment.nsw.gov.au/threatenedspeciesapp/

Sources: (Clarke et al., 2009; DAWE, 2021b; Miles, 2006; NSW Scientific Committee, 2011; Tozer et al., 2010).

A2 Fauna

Table 5: Fauna likely or known to occur in the ecological community. Species of conservation concern are indicated with *.

Scientific name	Common name/s	EPBC status[1]	State status[2]	Source
Mammals				
Acrobates pygmaeus	Feathertail Glider	not listed	not listed	DPIE survey (ALA, 2021b)
Antechinus agilis	Agile Antechinus	not listed	not listed	DPIE survey (ALA, 2021b)
Antechinus mimetes	Dusky Antechinus	not listed	not listed	DPIE survey (ALA, 2021b)
Antechinus stuartii	Brown Antechinus	not listed	not listed	DPIE survey (ALA, 2021b)
Canis lupus	Dingo	not listed	not listed	DPIE survey (ALA, 2021b)
Chalinolobus morio	Chocolate Wattled Bat	not listed	not listed	DPIE survey (ALA, 2021b)
**Dasyurus maculatus*	Bindjulang; Spot-tailed Quoll	Endangered	Vulnerable	DPIE survey (ALA, 2021b)
Macropus giganteus	Eastern Grey Kangaroo	not listed	not listed	DPIE survey (ALA, 2021b)
Notamacropus rufogriseus	Red-necked Wallaby	not listed	not listed	DPIE survey (ALA, 2021b)
Nyctophilus geoffroyi	Lesser Long-eared Bat	not listed	not listed	DPIE survey (ALA, 2021b)
Ozimops planiceps	Little Mastiff-bat	not listed	not listed	Other survey (ALA, 2021b)
Perameles nasuta	Long-nosed Bandicoot	not listed	not listed	DPIE survey (ALA, 2021b)
Petaurus breviceps	Sugar Glider	not listed	not listed	DPIE survey (ALA, 2021b)
**Phascolarctos cinereus*	Koala	Vulnerable	Vulnerable	WYLIE (DAWE, 2021)
Pseudocheirus peregrinus	Common Ringtail Possum	not listed	not listed	DPIE survey (ALA, 2021b)
**Pteropus poliocephalus*	Grey-headed Flying-fox	Vulnerable	Vulnerable	WYLIE (DAWE, 2021)
Rattus fuscipes	Bush Rat	not listed	not listed	DPIE survey (ALA, 2021b)
Rattus lutreolus	Swamp Rat	not listed	not listed	DPIE survey (ALA, 2021b)
Rhinolophus megaphyllus	Eastern Horseshoe-bat	not listed	not listed	DPIE survey (ALA, 2021b)
Tachyglossus aculeatus	Short-beaked Echidna	not listed	not listed	DPIE survey (ALA, 2021b)
Trichosurus vulpecula	Common Brushtail Possum	not listed	not listed	DPIE survey (ALA, 2021b)
Vespadelus darlingtoni	Large Forest Bat	not listed	not listed	DPIE survey (ALA, 2021b)
Vespadelus regulus	Southern Forest Bat	not listed	not listed	DPIE survey (ALA, 2021b)
Vespadelus vulturnus	Little Forest Bat	not listed	not listed	DPIE survey (ALA, 2021b)
Vombatus ursinus	Common Wombat	not listed	not listed	DPIE survey (ALA, 2021b)
Wallabia bicolor	Swamp Wallaby	not listed	not listed	DPIE survey (ALA, 2021b)

Scientific name	Common name/s	EPBC status[1]	State status[2]	Source
Birds				
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	not listed	not listed	DPIE survey (ALA, 2021b)
Acanthiza lineata	Striated Thornbill	not listed	not listed	DPIE survey (ALA, 2021b)
Acanthiza nana	Yellow Thornbill	not listed	not listed	DPIE survey (ALA, 2021b)
Acanthiza pusilla	Brown Thornbill	not listed	not listed	DPIE survey (ALA, 2021b)
Acanthiza reguloides	Buff-rumped Thornbill	not listed	not listed	DPIE survey (ALA, 2021b)
Acanthorhynchus tenuirostris	Eastern Spinebill	not listed	not listed	DPIE survey (ALA, 2021b)
Accipiter cirrocephalus	Collared Sparrowhawk	not listed	not listed	DPIE survey (ALA, 2021b)
Accipiter fasciatus	Brown Goshawk	Marine	not listed	DPIE survey (ALA, 2021b)
Accipiter novaehollandiae	Grey Goshawk	not listed	not listed	DPIE survey (ALA, 2021b)
Aegotheles cristatus	Australian Owlet-nightjar	not listed	not listed	DPIE survey (ALA, 2021b)
Alisterus scapularis	Australian King-parrot	not listed	not listed	DPIE survey (ALA, 2021b)
Anthochaera carunculata	Red wattlebird	not listed	not listed	DPIE survey (ALA, 2021b)
Anthochaera chrysoptera	Little Wattlebird	not listed	not listed	DPIE survey (ALA, 2021b)
**Anthochaera phrygia*	Regent Honeyeater	Critically Endangered	Critically Endangered	WYLIE (DAWE, 2021)
Apus pacificus	Fork-tailed swift	Marine; Migratory	not listed	DPIE survey (ALA, 2021b)
Aquila audax	Wedge-tailed Eagle	not listed	not listed	DPIE survey (ALA, 2021b)
**Artamus cyanopterus*	Dusky Woodswallow	not listed	Vulnerable	DPIE survey (ALA, 2021b)
Artamus superciliosus	White-browed woodswallow	not listed	not listed	DPIE survey (ALA, 2021b)
Cacatua galerita	Sulphur-crested Cockatoo	not listed	not listed	DPIE survey (ALA, 2021b)
Cacomantis flabelliformis	Fan-tailed Cuckoo	Marine	not listed	DPIE survey (ALA, 2021b)
Cacomantis pallidus	Pallid Cuckoo	Marine	not listed	Unknown
Cacomantis variolosus	Brush Cuckoo	not listed	not listed	DPIE survey (ALA, 2021b)
Caligavis chrysops	Yellow-faced Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
**Callocephalon fimbriatum*	Gang-gang Cockatoo	not listed	Vulnerable	DPIE survey (ALA, 2021b)
Calyptorhynchus funereus	Yellow-tailed Black-cockatoo	not listed	not listed	Other survey (ALA, 2021b)
Chalcites basalis	Horsfield's Bronze-cuckoo	Marine	not listed	DPIE survey (ALA, 2021b)
Chalcites lucidus	Shining Bronze-cuckoo	Marine	not listed	DPIE survey (ALA, 2021b)
Chenonetta jubata	Maned Duck	not listed	not listed	DPIE survey (ALA, 2021b)
Cinclosoma punctatum	Spotted Quail-thrush	not listed	not listed	DPIE survey (ALA, 2021b)
Colluricincla harmonica	Grey Shrike-thrush	not listed	not listed	DPIE survey (ALA, 2021b)
Columba leucomela	White-headed Pigeon	not listed	not listed	DPIE survey (ALA, 2021b)
Coracina novaehollandiae	Black-faced cuckoo-shrike	Marine	not listed	DPIE survey (ALA, 2021b)
Coracina papuensis	White-bellied Cuckoo-shrike	Marine	not listed	DPIE survey (ALA, 2021b)
Coracina tenuirostris	Cicadabird	Marine	not listed	Unknown
Corcorax melanorhamphos	White-winged Chough	not listed	not listed	DPIE survey (ALA, 2021b)
Cormobates leucophaea	White-throated Treecreeper	not listed	not listed	DPIE survey (ALA, 2021b)
Corvus coronoides	Australian Raven	not listed	not listed	DPIE survey (ALA, 2021b)
Corvus mellori	Little Raven	Marine	not listed	DPIE survey (ALA, 2021b)
Coturnix pectoralis	Grey Quail	Marine	not listed	DPIE survey (ALA, 2021b)

