



Australian Government

Department of Climate Change, Energy,  
the Environment and Water

# Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

In effect under the *Environment Protection and Biodiversity Conservation Act 1999* from 5 October 2022.

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 ecological community at the Brisbane Entertainment Centre © Nikki Ward

The Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions occurs within Country (the traditional lands) of several Indigenous peoples, including the Biripai, Dainggatti, Gumbaynggirr, Bundjalung, Yuggera, Waka Waka, Gubbi Gubbi, Butchulla, Gooreng Gooreng, Gangula and Bayali. We acknowledge their cultures and continuing link to the ecological community and the Country it inhabits.

## Conservation Status

The Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions is listed in the **endangered** category of the threatened ecological communities list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from 5 October 2022.

The ecological community was assessed by the Threatened Species Scientific Committee (the Committee) to be eligible for listing as endangered under criteria 1 and 4. The Committee's assessment is at [Section 6](#).

The main factors that make the threatened ecological community eligible for listing in the endangered category are its historic losses due to clearing and selective logging; fragmentation resulting from land clearing legacies; and ongoing threats to its integrity and function.

Ecological communities can also be listed as threatened under state and territory legislation. At the time of this Conservation Advice, the ecological community corresponds closely with the NSW-listed 'Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion'. More information is at [Section 2.2.7.1](#).

## Recovery Plan Decision

The Minister decided, in line with the Committee's recommendation, that a recovery plan is not required at this time. The Committee's recommendation is at [Section 6.3](#).

# Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

## 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 its important occurrences ([Section 1.2.3](#)); and describes its cultural significance ([Section 3](#)).

In line with the requirements of Section 266B of the EPBC Act, this document 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 .....	4
1.1	Name .....	4
1.2	Description of the ecological community and the area it inhabits.....	4
2	Identifying areas of the ecological community.....	12
2.1	Key diagnostic characteristics.....	13
2.2	Additional information to assist in identifying the ecological community .....	14
2.3	Condition classes, categories and thresholds .....	18
2.4	Habitat critical to the survival of the ecological community .....	21
2.5	Areas of high value – surrounding environment and landscape context.....	21
3	Cultural significance .....	22
3.1	Indigenous cultural values and uses associated with the ecological community .....	22
4	Threats.....	23
4.1	Threat table.....	24
5	Conservation of the ecological community .....	33
5.1	Primary conservation objective.....	33
5.2	Existing protection and management plans.....	33
5.3	Principles and standards for conservation.....	36
5.4	Priority conservation and research actions .....	37
6	Listing assessment.....	50
6.1	Assessment process .....	50
6.2	Eligibility for listing.....	50
6.3	Listing and Recovery Plan Recommendations.....	60
	Appendix A – Species lists.....	61
	Appendix B – Relationship to other vegetation classification and mapping systems.....	78
	Appendix C – Indigenous Australians and cultural values associated with the ecological community .....	83
	Appendix D – Landforms and soils .....	88
	References.....	90

# 1 Ecological community name and description

## 1.1 Name

The name of the ecological community is the *Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions* (also referred to as the/this 'ecological community'). The name refers to its climate zone, dominant canopy species, primary vegetation type, landscape position and geographic area.

The ecological community was originally placed on the 2020 Finalised Priority Assessment List as the 'Subtropical coastal floodplain eucalypt forest of northern New South Wales and southern Queensland' and underwent consultation as the 'Subtropical eucalypt forest on the floodplains of eastern Australia'.

In New South Wales, the majority of the ecological community is recognised as the NSW state-listed 'Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion' threatened ecological community (TEC).

## 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 Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions.

The ecological community described in this Conservation Advice is the assemblage of plants, animals and other native organisms associated with eucalypt forests and woodlands, on the floodplains of the eastern watershed of the Great Dividing Range, predominantly in the New South Wales North Coast and South Eastern Queensland bioregions. It is a floodplain forest community with a canopy dominated by eucalypts and other myrtaceous tree species.

This section primarily describes the natural state (or range of natural states) of the ecological community as a reference for comparison of occurrences in varying states related to environmental gradients and varying levels of degradation. More information to assist in identifying patches of the ecological community is provided in [Section 1.2.3](#). Because of past loss or degradation, not all patches of the ecological community are in a completely natural state. [Section 2.3](#) provides information to identify which patches retain sufficient conservation value to be considered a matter of national environmental significance.

### 1.2.1 Location and physical environment

The Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions occurs in the New South Wales North Coast (NNC) and South Eastern Queensland (SEQ) IBRA bioregions and on Curtis Island in the Brigalow Belt North (BBN) IBRA Bioregion (DoE 2013). This encompasses an area from just north of Newcastle, New South Wales (around Raymond Terrace) in the south, to just north of Gladstone in Queensland.

The ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. It generally occurs below 50 m above sea-level (ASL), although it can occur up to 250 m ASL (NSW SC 2010a).

The ecological community generally occurs on alluvial soils, with more limited occurrences on in-situ soils within localised depressions, that may be at least occasionally saturated,

water-logged, or inundated. Alluvial soils are very diverse and usually reflect the properties of their parent material in the upper catchment (Wilson & Taylor 2012), but they may include in-situ subsoils, and colluvial deposits that overlay the alluvial floodplain. The soils are typically deep (greater than one metre), except in certain circumstances (i.e., particularly where floodplains and depressions grade into lithic landforms). They include silts, clay loams, clays and sandy loams, gravel and cobbles; and show little influence of saline ground water. The ecological community may occur on shallower soils on the margins of the floodplain and in smaller narrow alluvial systems. The ecological community does not typically occur on soils that are primarily marine or aeolian sand, but may occur on such substrates after they have been modified by fluvial activity.

More detailed information on soils and landforms is at [Appendix D – Landforms and soils](#).

### 1.2.2 Description of the assemblage

#### 1.2.2.1 VEGETATION STRUCTURE

The structure of the ecological community, in its undisturbed state, varies from tall open forest to woodland, although partial clearing may have reduced the canopy to scattered trees in some areas. Elsewhere, there may be localised areas of denser closed forest and/or low forest, often associated with other disturbance (including flooding). It tends to be shorter and less dense on the wider floodplains, and taller and denser on the more confined floodplains.

The tree canopy is dominated by eucalypts and/or other myrtaceous trees (specifically from the *Angophora*, *Corymbia*, *Lophostemon* and *Syncarpia* genera), often as a mixture of species. The canopy may exceed 40 m in height, but can be considerably shorter; for example in regrowth stands, or where growth is inhibited (such as on waterlogged sites, or in areas with lower rainfall). When intact, the canopy typically has 40–60% crown cover<sup>1</sup>, with large trees often containing hollows. However, crown cover may be as low as 20%; and areas of higher crown cover also occur.

A mid-layer or sub-canopy of small trees may be present – with scattered to dense shrubs. For example, *Melaleuca*, *Leptospermum* and related genera may form dense thickets beneath the main canopy, or in gaps between canopy trees. The mid-layer may be sparser in lower rainfall areas, or where partially cleared, grazed or frequently burnt. The ecological community often has climbers extending into the mid-layer and canopy.

The ecological community generally has a more diverse and abundant groundcover than ecological communities on locally adjoining slopes. Its groundcover typically includes grasses, forbs, ferns, sedges and scramblers. The intact ecological community may have high litter cover and fallen logs.

The local expression of the ecological community is influenced by its location relative to the riparian areas of the floodplain, frequency of inundation by stream flows, local climate, latitude, and the contribution of biota from surrounding areas. Hence there is regional variation and intergradation of key species, although the structure and function remain similar throughout its extent.

The ecological community typically forms ‘mosaics’ with other floodplain forest communities, lowland woodlands and treeless wetlands.

---

<sup>1</sup> Crown cover is measured as the area within the vertical projection of the periphery of the tree crowns, where the tree crowns are considered to be solid (as per National Committee on Soil and Terrain (2009)).

Areas lacking canopy cover (that also lack tree regrowth/signs of regeneration) are not considered part of this ecological community on their own. However, where they represent a small gap in, or at the edge of, a larger patch of forest/woodland (or where the tree layer is sparse between treed areas across a short distance), they are part of the ecological community (see also [Section 2.2.1 – Identifying a patch](#) and [Section 2.2.2 – Breaks in a patch](#)).

#### 1.2.2.2 FLORA

This section describes the assemblage of native vascular plant species that characterises the ecological community throughout its range. More comprehensive species lists are in [Appendix A – Species](#) lists. However, these lists do not include all the species that make up the ecological community and many sites may have species that are not mentioned in this Conservation Advice. At any one time, above-ground individuals of some species may be absent, but the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The ecological community also includes micro-organisms, fungi and cryptogamic plants; however, these are less well documented (NSW SC 2010a).

The floristic composition of ecological community is primarily determined by the frequency and duration of waterlogging and the texture, nutrient and moisture content of the soil; composition also varies with latitude (NSW SC 2010a). Characteristic species may be abundant or rare, and are only a subset of all the species in the ecological community. Not all characteristic species are present at every site. The number and identity of species at different sites also vary because of disturbance and historical land use and biogeography. Contextual effects of adjacent vegetation are also important (i.e., the local species pool is strongly influenced by the surrounding vegetation).

The species recorded at a site can also be affected by sampling scale, survey season and effort and expertise. At some sites characteristic native species are now locally extinct; and/or non-characteristic species have established themselves, or have become more abundant. In general, the number of species recorded is likely to increase with the size of the site.

##### 1.2.2.2.1 Canopy species

The composition of the tree canopy varies across the extent of the ecological community. It is characterised by the dominance of eucalypt and other myrtaceous trees. It may be dominated by a single tree species, or by a mix of several tree species, from five genera that characterise the ecological community. These five genera are *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia*.

The following are typical examples of tree species that may dominate, or co-dominate, the canopy of the ecological community, in areas across its range, or locally (NSW SC 2010a; NSW DPIE 2021; Qld Herbarium 2021; Tozer et al. in press; T Ryan Pers Comm):

- *Corymbia intermedia* (pink bloodwood)
- *Eucalyptus bancroftii* (Bancroft's red gum), *E. moluccana* (grey box), *E. grandis* (flooded gum), *E. siderophloia* (grey ironbark), and *E. tereticornis* (forest red gum, red iron gum)
- North of the Macleay floodplain *Lophostemon confertus* (brush box) and/or *L. suaveolens* (swamp box, turpentine) may also be dominant, or co-dominant with other tree species from the four genera (*Angophora*, *Corymbia*, *Eucalyptus* and *Syncarpia*), or form part of the subcanopy

- In Queensland *Syncarpia glomulifera* (turpentine) may also dominate, or co-dominate; for example, with *Eucalyptus resinifera* (red mahogany) in some areas, and with *Corymbia intermedia* (pink bloodwood) in others.

As well as those mentioned above, a wide range of other canopy species (from the five genera) have also been recorded, and in some areas may dominate, or co-dominate in combination with other canopy species from the five genera (*Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia*). Examples include:

- *Angophora floribunda* (rough-barked apple), *Angophora subvelutina* (broad-leaved apple) and *A. leiocarpa* (rusty gum)
- *Corymbia citriodora* subsp. *variegata* (spotted gum), *C. maculata* (spotted gum) and *C. tessellaris* (Moreton Bay ash)
- *Eucalyptus crebra* (narrow-leaved ironbark), *E. exserta* (Queensland peppermint), *E. fibrosa* (red ironbark), *E. latisinensis* (white mahogany), *E. microcorys* (tallowwood), *E. melanophloia* (silver-leaved ironbark), *E. pilularis* (blackbutt), *E. propinqua* (grey gum), *E. racemosa* (scribbly gum) and *E. seeana* (narrow-leaved red gum).

Other canopy tree species may be present. In some areas rainforest trees such as *Ficus* spp. (figs), *Cupaniopsis* spp (tuckeroos) and *Glochidion ferdinandi* (cheese tree) may be prominent (NSW SC 2010a; Qld Herbarium 2021). Other non-eucalypt tree species may also be part of the canopy (e.g., *Allocasuarina littoralis* (black sheoak) and *Livistona australis* (cabbage palm); but they mostly occur as an open sub-canopy, as described in [Section 1.2.2.1](#). *Eucalyptus robusta* (swamp mahogany) may occur but is not dominant in this ecological community; it is more typically found in low-lying permanently waterlogged (swampier) parts of the floodplain.

A more comprehensive list of canopy species likely to occur in the ecological community, is in [Appendix A – Species lists](#).

#### 1.2.2.2.2 Understorey species – mid-layer

As well as species from the five genera described as dominating the canopy (see [Section 1.2.2.2.1](#)), some of which will also be in the mid-layer, other tree species are also part of the ecological community, mostly as an open mid-storey/ mid-layer or sub-canopy. These include *Allocasuarina littoralis* (black sheoak), *A. torulosa* (forest oak), *Alphitonia excelsa* (red ash), *Brachychiton populneus* (kurrajong), *Callistemon* spp. (bottlebrushes), *Casuarina cunninghamiana* (river oak, sheoak) and *C. glauca* (swamp oak, sheoak), *Elaeocarpus reticulatus* (blueberry ash, blue olive-berry), *Glochidion ferdinandi* (cheese tree) and *Pittosporum revolutum* (hairy pittosporum) (NSW SC 2010a; Qld Herbarium 2021).

A range of paperbarks (*Melaleuca* spp.) may occur, and be abundant, in the sub-canopy and shrub-layer of this ecological community. These include *Melaleuca decora* (white feather honey myrtle), *M. linariifolia* (flax-leaved paperbark, snow-in-summer), *M. quinquenervia* (broad-leaved paperbark), *M. nodosa* (prickly-leaved paperbark) and *M. styphelioides* (prickly-leaved tea tree/ paperbark) (NSW SC 2010a; Qld Herbarium 2021; Tozer et al. in press).

Other common mid-layer species (small trees and scattered shrubs) include *Acacia concurrens* (Curracabah), *A. disparrima* (southern salwood), *A. leiocalyx* (black wattle), *A. maidenii* (Maiden's wattle), *A. melanoxylon* (blackwood), *Breynia oblongifolia* (coffee bush), *Androcalva* spp. (syn. *Commersonia* spp.), *Hibiscus* spp. (native hibiscus), *Myrsine variabilis* (Muttonwood) and *Notelaea longifolia* (native olive); and less frequently, rainforest species such as *Aphananthe philippinensis* (native elm), *Cupaniopsis parvifolia* (small-leaved tuckeroo) and *Elaeocarpus obovatus* (hard quandong) (NSW SC 2010a; Qld Herbarium 2021; Tozer et al. in press).

A more comprehensive list of mid-layer species likely to occur in the ecological community is in [Appendix A – Species lists](#).

#### 1.2.2.2.3 Understorey species – Climbers and scramblers

*Veronica plebeia* (trailing speedwell) is found mainly in the ground-layer in some patches, whereas *Desmodium varians* (slender trefoil), *Glycine clandestina* (twining glycine), *Parsonsia straminea* (common silkpod), *Smilax australis* (native sarsaparilla) and *Stephania japonica* (snake vine) may climb into the sub-canopy or mid-layer. Other commonly occurring species include *Clematis glycinoides* (headache vine), *Cissus hypoglauca* (water vine), *Eustrephus latifolius* (wombat berry), *Geitonoplesium cymosum* (scrambling lily), *Gynochthodes jasminoides* (morinda vine), *Hibbertia scandens* (climbing Guinea flower), and *Rubus parvifolius* (native raspberry) (NSW SC 2010a; Qld Herbarium 2021; Tozer et al. in press).

A more comprehensive list of climber and scrambler species likely to occur in the ecological community are in [Appendix A – Species lists](#).