Scientific name	Common name/s	EPBC status[1]	State status[2]	Source
Cracticus torquatus	Grey Butcherbird	not listed	not listed	DPIE survey (ALA, 2021b)
Dacelo novaeguineae	Laughing Kookaburra	not listed	not listed	DPIE survey (ALA, 2021b)
**Daphoenositta chrysoptera*	Varied Sittella	not listed	Vulnerable	DPIE survey (ALA, 2021b)
Dicaeum hirundinaceum	Mistletoebird	not listed	not listed	DPIE survey (ALA, 2021b)
Eolophus roseicapilla	Galah	not listed	not listed	DPIE survey (ALA, 2021b)
Eopsaltria australis	Eastern Yellow Robin	not listed	not listed	DPIE survey (ALA, 2021b)
Eudynamys orientalis	Pacific Koel	not listed	not listed	DPIE survey (ALA, 2021b)
Eurostopodus mystacalis	White-throated Nightjar	Marine	not listed	DPIE survey (ALA, 2021b)
Eurystomus orientalis	Dollarbird	Marine	not listed	DPIE survey (ALA, 2021b)
Falco berigora	Brown Falcon	not listed	not listed	DPIE survey (ALA, 2021b)
Falco cenchroides	Nankeen Kestrel	Marine	not listed	DPIE survey (ALA, 2021b)
Falco longipennis	Australian Hobby	not listed	not listed	DPIE survey (ALA, 2021b)
Falco peregrinus	Peregrine Falcon	not listed	not listed	DPIE survey (ALA, 2021b)
Falcunculus frontatus	Eastern Shrike-tit	not listed	not listed	DPIE survey (ALA, 2021b)
Geopelia striata	Peaceful Dove	not listed	not listed	DPIE survey (ALA, 2021b)
Gerygone mouki	Brown Gerygone	not listed	not listed	DPIE survey (ALA, 2021b)
Gerygone olivacea	White-throated Gerygone	not listed	not listed	DPIE survey (ALA, 2021b)
Glossopsitta concinna	Musk Lorikeet	not listed	not listed	DPIE survey (ALA, 2021b)
Grallina cyanoleuca	Magpie-lark	Marine	not listed	DPIE survey (ALA, 2021b)
Gymnorhina tibicen	Australian Magpie	not listed	not listed	DPIE survey (ALA, 2021b)
**Haliaeetus leucogaster*	White-bellied Sea-eagle	Marine	Vulnerable	DPIE survey (ALA, 2021b)
Haliastur sphenurus	Whistling Kite	Marine	not listed	DPIE survey (ALA, 2021b)
**Hieraaetus morphnoides*	Little Eagle	not listed	Vulnerable	DPIE survey (ALA, 2021b)
**Hirundapus caudacutus*	White-throated Needletail	Vulnerable	not listed	WYLIE (DAWE, 2021)
Hirundo neoxena	Welcome Swallow	not listed	not listed	DPIE survey (ALA, 2021b)
Lalage sueurii	White-winged Triller	not listed	not listed	DPIE survey (ALA, 2021b)
Leucosarcia melanoleuca	Wonga Pigeon	not listed	not listed	DPIE survey (ALA, 2021b)
Lichenostomus melanops	Yellow-tufted Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Lopholaimus antarcticus	Topknot Pigeon	not listed	not listed	DPIE survey (ALA, 2021b)
Macropygia phasianella	Brown Cuckoo-dove	not listed	not listed	DPIE survey (ALA, 2021b)
Malurus cyaneus	Superb Fairy-wren	not listed	not listed	DPIE survey (ALA, 2021b)
Malurus lamberti	Variegated Fairy-wren	not listed	not listed	Other survey (ALA, 2021b)
Manorina melanocephala	Noisy Miner	not listed	not listed	DPIE survey (ALA, 2021b)
Manorina melanophrys	Bell Miner	not listed	not listed	DPIE survey (ALA, 2021b)
Meliphaga lewinii	Lewin's Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Melithreptus brevirostris	Brown-headed Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Melithreptus lunatus	White-naped Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Menura novaehollandiae	Superb Lyrebird	not listed	not listed	DPIE survey (ALA, 2021b)
Microeca fascinans	Jacky Winter	not listed	not listed	DPIE survey (ALA, 2021b)
Monarcha melanopsis	Black-faced Monarch	Marine; Migratory	not listed	DPIE survey (ALA, 2021b)
Myiagra inquieta	Restless Flycatcher	not listed	not listed	DPIE survey (ALA, 2021b)
Myiagra rubecula	Leaden Flycatcher	not listed	not listed	DPIE survey (ALA, 2021b)
Myzomela sanguinolenta	Scarlet Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Neochmia temporalis	Red-browed Finch	not listed	not listed	DPIE survey (ALA, 2021b)
Nesoptilotis leucotis	White-eared Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
**Ninox connivens*	Barking Owl	not listed	Vulnerable	DPIE survey (ALA, 2021b)