#### 1.2.2.2.4 Understorey species – ground-layer

Because this is a floodplain ecological community there are several understorey species adapted to the alluvial soils and its comparatively higher soil moisture, compared to surrounding slopes. These species are mostly perennial forbs, grasses, sedges, rushes, low shrubs and ferns, including *Centella asiatica* (pennywort), *Cheilanthes sieberi* (forest fern), *Commelina cyanea* (scurvy-weed), *Dichondra repens* (kidney weed), *Dianella caerulea* (blue flax lily), *Entolasia marginata* (bordered panic), *E. stricta* (wiry panic), *Gahnia* spp. (saw-sedge), *Lobelia purpurascens* (whiteroot), *Lomandra filiformis* (wattle mat-rush), *L. longifolia* (spiny-headed mat-rush), *L. multiflora* (many-flowered mat-rush), *Microlaena stipoides* (weeping grass), *Oplismenus aemulus* (creeping shade grass), *Paspalum distichum* (water couch), *Viola banksii* (wild violet) and *Viola hederacea* (ivy-leaved/ native violet) (Good et al. 2017; Keith & Scott 2005; NSW SC 2010, 2011). Widespread grasses, that may dominate the groundcover include *Cymbopogon refractus* (barbed wire grass), *Heteropogon contortus* (black spear grass), *Imperata cylindrica* (blady grass) and *Themeda triandra* (kangaroo grass), (NSW SC 2010a; Qld Herbarium 2021; Tozer et al. in press).

A more comprehensive list of ground-layer species likely to occur in the ecological community is in [Appendix A – Species lists](#).

#### 1.2.2.3 FAUNA

The ecological community includes a wide range of fauna species in the canopy and sub-canopy; on the ground; in the soil, litter and subsurface; and those dependent on wetlands. The ecological community's wide variety of habitat is important for food, nesting, roosting and/or hunting (Law et al. 2000). This includes habitat for species travelling across the landscape, particularly birds (e.g., *Caligavis chrysops* (yellow-faced honeyeater), *Zosterops lateralis* (silvereye)). Fauna species play important roles in the ecological community, including pollination, seed dispersal and soil turnover.

Fauna may be abundant or rare; and the description and species lists do not include all the species that make up the ecological community (i.e., many sites may have species that are not mentioned in this Conservation Advice). Not all species are present at every site; and some species may be only sporadically present. The ecological community also includes many ecologically important invertebrate fauna species that are less well documented (e.g., gall forming insects, including flies, wasps, bugs and thrips).

A more comprehensive list of fauna species likely to occur in the ecological community, including threatened fauna, is in

## Appendix A – Species lists.

### 1.2.2.3.1 CANOPY AND SUB-CANOPY FAUNA

The ecological community includes a range of fauna species that depend on hollows and other habitat values supplied by mature trees. For example, the tree hollows and crevices that form in mature trees are of particular importance to arboreal mammals, birds, frogs, reptiles and invertebrates, including bees and butterflies (Carritt 1999; HLW 2016a & b; Good et al. 2017). Certain tree species, such as *Eucalyptus tereticornis* (forest red gum, Queensland blue gum), are preferred by a broad range of species including bats, arboreal mammals and some reptiles (Gibbons & Lindenmayer 2002). Many of the diagnostic eucalypt species are also important food trees for endangered populations of *Phascolarctos cinereus* (koala), including *Eucalyptus amplifolia* (cabbage gum) and *E. tereticornis* (NSW DECC 2008; NSW OEH 2018a). Koalas generally favour habitat on soils with higher fertility and soil moisture such as the ecological community, particularly during times of high temperature and drought (Ellis et al. 1995).

Arboreal mammals play important roles in the ecological community, including pollination and seed dispersal for native plants (Turner 1983). They include *Acrobates pygmaeus* (feathertail glider), *Petaurus australis* (yellow-bellied glider), *Petaurus breviceps* (sugar glider), *Petaurus norfolcensis* (squirrel glider), *Pseudocheirus peregrinus* (common ringtail possum) and *Trichosurus vulpecula* (common brushtail possum), while nationally threatened species include *Petauroides volans* (greater glider) and *Phascolarctos cinereus* (koala). The state-listed *Cercartetus nanus* (eastern pygmy possum) is an active climber in the canopy and subcanopy. It feeds on nectar and pollen, especially from banksias, eucalypts and bottlebrushes. It also feeds on insects and will eat soft fruits when flowers are not available (NSW OEH 2017a). *Phascogale tapoatafa* (brush-tailed phascogale) preys on smaller mammals, birds, lizards and insects, as well as feeding on nectar from flowering trees in the ecological community (NSW OEH 2021, 2022).

Coastal lowland forests are important foraging resources for flying foxes; for example, the nationally-listed *Pteropus poliocephalus* (grey-headed flying-fox) is part of the ecological community across its entire extent (Eby & Law 2008). In autumn and winter they congregate on coastal lowlands north of the Hunter Valley; whilst in summer they spread further south. Together with *Pteropus alecto* (black flying-fox) and *P. scapulatus* (little red flying-fox), they feed primarily on nectar and pollen from eucalypt blossoms and are responsible for much of their pollination (Tidemann 1998 cited in DAWE 2020a, SCEE 2017, NSW DPIE 2020 & DAWE 2021b). Fringing forests are important as roosting sites for flying foxes; whilst other species may live in adjacent habitats and move through the ecological community to access water (HLW 2017b).

Microchiroptera (micro-bats) frequently forage across the fertile floodplains and riparian corridors of the ecological community. Megachiroptera (megabats) species of the ecological community include *Myotis macropus* (southern myotis) and *Syconycteris australis* (eastern/ Queensland blossom bat) (Law 1994); both are state-listed as vulnerable in NSW. The latter requires a year-round supply of nectar and pollen, which is gathered from a mosaic of coastal complex vegetation types (NSW OEH 2020b). The former is Australia's only true fishing bat. It may roost in small groups of 10 to 15, close to water in hollow-bearing trees, or in dense foliage. It forages over streams and pools, catching insects and small fish by raking its feet across the water surface (NSW OEH 2017b).

Understorey plants influence bird diversity. For example, shrubs and twiners provide shelter, nesting substrates and foliage, and include seasonal flowers which attract birds and insects

(HLW 2017a). The nationally and state-listed *Anthochaera phrygia* (regent honeyeater) and *Grantiella picta* (painted honey-eater) inhabit eucalypt forests with a reliable nectar supply, such as those with *Angophora floribunda* (rough-barked apple). Other birds likely to be part of the ecological community include other honeyeaters, along with cuckoos, doves, fantails, fairywrens, owls, scrubwrens and whistlers. The ecological community also includes a range of cockatoos, lorikeets, parrots and rosellas such as the critically endangered *Lathamus discolor* (swift parrot) that forage on flowers and psyllid lerps. *L. discolor* and the ecological community have a similar northern distribution limit and during periods of drought, the ecological community is a particularly important refuge habitat for the parrot (Saunders & Tzaros 2011).

The ecological community includes birds of prey such as *Haliaeetus leucogaster* (white-bellied sea-eagle), *Haliastur indus* (brahmyny kite), *Haliastur sphenurus* (whistling kite) and *Pandion cristatus* (osprey) (Law et al. 2000; NSW SC 2010a). It also includes *Ninox strenua* (powerful owl), *Tyto novaehollandiae* (masked owl) and *Tyto tenebricosa* (sooty owl), which are listed as vulnerable in New South Wales. They prefer the more densely wooded areas of the ecological community (e.g., in the upper floodplain and riparian corridors) and roost and nest in large tree hollows near foraging areas. *Tyto novaehollandiae* often hunts along the edges of forests, including roadsides. Birds of prey feed on a wide range of native and introduced animals in the ecological community, including bandicoots, bats, birds, small dasyurids, fish, gliders, insects, possums, rabbits and reptiles.

Some flowering plants provide large amounts of nectar in the ecological community. This attracts many insects (e.g., butterflies), which lay their eggs on the various food plants for their larvae and nymphs, including *Acacia* spp. (wattles), sedges like *Carex* spp. and *Gahnia* spp., the vine *Hardenbergia violacea* (purple coral-pea) and *Lomandra* spp.. For example, *Trapezites symmopus* (splendid ochre), which is found across the whole extent of the ecological community, feeds on *Lomandra* spp., most commonly *Lomandra longifolia* (spiny-headed mat-rush) (Braby 2004).

#### 1.2.2.3.2 Ground dwelling fauna

The ground-layer vegetation provides food and shelter for a wide range of ground-dwelling animals, including birds, many invertebrates, kangaroos, native mice and rats, reptiles, wallabies and wombats. Prior to European settlement, some areas of the ecological community also supported large birds such as bustards and emus, that are now locally extinct in southeast Queensland (HLW 2016b) and rare in NSW.

In the understorey, clumps of grasses, ferns, forbs and sedges provide cover for small to medium sized ground dwelling animals such as *Isoodon macrourus* (northern brown bandicoot) in the northern part of the ecological community's distribution, *Perameles nasuta* (long-nosed bandicoot) and *Tachyglossus aculeatus* (short-beaked echidna). The diverse understorey also provides habitat for animals that forage or dwell in nearby rainforest (HLW 2017a). Species such as the threatened *Pseudomys novaehollandiae* (New Holland mouse) live in communal burrows and are found in habitats that are often high in floristic diversity, especially with leguminous perennials (Haering & Fox 1997; Kemper & Wilson 2008). *Pseudomys novaehollandiae* feeds primarily on seeds, although it also eats leaves, fungi and invertebrates, depending on seasonal or floristic characteristics of individual patches of the ecological community; it is thought to play an important role in seed and fungal spore dispersal (Seebeck et al. 1996; Smith & Quin 1996).

Predators such as the threatened *Dasyurus maculatus* (spotted-tailed quoll) are adept at moving through the canopy, as well as at ground level, preying on birds, crayfish, fish, frogs, insects, lizards, snakes, small mammals, possums and rabbits (Alexander 1980; Belcher 1995;

Burnett 2000; Jones & Barmuta 1998; Troughton 1954: all cited in Jones et al. 2001). *Antechinus flavipes* (yellow-footed antechinus) and *Antechinus stuartii* (brown antechinus) are also part of the ecological community, living in forested habitats with dense ground cover and low fire frequency. These small carnivores prey on invertebrates; and mostly nest communally in tree-hollows.

Lizards such as *Cyclodomorphus gerrardii* (pink-tongued lizard) are a part of the ecological community, sheltering beneath leaf litter, in hollow logs, and in rock and tree crevices. Their slender bodies and limbs are adapted to moving in thick undergrowth. *Cyclodomorphus gerrardii* is also a good climber and uses its semi-prehensile tail as a supporting aid to climb trees to feed when necessary (Lindenmayer et al. 2002; Shea 2004).

#### 1.2.2.3.3 Soil Fauna

The grasses, herbs, ferns and deep-rooted trees of the ecological community play a prominent role in intercepting, storing and recycling nutrients; protecting soil from erosion; reducing stream sediment loads during high intensity rainfall events; and regulating ground water (HLW 2016b). A broad range of invertebrates and fungi are associated with the decomposition cycles in moist, shaded conditions on the forest floor (HLW 2017a).

Ground-dwelling and burrowing mammals, such as bandicoots, *Tachyglossus aculeatus* (short-beaked echidna) and *Vombatus ursinus* (common/ bare-nosed wombat), play important roles (e.g., by digging and raking through soil). These include the dispersal of fungal species important for plant growth; soil aeration and water infiltration; and the breakdown of leaf litter (Fleming et al. 2014). The alluvial soil of the ecological community may be an important indicator of the suitability of habitat for species such as the threatened *Pseudomys novaehollandiae* (New Holland mouse), with deeper top-soils and softer substrates preferred for digging burrows (Wilson & Laidlaw 2003).

#### 1.2.2.3.4 Water dependant fauna

The ecological community plays an important role in maintaining river ecosystems and riverbank stability; and it provides essential connectivity between the slopes and rivers, as well as longitudinally along rivers. As an interface between terrestrial and aquatic habitats, the ecological community includes species considered to be water-dependent, such as *Hydromys chrysogaster* (water rat), *Intellagama lesueurii* (eastern water dragon), *Ornithorhynchus anatinus* (platypus), and frogs and turtles. *Intellagama lesueurii* basks on tree branches overhanging streams, and dives into the water to escape predators. Waterbirds such as *Phalacrocorax* spp (cormorants), egrets (*Ardea* spp. and *Egretta* spp.), *Ephippiorhynchus asiaticus* (black-necked stork) and kingfishers, are also part of the ecological community.

Aquatic ecosystems (e.g., ephemeral ponds, creek lines and floodplains) support amphibians, particularly several species of southern frog (family Myobatrachidae) and tree frog (family Hylidae) (NSW SC 2010a). These include *Adelotus brevis* (tusked frog), *Limnodynastes peronii* (brown striped-frog) and *Limnodynastes tasmaniensis* (spotted grass-frog), and the threatened *Litoria aurea* (green and golden bell frog), *Litoria brevipalmata* (green-thighed frog) and *Mixophyes iteratus* (giant barred-frog) (Littlejohn et al. 1993; Cogger 2000; MRCCC 2005; HLW 2016a; NSW SC 2010a & b). Characteristic reptiles of the ecological community, that feed on frogs and other water-dependent species, include *Chelodina longicollis* (eastern long-necked turtle), *Pseudechis porphyriacus* (red-bellied black snake) and *Varanus varius* (tree goanna, lace monitor).

A more comprehensive list of fauna species likely to occur in the ecological community, including threatened fauna, is in

## Appendix A – Species lists.

### *1.2.3 Functionally important species within the ecological community*

The dominant canopy species of the *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia* genera are functionally important across the range of the ecological community. These species play a key role in maintaining the forest structure and environment and supporting its biodiversity. They provide much of the physical framework of the ecosystem including hollows for nesting and shelter; foliage for herbivores; pollen and nectar; nutrient cycling; and litter and fallen branches for ground-dwelling fauna (Fensham et al. 2020).

The tree canopy provides protection from strong winds and storms, while also intercepting sunlight and precipitation, leading to a relatively sparsely vegetated understory layer. It moderates and stabilises temperature and humidity, both in and beneath it. The combination of environmental conditions at various heights creates different microclimates, which provide specialised niches for other plants, fungi, birds, insects, and other animals. The large trees maintain soil stability, influence water table levels and cycle large volumes of nutrients via mycorrhizae and extensive root systems. As well as microclimates, the forest canopy, with its branches and arboreal connections, creates structural diversity which is vital for the survival of many animals. For example, many tree-dwellers escape ground predators by staying in and moving through the canopy (Trimble 2019).

Faunal components of the ecological community have equally important ecological roles to the flora. These include nutrient cycling, dispersal and burial of seeds and fungal spores and pollination provided by mammals, birds and insects.

## 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 help identify the ecological community and its important occurrences.

The ecological community intergrades with other vegetation types and ecological communities (see Section 2.2.7). The key diagnostic characteristics (in Section 2.1) are used to identify an area of native vegetation as being the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions, and they define the features that distinguish it from other ecological communities; noting that additional information to assist with identification is provided in the other sections of this document, particularly in the description (Section 1.2) and in 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. Assemblages of species that do not meet the key diagnostic characteristics are not part of the nationally-listed threatened ecological community, protected as a Matter of National Environmental Significance (MNES).

The ecological community is defined as the assemblage of species, described in [Section 1.2](#), that meets the following key diagnostic characteristics.

- It occurs in the New South Wales North Coast (NNC) and South Eastern Queensland (SEQ) IBRA<sup>2</sup> bioregions, and on Curtis Island in the Brigalow Belt North IBRA Bioregion (BBN).
- It occurs in the catchments of the eastern watershed of the Great Dividing Range, typically in their lower reaches,
- It occurs at elevations up to 250 m above sea-level (ASL), most typically below 50 m ASL.
- It occurs on alluvial landforms including river floodplains, riparian zones (e.g., along riverbanks, lake foreshores and creek lines), the floors of tributary gullies, floodplain pockets, alluvial flats, fans, terraces, and localised colluvial fans; as well as on localised depressions amongst low rises and on associated sites where water can pond (refer to [Section 1.2.1](#) and [Appendix D – Landforms and soils](#)).
- It occurs on alluvial soils<sup>3</sup> of various textures including silts, clay loams, sandy loams, gravel and cobbles.
- It does not typically occur on soils that are primarily marine or aeolian sands, but may occur on such substrates after they have been modified by fluvial activity.
- It occurs as a tall closed-forest, tall open-forest, closed forest, open forest, tall woodland, or woodland (Specht 1970). The canopy has a crown cover<sup>4</sup> of at least 20%<sup>5</sup>.
- It has a canopy dominated<sup>6</sup> by one or a combination of *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and/or *Syncarpia* tree species<sup>7</sup>, but NOT dominated by *Eucalyptus robusta* (swamp mahogany). Other canopy tree species may be present, and in some areas rainforest trees may be prominent.
- A mid-layer (including a sub-canopy, and/or shrub-layer) may be present, sparse or absent; and fauna may be abundant or rare.

---

<sup>2</sup> Interim Biogeographic Regionalisation for Australia (Subregions - States and Territories) Version 7 (DoE 2013).

<sup>3</sup> See [Appendix D – Landforms and soils](#) for more information on soils.

<sup>4</sup> Crown cover is measured as the area within the vertical projection of the periphery of the tree crowns, where the tree crowns are considered to be solid (as per National Committee on Soil and Terrain (2009)).

<sup>5</sup> 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 nationally protected ecological community when the other key diagnostic characteristics and condition thresholds are met, even when crown cover is temporarily less than 20%. However, there must also be evidence that some of the dominant tree species (of the *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and/or *Syncarpia* genera) typical of the ecological community will regenerate (e.g., from suckers, seedlings, saplings, lignotubers, or from epicormic regrowth), such that they can reasonably be expected to eventually dominate the tree canopy once more.

<sup>6</sup> This is where one, or a combination of, species from any of the five genera (*Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia*) are collectively the most abundant trees in the canopy – in terms of either crown cover (i.e., at least 50% of the canopy cover), or stem/trunk density (i.e., at least 50% of the trees in the patch).

<sup>7</sup> This includes hybrids (TSSC 2011).

## 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 diagnostic characteristics, but it can include small-scale variations, gaps and disturbances. The smallest patch size that can be identified is 0.5 ha, because the key diagnostic characteristics cannot reliably be identified for smaller areas. Where a larger area has been mapped or classified as a different vegetation type (e.g., by state vegetation mapping), localised areas of the ecological community ( $\geq 0.5$  ha in size) may still be present within this larger area.

It is also important to consider whether a patch of the ecological continues beyond the boundary of a particular area surveyed, or site for a particular proposed development, project, or change of use/activity (i.e., it is important to assess and consider the patch as a whole).

Note that at the time of this advice NSW vegetation assessment tools/methodologies define a patch differently – as including all intact native vegetation, which may include one or more ecological communities, that have a gap of less than 100 m from the next area of moderate to good condition native vegetation. The national Threatened Species Scientific Committee uses the term ‘patch’ to describe a discrete area of a single ecological community.

### 2.2.2 *Breaks in a patch*

When it comes to defining a patch of the ecological community, allowances are made for ‘breaks’ of up to 30 m between areas that meet the key diagnostic characteristics. These breaks may be because of watercourses or drainage lines, tracks, paths, roads, gaps made by exposed areas of soil, or leaf litter, or areas of localised variation in vegetation that do not meet the key diagnostic characteristics. For example, a single patch could include two areas of the ecological community on different sides of a watercourse. Breaks like this do not significantly alter the overall functionality of the ecological community and they are 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 when determining the overall condition of the patch. Tracks, paths, roads or other artificial surfaces or buildings should be excluded from the calculation of patch size and condition.

Where there is a break in the ecological community of 30 m or more (e.g., due to permanent artificial structures, wide roads or other barriers, water bodies or a different type 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, one part of a patch may have more rainforest species, whereas another part of the same patch may be dominated by more dry sclerophyll species; or one part of a patch may have been more recently burnt and therefore be at a different stage of regeneration. Variation, in canopy cover, condition or composition of vegetation across a patch is not evidence of multiple patches, as long as the patch as a whole meets the key diagnostic characteristics.

#### 2.2.4 *Revegetation and regrowth*

Restored (including reconstructed) sites, or areas of regrowth, are part of the nationally-listed threatened ecological community, as long as the patch meets the key diagnostic characteristics. Their inclusion reflects the ecological community's ability to persist (and even flourish) if threats are managed and ameliorated.

Where ecological restoration is planned, the aim should be for recovery of as many key biodiversity and ecosystem attributes as practical for a particular patch, 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). See also [Section 5.3 Principles and standards for conservation](#) and [Section 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), the New South Wales Native Vegetation Interim Type Standard (Sivertsen 2009), and the Queensland Methodology For Surveying and Mapping Regional Ecosystems (Neldner et al. 2020) provide guidance, along with relevant local guidelines.

The size, number and spatial distribution of plots or transects must be adequate to represent variation across the patch. Sampling should account for 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. Plots of 0.04 ha (e.g., quadrats of 20 x 20 m) would be suitable to establish condition (Tozer 2003; Tozer et al. 2010).

Record the survey date(s) and the survey effort involved. Record 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. Include a map with adequate details to locate surveyed areas (such as an ortho-photo of sufficient transparency not to obscure other information and geographic coordinates).

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 a survey/assessment of key diagnostic characteristics and condition. For example, plant surveys conducted during spring and early summer will more easily identify understorey species; and after disturbance such as a fire, one or more vegetation layers, or groups of species (e.g., obligate seeders), may not be evident for some time. Ideally, surveys should be held in more than one season to maximise the chance of detecting all species present, particularly threatened species. In years of low rainfall, assessors should recognise that many species may not be detected. In these situations, it is preferable that surveys are carried out over more than one year.

Timing of surveys should allow for a reasonable interval (e.g., 6–12 months) after a disturbance (natural or human-induced), to allow regrowth to become evident; as well as being 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 in the patch and when.

Surveys should also note any areas that are either in a significantly higher or lower condition, and the condition categories that would apply, as well as any gaps in canopy cover.

Fauna surveys should be conducted following best practice guidelines, such as the Survey guidelines for Australia's threatened mammals (DSEWPC 2011) or equivalent.

#### 2.2.6 Mapping and vegetation classifications

Several mapping and vegetation classification schemes are used in New South Wales and Queensland. Whilst none directly map areas of the ecological community according to the key diagnostic characteristics in this document, they still provide useful information on the likely occurrence of the ecological community.

In NSW, the ecological community is related to at least 27 Plant Community Types (PCTs). In Queensland, the ecological community corresponds to at least 17 Regional Ecosystems (REs). Each mapping/vegetation unit is dominated by one or more tree species, from five genera (*Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia*), occurring on floodplains. Appendix B – Relationship to other vegetation classification and mapping systems outlines the map units or classifications from several common mapping and classification systems that best relate to the ecological community.

The boundaries of ecological communities may change over time due to the dynamic nature of these systems. This ecological community is often found in association with other vegetation types such as, littoral rainforest, swamp oak forests, or swamp sclerophyll forests in a mosaic of floodplain ecological communities.

The characteristic features that distinguish this ecological community from other floodplain ecological communities within its range are:

- its canopy dominated by tree species from one or more of five genera (*Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia*); and
- the sub-dominance, or relatively low abundance, of *Casuarina* and *Melaleuca* species, along with the relatively low abundance of *Eucalyptus robusta* (Swamp Mahogany).

#### 2.2.7 Other relevant listed ecological communities

##### 2.2.7.1 STATE-LISTED ECOLOGICAL COMMUNITIES IN NEW SOUTH WALES

New South Wales protects threatened ecological communities by listing them under the NSW *Biodiversity Conservation Act 2016*.

Much of the ecological community in New South Wales corresponds to the NSW-listed 'Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion' (NSW SC 2010a) and some of it corresponds to the 'River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions' (NSW SC 2011) – if areas meet the key diagnostic characteristics.

The ecological community may also adjoin or intergrade with several other NSW-listed endangered ecological communities, which collectively cover the remaining native vegetation on the northern coastal floodplains of NSW. These include 'Lowland Rainforest on Floodplain in the NSW North Coast bioregion', 'Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions', 'Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions' and 'Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions' (NSW SC 2010b; NSW DPE 2022).

#### 2.2.7.2 REGIONAL ECOSYSTEMS RECOGNISED AS THREATENED IN QUEENSLAND

Queensland does not have a legislative mechanism for listing threatened ecological communities. However, Regional Ecosystems (REs) are assigned a status under the Qld *Vegetation Management Act 1999*. Components of this ecological community are recognised as endangered under this framework, including:

- RE 12.3.3 – *Eucalyptus tereticornis* woodland on Quaternary alluvium
- RE 12.3.3a – *Eucalyptus crebra*, *Corymbia tessellaris* woodland to open forest
- RE 12.3.3d – *Eucalyptus moluccana* woodland
- RE 12.3.19 – *Eucalyptus moluccana* and/or *E. tereticornis* and *E. crebra* open forest to woodland
- RE 12.3.20 – *Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis*, *E. siderophloia*, *M. styphelioides* open forest on low coastal alluvial plains (Qld Herbarium 2021).

Areas of the Subtropical eucalypt floodplain forest and woodland may occur within other Qld REs recognised as endangered, where individual occurrences meet the key diagnostic characteristics. Examples include:

- RE 12.3.10 – *Eucalyptus populnea* woodland on alluvial plains
- RE 12.3.18 – *Melaleuca irbyana* low open forest on alluvial plains (Qld Herbarium 2021).

#### 2.2.7.3 OTHER NATIONALLY-LISTED THREATENED ECOLOGICAL COMMUNITIES

Several other nationally-listed threatened ecological communities occur in, or close to, areas of the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions. [Table 1](#) lists these ecological communities and their status at the time of national listing.

As soil salinity increases the ecological community may intergrade with, and be replaced by, the 'Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland' (Keith & Scott 2005; DEE 2018). As soils become sandier and more waterlogged, the ecological community may intergrade with, and be replaced by, the 'Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland' (e.g., forests with abundant *Melaleuca* spp. and/or *E. robusta* on sandy textured soils and poor drainage) (DAWE 2021a). As soil fertility increases rainforest is likely to dominate. The boundaries between all of these ecological communities are dynamic and may shift in response to changes in hydrological regimes, fire regimes or land management practices. In most cases, an area of vegetation can be defined as either one nationally-listed threatened ecological community or another. In some circumstances however, an area of vegetation may meet the key diagnostic characteristics of two nationally-listed threatened ecological communities, especially after disturbance. Areas that meet two sets of key diagnostic characteristics should be treated as both nationally-listed threatened ecological communities.

**Table 1: Nationally-listed threatened ecological communities that can intergrade or overlap with the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions**

Ecological community name	EPBC Listing Status
<u>Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland</u>	Endangered
<u>Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland</u>	Endangered
<u>Lowland Rainforest of Subtropical Australia</u>	Critically endangered
<u>Swamp Tea-tree (<i>Melaleuca irbyana</i>) Forest of South-east Queensland</u>	Critically endangered
<u>Littoral Rainforest and Coastal Vine thickets of Eastern Australia</u>	Critically endangered
<u>Grey box – grey gum wet forest of subtropical eastern Australia</u>	Endangered

Source: DAWE (2022a).

### 2.3 Condition classes, categories and thresholds

Landuse 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 (MNES) areas of the ecological community must meet both:

- the key diagnostic characteristics ([Section 2.1](#)) AND
- at least the minimum condition thresholds ([Table 2](#)).

[Table 2](#) outlines the different condition classes and categories that apply to the ecological community. The minimum condition thresholds are designed to identify patches that retain sufficient conservation values to be considered a MNES and to which the referral, assessment, approval and compliance provisions of the EPBC Act apply. These include all patches of the ecological community in classes A, B and C.

Patches that do not meet the minimum condition thresholds for at least Class C are excluded from protection under the EPBC Act. In many cases, their loss and degradation are irreversible, because natural characteristics have been permanently removed. However, although not protected under the EPBC Act, many of these patches 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 protected under the EPBC Act. Management actions should be designed to restore patches to high condition where practical.

When assessing the condition of a patch of the ecological community it is important to also consider the key diagnostic characteristics ([Section 2.1](#)) and patch definition information ([Section 2.2](#)).

The broadest area that meets the key diagnostic characteristics of the ecological community should be used to determine patch condition. Where condition varies and the condition of the whole area falls below the minimum thresholds, the largest area, or areas, that meet(s) the minimum condition thresholds should be identified. This may result in multiple patches of the ecological community being identified, within the area first considered.

Recent disturbance by fire is likely to result in the ecological community being 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 top-killed<sup>8</sup>. It may also lack several obligate seeder species that must complete their primary juvenile phase following fire. This condition is likely to be temporary, and if effects are severe consider postponing surveys until a later date.

---

<sup>8</sup> Topkill: Death of the canopy and above-ground stems

**Table 2: Condition categories, classes and thresholds**

Patch size thresholds →		Large patch Patch size ≥2 ha	Small contiguous <sup>4</sup> patch ≥ 0.5 ha, within a larger area of native vegetation ≥ 5 ha	Small patch Patch size ≥ 0.5 ha
Biotic thresholds ↓				
Vegetation	Arboreal mammals			
<p><b>HIGH CONDITION</b></p> <p>Ground cover richness<sup>1</sup> ≥ 10 native species per sample plot <b>AND</b> ≥ 20 <u>large</u> native trees<sup>2</sup> per ha. <b>AND</b> ≥ 80% of its total perennial understorey vegetation cover<sup>3</sup> comprises native species</p>		<p><b>CLASS A1</b></p> <p>Large or contiguous<sup>4</sup> patch, with high quality understorey and many large native trees</p>		<p><b>CLASS B1</b></p> <p>Small patch, with high quality understorey and many large native trees</p>
<p><b>GOOD CONDITION</b></p> <p>Ground cover richness<sup>1</sup> ≥ 6 native species per sample plot <b>AND</b> ≥ 10 <u>large</u> native trees<sup>2</sup> per ha. <b>AND</b> ≥ 50% of its total perennial understorey vegetation cover<sup>3</sup> comprises native species</p>	<p><b>AND</b></p> <p>≥5 species of arboreal mammals<sup>5</sup> detected<sup>6</sup> in the patch.</p>	<p><b>CLASS A2</b></p> <p>Large or contiguous<sup>4</sup> patch, with good quality understorey, large native trees and evidence of many arboreal mammal species</p>		<p><b>CLASS B2</b></p> <p>Small patch, with good quality understorey, large native trees and evidence of arboreal mammals</p>
			<p><b>CLASS B3</b></p> <p>Large or contiguous<sup>4</sup> patch, with good quality understorey and large native trees</p>	
<p><b>MODERATE CONDITION</b></p> <p>Ground cover richness ≥ 4 native species per sample plot<sup>1</sup> <b>AND at least one of:</b> ≥ 6 <u>very large</u> native trees<sup>7</sup> per ha <b>AND/OR</b> ≥ 30% of its total perennial understorey vegetation cover<sup>3</sup> comprises native species</p>		<p><b>CLASS C2</b></p> <p>Large or contiguous<sup>4</sup> patch, with moderate quality understorey and/or some <u>very</u> large native trees</p>		<p>Not nationally protected</p>
<p><b>Notes</b></p> <p><sup>1</sup> Ground cover richness includes combined species richness of native grasses, forbs, ferns and sedges per 0.04 ha (20 x 20 m sample plot) on average.</p> <p><sup>2</sup> <u>Large</u> native trees are <u>greater than 45 cm [diameter at breast height (dbh)]</u>. This is used as a surrogate for tree hollows and other habitat values. These should be counted, and averaged across the patch as a whole. For larger patches, they can be counted in plots of at least 0.5 ha.</p> <p><sup>3</sup> Perennial understorey vegetation cover includes all vegetation below the canopy layer, from species with a life-cycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, shorter trees, juvenile canopy species, resprouting or suckering of the lower portions of canopy trees, and cryptogams; but it does not include annual plants, plant litter, or exposed soil.</p> <p><sup>4</sup> Contiguous means the patch is connected to, or in close proximity to (i.e., within 30 m of), one or more areas of native vegetation (i.e., an area where the total perennial vegetation cover is dominated (50% or more) by native plant species).</p> <p><sup>5</sup> For the purposes of this calculation, evidence of any number of micro-bat species (Microchiroptera) found in the patch counts as one species of arboreal mammal.</p> <p><sup>6</sup> Survey guidelines include DSEWPC (2011).</p> <p><sup>7</sup> <u>Very large</u> native trees are <u>greater than 60 cm dbh</u>. These should be counted, and averaged across the patch as a whole. For larger patches, they can be counted in plots of at least 0.5 ha (i.e., an average of 3 very large native trees per 0.5 ha plot).</p>				

## 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 2](#)). These represent those parts of the ecological community that retain the highest diversity and most intact structure and ecological function and have the highest chance of persisting in the long-term.