Scientific name	Common name/s	EPBC status[1]	State status[2]	Source
Ninox novaeseelandiae	Southern Boobook	Marine	not listed	DPIE survey (ALA, 2021b)
**Ninox strenua*	Powerful Owl	not listed	Vulnerable	DPIE survey (ALA, 2021b)
Oriolus sagittatus	Olive-backed Oriole	not listed	not listed	DPIE survey (ALA, 2021b)
Pachycephala pectoralis	Golden Whistler	not listed	not listed	DPIE survey (ALA, 2021b)
Pachycephala rufiventris	Rufous Whistler	not listed	not listed	DPIE survey (ALA, 2021b)
Pardalotus punctatus	Spotted Pardalote	not listed	not listed	DPIE survey (ALA, 2021b)
Pardalotus striatus	Striated Pardalote	not listed	not listed	DPIE survey (ALA, 2021b)
Petrochelidon nigricans	Tree Martin	Marine	not listed	DPIE survey (ALA, 2021b)
**Petroica boodang*	Scarlet Robin	not listed	Vulnerable	DPIE survey (ALA, 2021b)
**Petroica phoenicea*	Flame Robin	Marine	Vulnerable	DPIE survey (ALA, 2021b)
Petroica rosea	Rose Robin	not listed	not listed	DPIE survey (ALA, 2021b)
Phaps chalcoptera	Common Bronzewing	not listed	not listed	DPIE survey (ALA, 2021b)
Philemon corniculatus	Noisy Friarbird	not listed	not listed	DPIE survey (ALA, 2021b)
Phylidonyris novaehollandiae	New Holland Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Phylidonyris pyrrhoptera	Crescent Honeyeater	not listed	not listed	DPIE survey (ALA, 2021b)
Platycercus elegans	Crimson Rosella	not listed	not listed	DPIE survey (ALA, 2021b)
Platycercus eximius	Eastern Rosella	not listed	not listed	DPIE survey (ALA, 2021b)
Podargus strigoides	Tawny Frogmouth	not listed	not listed	DPIE survey (ALA, 2021b)
Psophodes olivaceus	Eastern Whipbird	not listed	not listed	DPIE survey (ALA, 2021b)
Ptilonorhynchus violaceus	Satin Bowerbird	not listed	not listed	DPIE survey (ALA, 2021b)
Rhipidura albiscapa	Grey Fantail	not listed	not listed	DPIE survey (ALA, 2021b)
Rhipidura leucophrys	Willie Wagtail	not listed	not listed	DPIE survey (ALA, 2021b)
Rhipidura rufifrons	Rufous Fantail	Marine; Migratory	not listed	DPIE survey (ALA, 2021b)
Scythrops novaehollandiae	Channel-billed Cuckoo	Marine	not listed	DPIE survey (ALA, 2021b)
Sericornis frontalis	White-browed Scrubwren	not listed	not listed	DPIE survey (ALA, 2021b)
Sericornis magnirostra	Large-billed Scrubwren	not listed	not listed	DPIE survey (ALA, 2021b)
Stagonopleura guttata	Diamond Firetail	not listed	not listed	DPIE survey (ALA, 2021b)
Strepera graculina	Pied Currawong	not listed	not listed	DPIE survey (ALA, 2021b)
Strepera versicolor	Grey Currawong	not listed	not listed	DPIE survey (ALA, 2021b)
Todiramphus sanctus	Sacred Kingfisher	Marine	not listed	DPIE survey (ALA, 2021b)
Trichoglossus haematodus	Rainbow Lorikeet	not listed	not listed	DPIE survey (ALA, 2021b)
**Tyto novaehollandiae*	Masked Owl	not listed	Vulnerable	DPIE survey (ALA, 2021b)
**Tyto tenebricosa*	Sooty Owl	not listed	Vulnerable	DPIE survey (ALA, 2021b)
Vanellus miles	Masked Lapwing	not listed	not listed	DPIE survey (ALA, 2021b)
Zoothera lunulata	Bassian Thrush	not listed	not listed	DPIE survey (ALA, 2021b)
Zosterops lateralis	Silvereye	Marine	not listed	DPIE survey (ALA, 2021b)
Reptiles				
Acanthophis antarcticus	Common Death Adder	not listed	not listed	DPIE survey (ALA, 2021b)
Amphibolurus muricatus	Jacky Lizard	not listed	not listed	DPIE survey (ALA, 2021b)
Chelodina longicollis	Eastern snake-necked turtle	not listed	not listed	DPIE survey (ALA, 2021b)
Concinnia tenuis	Barred-sided Skink	not listed	not listed	DPIE survey (ALA, 2021b)
Cryptophis nigrescens	Eastern Small-eyed Snake	not listed	not listed	DPIE survey (ALA, 2021b)
Drysdalia coronoides	White-lipped Snake	not listed	not listed	DPIE survey (ALA, 2021b)
Egernia saxatilis	Black Rock Skink	not listed	not listed	DPIE survey (ALA, 2021b)