However areas that otherwise meet the minimum condition thresholds (i.e., Class C in [Table 2](#)) are also important for the functioning and survival of the ecological community. These areas are critical to the survival of the ecological community: if they occur in locations or landscape positions that are particularly important for biodiversity or function; and/or contain suites of species, or habitat features, that are important in a regional or local context (see [Section 2.5](#)). They also have the potential to recover, or be restored, to a higher condition.

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat at this time.

## 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 entire landscape context and environment surrounding patches of the ecological community. The surrounding vegetation and other landscape considerations will influence how important a patch is to the survival of 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 corridors; this also adds to their viability. However, these are not the only factors to consider. For example, in heavily cleared areas, some patches that meet the minimum condition thresholds occur in isolation. These patches need protection and could benefit from revegetation or other restoration activities to link them with other patches. In other areas, patches that are connected to other native vegetation may not, in their current state, meet the minimum condition thresholds; but they still have high conservation value. Such patches could benefit from restoration work to improve their condition so they can meet the minimum condition thresholds.

The ecological community often occurs in association with other native vegetation types. Patches of the ecological community that are connected to other native vegetation have a better chance of survival and restoration success, because they are buffered from disturbance by the surrounding native vegetation.

The following indicators of high-conservation 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. They may be based on on-site observations, or on known past management history.

- Patches that meet or are closest to the best condition for this ecological community (classes A and B); particularly those which have been subject to low or no impacts (such as light grazing), and those which retain more hollow bearing trees.
- Patches with a low incidence of weeds, more ‘mature habitat trees’ (e.g., with more hollows) and a more diverse understorey, and/or those that support arboreal mammals.
- Patches with a larger area to boundary ratio. These are more resilient to edge effect disturbances such as weed invasion and human impacts.

- Patches in, or near to, a larger native vegetation remnant and that contribute to a mosaic of vegetation types present in an area. 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’ between native remnants in the landscape. Connectivity includes actual or potential connectivity to restoration works (e.g., native plantings).
- Patches in areas where the ecological community has been most heavily cleared and degraded, or that are at the natural edge of its range, particularly where there is genetic distinction, or the absence of some threats. These may include unique variants of the ecological community (e.g., with a unique flora and/or fauna composition, or a patch that contains flora or fauna that have largely declined across the broader ecological community or region).
- Patches that show evidence of recruitment of key native plant species, or the presence of a range of age cohorts (including through successful assisted regeneration, or management of sites). For example, where tree canopy species are present in a range of sizes from saplings to large hollow-bearing trees.
- Patches with good faunal habitat (e.g., 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, large rocks, watercourses).
- Patches that include nationally or state-listed threatened species.
- Patches with high species richness (e.g., as shown by the variety of native understorey plant species, or high number of native fauna species (vertebrates and/or invertebrates)).
- Patches that do not experience grazing, or show low-levels of disturbance caused by grazing by domestic livestock or feral herbivores.
- Patches with relatively low levels of weeds and feral animals, or areas where these can be managed efficiently.

Additionally, areas such as buffer zones around patches (see information on buffer zones in [Section 5.4.1.3](#)) particularly adjoining other native vegetation, and areas that meet the description of the ecological community but not the condition thresholds, can also be important to the survival of the ecological community. They should still be taken into consideration as part of the surrounding environment and landscape context.

## 3 Cultural significance

### 3.1 Indigenous cultural values and uses associated with the ecological community

The Ecological community occurs on Country (the traditional lands) for several Indigenous Australian peoples including the Biripai, Dainggatti, Gumbaynggirr, Bundjalung, Yuggera, Waka Waka, Gubbi Gubbi, Badtjala, Gooreng Gooreng, Gangula and Bayali. We acknowledge their cultures and continuing links to the ecological community and the Country it inhabits. Further details are in [Appendix C](#) – Indigenous Australians and cultural values associated with the ecological community.

The significance of the ecological community, particular species, spiritual, customary and other cultural values are diverse and varied for the Indigenous Australians 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 Australians. Such knowledge may be only held by Indigenous groups and individuals who are the custodians of this knowledge and have the rights to decide how it is shared and used.

Indigenous Australians occupied the floodplains, coastal flats, creeks, rivers, estuaries and Sea Country of eastern Australia for tens of thousands of years. The landscape provides a direct link to their traditional spiritual and material cultures and has considerable cultural heritage values.

Indigenous Australians have an ongoing interest in continuing to use traditional land management practices to protect important areas and resources. The ecological community has many cultural values and important cultural land management practices required to keep it healthy, such as rites of life (at increase sites) and cultural burning. Places, cultural values and practices, ecological features, and Indigenous language are all intrinsically linked to the ecological community and the broader Indigenous landscape.

Trees of the ecological community have had a broad array of uses including as gum for chewing, dying and medicine; ash rubbed into the skin for soothing young mothers; where bees, honey and wax can be found; hollow logs for fish-traps, hard timber for weapons and utensils; bark for shelter, canoes, embalming and containers. Some species contain water; others were used to create smoke for sending signals. Some species indicate an unsuitable campsite, and others indicate the likelihood of finding koalas and possum as game (Fensham 2021). The practice of cutting sections of bark and wood from trees was widespread. Evidence of the use of bark for containers, canoes and shields can still be seen on scattered trees. Other trees, popularly known as 'possum trees' had a series of climbing notches cut into them to enable hunters to catch possums living in the upper part of the trees (Byne 1988).

Larger game such as emus and kangaroo were hunted in the more open woodlands and grasslands, while smaller game such as possums and wallabies were found in the forest. In a diet of plant foods and meat, plant foods contributed at least 50%. The burrawang nut, bracken fern root and yams were important sources of starch (Byne 1988).

A brief glossary of terms referring to diagnostic tree species of the ecological community, in vocabularies derived from various Indigenous language groups across the south-east Queensland distribution of the ecological community is in [Appendix C2](#).

## 4 Threats

The ecological community has primarily been impacted by clearing and the selective harvesting of the dominant canopy tree species; altered fire and hydrological regimes; livestock grazing; weeds; invasive fauna (pests); climate change; disease, pathogens and dieback (e.g., bell miner associated dieback (BMAD)); and human disturbance.

Most remaining patches of the ecological community are on productive agricultural land and/or in coastal areas, where continuing population growth and urban development is expected. Historically, clearing was primarily for timber and agriculture, and actions such as culling native fauna were largely to support agricultural productivity. Clearing continues for agriculture, residential and industrial development, and for fire protection (e.g., along property boundaries and roads (State of NSW 2021)). The nature of some areas of the ecological community has changed structurally because of clearing, followed by regrowth that is likely to be subject to

altered fire and hydrological regimes and to livestock grazing and trampling. Disturbance from increased urbanisation and recreational activity is also a problem.

Additional potential threats include the impact of the decline in pollinator species, particularly long-range pollinators such as flying-foxes.

#### 4.1 Threat table

Table 3 outlines the key threats facing the ecological community, which represent the *main factors that cause it to be eligible for listing* as required by section 266B (2) (a) (ii) of the EPBC Act. This information supports the assessment against the criteria in Section 6. Although presented as a list, in reality these threats typically interact cumulatively.

**Table 3: Summary of threats facing the ecological community**

Threat factor	Threat Status*	Threat impacts
<b>Clearing</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Extreme</p> <p><i>Scope:</i> Whole</p>	<p>Eastern Australian floodplains were severely cleared and modified, primarily for agricultural development, following non-Indigenous settlement. Large areas of forested floodplains are now occupied by exotic pastures grazed by cattle, or occupied by market gardens, turf and other cropping enterprises. Overall, more than 70% of native vegetation on the coastal floodplains in New South Wales has been destroyed since non-Indigenous settlement (Keith 2004; Keith &amp; Scott 2005; Good et al. 2017). As the ecological community occurs on the most productive parts of floodplain landscapes, it is likely that even greater amounts have been cleared. Early clearing for agriculture included tree-felling for timber.</p> <p>Outside of the National Reserve System (which contains an estimated 10% of the area of the ecological community), land clearing is an ongoing threat, with population growth and coastal development continuing across much of its range. Recent clearing typically happens at local scales, but cumulatively has a large overall impact. Clearing for agriculture continues today, as rural enterprises and hobby farms have expanded into the upper reaches of floodplains. Major cities, rural centres and coastal towns continue to expand, with the construction of new housing estates, industrial development, roads and recreational facilities all displacing alluvial forests and adjacent native vegetation.</p> <p>Although habitat restoration and revegetation programs are ongoing, these are not restoring native vegetation at the rate of permanent clearing (State of NSW &amp; NSW EPA 2021).</p>

Threat factor	Threat Status*	Threat impacts
<b>Hydrological changes</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Extreme</p> <p><i>Scope:</i> Majority</p>	<p>The ecological community is detrimentally impacted by changes to hydrology, including from construction of dams, weirs, levees, roads and bridges; flood mitigation and drainage works; water extraction; and river regulation. In addition, water has been diverted for crop irrigation and to fill farm dams (Keith &amp; Scott 2005, Qld DES 2021). Impacts are not only in the immediate area, they also occur for significant distances downstream.</p> <p>Alteration of the natural flow regimes of rivers, streams and wetlands is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems and their associated floodplains (NSW SC 2002a).</p> <p>Hydrological changes, created through levee and weir construction, artificial drainage and irrigation, can trigger oxidisation in acid sulfate soils (NSW OEH 2020a). This has the potential for severe negative impacts on the flora and fauna of the ecological community, as well as water quality. These impacts include changes in species composition, declines in population and shifts in food resources (e.g., after natural flooding patterns are impacted by the diversion of water). Declining food resources include a lower abundance of vegetation and fewer invertebrates on floodplains that inundate less frequently after their natural flow regimes are disrupted.</p> <p>Urbanisation of landscapes adjoining the ecological community may also have significant hydrological effects. The 'hardening' of surfaces through activities such as road building and urban development surrounding the ecological community, results in increased runoff (and less infiltration and water retention). This changes stream flow patterns causing erosion, and the runoff often penetrates adjacent bushland. It can carry high nutrient and sediment loads, which encourage weed invasion (NSW DEC 2005; NSW DECCW 2010).</p>

Threat factor	Threat Status*	Threat impacts
<b>Fragmentation legacies</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Major</p> <p><i>Scope:</i> Whole</p>	<p>Native eucalypt forests and woodlands on eastern Australian floodplains are often degraded and have a fragmented distribution. Few remaining patches are large enough on their own to provide sufficient species and genetic diversity to ensure the ecological community's long-term survival. This is especially so for some of its most representative habitat (e.g., the broad areas that flood less often, on larger floodplains between the riparian zone and hills). In contrast, many of the largest and most intact remnants are on the margins of the large floodplains, or occur as long linear remnants in riparian zones; or in localised depressions in other types of wetland forest ecosystems.</p> <p>The historic loss of patches of the ecological community, plus the decreased size of remaining patches, has led to a greater vulnerability to threats and to the negative impacts of edge effects.</p> <p>When patches are isolated, in modified landscapes, with a higher incidence of introduced plants and feral animals, they are more susceptible to further degradation and are less amenable to successful recovery actions. Habitat value declines if the remnants become too small and isolated to support a diversity of flora and fauna. Increased separation of patches is likely to limit regeneration and colonisation opportunities and so reduce genetic diversity within patches. This is because many understorey plants have restricted seed dispersal or seed longevity or rely on overbank flows for dispersal; while many fauna (e.g., ground-dwelling reptiles and birds with small ranges) have limited ability to move between sites if they are too distant and/or separated by large expanses of unfavourable habitat.</p> <p>Where much of this ecological community persists as long, narrow patches along rivers and waterways, the edge effects can be even greater. Small or linear patches have a large edge to area ratio, which is likely to allow the introduction of weeds and incursions by feral animals, and alter microclimates, making the ecological community more vulnerable to damage during droughts, floods, heatwaves, or other extremes.</p>

Threat factor	Threat Status*	Threat impacts
<b>Weeds</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Major</p> <p><i>Scope:</i> Whole</p>	<p>Invasion by non-native plants, including transformer weed species, is a major threat to this ecological community (Keith &amp; Scott 2005; Tozer et al. 2010; NSW OEH 2020a). Transformer weeds are highly invasive plants with the potential to seriously alter the structure and function of the ecological communities they invade, thereby ‘transforming’ them into a different system. In this ecological community they include camphor laurel (<i>Cinnamomum camphora</i>), groundsel bush (<i>Baccharis halimifolia</i>), exotic vines and scramblers (such as lantana (<i>Lantana camara</i>), cats-claw creeper (<i>Dolichandra unguis-cati</i>) and Madeira vine (<i>Anredera cordifolia</i>)), and exotic perennial grasses (such as cocksfoot (<i>Dactylis glomerata</i>), paspalum (<i>Paspalum dilatatum</i>) and fountain grass (<i>Cenchrus setaceus</i>)).</p> <p>Weed seeds can be transported by water, wind, birds and other animals. High levels of fertility and moisture make the ecological community prone to invasion by weeds that have a capacity to alter nutrient cycling, species composition, vegetation structure, habitat values, soil chemistry, mycorrhizae and fire regimes (NSW SC 2010a; Good et al. 2017). Impacts include a reduction in native plant species richness and a lower abundance of certain bird feeding guilds (Cousens et al. 2013). Floodplain ecological communities are particularly susceptible to weeds following natural disturbance such as flooding and fires.</p> <p>Studies in wet sclerophyll forests near the NSW coast demonstrated that heavy invasion by lantana is accompanied by a loss of species richness and composition, and was apparent across different vegetation forms such as herbs, vines, shrubs and trees (Gooden et al. 2009a &amp; b). Impacts were greater for juvenile than adult forms, indicating that lantana limits the natural recruitment of native species (Gooden et al. 2009a). There also appeared to be an impact threshold whereby native species richness declined markedly when the cover of lantana increased above 75% (Gooden et al. 2009b).</p> <p>Many weeds have the potential to invade patches that are close to urban settlements. Invasion is often the result of physical disturbance; dumping of landfill/rubbish and garden refuse; naturalised garden plants which have escaped cultivation; construction of roads and other utilities, polluted runoff from urban and agricultural areas and grazing by domestic livestock. Physical disturbance reduces the ability of native plants to compete with invading species, while also directly providing bare soil and resource to allow non-native species to establish.</p> <p>Highly invasive coastal weeds have a range of detrimental impacts on native flora and fauna; for instance reduction in native plant species richness and lower abundance of certain bird feeding-guilds. The invasion of weed species will continue under future climate change, where different suites of invaders may become problematic (Duursma et al. 2013; Roger et al. 2015).</p>