Scientific name	Common name/s	EPBC status[1]	State status[2]	Source
Eulamprus heatwolei	Yellow-bellied Water-skink	not listed	not listed	DPIE survey (ALA, 2021b)
Eulamprus quoyii	Eastern Water-skink	not listed	not listed	DPIE survey (ALA, 2021b)
Lampropholis delicata	Dark-flecked Garden Sunskink	not listed	not listed	DPIE survey (ALA, 2021b)
Lampropholis guichenoti	Pale-flecked Garden Sunskink	not listed	not listed	DPIE survey (ALA, 2021b)
Pseudechis porphyriacus	Red-bellied Black Snake	not listed	not listed	DPIE survey (ALA, 2021b)
Pseudonaja textilis	Eastern Brown Snake	not listed	not listed	DPIE survey (ALA, 2021b)
Saproscincus mustelinus	Weasel Skink	not listed	not listed	DPIE survey (ALA, 2021b)
Tiliqua scincoides	Eastern Blue-tongue	not listed	not listed	DPIE survey (ALA, 2021b)
Varanus varius	Lace Monitor	not listed	not listed	DPIE survey (ALA, 2021b)
Amphibians				
Crinia signifera	Common Froglet	not listed	not listed	DPIE survey (ALA, 2021b)
**Heleioporus australiacus*	Giant Burrowing Frog	Vulnerable	Vulnerable	WYLIE (DAWE, 2021)
Limnodynastes peronii	Brown-striped Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria citropa	Blue Mountains Tree Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria quiritatus	Screaming Tree Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria ewingii	Brown Tree Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria lesueuri	Lesueur's Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria peronii	Peron's Tree Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria nudidigitus	Southern Green Stream Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Litoria verreauxii	Verreaux's Frog	not listed	not listed	DPIE survey (ALA, 2021b)
Uperoleia laevigata	Smooth Toadlet	not listed	not listed	DPIE survey (ALA, 2021b)
Fish				
Anguilla australis	shortfin eel	not listed	not listed	Citizen science (ALA, 2021b)
Gobiomorphus coxii	Cox Gudgeon	not listed	not listed	Other survey (ALA, 2021b)
Retropinna semoni	Smelt	not listed	not listed	Other survey (ALA, 2021b)
Invertebrates				
Acrida conica	Giant Green Slant-face	not listed	not listed	Citizen science (ALA, 2021b)
Adversaeschna brevistyla	NA	not listed	not listed	Citizen science (ALA, 2021b)
Agathodesmus carorum	NA	not listed	not listed	Other survey (ALA, 2021b)
Aglaosoma variegata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Amata nigriceps	NA	not listed	not listed	Citizen science (ALA, 2021b)
Amenia imperialis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Amphirhoe sloanei	NA	not listed	not listed	Citizen science (ALA, 2021b)
Anachloris subochraria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Anax papuensis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Anoplognathus chloropyrus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Anoplognathus viriditarsis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Anthela excellens	NA	not listed	not listed	Citizen science (ALA, 2021b)
Aphaenogaster longiceps	NA	not listed	not listed	Citizen science (ALA, 2021b)
Apis mellifera	NA	not listed	not listed	Citizen science (ALA, 2021b)
Araneus brisbanae	NA	not listed	not listed	Citizen science (ALA, 2021b)
Argiope keyserlingi	NA	not listed	not listed	Citizen science (ALA, 2021b)
Aridaeus thoracicus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Aulacophora hilaris	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austracantha minax	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austroaeschna pulchra	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austroagrion watsoni	NA	not listed	not listed	Citizen science (ALA, 2021b)

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Austroargiolestes icteromelas	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austrogomphus guerini	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austrogomphus ochraceus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austrolestes cingulatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austrolestes leda	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austrolestes psyche	NA	not listed	not listed	Citizen science (ALA, 2021b)
Austroscolia soror	NA	not listed	not listed	Citizen science (ALA, 2021b)
Badumna insignis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Belenois java	Caper White	not listed	not listed	Citizen science (ALA, 2021b)
Bermius brachycerus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Blepharotes coriarius	NA	not listed	not listed	Citizen science (ALA, 2021b)
Blepharotes splendidissimus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Boreoides subulatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Calomela curtisi	NA	not listed	not listed	Citizen science (ALA, 2021b)
Calomela pallida	NA	not listed	not listed	Citizen science (ALA, 2021b)
Camponotus consobrinus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Camponotus innexus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Camponotus suffusus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cercophonius squama	NA	not listed	not listed	Other survey (ALA, 2021b)
Charaxes sempronius	Tailed Emperor	not listed	not listed	Citizen science (ALA, 2021b)
Chauliognathus imperialis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chauliognathus lugubris	Plague Soldier Beetle	not listed	not listed	Citizen science (ALA, 2021b)
Chauliognathus tricolor	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chelepteryx chalepteryx	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chlorobapta frontalis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chlorocoma dichloraria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chondropyga dorsalis	Cowboy Beetle	not listed	not listed	Citizen science (ALA, 2021b)
Choristhemis flavoterminata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chrysodeixis argentifera	NA	not listed	not listed	Citizen science (ALA, 2021b)
Chrysolopus spectabilis	Diamond Weevil	not listed	not listed	Citizen science (ALA, 2021b)
Coccinella transversalis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Coelophora inaequalis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Comocrus behri	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cordulephya pygmaea	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cormocephalus esulcatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cormocephalus westwoodi	NA	not listed	not listed	Citizen science (ALA, 2021b)
Coryphistes ruricola	Bark-mimicking Grasshopper	not listed	not listed	Citizen science (ALA, 2021b)
Creophilus erythrocephalus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cryptachaea gigantipes	NA	not listed	not listed	Citizen science (ALA, 2021b)
Cryptoptila australana	NA	not listed	not listed	Citizen science (ALA, 2021b)