Threat factor	Threat Status*	Threat impacts
<b>Climate change</b>	Timing: Ongoing  Severity: Major  Scope: Whole	<p>Major impacts of climate change are likely through interactions with other threatening processes, including habitat loss and degradation, invasion of exotic species, and changes to hydrological and fire regimes (Auld &amp; Keith 2009; Dunlop &amp; Brown 2008).</p> <p>A generally warming and drying climate in southern and eastern Australia may at times significantly reduce run-off to coastal rivers and streams within the range of the ecological community (DCC 2009). It is likely to intensify drought events (Dai 2012; Mitchell et al. 2016), which may exacerbate tree mortality. Flood events are also likely to increase in scale, as rainfall variability increases.</p> <p>Some functionally important fauna species of the ecological community, such as <i>Pteropus</i> spp. (flying foxes), can suffer heat stress, with reported mass deaths when temperatures exceed 42°C (Welbergen et al. 2008).</p> <p>Latitudinal shift in the distribution of this ecological community is a plausible response to climate change; but areas to shift into may not be available or suitable, because of coastal development, the lack of suitable soil types, or competition with other vegetation communities (Paice &amp; Chambers 2016). Groundwater salinity is considered a potential influence of regrowth dynamics for the ecological community. These can be affected by both altered hydrology, and by sea water incursion as result of rising sea-levels (Keith &amp; Scott 2005).</p>

Threat factor	Threat Status*	Threat impacts
<p><b>Fire regimes that cause declines in biodiversity</b></p>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Major</p> <p><i>Scope:</i> Majority</p>	<p>Altered fire regimes may threaten the ecological community through a variety of direct and indirect processes (DAWE 2022b; Keith et al. in press). Fire regimes have changed throughout the extent of the ecological community in association with the growth of agriculture and urban development. Fire may be used to promote regrowth (green pick) for livestock and for hazard reduction management, both of which can increase fire frequency. The amount of fallen timber and other plant litter can be diminished during such burns. Arson can also be an issue, particularly on urban fringes. Alternately, fire management, altered land practices, fragmentation and other vegetation changes can decrease fire frequency.</p> <p>In some areas, high intensity or too frequent fires may slow or prevent regeneration of some species in the ecological community and lead to lower species richness. Sustained high frequency fire will lead to a loss of eucalypts and other plant species, a reduction in vegetation structure and a corresponding loss of animal species in the ecological community (NSW OEH 2017c). Severe fires, and the resulting habitat changes, are likely to detrimentally impact fauna such as bandicoots, gliders, koalas and potoroos (Tozer et al. 2010; NSW OEH 2017c). Even in areas where vegetation recovers quickly, the loss of animal species detrimentally impacts the short-term recovery and long-term health of the ecological community, as animals provide essential functions such as soil turnover and seed dispersal.</p> <p>Fires' frequency, intensity and size are expected to increase under climate change as temperatures rise, rainfall variability increases, droughts become more severe and ecosystem dynamics alter - resulting in changed biomass fuel loads and types(Andrade et al. 2019; Nolan et al. 2020, Canadell et al. 2021). The projected hotter, drier, windier conditions associated with climate change would extend the period of fuel drying and increase rates of fire spread (Harrison &amp; Kelley 2017). In addition, climate change will broaden the seasonal window of fire occurrence.</p> <p>Mega-fires, such as those experienced in the 2019–2020 fire season, can burn a significant proportion of an ecological community and the surrounding vegetation in a single event, which compounds these detrimental impacts. Almost 15% of the ecological community was burnt in 2019–20, based on the Australian Google Earth Engine Burnt Area Map (DAWE 2020b).</p>

Threat factor	Threat Status*	Threat impacts
<b>Invasive fauna</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Major</p> <p><i>Scope:</i> Majority</p>	<p>The ecological community is subject to a range of negative impacts from invasive animals. These include:</p> <ul style="list-style-type: none"> <li>• predation and habitat destruction through trampling and soil disturbance, competition and disease transmission by feral pigs (<i>Sus scrofa</i>);</li> <li>• predation, disease transmission and spread of invasive plant species by cats (<i>Felis catus</i>), dogs (<i>Canis lupus</i>), European red foxes (<i>Vulpes vulpes</i>) and other feral (or domestic) predators;</li> <li>• grazing and trampling pressures from rabbits, feral /unmanaged goats (<i>Capra hircus</i>), deer and other feral herbivores, which can leave the ecological community open to erosion and weed invasion (Davis et al. 2008; Davis et al. 2016);</li> <li>• adverse competitive, or lethal impacts to fauna, such as from cane toads (<i>Rhinella marina</i>), feral honeybees, over-abundant noisy miners (<i>Manorina melanocephala</i>) and other aggressive birds and insects (e.g., exotic ants); and</li> <li>• bell miner associated dieback (BMAD) (Silver &amp; Carnegie 2017).</li> </ul>
<b>Disturbance from urbanisation and recreational activity</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Major</p> <p><i>Scope:</i> Minority</p>	<p>Recreational activities result in a range of detrimental impacts when people access areas of the ecological community. For example, visitors' feet, motorcycles, bikes and four-wheel drive vehicles cause soil disturbance, compaction and erosion, and can spread weeds and diseases. Fishing and boat ramp access points, and new planned and unplanned tracks, also increase disturbance and other impacts.</p> <p>Increased visitation to adjacent watercourses results in greater demand for and use of visitor facilities, such as walking tracks, viewing platforms, toilet blocks, parking lots and picnic areas in the ecological community.</p> <p>Other damaging activities include dumping cars, rubbish and garden waste, which can harm wildlife and cause weed infestation.</p> <p>Other cumulative detrimental impacts include vehicle strikes on species (e.g., kangaroos and koalas), predation or disturbance by domestic animals, and bush rock removal.</p> <p>As impervious surfaces (e.g., concrete and asphalt) proliferate in urban areas, residual bushland is increasingly used as a stormwater receiving system. The resultant nutrient-enriched soil and water can lead to weed proliferation and the transformation of a naturally oligotrophic ecosystem into a weed-dominated eutrophic system, or a shift from a eucalypt-dominated to a melaleuca-dominated ecological community.</p>

Threat factor	Threat Status*	Threat impacts
<b>Diseases and pathogens</b>	<p><i>Timing:</i> ongoing</p> <p><i>Severity:</i> Minor</p> <p><i>Scope:</i> Majority</p>	<p>A number of diseases and pathogens can affect the canopy of the ecological community, including dieback resulting from Armillaria root rot caused by <i>Armillaria</i> spp. (honey fungus).</p> <p>Infection by myrtle rust (<i>Austropuccinia psidii</i>) is also a threat to trees and shrubs in the Myrtaceae family in the ecological community, including some common mid-layer species (Makinson et al 2020). While there are unlikely to be major impacts, myrtle rust infection has impacted localised areas and susceptible species, particularly those adjacent to lowland/littoral rainforest.</p> <p>Dieback caused by <i>Phytophthora cinnamomi</i> is a potential threat to the ecological community. This plant pathogen can spread easily, causing disease, death and potential extinction in susceptible plant species, and loss of habitat for animals. It appears to be widespread in coastal forests (Arentz 1974; Blowes 1980; Gerrettsen-Cornell 1986; McDougall &amp; Summerell 2003: all cited in NSW SC 2002b).</p> <p>The ecological community includes a wide range of amphibians that are at high risk from Chytridiomycosis caused by chytrid fungus (<i>Batrachochytrium dendrobatidis</i>) (DEE 2016a).</p> <p>Psittacine beak and feather disease (Psittacine circoviral disease) is a threat to bird species in the ecological community (DEE 2016b).</p>
<b>Livestock grazing</b>	<p><i>Timing:</i> Ongoing</p> <p><i>Severity:</i> Minor</p> <p><i>Scope:</i> Minority</p>	<p>The ecological community suffers from overgrazing, trampling, weed invasion and other soil disturbance by domestic livestock, which are known to have a strong negative influence on riparian and floodplain vegetation (Good et al. 2017). Domestic livestock are known to preferentially browse grasses, followed by forbs, and will also browse woody shrubs and trees in the ecological community when resources become scarce, such as during drought (Pahl 2019).</p> <p>Grazing pressure and impacts are exacerbated by the provision of artificial water sources (bores, tanks and troughs) near patches of the ecological community that provide shelter for stock, with grazing by domestic stock more likely to happen near watering points. This leads to concentrated trampling of vegetation and soil and the selective removal of vegetation because livestock preferentially browse the more palatable species (Lunt 2005). Heavy grazing can lead to reduced plant diversity, with the most grazing sensitive grasses and forbs disappearing earliest in a sequence of decline; it also disturbs the soil, which often prevents seeds from successfully germinating (Cole et al. 2004).</p> <p>The ecological community is also susceptible to degradation by overgrazing and by stock accessing natural waterways, causing vegetation loss (grazing and trampling), soil compaction (hard hoofed stock), and riverbank erosion/collapse, disturbing sediments and increasing nutrient levels.</p>

Threat factor	Threat Status*	Threat impacts
<b>Vegetation and firewood removal</b>	<i>Timing:</i> Ongoing <i>Severity:</i> Minor <i>Scope:</i> Minority	In rural-residential areas, patches of the ecological community are often mown, slashed or under-scrubbed (removing scrubby undergrowth) for bushfire fuel reduction, grazing and perceived aesthetics. These activities can deplete the soil seed bank (James 1994) and contribute to the spread of weeds.  Firewood collection and the removal of woody debris also damages the ecological community. This is likely to interact with the effects of drought, fire and overgrazing and further contribute to disturbance and exacerbate impacts. For example coarse woody debris influences leaf litter moisture content and soil conditions, moderating the effects of drought on soil moisture (Goldin & Hutchinson 2014) and on fire behaviour. Further, interactions between selective timber removal and livestock grazing may alter bird assemblages (e.g., increasing the abundance of aggressive birds such as <i>Manorina melanocephala</i> (noisy miner) (Eyre et al. 2009)). Trampling, loss of fauna habitat and interruption of other natural processes such as decomposition are also an issue. The majority of the ecological community is on private land or other tenure where firewood harvesting may occur.
<b>Urban heat effects</b>	<i>Timing:</i> Ongoing <i>Severity:</i> Unknown <i>Scope:</i> Minority	Urbanisation can also result in an 'urban heat island effect' whereby heat is absorbed then radiated by urban structures, such as houses and paved, concreted and asphalted areas, leading to elevated temperatures. With increased temperatures and less soil moisture, the small remnant occurrences of the ecological community in built landscapes are not sufficient to cool the surrounding environment. The altered local micro-climate may, in turn, adversely impact patches of the ecological community in and adjacent to urban developments. This process operates in addition to any temperature rise due to global climate change.
<p><u>Notes</u>            *<b>Timing</b> – the threat occurs in the <b>past</b> (and unlikely to return), is <b>ongoing</b> (present/continuing), is likely to occur/return in the <b>future</b>, or timing is <b>unknown</b>.  <b>Severity</b> – the threat causes or has the potential to cause impacts that are <b>extreme</b> (leading to loss or transformation of affected patches), <b>major</b> (leading to degradation of affected patches), <b>minor</b> (impacting some components of affected patches), <b>negligible</b> or <b>unknown</b>.  <b>Scope</b> – the threat is affecting the <b>whole</b> (&gt;90%), a <b>majority</b> (&gt;50%), a <b>minority</b> (&lt;50%), a <b>negligible</b> amount, or <b>unknown</b> amount of the ecological community.</p>		

#### 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:

- Land clearance
- Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Novel biota and their impact on biodiversity
- 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
- Competition and land degradation by unmanaged goats
- Aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners (*Manorina melanocephala*)
- Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis
- Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)

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>

## 5 Conservation of the ecological community

### 5.1 Primary conservation objective

To prevent the extinction of the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions in the near future, and to promote recovery of its biodiversity and function through protecting it from significant impacts as a Matter of National Environmental Significance under national environmental law, and by guiding management and recovery, consistent with the recommended priority conservation and research actions set out in this advice.

### 5.2 Existing protection and management plans

#### 5.2.1 Existing protections

##### 5.2.1.1 EXISTING PROTECTIONS AS OTHER MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Based on an analysis of New South Wales Plant Community Types (NSW PCTs) and Queensland Regional Ecosystems (Qld REs) representative of the ecological community (see [footnote 10 on page 51](#)), an estimated less than two percent of the ecological community occurs in world heritage areas (Gondwana rainforest of Australia and Great Barrier Reef) (DAWE 2020c). An estimated less than one percent of the ecological community is in Ramsar areas (Great Sandy Strait, Moreton Bay and Myall Lakes) (DAWE 2020d).

##### 5.2.1.2 EXISTING PROTECTION IN RESERVES

Despite a number of reserves containing the ecological community, its position in the landscape means only a relatively small area of the ecological community has been included in formal conservation reserves, typically on localised, sheltered river-flats between hills, rather than the large open floodplains that comprised the majority of its original extent.

Based on an analysis of New South Wales Plant Community Types (NSW PCTs) and Queensland Regional Ecosystems (Qld REs) representative of the ecological community (see [footnote 10 on page 51](#)), an estimated 10% of the remaining ecological community is in the National Reserve System; this represents three percent of the estimated original extent of the ecological community (DAWE 2020e). These reserves include Banyabba, Bulburin, Bundjalung, Bungawalbin, Burrum Coast, Curtis Island, Deepwater, Eurimbula, Fortis Creek, Great Sandy,

Kewilpa, Karuah, Limeburners Creek, Lockyer, Maria, Ukerebagh, Wongi and Yuraygir (NSW SC 2010a; DAWE 2020e; Qld Herbarium 2021).

Most threats to the ecological community operate regardless of land tenure.

### 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.

A number of existing plans relate to management and/or recovery of the ecological community, or its component species. Please refer to the relevant agency's website for any updated versions or new information that has been published.

#### 5.2.2.1 STATE MANAGEMENT PLANS

There are documents at the state level available that relate to the management and/or recovery of the ecological community (or its component vegetation units and state-listed equivalent communities).

A Saving Our Species Strategy for the NSW state-listed threatened ecological community that aligns with the national ecological community was developed by the NSW Department of Planning, Industry and Environment. Please refer to the relevant agency's website for any updated versions or new information that has been published.