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Ctenomorpha marginipennis	Margined-winged Stick-insect	not listed	not listed	Citizen science (ALA, 2021b)
Cyclochila australasiae	Masked Devil	not listed	not listed	Citizen science (ALA, 2021b)
Dasygaster padockina	NA	not listed	not listed	Citizen science (ALA, 2021b)
Dasypodia selenophora	NA	not listed	not listed	Citizen science (ALA, 2021b)
Delena cancerides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Delias nigrina	Black Jezebel	not listed	not listed	Citizen science (ALA, 2021b)
Diamma bicolor	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diatenes aglossoides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Dicladosomella georgii	NA	not listed	not listed	Other survey (ALA, 2021b)
Dicladosomella perplexa	NA	not listed	not listed	Other survey (ALA, 2021b)
Dicranosterna immaculata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Didymuria violescens	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diphlebia lestoides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diphlebia nymphoides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diplacodes bipunctata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diplacodes haematodes	NA	not listed	not listed	Citizen science (ALA, 2021b)
Diplacodes melanopsis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Dispar compacta	Barred Skipper	not listed	not listed	Citizen science (ALA, 2021b)
Dissomorphia australiaria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Dolichoderus doriae	NA	not listed	not listed	Citizen science (ALA, 2021b)
Doratifera quadriguttata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Endoxyla encalypti	NA	not listed	not listed	Citizen science (ALA, 2021b)
Epicoma contristis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Epidesmia chilonaria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Epidesmia tricolor	NA	not listed	not listed	Citizen science (ALA, 2021b)
Eriophora transmarina	NA	not listed	not listed	Citizen science (ALA, 2021b)
Eupoecila australasiae	Fiddler Beetle	not listed	not listed	Citizen science (ALA, 2021b)
Eurymela distincta	NA	not listed	not listed	Citizen science (ALA, 2021b)
Eurymeloides punctata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Eusynthemis virgula	NA	not listed	not listed	Citizen science (ALA, 2021b)
Exaireta spinigera	NA	not listed	not listed	Citizen science (ALA, 2021b)
Fodina ostorius	NA	not listed	not listed	Citizen science (ALA, 2021b)
Gastrimargus musicus	Yellow-winged Locust	not listed	not listed	Citizen science (ALA, 2021b)
Gastrophora henricaria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Geitoneura acantha	Ringed Xenica	not listed	not listed	Citizen science (ALA, 2021b)
Glyphipterix chrysoplanetis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Gminatus australis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Goniaea australasiae	Gumleaf Grasshopper	not listed	not listed	Citizen science (ALA, 2021b)
Harmonia conformis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Helicoverpa punctigera	NA	not listed	not listed	Citizen science (ALA, 2021b)
Helpis minitabunda	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hemicordulia australiae	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hemicordulia tau	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hemigomphus gouldii	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hesperilla ornata	Spotted Sedge-skipper	not listed	not listed	Citizen science (ALA, 2021b)
Hestiochora furcata	NA	not listed	not listed	Citizen science (ALA, 2021b)

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Heteronympha banksii	Banks' Brown	not listed	not listed	Citizen science (ALA, 2021b)
Heteronympha merope	Common Brown	not listed	not listed	Citizen science (ALA, 2021b)
Heteronympha mirifica	Wonder Brown	not listed	not listed	Citizen science (ALA, 2021b)
Heteronympha paradelpha	Spotted Brown	not listed	not listed	Citizen science (ALA, 2021b)
Hippodamia variegata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hippotion scrofa	NA	not listed	not listed	Citizen science (ALA, 2021b)
Hoplatessara froggatti	NA	not listed	not listed	Other survey (ALA, 2021b)
Hypocysta metirius	Brown Ringlet	not listed	not listed	Citizen science (ALA, 2021b)
Idiodes apicata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Illeis galbula	NA	not listed	not listed	Citizen science (ALA, 2021b)
Ischnura heterosticta	NA	not listed	not listed	Citizen science (ALA, 2021b)
Isidorella hainesii	NA	not listed	not listed	Other survey (ALA, 2021b)
Jalmenus evagoras	Imperial Hairstreak	not listed	not listed	Citizen science (ALA, 2021b)
Junonia villida	Meadow Argus	not listed	not listed	Citizen science (ALA, 2021b)
Laccotrephes tristis	Toe-Biter	not listed	not listed	Citizen science (ALA, 2021b)
Lamprima aurata	Golden Stag Beetle	not listed	not listed	Citizen science (ALA, 2021b)
Lasioglossum callomelittinum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Lasioglossum hiltacum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Laxta friedmani	NA	not listed	not listed	Citizen science (ALA, 2021b)
Lema daturaphila	NA	not listed	not listed	Citizen science (ALA, 2021b)
Leptomyrmex erythrocephalus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Leptotarsus clavatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Lipotriches australica	NA	not listed	not listed	Citizen science (ALA, 2021b)
Lophyrotoma analis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Maechidius tibialis	NA	not listed	not listed	Other survey (ALA, 2021b)
Megachile maculariformis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Melangyna viridiceps	NA	not listed	not listed	Citizen science (ALA, 2021b)
Melanococcus albizziae	Wattle Mealybug	not listed	not listed	Citizen science (ALA, 2021b)
Melanodes anthracitaria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Metriolagria affinis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Micraspis frenata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Musgraveia sulciventris	Bronze Orange Bug	not listed	not listed	Citizen science (ALA, 2021b)
Myrmecia forficata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Myrmecia piliventris	NA	not listed	not listed	Citizen science (ALA, 2021b)
Myrmecia pilosula	NA	not listed	not listed	Citizen science (ALA, 2021b)
Myrmecia simillima	NA	not listed	not listed	Citizen science (ALA, 2021b)
Myrmecia tarsata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Neoaratus hercules	NA	not listed	not listed	Citizen science (ALA, 2021b)
Neola semiaurata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Neorrhina punctatum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Nyctemera amicus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Nysius vinitor	Rutherglen Bug	not listed	not listed	Citizen science (ALA, 2021b)
Nyssus albopunctatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Nyssus coloripes	NA	not listed	not listed	Citizen science (ALA, 2021b)
Ocybadistes flavovittatus	Narrow-brand Grass-dart	not listed	not listed	Citizen science (ALA, 2021b)
Ocybadistes walkeri	Green Grass-dart	not listed	not listed	Citizen science (ALA, 2021b)
Oechalia schellenbergii	Predatory Shield Bug	not listed	not listed	Citizen science (ALA, 2021b)
Ommatius coeraebus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Omyta centrolineata	NA	not listed	not listed	Citizen science (ALA, 2021b)

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Oncopeltus sordidus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Onthophagus leanus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Orthetrum caledonicum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Orthetrum villosovittatum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Orthodera ministralis	Green Mantid	not listed	not listed	Citizen science (ALA, 2021b)
Oxycanus dirempta	NA	not listed	not listed	Citizen science (ALA, 2021b)
Panesthia australis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Papilio aegeus	Orchard Butterfly	not listed	not listed	Citizen science (ALA, 2021b)
Papilio anactus	Dingy Swallowtail	not listed	not listed	Citizen science (ALA, 2021b)
Paralucia pyrodiscus	Dull Copper	not listed	not listed	Citizen science (ALA, 2021b)
Paraoxypilus tasmaniensis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Paropsis atomaria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Paropsisterna liturata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Pasma tasmanica	Tasmanica Skipper	not listed	not listed	Citizen science (ALA, 2021b)
Pempsamacra tillides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Perga affinis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Perperus lateralis	Whitestriped Weevil	not listed	not listed	Citizen science (ALA, 2021b)
Philobota protecta	NA	not listed	not listed	Citizen science (ALA, 2021b)
Pholodes sinistraria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Phonognatha graeffei	NA	not listed	not listed	Citizen science (ALA, 2021b)
Phyllotocus navicularis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Phyllotocus ruficollis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Pieris rapae	Cabbage White Butterfly	not listed	not listed	Citizen science (ALA, 2021b)
Plebs eburnus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Podalonia tydei	NA	not listed	not listed	Citizen science (ALA, 2021b)
Poecilometis strigatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Poecilopachys australasia	Two-spined Spider	not listed	not listed	Citizen science (ALA, 2021b)
Polistes humilis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Polyrhachis ammon	NA	not listed	not listed	Citizen science (ALA, 2021b)
Polyrhachis femorata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Porrostoma rhipidium	NA	not listed	not listed	Citizen science (ALA, 2021b)
Pterygophorus cinctus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Repsimus manicatus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Rhadinosticta simplex	NA	not listed	not listed	Citizen science (ALA, 2021b)
Rhytidoponera metallica	NA	not listed	not listed	Citizen science (ALA, 2021b)
Rhytiphora nodosa	NA	not listed	not listed	Citizen science (ALA, 2021b)
Ropalidia plebeiana	NA	not listed	not listed	Citizen science (ALA, 2021b)
Runcinia acuminata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Scaptia testacea	NA	not listed	not listed	Citizen science (ALA, 2021b)
Sceliphron formosum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Scolia verticalis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Scolypopa australis	Passionvine Hopper	not listed	not listed	Citizen science (ALA, 2021b)
Scopula rubraria	NA	not listed	not listed	Citizen science (ALA, 2021b)
Simosyrphus grandicornis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Somethus biramus	NA	not listed	not listed	Other survey (ALA, 2021b)
Spilosoma curvata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Stenoderus suturalis	NA	not listed	not listed	Citizen science (ALA, 2021b)
Stephanopis altifrons	NA	not listed	not listed	Citizen science (ALA, 2021b)
Stephanopis barbipes	NA	not listed	not listed	Citizen science (ALA, 2021b)
Storenosoma hoggi	NA	not listed	not listed	Other survey (ALA, 2021b)
Synlestes weyersii	NA	not listed	not listed	Citizen science (ALA, 2021b)
Talaurinus kirbii	NA	not listed	not listed	Citizen science (ALA, 2021b)
Taxeotis perlinearia	NA	not listed	not listed	Citizen science (ALA, 2021b)

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Tenagogerris euphrosyne	NA	not listed	not listed	Citizen science (ALA, 2021b)
Tepperia sterculiae	Kurrajong Seed Weevil	not listed	not listed	Citizen science (ALA, 2021b)
Thalaina clara	NA	not listed	not listed	Citizen science (ALA, 2021b)
Thyreus nitidulus	NA	not listed	not listed	Citizen science (ALA, 2021b)
Toxidia doubledayi	Doubleday's Skipper	not listed	not listed	Citizen science (ALA, 2021b)
Toxidia parvula	Parvula Skipper	not listed	not listed	Citizen science (ALA, 2021b)
Toxidia rietmanni	White-brand Grass-skipper	not listed	not listed	Citizen science (ALA, 2021b)
Tramea loewii	NA	not listed	not listed	Citizen science (ALA, 2021b)
Trapezites symmomus	Splendid Ochre	not listed	not listed	Citizen science (ALA, 2021b)
Triclista guttata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Trigonidium sjostedti	NA	not listed	not listed	Citizen science (ALA, 2021b)
Utetheisa pulchelloides	NA	not listed	not listed	Citizen science (ALA, 2021b)
Vanessa itea	Yellow Admiral	not listed	not listed	Citizen science (ALA, 2021b)
Vanessa kershawi	Australian Painted Lady	not listed	not listed	Citizen science (ALA, 2021b)
Vespula germanica	NA	not listed	not listed	Citizen science (ALA, 2021b)
Visiana brujata	NA	not listed	not listed	Citizen science (ALA, 2021b)
Xanthagrion erythroneurum	NA	not listed	not listed	Citizen science (ALA, 2021b)
Ypthima arctous	Dusky Knight	not listed	not listed	Citizen science (ALA, 2021b)
Zizina otis	Grass Blue	not listed	not listed	Citizen science (ALA, 2021b)
1 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 2 Species listed under the State Act at the time this document was prepared. Source: https://www.environment.nsw.gov.au/threatenedspeciesapp/				

Sources: (ALA, 2021b; DAWE, 2021b).

Consultation Questions on the species lists

- Are the lists of flora and fauna accurate? If not, what species should be added or removed?

Appendix B - Relationship to other vegetation classification and mapping systems

Ecological communities are complex to classify. States and Territories apply their own systems 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 the ecological community. Judgement of whether the ecological community is present at a particular site should focus on how the site meets the description (section 1.2), the key diagnostic characteristics (section 2.1) and minimum condition thresholds (section 2.3).

State 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.

Table 6: Key features of vegetation types/mapping units that correspond or are considered equivalent to Brogo Wet Vine Forest.

Classification system	Name	Key distinguishing features
NSW SCIVI	Brogo Wet Vine Forest	• Eucalypt forest with a canopy usually dominated by *E. tereticornis* and soft-leaved shrubs and climbers in the understorey • A canopy sub-stratum of rainforest trees such as *Ficus rubiginosa* and *Pittosporum undulatum* may be present • Climbers likely to be present throughout the lower layers • Restricted to steep granitic or mudstone substrates below 400 m elevation • Rainforest elements may be absent where fire or grazing impacts are frequent or severe • NSW TEC listing includes *Angophora floribunda* as a co-dominant canopy tree species • NSW TEC listing suggest the grass *Cenchrus caliculatus* is typically associated with this community and not others within the Bega region • Considered equivalent to the TEC
NSW TEC	Brogo Wet Vine Forest in the South East Corner Bioregion	
Shoalhaven EEC	Brogo Wet Vine Forest	
NSW SVTM	3108: South Coast Scarp Wet Vine Forest	• Structurally similar to the TEC • Canopy typically contains *E. bosistoana*, and a wide range of other eucalypts may be present, such as *E. maidenii E. tereticornis, E. muelleriana* and sometimes *E. smithii* • Considered equivalent to the TEC

Sources: NSW SVTM: NSW Plant Community Type (DPIE, 2020), NSW TEC: NSW Threatened Ecological Community mapping, NSW SCIVI: Southeast NSW Native Vegetation Classification and Mapping (NSW DPIE, version 14).