- NSW Office of Environment and Heritage (Undated). Saving Our Species - Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion. Last viewed April 2022.  
<https://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10944>

The Queensland Regional Ecosystem Description Database (REDD) Version 12.1 (Qld Herbarium 2021) has fire guidelines for each regional ecosystem (Qld RE), at: <https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/download>

#### 5.2.2.2 OTHER RELEVANT CONSERVATION MANAGEMENT PLANS

- DoE (2015). Arrive Clean, Leave Clean: guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems. Commonwealth of Australia. [www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean](http://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean)
- Makinson RO, Pegg GS & Carnegie AJ (2020). Myrtle Rust in Australia – A National Action Plan. Plant Biosecurity Science Foundation, Canberra. [www.anpc.asn.au/myrtle-rust/](http://www.anpc.asn.au/myrtle-rust/)
- Department of Agriculture, Water and the Environment (2021). National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus*. Last viewed January 2022. <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/grey-headed-flying-fox>
- Australian Pork Limited (2021). The National Feral Pig Action Plan 2021 – 2031. <https://feralpigs.com.au/the-plan/#ActionPlan>
- Silver, MJ & Carnegie AJ (2017). An independent review of bell miner associated dieback. Final report prepared for the Project Steering Committee: systematic review of bell miner associated dieback. <https://www.environment.nsw.gov.au/resources/vegetation/bell-miner-associated-dieback-independent-review.pdf>

- NSW DECC (2008). Recovery plan for the koala (*Phascolarctos cinereus*). <https://www.environment.nsw.gov.au/research-and-publications/publications-search/recovery-plan-for-the-koala-phascolarctos-cinereus>
- NSW DPIE (2020a). Koala Habitat Protection SEPP State Environmental Planning Policy (Koala Habitat Protection) 2019. <https://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Koala-Habitat-Protection-SEPP>
- Saunders & Tzaros (2011). National Recovery Plan for the Swift Parrot (*Lathamus discolor*). <http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-swift-parrot-lathamus-dicolor>
- Costello G, Gregory M & Donatiu P (2009). Southern Macadamia Species Recovery Plan. Report to Department of the Environment, Water, Heritage and the Arts, Canberra by Horticulture Australia Limited, Sydney. <https://www.environment.gov.au/biodiversity/threatened/recovery-plans/southern-macadamia-species-recovery-plan>. (See also Draft Macadamia Species Recovery Plan 2019-2024 <http://www.environment.gov.au/biodiversity/threatened/recovery-plans/comment/draft-recovery-plan-macadamia-species-2019-24>)
- State of Queensland (2020). South East Queensland Koala Conservation Strategy 2020–2025. <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/conservation/seq-koala-strategy>
- South East Queensland Catchments (2016). Managing Natural Assets for a Prosperous South East Queensland 2014 - 2031. <https://hlw.org.au/download/managing-natural-assets-for-a-prosperous-south-east-queensland-2014-2031/>
- NSW DECCW [Department of Environment, Climate Change and Water] (2010a). Far North Coast Regional Conservation Plan. <https://www.environment.nsw.gov.au/resources/biodiversity/10982fncrcp.pdf>
- NSW DECCW (2010b). Draft Mid North Coast Regional Conservation Plan. <https://www.environment.nsw.gov.au/resources/biodiversity/10999dmncrcp.pdf>
- NSW DECCW (2010c). Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers Region, Department of Environment, Climate Change and Water NSW, Sydney. <https://www.awe.gov.au/sites/default/files/documents/northern-rivers.pdf>
- NSW DECCW (2010d). Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers Region. <http://www.environment.gov.au/resource/northern-rivers-regional-biodiversity-management-plan>
- NSW DECCW (2010e). Border Ranges Rainforest Biodiversity Management Plan. <https://www.environment.gov.au/resource/border-ranges-rainforest-biodiversity-management-plan>
- NSW NPWS [National Parks and Wildlife Service] (2020a). Queens Lake Nature Reserve Plan of Management, Department of Planning, Industry and Environment. [www.environment.nsw.gov.au/research-and-publications/publications-search/queens-lake-nature-reserve-and-queens-lake-state-conservation-area-plan-of-management](http://www.environment.nsw.gov.au/research-and-publications/publications-search/queens-lake-nature-reserve-and-queens-lake-state-conservation-area-plan-of-management)
- NSW NPWS (2020b). Ti Tree Lake Aboriginal Area Plan of Management. Department of Planning, Industry and Environment. [www.environment.nsw.gov.au/research-and-publications/publications-search/ti-tree-lake-aboriginal-area-plan-of-management](http://www.environment.nsw.gov.au/research-and-publications/publications-search/ti-tree-lake-aboriginal-area-plan-of-management)

- NSW NPWS (2020c). Tyagarah Lake Nature Reserve Plan of Management, Department of Planning, Industry and Environment. [www.environment.nsw.gov.au/research-and-publications/publications-search/tyagarah-nature-reserve-plan-of-management](http://www.environment.nsw.gov.au/research-and-publications/publications-search/tyagarah-nature-reserve-plan-of-management)
- NSW Department of Primary Industries and Environment (2018). New South Wales Invasive Species Plan 2018-2021. [www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0003/807753/InvasiveSpeciesPlan2018.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0003/807753/InvasiveSpeciesPlan2018.pdf)
- NSW Office of Environment and Heritage (2018b). Saving our Species Monitoring Evaluation and Reporting Guidelines for conservation projects. <https://www.environment.nsw.gov.au/research-and-publications/publications-search/saving-our-species-monitoring-evaluation-and-reporting>

#### 5.2.2.3 PLANS RELATING TO CULTURAL HERITAGE MANAGEMENT AND/OR INDIGENOUS PROTECTED AREAS (IPAs)

- Jali Local Aboriginal Land Council (2013). Ngunya Jargoona Indigenous Protected Area Plan of Management. <http://jalilands.com.au/assets/ngunya-jargoona-ipa-plan-of-management.pdf>
- NSW Office of Environment and Heritage (2015). Worimi Conservation Lands: Plan of Management. <https://worimiconservationlands.com/wp-content/uploads/2014/07/Worimi-Conservation-Lands-Plan-of-Management.pdf>
- Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) & Queensland Parks and Wildlife Service and Partnerships (QPWS&P) (2020). Naree Budjong Djara Management Plan. Department of Environment and Science. [https://parks.des.qld.gov.au/\\_data/assets/pdf\\_file/0019/204058/naree-budjong-djara-mp-draft-mgmt-plan.pdf](https://parks.des.qld.gov.au/_data/assets/pdf_file/0019/204058/naree-budjong-djara-mp-draft-mgmt-plan.pdf)
- Queensland Department of Agriculture (1999). Indigenous Cultural Heritage Management Guidelines for South East Queensland Forests: Report for the Queensland South East Queensland Regional Forest Agreement December 1999. [www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/rfa/regions/qld-south-east/cultural-heritage/forest-industry-places/qld-se-rfa-indigm.pdf](http://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/rfa/regions/qld-south-east/cultural-heritage/forest-industry-places/qld-se-rfa-indigm.pdf)
- Tweed Shire Council (2018). Aboriginal Cultural Heritage Management Plan. <https://www.tweed.nsw.gov.au/files/assets/public/documents/community/arts-and-culture/aboriginal-cultural-heritage/aboriginal-cultural-heritage-management-plan-2018.pdf>

### 5.3 Principles and standards for conservation

To undertake priority actions to meet the conservation objective, the overarching principle is 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, including fauna 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 landholders, Natural Resource Management (NRM) and community groups, Traditional Owners/Custodians and other land managers (including local and/or state governments);
- 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 for certain parks or regions. The most relevant, at the time this Conservation Advice was developed, are recorded in [Section 5.2.2](#).

More specific guidance regarding restoration of the ecological community, or information that is regionally specific, may become available. Restoration ecology is continually developing. So, it is important to reflect on the experience of others involved in restoring the ecological community, or other eucalypt or floodplain communities, as well as adapting restoration projects as site-level experience accumulates.

To achieve cost-effective investments in conservation management it is important to consider the likely interaction of the various management actions being undertaken at any one site, because these may be synergistic or antagonistic. There are also likely to be interactions between sites. Additionally, when allocating management resources it is important to consider what is the minimum investment required for success and the follow-up required to secure long-term recovery (e.g., for how many years should weed management be repeated).

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.

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

##### 5.4.1.1 CONSERVE REMAINING PATCHES

There should be no further clearance and deliberate damage to patches of this ecological community that meet the minimum condition thresholds because it has been greatly reduced in its extent and ecological 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 and diversity of habitat, or act as buffer zones between the ecological community and threats or development zones.
- Protect patches identified as of regional importance by including them in formal conservation reserves. Consider other remnants for less formal conservation tenures, preferably ones that aim for long-term protection. 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 (e.g., wildlife corridors and migration routes).
- Identify Travelling Stock Reserves where the ecological community occurs and work with regional NRM agencies to manage these areas for conservation purposes.

- Where regeneration is occurring, implement measures that will support the regeneration to maturity (e.g., provide fencing to minimise damage risk).
- Protect mature and over-mature trees and stags<sup>9</sup>, particularly those with hollows. Large and old trees typically have numerous hollows or fissures that provide shelter and support a diversity of animals.

#### 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 impacts to the ecological community.
- In circumstances where impacts cannot be totally avoided, then they should be minimised by:
  - retaining and avoiding damage to high condition patches, which should be managed to retain their benchmark state; and
  - protecting important habitat features, such as large mature trees or stags with hollows as these take many decades to develop and cannot be quickly replaced.
- High and good condition areas ([Table 2](#)) should not be offset. Where impacts are unavoidable to moderate condition patches, offsets should be used as a last resort to compensate for the adverse impacts of the action deemed unavoidable. The outcomes of offsetting activities are generally highly uncertain. Any proposals considering offsets for this ecological community should aim to:
  - minimise the need to offset the ecological community by designing development around the ecological community and applying buffers;
  - retain good and high condition patches (classes A and B in [Table 2](#)) of the ecological community, rather than offset them (particularly with lower condition offset sites);
  - manage and protect offset areas in perpetuity, in areas dedicated for conservation purposes – avoid risks that may reduce 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 the ecological function of existing patches – for example by enhancing landscape connectivity, habitat diversity and condition;
  - focus on the restoration of lower condition patches of the ecological community to achieve high condition (see [Table 2](#));
  - extend protection to otherwise unprotected sites (e.g., sites that are currently too small or degraded to meet the minimum condition thresholds, but can

---

<sup>9</sup> A standing, dead or dying tree, often missing a top, or most of the smaller branches.

reasonably be restored to a better, more intact, condition that does meet the thresholds);

- maintain a register of offsets for the ecological community; 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 (such as powerlines or telecommunications infrastructure) in or immediately adjacent to patches of the community, because they encourage fire-hazard reduction activities, or they may preclude future ecological burns, in the ecological community.
  - Prior to removing any trees, or using heavy machinery that may damage the understorey, ensure comprehensive flora and fauna surveys have identified threatened or locally important species on site (and in the case of fauna, their potential shelter and nesting sites such as tree hollows, burrows, rocks and tree crevices, as well as visible nests). Damage should be avoided, but if approved for removal: take care to appropriately relocate or otherwise protect flora and fauna; and avoid undertaking the works during important times, such as breeding/flowering-seeding 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 impacts arising off-site. A buffer zone is a contiguous area adjacent to a patch, that is important for protecting the integrity of the ecological community. The risk of indirect damage to an ecological community is usually greater where actions occur close to a patch. One purpose of buffer zones is to minimise this risk, by absorbing and reducing impacts on the ecological community. They also guide land managers to be aware that the ecological community is nearby and take extra care. For instance, buffer zones help protect the root zone of outermost 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 areas of 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.
- A buffer zone of at least 50 m (beyond the canopy of the outermost trees in the patch) helps protect the patch from many potential adverse impacts (Smith & Smith 2010). This distance accounts for likely influences on the root zone. A larger buffer zone (e.g., 100 m) should be applied, where practical, to protect patches of high conservation value, or where indirect impacts are more extensive. Judgement should be exercised to determine an appropriate buffer distance, depending on circumstances and how a patch may be detrimentally impacted.
- Implement a water sensitive design that benefits the ecological community, such as planting buffer zones to trap nutrients and the design and installation of detention (retarding) basins that have an ecological value, so that hydrology is improved. Encourage Councils and other land managers to plan holistically when installing water infrastructure.

5.4.1.4 *PREVENT THE INTRODUCTION AND SPREAD OF EXOTIC SPECIES*

- Implement strong border biosecurity and avoid importing or accidentally introducing invasive species and pathogens that may have a serious adverse impact on this ecological community.
- Encourage landholders/managers to engage in weed identification and intervention, and to implement prevention measures using current best management practices. Encourage landholders/managers to identify weed threats early by monitoring invasion pathways.
- Engage with Local Government and Local Land Services to minimise impacts from weed spraying activities when managing roadsides in or adjacent to the ecological community.
- Use an integrated weed management approach to control transformer weeds species. Where appropriate use a staged approach and use methods that reduce off-target damage. Weed control should target all problematic species. Schedule regular follow-up work to maintain effective weed management.
- Avoid selling known invasive species in areas where the ecological community occurs.
- Prevent planting known or potential invasive species in gardens, developments and landscaping near the ecological community; particularly known transformer weeds, or bird-dispersed species. For example, avoid planting highly invasive rainforest species in or around patches where rainforest species are uncommon, or absent.
- Prevent dumping garden waste in bushland, especially in or near patches of the ecological community.
- Review planting schedules 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 occur, detect and control them early, because small infestations are easier to eradicate.
- Limit or prevent access of grazing animals to patches of the ecological community (e.g., construct fences) where practicable; exotic species seeds (e.g., from cattle fodder, or from other areas), can be spread in their manure and by adhering to their coats. Provide advice and support to landholders/managers to assist with this.
- 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 remaining occurrences of the ecological community by active abatement of threats, appropriate management, restoration and other conservation initiatives. Restoration actions should be based on the best available knowledge and scientific research, to maximise positive biodiversity outcomes.

- Engage and liaise with landholders/managers, NRM and community groups, Traditional Owners/Custodians and governments to support, undertake and promote programs that ameliorate threats such as grazing and human disturbance.
- Identify and prioritise other specific threats and undertake appropriate on-ground site management strategies where required.

#### 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.
- Plan and budget for both initial weed management and for follow up treatment for as long as this is needed.
- 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.
- Implement controls to prevent or reduce infection by fungal pathogens.
- Control introduced pest animals through coordinated landscape-scale control programs (For example, work with relevant authorities to suppress rabbits, pigs, deer, goats, cats, foxes and exotic ants), in line with regional pest management strategies.
- Implement best practice measures to control, prevent and restore bell miner associated dieback. Follow recommendations in Silver & Carnegie (2017).

#### 5.4.2.2 *MANAGE TRAMPLING, BROWSING AND GRAZING*

- Strategically timed reductions in grazing pressure are essential to ensure periodic recruitment and renewal of the tree layer. Stop grazing in the ecological community during seedling establishment. Fencing may be required, to exclude stock and native herbivores, until seedlings are at least two metres high. The most appropriate way to manage tree recruitment may be to protect individual seedlings by installing herbivore guards.
- The ecological community naturally has a variety of structural and floristic understorey characteristics. In some cases, occasional grazing may be used to reduce exotic grass cover and manage shrub regeneration – encouraging native grass and herb growth. It may be used to help manage some weeds, such as African olive. However, effects must be closely monitored and grazing carefully managed in accordance with recommendations for biodiversity conservation, because grazing is more typically associated with a loss of biodiversity in grassy ecosystems (Dorrrough et al. 2004).

- Ensure that the timing of grazing enables the regeneration of native plant species. Allow moderate to high intensity grazing for a short period of time (usually in early spring) and avoid grazing during peak native plant flowering and seeding times for many species (late spring and summer).
- Promote native pastures as grazing best management practice.
- Integrate appropriate grazing management regimes with fire management requirements.
- Construct wildlife friendly fences to exclude overgrazing and that incorporate a buffer to protect patches and allow for recruitment and enhanced connectivity.
- Remove (access to) non-essential sources of water and manage remaining watering points to reduce total grazing pressure on the ecological community, for example, with appropriate fencing.

#### 5.4.2.3 *MANAGE OTHER ACTIVITY AND ACCESS CAUSING DEGRADATION*

- 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 destructive activities such as off-road trail bike or four-wheel-driving
- 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.
- Limit or prevent access of vehicles to patches of the ecological community (e.g., install bollards, gates, and/or fencing at strategic locations and/or use deterrent signage).

#### 5.4.2.4 *MANAGE APPROPRIATE FIRE REGIMES*

Fires (including planned burns and associated activities) must be managed, to: maintain the integrity of the ecological community; avoid disruption of the life cycles of component species; support rather than degrade the habitat; avoid invasion and facilitate control of exotic species; avoid impacts from suppression and mop-up operations; and avoid increasing the impacts of other threats (such as drought, prolonged heavy grazing or predation by feral predators). Isolated faunal populations and threatened plants are particularly vulnerable to local extinction following intense fires, combined with other threats.

- Implement appropriate fire management regimes for the ecological community and for the surrounding landscapes. Use both indigenous knowledge and scientific research results.
- Manage fire appropriately, including actions to protect individual hollow-bearing trees, in patches of the ecological community.
- Where hazard reduction burns, or prescribed fires, are undertaken near 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 patches of the ecological community that would benefit from reinstating

appropriate fire frequency to prevent further declines because of either too low, or too high, fire frequency.