Table 7: Key features distinguishing Brogo Wet Vine Forest from other vegetation types/mapping units that may be adjacent to the ecological community.

Classification system	Name	Key distinguishing features
Woodlands and grassy forests		
NSW SVTM	3332: Southeast Lowland Grassy Woodland	• Typically occurs below 500 m elevation • Does not contain species associated with rainforest flora. • Has substantial grass cover (e.g. 40 to 90%)
NSW TEC	Lowland Grassy Woodland in the South East Corner Bioregion	
EPBC	Lowland Grassy Woodland in the South East Corner Bioregion	
NSW SCIVI	e20: Southeast Lowland Grassy Woodland	
NSW SVTM	4052: South Coast Low Hills Red Gum Grassy Forest	• Tall, grassy open forest to woodland dominated by *E. tereticornis,* found on lows hills and slopes • Does not have a canopy substratum of rainforest trees such as *Ficus spp.* and *Brachychiton spp.* • Ground layer typically contains grasses, forbs and small climbers
NSW SVTM	3325: South Coast Valley Flats Ribbon Gum Forest	• Tall forest that occurs on creek flats only • Canopy dominated by *E. viminalis, E. melliodora*, with *Acacia melanoxylon* sometimes present • Numerous Acacia species in the mid-storey, including *A. implexa, A. mearnsii*
NSW SVTM	3331: Southeast Gorge Dry Forest	• Tall forest or woodland occurring at lower elevations on slopes within gorges. • Canopy dominated by *A. floribunda* and stringybark eucalypts • Contains a mid-storey of *Allocasuarina littoralis*, *Persoonia linearis* and *Acacia mearnsii* • Typically contains a sclerophyllous shrub layers and patchy grasses • DSF eW5 is restricted to gorges within Wadbilliga National Park
NSW SCIVI	DSF eW5: Wadbilliga Gorge Dry Forest	
Wet sclerophyll forests		
NSW SVTM	3181: Bega Wet Shrub Forest	• Occurs in drainage lines and moist lower slopes. • *Eucalyptus elata* is typically the dominant canopy species • Has a prominent layer of shrubs • Typically occurs on south-facing slopes
NSW SCIVI	Bega Wet Shrub Forest	
NSW SCIVI	WSF e12: Mountain Wet Fern Forest	• Usually over 32 m canopy height • Groundcover is dominated by ferns • Multi-layered mid-storey containing tree ferns (e.g. *Cyathea australis*) • Dominant *Eucalyptus* species are *E. cypellocarpa* and *E. fastigata* • Generally occurs at sheltered sites at higher elevations • Plant Community Type (PCT) 3190 may not contain tree ferns and *E. muelleriana* may also be present in the canopy. Generally occurs < 750 m elevation • WSF e13 generally occurs below 800 m elevation • WSF e14 generally occurs in steep gullies below 500 m elevation on metasedimentary substrates
NSW SCIVI	WSF e13: Southeast Hinterland Wet Fern Forest	
NSW SCIVI	WSF e14: Southeast Hinterland Wet Shrub Forest	
NSW SVTM	3219: Southeast Mountain Wet Fern Forest	
NSW SVTM	3190: South Coast Hinterland Monkey Gum Wet Fern Forest	

Classification system	Name	Key distinguishing features
NSW SVTM	3193: South Coast Stringybark-Monkey Gum Wet Forest	• Tall wet open forest occurring on sedimentary substrate at elevations < 450 m • Canopy typically dominated by *E. cypellocarpa* or *E. muelleriana*
NSW SCIVI	WSF e34: Southeast Coastal Gully Shrub Forest	• Wet open forest occurring in steep gullies below 200 m elevation on metasedimentary substrates • Canopy species are highly variable • Contains a canopy sub-stratum of rainforest species • Contains a mesophyllous shrub layer • Ground layer typically contains a diversity of grass species and climbers
NSW SVTM	3185: Far South Riverflat Wet Forest	• Tall wet open forest with canopy dominated by *E. cypellocarpa* and *E. elata* • Restricted to sheltered lower slopes and flat areas along major waterways and creeks • Contains a layer of small trees and shrubs of medium density • Ground layer is dominated by ferns
NSW SVTM	3310: Gulaga Silvertop Ash Moist Forest	• Tall wet open forest restricted to north-facing slopes of Mount Dromedary • Occurs between 300-750 m elevation • Canopy typically dominated by *E. sieberi*; *E. cypellocarpa* occurs occasionally • Ground layer dominated by *Pteridium esculentum*
NSW SCIVI	WSF p103: South Coast Hinterland Wet Forest	• Canopy dominated by eucalypts over 30 m tall • Dense sub-canopy stratum of small trees • Tree ferns are present • Dense groundcover dominated by ferns • Many climbing plants strewn throughout understorey shrubs
NSW SVTM	3189: South Coast Gully Shrub Forest	• Tall wet open forest with a sparse small tree layer, sparse shrub layer and ground layer comprised of ferns, climbers, grasses and forbs • A range of eucalypts and *A. floribunda* may be present in the canopy • *E. tereticornis* is generally not present • In addition to *Acacia mearnsii, Acacia falciformis* and *Allocasuarina littoralis* may be present in the small tree layer • Is not restricted to northwest to northeast facing slopes • Occurs on sheltered slopes and in steep gullies
NSW SVTM	3273: South Coast Lowland Shrub-Grass Forest	• Tall wet open forest found in coastal areas • Lacks canopy sub-stratum of rainforest trees • Typically contains dense ground cover of grasses, ferns, graminoids and ferns • Typically found on sedimentary substrates
NSW SVTM	3192: South Coast Riverflat Ribbon Gum Forest	• Tall wet open forest occurring on alluvial flats near major waterways and below 400 m elevation • Canopy typically contains *E. viminalis* and *E. elata*
NSW SVTM	3301: Southeast Tableland Ranges Snow Gum Sheltered Forest	• Grassy open forest restricted to tablelands and higher elevations > 750 m • Canopy dominated by *E. pauciflora, E. dalrympleana* or *E. viminalis* • Acacia melanoxylon may be present as a small tree
Rainforests		
NSW SCIVI	RF e1: Southeast Dry Rainforest	• Canopy typically closed • Low, dense canopy dominated by *Ficus rubiginosa*, with *Pittosporum undulatum*, *Brachychiton populneus* and emergent eucalypts occurring occasionally

Classification system	Name	Key distinguishing features
NSW TEC	Dry Rainforest of the South East Forests in the South East Corner Bioregion	• Occurs on north-facing slopes • Patch-size usually small, less than 10 ha
NSW SVTM	3106: South Coast Grey Myrtle Dry Rainforest	• Tall, dense rainforest occurring along waterways in gullies • Canopy dominated by *Backhousia myrtifolia* • Occasional emergent eucalypts and *Casuarina cunninghamiana*
NSW SCIVI	RF p40: Temperate Dry Rainforest	• Canopy is closed • Canopy dominated by non-eucalypt species such as *Backhousia myrtifolia*, *Syzigium smithii*, *Pittosporum undulatum* Typically grows in gullies on shale-derived soils
NSW SCIVI	RF e6e7: Southeast Warm Temperate Rainforest	• Only found in steep, sheltered gullies • Dense canopy dominated by *Syzigium smithii*, *Pittosporum undulatum, Doryphora sassafras, Ceratopetalum apetalum* with sub-stratum of tree ferns • Contains lianas and epiphytic species • May contain large emergent eucalypts • PCT 3045 occurs at low elevations in higher rainfall areas, tree ferns may be absent • PCT 3036 has higher canopy diversity, palms may be present and is not restricted to gullies. Tree ferns may be absent
NSW SVTM	3046: Southeast Warm Temperate Rainforest	
NSW SVTM	3045: South Coast Temperate Gully Rainforest	
NSW SVTM	3036: South Coast Warm Temperate-Subtropical Rainforest	
Dry sclerophyll forests		
NSW SVTM	3659: South Coast Hinterland Silvertop Ash Forest	• Tall, dry open forest with sclerophyllous shrubs and sparse grasses and ferns • Canopy typically dominated by *E. sieberi* and stringybark eucalypts
NSW SCIVI	DSF e35: Southeast Escarpment Dry Grass Forest	• Tall open forest occurring on granite-derived slopes below 700 m elevation • Canopy is typically dominated by *E. bosistoana, E. maidenii* and *E. globoidea* • A small tree layer usually contains *Acacia spp*. • Typically contains and open shrub layer a groundcover of grasses and forbs • Rainforest elements may be lacking, but will depend on fire history
NSW SVTM	3662: South Coast Lowland Blackbutt Forest	• Tall, shrubby dry forest with canopy dominated by *Corymbia gummifera* and *E. pilularis* • Understorey typically contains shrubs associated with DSF, e.g. *Banksia spp.* • Limited to coastal strip
NSW SVTM	3664: Southeast Foothills Woollybutt Dry Shrub Forest	• Tall, dry open forest occurring on sandstone at lower elevations • Canopy typically dominated by *E. longifolia* and Stringybark eucalypts • DSF e32A occurs on a wider range of sedimentary substrates

Classification system	Name	Key distinguishing features
NSW SCIVI	DSF e32A: Deua-Brogo Foothills Dry Shrub Forest	
NSW SVTM	3660: South Coast Hinterland Yellow Stringybark Forest	• Tall, dry and shrubby sclerophyll forest found on exposed slopes, ranges and foothills • Canopy typically dominated by *E. muelleriana, E. sieberi* and *A. floribunda* • Very sparse shrub layer, *Persoonia linearis* and *Acacia falciformis* usually present • Occurs on quartz-rich sediments, granites
NSW SVTM	3656: South Coast Foothills Dry Shrub Forest	• Tall, dry open sclerophyll forest with sparse shrub layer and sparse groundcover of grasses • Canopy is typically dominated by stringybark eucalypts, along with *E. sieberi* • *Allocasuarina littoralis* and *Acacia falciformis* are typically present in the mid-storey • Occurs on exposed ridges and upper slopes • DSF e48 may not contain *A. falciformis* • DSF e49 may contains climbers and twiners in the understorey and occurs primarily on metasedimentary substrates
NSW SCIVI	DSF e48: Mumbulla Dry Shrub Forest	
NSW SCIVI	DSF e49: Southeast Coastal Dry Shrub Forest	
NSW SVTM	3452: Southeast Hinterland Dry Grassy Forest	• Tall grassy dry forest occurring on exposed slopes • Canopy dominated by *E. globoidea* and *E. maidenii* • Lacks a sub-stratum of rainforest trees • PCT 3453 may also contain box eucalypts such as *E. bosistoana, E. baueriana* and *E. polyanthemos*
NSW SVTM	3453: Southeast Scarp Maidens Gum Forest	
Other vegetation types		
NSW SVTM	4061: Bega-Towamba Riparian Scrub	• Very tall shrubland dominated by Leptospermum spp. and Acacia spp. • Occasional emergent eucalypts may be present • Restricted to waterway margins on alluvial soils
NSW SCIVI	FoW e60: Southeast Floodplain Wetlands	• Herbaceous wetland occurring on floodplains that frequently contains standing water • *E. ovata* and *Melaleuca spp.* may be present
NSW SCIVI	FoW p30: South Coast River Flat Forest	• Occurs on alluvial flat areas along the margins of floodplains and waterways • Tree canopy typically over 20 m high • TEC community typically has a dense groundcover of Lomandra longifolia • Overlap of species with Brogo Wet Vine Forest, but landscape position should distinguish
TEC	River Flat Eucalypt Forest on Coastal Floodplains	
EPBC	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	
NSW SVTM	3188: South Coast Riverflat Peppermint Forest	

Sources: NSW SVTM: NSW Plant Community Type (DPIE, 2020), NSW TEC: NSW Threatened Ecological Community mapping, EPBC: communities listed under the EPBC Act 1999, NSW SCIVI: Southeast NSW Native Vegetation Classification and Mapping (NSW DPIE, version 14).

Consultation Questions on map units

- Does the list of current and superseded map units and classifications include all those that may be related to the ecological community?
- Are the key distinguishing features sufficient to differentiate other vegetation types from the ecological community?

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