- For areas affected by too low fire frequency, identify opportunities for applying appropriate ecological burns, including with traditional knowledge and practices.
  - For areas affected by too high fire frequency, identify options for reducing the frequency of fires and protecting important features, such as large habitat trees.
  - Fire management strategies at each location should take into account antecedent fire history, life histories of species within the community, forecasts of drought, post-fire management plans for herbivores and predators, patch size, habitat features (e.g., protect hollow-bearing trees and large logs), vegetation structure and the surrounding landscape (including property protection) to sustain biological diversity, maintain refuges for fauna (during and after fire) and increase habitat variability.
  - Ensure that an invasive species risk assessment and evidence-based management program is planned and budgeted-for ahead of proposed burning to ensure adequate protection of post-fire regeneration from invasive species.
  - Use available ecological information to avoid detrimental fire impacts on key and susceptible species in the ecological community. For instance, do not burn areas in or 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 in, or adjacent to, the ecological community when soil moisture is low, or dry conditions are predicted for the coming season. Otherwise, already stressed flora and fauna will struggle to recover 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 threats in an appropriate timescale (e.g., immediately put in place erosion control measures; limit access by feral predators and grazers; and control weeds as they first appear, with follow up treatments as necessary, until native vegetation has regenerated). Ensure monitoring results are considered when planning and implementing future fire regimes. For further information on monitoring priorities see [Section 5.4.4.3](#).

#### 5.4.2.5 *UNDERTAKE RESTORATION*

There are opportunities for private landholders, Government agencies, bush regenerators and community groups, Traditional Owners/Custodians and others to work together to strategically maintain and where possible improve the extent and condition of ecological community. The overall aim of any restoration actions is to develop ecosystem resilience. This is done by restoring representative flora and fauna diversity, natural structural elements, and ecological function, over the long term, while avoiding deleterious management interventions that alter restoration trajectory.

Across the range of the ecological community, consider opportunities to facilitate natural regeneration to increase its area and improve ecological function. While the ecological qualities of regenerated areas, particularly planted areas, may not match those of intact remnants, these areas can still contribute to functioning landscapes that in turn aid the persistence of higher condition patches of the ecological community. Ensure that more intensive management

approaches, such as planting, do not preclude opportunities for natural regeneration. As part of restoration activities, also manage other threats such as grazing, fire, and invasive animals, as outlined above. Directly involve, or seek advice and guidance from, suitably qualified and experienced bush regenerators and Traditional Owners/Custodians when planning and carrying out restoration works – from seed collection and propagation, to invasive species management, re-planting, and other restoration activities.

- Undertake restoration, including facilitating regeneration and revegetation, of poorer and moderate and good condition patches to restore them to high condition. This includes restoring patches that do not currently meet the minimum condition thresholds for protection to a condition that does (see [Table 2](#)). Restoration 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 2](#) 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](#)).
  - Identify which areas are best revegetated with either seedlings or seed (e.g., residual chemicals and nutrients in the soil of agricultural areas can suppress native species germination for up to five years).
  - Restoration should aim to establish species from the full suite of life-history successional characteristic species (e.g., pioneer species, through to mid-late successional species) and should create resilient soil and understorey conditions, to promote natural regeneration and recovery from disturbance (e.g., storms).
  - Support natural regeneration before planning and implementing replanting programs (e.g., using fenced areas, weed and pest control, and fire). Replant areas where natural regeneration has been unsuccessful.
  - Work with landholders/managers to restore and reconnect patches of the ecological community and other adjacent or nearby native vegetation (including buffer areas).
  - Maintain stags, logs, large rocks and mature and old-growth trees with hollows, because 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 the ecological community. This may be particularly important after disturbance, such as severe fire events.
  - Identify sites prone to sea-level rise impacts and use as a genetic source (seed collection) for retreat sites at higher locations. Identify higher sites as re-establishment sites and work with land managers to establish these.
  - 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 account of key plant species' growing seasons to successfully achieve seed set.

- Ensure commitment to follow up after planting, such as the care of newly planted vegetation by watering, weeding and use/removal of tree guards.
- Consider the landscape context and other relevant species and communities when planning restoration works. For example, ensure that adjacent ecological communities and threatened and migratory species are not adversely impacted by tree planting, or other restoration activities.
- Close and rehabilitate unnecessary roads and tracks and otherwise control access to restored patches; but take account of required access (e.g., by elderly Indigenous Traditional Owners/Custodians to cultural sites).
- Where appropriate habitat is available, and predators and competitors can be sufficiently controlled, re-introduction of some fauna species, including those supporting important ecological functions, may be possible.
  - Consider the size of the gene pool and interactions with naturally occurring populations when introducing fauna.
  - Where key ecological services, formerly provided by fauna, are limited or missing, consider any opportunities to replicate these.
- Explore the potential for carbon mitigation investment activities to also restore this ecological community through reforestation of farmland. This should be in line with appropriate reforestation methodologies such as those developed under the *Carbon Credits (Carbon Farming Initiative) Act 2011*. As part of any such initiatives, investigate the potential for biodiversity credits.
- Support and enhance existing programs for carbon mitigation across the entire range of the ecological community to inform restoration.
- Implement effective adaptive management regimes using information from available research and management guidelines. For example, see the National Standards for the Practice of Ecological Restoration in Australia (Standards Reference Group SERA, 2021), relevant research or advice from local authorities.

#### 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 protection and recovery efforts. Key groups to communicate with include landholders, land managers, land use planners, researchers, schools, volunteers, Indigenous communities and other community members and groups.

##### 5.4.3.1 RAISE AWARENESS

Raise awareness by distributing relevant publications, erecting interpretive signs at strategic locations, through school programs and by establishing demonstration sites for the ecological community.

- Communicate with and educate landholders/managers, relevant agencies, groups and the public about the ecological community. Emphasise its value, significance and key

threats (such as continued clearing, altered hydrology, other human disturbance, and pests and weeds); the importance of its protection and restoration; and appropriate management actions.

- Encourage the activities of, and seek support from, local restoration groups, Indigenous Australians, State-based conservation organisations, as well as national groups.
- With permission, include culturally appropriate information on traditional knowledge and values in education and awareness programs, publications and signage.
- Encourage landholders/managers to talk with local NRM organisations and other knowledgeable groups to promote cooperation to protect and restore patches of the ecological community
- Undertake effective community engagement and education to highlight the importance of minimising disturbance (e.g., during recreational activities) and of minimising pollution and littering; for example, via signage.
- Highlight a species such as the koala, or platypus, as a flagship species to use to raise community awareness about the ecological community.
- Tell landholders/managers about incentives, such as conservation agreements, stewardship projects, funding and government NRM programs, that may help them look after the ecological community on private lands.

#### 5.4.3.2 *GATHER AND PROVIDE INFORMATION*

- Develop education programs, information products and signage to help the public recognise the presence and importance of the ecological community – and to understand their responsibilities under state and local regulations, and under the EPBC Act.
- Improve understanding of Traditional ecological knowledge about the ecological community. Identify and support culturally appropriate mechanisms to share this knowledge, to protect and restore the ecological community.
- Install signage to discourage damaging activities such as removing dead timber, dumping garden waste and other rubbish, creating informal paths and tracks, and using off-road vehicles, in patches of the ecological community.
- Install significant vegetation markers along roads to designate areas of the ecological community, to help protect it and to prevent inappropriate road side maintenance.
- 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. Discourage nurseries and DIY stores from selling weed species.

#### 5.4.3.3 *COORDINATE EFFORTS*

- Encourage local participation in restoration and 'landcare' efforts (e.g., through local conservation groups, creating 'friends of' groups, field days and planting projects).
- Engage with sympathetic landholders and utilise peer-to-peer learning with other landholders.
- Liaise with local fire management authorities and agencies; and engage their support in appropriate 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 NRM groups.
- Support opportunities for Traditional Owners/Custodians, or other Indigenous community members, 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 protects remnants, with due regard to principles for long-term conservation;
  - land owners and developers, to minimise threats associated with land conversion and development; and
  - local councils and state authorities, to ensure infrastructure or development works, involving substrate or vegetation disturbance, do not adversely impact the ecological community – this includes avoiding the introduction or spread of weeds.

#### 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, management and protection. Relevant and well-targeted research and other information gathering activities are important to inform protecting and managing the ecological community.

- Improve understanding of Traditional ecological knowledge; and identify and support culturally appropriate mechanisms to share this knowledge to protect and restore the ecological community.
- Investigate the responses of key plants and animals to alternative fire regimes. Consider the effects on reproduction and identify limits of survival.
- Investigate potential impacts of climate change on the current distribution and future habitat suitability of important species of the ecological community.
- Investigate the impact of climate change on flowering phenology and plant-animal interactions (e.g., pollination networks).

##### 5.4.4.1 MAPPING

- Collate, update and validate existing vegetation mapping information and associated data for this ecological community and identify gaps in knowledge.
- Identify and map the fire interval status of the ecological community and surrounding fire-dependent and/or fire sensitive vegetation.
- Comprehensively map and monitor the extent and condition of the ecological community across its range.
  - Support targeted field surveys and interpretation of other data, such as aerial photographs and satellite images. More accurately document current extent, condition, threats, function, the presence of and use by regionally significant or threatened species. Ground-truth to fill data and knowledge gaps, including knowledge of the different 'states' and recovery from different disturbances.

- 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.
- Identify and map, at high accuracy and spatial resolution, the fire history/interval status of the ecological community and surrounding fire-dependent and/or fire sensitive vegetation.
- Undertake new surveys and 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.
- Conduct research into the role of fire in this ecological community, including understanding the:
  - current fire frequency status in each management area, by comparing time since fire across the ecological community;
  - ecological consequences of fire-exclusion, including identifying critical thresholds in the process of canopy closure, ground-layer displacement and rainforest invasion;
  - role of low intensity fires in maintaining an open vegetation structure and in the ongoing recruitment of open-forest species; and
  - development of rainforest-invaded stands and their rate and trajectory of development, to evaluate their departure from fire-maintained reference states.
- Improve understanding of habitat requirements of resident and transient fauna.
- Conduct 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 how fire regimes affect life history processes and population dynamics of component flora and fauna, including indirect effects through interactions with threats posed by periodic droughts, invasive species and other threats.
- Use improved knowledge of fire ecology to investigate the efficacy of alternative fire management strategies for conservation of the community under different land tenures and land uses.
- Conduct research to develop effective landscape-scale restoration techniques for the ecological community, incorporating Traditional ecological knowledge.
- Investigate interactions between disturbance types, such as fire and invasion by weeds and feral animals, to determine how to implement an integrated approach to threat management.

- Investigate the most cost-effective options for restoring landscape function - including re-vegetation or assisted regeneration of priority areas; or 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 management action.
  - Monitor for new weed and pest animal incursions.
  - Monitor for signs of decline, in terms of known problems (e.g., dieback due to pathogens and pests), and for new incursions (e.g., myrtle rust, phytophthora).
  - 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 better understand the ecological community and inform future management recommendations.

## 6 Listing assessment

The Threatened Species Scientific Committee finalised this assessment on 26 April 2022.

### 6.1 Assessment process

#### 6.1.1 Reason for assessment

This assessment follows prioritisation of a nomination from the Threatened Species Scientific Committee in response to the impacts of the 2019–2020 bushfires.

#### 6.1.2 Public consultation

Notice of the proposed listing and a consultation document were made available for public comment for 35 business days between 14 December 2021 and 7 February 2022. Any comments received that were relevant to the assessment of the ecological community were considered by the Committee as part of the assessment process.

### 6.2 Eligibility for listing

An ecological community is eligible for listing under section 182 of the EPBC Act if it meets the prescribed criteria outlined in section 7.02 of the [EPBC Regulations](#). This assessment uses the criteria set out in section 7.02 the [EPBC Regulations](#) and the TSSC [Guidelines for nominating and assessing the eligibility for listing of threatened ecological communities](#) (TSSC 2017), as in force at the time of the assessment.

The TSSC Guidelines (TSSC 2017) outline indicative timeframes to be used when interpreting the prescribed criteria, in relation to the generation length of any long-lived or key species believed to play a major role in sustaining the community. For the purposes of this assessment the relevant species used to determine this timeframe are the mature canopy trees (see [Section 1.2.3](#)). These typically have a generation length that is similar to many Australian eucalypt species (e.g., 60 – 100+ years) – so their generation length is assumed to be at least 70 years (Fensham et al. 2020).

Information on listing eligibility under the IUCN Red List for Ecosystems criteria (Bland et al. 2017) is included for information only.

### 6.2.1 Criterion 1 – decline in geographic distribution

Eligible under Criterion 1 for listing as **endangered**

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

Source: TSSC (2017).

### Evidence

The ecological community has been extensively cleared and modified since European settlement. It has been estimated that at least 70% of native vegetation on the coastal floodplains of NSW has been destroyed since European settlement (Keith 2004; Keith & Scott 2005; Good et al. 2017). Along with lowland/littoral rainforests and swamp oak floodplain forest, this ecological community appears to have been more heavily depleted than the other floodplain assemblages (Keith & Scott 2005). Large areas of floodplains, that formerly supported this ecological community, are now occupied by exotic pastures grazed by cattle, market gardens, other cropping enterprises (e.g., sorghum, corn, poplars, etc.) and, further north, by canefields and tea-tree plantations.

Since the 1970s, vegetation clearing rates in Australia have been highest in southern Queensland and northern New South Wales (Bradshaw 2012). In the Tweed lowlands, Pressey & Griffith (1992) estimated that in 1985, less than three percent of the original floodplain wetlands and forests remained. Similar estimates are likely to apply to other parts of the NSW North Coast Bioregion (Goodrick 1970; Pressey 1989a & b; and NSW NPWS 1999: all cited in NSW SC 2010a). Qld Herbarium (2021) notes that areas of the ecological community have been cleared for grazing, agriculture and pine plantations, and that habitat has been fragmented by land uses such as horticulture and rural residential. Less than two per cent of the corresponding *Eucalyptus tereticornis* woodland on Quaternary alluvium (Qld RE 12.3.3) remains in south eastern Queensland (HLW 2016b).

An analysis of New South Wales Plant Community Types (NSW PCTs) and Queensland Regional Ecosystems (Qld REs) representative of the ecological community<sup>10</sup> provided an estimate of the current extent of the ecological community as 277,000 ha; with an estimated 70% reduction from its original extent (of 937,000 ha, prior to European settlement). Estimates of current

<sup>10</sup> Analysis of NSW DPIE (2021) and Qld Herbarium (2021); also using ABARES (2018). Using areas below 250 m above sea level (ASL) of 27 matched PCTs\* that occur in in the NNC & SEQ IBRA bioregions, and areas below 250 m ASL of 17 matched QLD REs<sup>#</sup> in the SEQ IBRA Bioregion and on Curtis Island in the Brigalow Belt North Bioregion (see [Appendix B](#) for details on selected map units). Not all areas identified/mapped as these state vegetation units will meet the key diagnostic characteristics and condition thresholds for the ecological community.

\* NSW PCTs: 3060, 3067, 3088, 3102, 3425, 3428, 3435, 3436, 3553, 3557, 3984, 3991, 4002, 4003, 4020, 4021, 4032, 4033, 4034, 4036, 4039, 4042, 4043, 4045, 4046, 4077 and 4087; and

<sup>#</sup> Qld REs: 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15 and 12.3.19.

extent do not take into account that some mapped areas may now be so degraded (see Criterion 4, at [Section 6.2.4](#)) that they no longer meet the key diagnostic characteristics and/or the minimum condition thresholds for the ecological community. So it is likely that the current extent of the ecological community is well below 30% of its estimated original extent.

This represents a **severe** decline in geographic distribution. The Committee considers that the ecological community has met the relevant elements of Criterion 1 to make it eligible for listing as **endangered**.

This decline in geographic distribution since 1750 also represents a likely **endangered** status under Criterion A3 of the IUCN Red List of Ecosystems (Bland et al. 2017).

#### 6.2.2 Criterion 2 – limited geographic distribution coupled with demonstrable threat

Ineligible under Criterion 2

	Category		
	Critically Endangered	Endangered	Vulnerable
Its geographic distribution is:	very restricted	restricted	limited
<i>Extent of Occurrence (EoO)</i>	<100 km <sup>2</sup>	< 1,000 km <sup>2</sup>	< 10,000 km <sup>2</sup>
<i>Area of Occupancy (AoO)</i>	<10 km <sup>2</sup>	< 100 km <sup>2</sup>	< 1,000 km <sup>2</sup>
<i>Average patch size</i>	<0.1 km <sup>2</sup>	< 1 km <sup>2</sup>	
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	the near future	medium term future
<i>Timeframe</i>	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

The ecological community occurs from just north of Newcastle NSW (around Raymond Terrace) in the south, to just north of Gladstone Qld.

Based on an analysis of New South Wales Plant Community Types (NSW PCTs) and Queensland Regional Ecosystems (Qld REs) representative of the ecological community (see [footnote 10 on page 51](#)), its estimated extent of occurrence (EoO) is 20,700,000 ha / 207,000 km<sup>2</sup>; the estimated total area of occupancy (AoO) of the ecological community is 277,000 ha / 2770 km<sup>2</sup>. These figures are not considered to indicate a **limited** geographic distribution under this criterion.

Following assessment of the data the Committee has determined that the ecological community is not eligible for listing in any category under Criterion 2.

### 6.2.3 Criterion 3 – decline of functionally important species

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
<i>Estimated decline over the last 10 years or three generations, whichever is longer</i>	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
<i>Timeframe</i>	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

The dominant canopy tree species of the *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Syncarpia* genera are functionally important across the range of the ecological community (see [Section 1.2.3](#)). The loss of large trees with hollows reduces other components of the ecological community such as arboreal mammals, parrots, insectivorous bats and other species that rely on tree hollows.

None of the key tree species of the ecological community are listed as threatened under the EPBC Act at the time of this assessment. However, an assessment of 822 Australian eucalypt species against IUCN Red List criteria by Fensham et al. (2020) concluded that two canopy species in the ecological community (*Eucalyptus longifolia* and *E. moluccana*) qualified as threatened (in the vulnerable category).

Faunal components of the ecological community, such as digging and arboreal mammals, birds and insects, are important for nutrient cycling, dispersal of fungi, seed dispersal and/or burial, water infiltration, and pollination. Several threatened fauna species occur in the ecological community, but only a few are identified as of particular functional significance across its range. Birds and arboreal mammals such as flying foxes feed on the nectar and pollen of native blossoms, spreading seeds and pollinating native plants. *Pteropus poliocephalus* (grey-headed flying-fox) is listed as vulnerable, following an estimated 30% decline in abundance over a decade; it has also suffered more recent large declines due to heat stress (TSSC 2001; NSW OEH 2019). As a key pollinator of the ecological community (SCEE 2017), this decline may impair the regeneration of key vegetation species in the ecological community. Even where vegetation is regenerating, regrowth trees lack the hollows found in older trees – limiting faunal habitat, ecological complexity and functionality.

Other species that have likely suffered significant declines, are likely to be locally important to the functioning and health of the ecological community in different areas, but are not necessarily important across the full range of the ecological community. This is because different species fulfil these ecological functions in different areas. For example, foraging by bandicoots and wombats is important in maintaining the health of the ecological community. They dig in the leaf litter and soil to find insects, fungi, plant root nodules and bulbs (mixing and aerating the soil

and litter, and recycling nutrients). They also eat fruit, seeds and other plant material on the ground (acting as a dispersal agent and further recycling nutrients).

Overall, there has been significant loss of components of the ecological community. However, data to support an analysis against this criterion (and its indicative thresholds), for decline in a particular functionally important species, 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
<i>such that restoration is unlikely (even with positive human intervention) within</i>	<i>the <u>immediate</u> future (10 years, or 3 generations up to a maximum of 60 years)</i>	<i>the <u>near future</u> (20 years, or 5 generations up to a maximum of 100 years)</i>	<i>the <u>medium-term</u> future (50 years, or 10 generations up to a maximum of 100 years)</i>

Source: TSSC (2017).

#### Evidence

The ecological community has undergone severe changes in structure and function as a result of the threats outlined in [Section 4](#). It has experienced a reduction in integrity across most of its extent, primarily because of:

- fragmentation and edge effects;
- weed invasion;
- loss of native fauna;
- changes to hydrological regimes; and
- altered fire regimes.

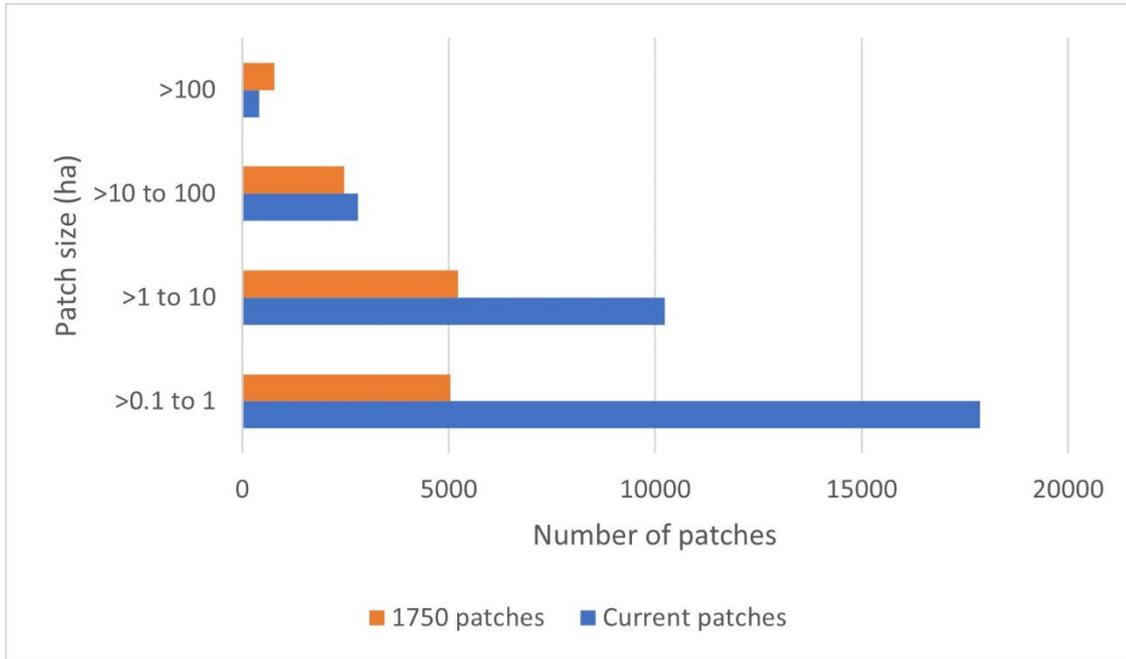
#### *Reduction in integrity due to fragmentation and edge effects*

Small remnants of this ecological community are often the only vegetation left in a cleared landscape; for example, as small strips along rivers and creeks less suitable for development. The large open floodplains that comprised the majority of the original habitat have been largely cleared, with more patches left on localised, sheltered river flats between hills (Keith 2004). This resulted in generally smaller and narrower patches, with an increased distance between patches and the isolation of some patches in a matrix of modified land use.

The ecological community was naturally patchy in many areas pre-1750, because of its position in a mosaic of floodplain ecological communities. However, patches have been much more fragmented by clearing and degradation – particularly in the broad floodplain areas that once supported the largest patches, but have now been heavily cleared.

Figure 1 shows that the number of large patches of the ecological community (greater than 100 ha) has almost halved since 1750; and that the number of very small patches has almost quadrupled, as larger patches have been fragmented. It is based on an analysis of New South Wales Plant Community Types (NSW PCTs) and Queensland Regional Ecosystems (Qld REs) representative of the ecological community (see footnote 10 on page 50).

**Figure 1: Patch sizes of the ecological community (1750 vs 2021).**



Source: DPIE (2021) and Qld Herbarium (2021).

The current distribution of the ecological community is severely fragmented, with an average edge density of 2300 m/ha. The new edges are largely the result of land clearing, and they typically adjoin agricultural or urban areas. An estimated 60% of the edges of the ecological community are adjacent to areas that are non-native (NSW) or non-remnant (Qld) vegetation. The majority (over 70%) of the ecological community now occurs within 50 m of the edge of a patch and as such is subject to significant edge effects<sup>11</sup>.

#### *Reduction in integrity due to weed invasion*

Weeds are frequently cited as a key threat, based on observations from vegetation mapping, surveys and studies; very few examples of the ecological community in New South Wales remain unaffected by weeds (NSW SC 2010a). The principal weed species affecting the ecological community include African olive (*Olea europaea* subsp. *cuspidata*), blackberry (*Rubus* spp.), black-berry nightshade (*Solanum nigrum*), bridal creeper (*Asparagus asparagoides*), camphor laurel (*Cinnamomum camphora*), carpet grasses (*Axonopus* spp.), catsear (*Hypochaeris radicata*), climbing asparagus fern (*A. plumosus*), cobbler's peg (*Bidens pilosa*), fireweed (*Senecio madagascariensis*), fleabanes (*Erigeron* spp. and *Conyza* spp.), groundsel bush (*Baccharis halimifolia*), Japanese honeysuckle (*Lonicera japonica*), kikuyu (*Pennisetum clandestinum*), lantana (*Lantana camara*), large-leaved privet (*L. lucidum*), morning glories (*Ipomoea* spp.), moth plant (*Araujia sericifera*), Paddy's lucerne (*Sida rhombifolia*), paspalum (*Paspalum*

<sup>11</sup> An edge width of 50 m was chosen for the analysis as a mid-range estimate for demonstrated edge effects in forests. Various studies indicate edge effects on different forest species or functions occur up to 10-500 m into patches (e.g., Ewers & Didham (2007), Berry (2001), Laurence et al. (2002) and Poccock & Lawrence (2005)).

*dilatatum*), purpletop (*Verbena bonariensis*), slender pigeon grass (*Setaria parviflora*), small-leaved privet *Ligustrum sinense*), wandering trad (*Tradescantia fluminensis*) and wild tobacco bush (*Solanum mauritianum*) (Keith & Scott 2005 cited in NSW SC 2010a). In Queensland there at least 18 weed species that typically invade components of the ecological (Qld Herbarium 2021). Three of these weeds are notably widespread: asparagus ferns (*Asparagus* spp.); corky passionfruit (*Passiflora suberosa*); and lantana (*Lantana camara*). Asparagus ferns and passionfruit include vine species that may climb into middle and upper canopy layers to smother trees and shrubs, and are often referred to as transformer species (Simberloff & Rejmánek 2011; Gallagher et al. 2015).

#### *Reduction in integrity due to loss of native fauna*

Faunal components of the ecological community, such as digging and arboreal mammals, birds and insects, are important for nutrient cycling, dispersal and/or burial of seeds and fungal spores, water infiltration, and pollination. The loss of these animals negatively impacts the functioning of the ecological community and reduces its ability to recover from the adverse impacts of other threats.

Most threatened and near threatened Australian land mammal species are continuing to decline (Woinarski et al. 2015), including those of the ecological community. *Pteropus poliocephalus* (grey-headed flying-fox), for example, suffered recent large declines due to heat stress and fire (TSSC 2001; NSW OEH 2019). As a key pollinator of the ecological community (SCEE 2017), its decline is likely to impair key vegetation species regeneration. Most recently, the State of NSW & NSW EPA (2021) reported that 64% of mammals are now considered to have suffered long-term reductions in habitat range.

Inappropriate fire regimes, grazing by stock and invasive herbivores, invasion by weeds, and hydrological alteration have resulted in the loss of groundcover and understorey structure and flora species. The loss of the native groundcover and understorey negatively impacts ground-dwelling fauna that play key roles in the ecological community. Fallen timber is also important as habitat for ground-dwelling fauna (as well as for carbon turnover) and has been removed for firewood, particularly close to urban centres. All these threats reduce habitat value and exacerbate fauna loss from the ecological community.

Insects are functionally critical to the ecological community, in a wide variety of roles. Marsh et al. (2021) found that 44% (more than 14,000) of the invertebrate species, for which they were able to compile data, were likely to have lost habitat during Australia's 2019-20 bushfires, including in the ecological community. This further compromises the ecological community via cascade effects through the food chain, including detrimental impacts on many birds, reptiles, amphibians and fish that feed on insects (Sanchez-Bayo & Wyckhuys 2019).

#### *Reduction in integrity due to changes to hydrological regimes*

South eastern Queensland is the most densely populated area of Queensland. Water storages are predominantly managed for urban use around Brisbane and the Gold Coast, whilst irrigated agriculture is the major water user in rural areas. Water resources are highly developed, with 22 major storages and a combined capacity of over two point five million megalitres (BOM 2012). Some areas have been leveed to expand agricultural production which can reduce connectivity with the floodplain and result in concentrated channel flow during high flows.

Many of the larger floodplains containing the ecological community, in both New South Wales and Queensland, have undergone major transformation as a result of systematic hydrological engineering for the development of agricultural land - especially in the early 20th century. As a result, the natural hydrological connectivity of the many parts of the ecological community has

been impaired. Construction of drain networks and tidal gates channelised much of the floodplain sheet flow, lowered the water tables and oxidised surface soils. Where native vegetation, including the ecological community, remains on the floodplain, hydrological transformation has resulted in major shifts in biogeochemical processes and ecosystem-scale impacts (Capon et al. 2016).

In coastal New South Wales, large areas of coastal floodplain habitat were directly drained by constructing artificial channels (Pressey 1989a; Boulton & Brock 1999: both cited in NSW SC 2010b); and river flows were significantly altered by weirs, levees, floodgates and dams (Pressey & Griffith 1992). By the early 1990s there were co-ordinated drainage systems on the major floodplains, while additional areas that were not directly drained may have been hydrologically altered by changed patterns of flooding and drainage following flood mitigation works (Pressey & Griffith 1992; Keith & Scott 2005). On the NSW north coast, expansion of *Melaleuca quinquenervia* and *Casuarina glauca* has been attributed to artificial drainage and shortening of the hydroperiod<sup>12</sup> (Johnston et al. 2003 cited in NSW SC 2010b). These changes appear to be closely associated with enhanced acidity, altered ionic ratios, increased dissolved organic carbon and sulfide oxidation in the soil profile (Johnston et al. 2003 cited in NSW SC 2010b).

Much of the coastal water diversions serve the large urban centres on the coastal plains (e.g., the Sunshine Coast and Brisbane-Gold Coast). In NSW weir distribution appears to be concentrated on the far north coast, where significant occurrences of the ecological community are.

As well as large dam construction, more widespread cumulative impacts affect broader hydrological changes across the landscape – for instance, the collective impacts of numerous smaller structures (such as town and farm dams, weirs, irrigation channels, drainage works, and buildings). Almost all NSW coastal rivers are affected by reduced flows, caused by extraction for livestock and domestic supplies. Water extraction diminishes flows, especially during dry times and reduces the frequency of small and medium-sized flood events (Pressey & Middleton 1982), which adversely impacts floodplain vegetation.

Constructing road and rail networks throughout the extent of the ecological community, particularly raised roadways, can also substantially affect floodplain drainage and hydrological connectivity.

#### *Reduction in integrity due to stormwater impacts*

Stormwater impacts in low-lying urban coastal areas include habitat loss and degradation. As the extent of impervious surfaces increases, residual bushland areas are increasingly used as stormwater receiving systems. What begins as a trickle of nutrient/fertiliser enriched water from a stormwater outlet, over time, creates a plume of nutrient-enriched soil and water around the outlet. This can lead to weed proliferation and the transformation of a naturally oligotrophic ecosystem into a weed-dominated eutrophic system, or a shift from a eucalypt-dominated to a melaleuca-dominated ecological community. This impact is pervasive, with impacts extending up to 150 m into a remnant ecosystem within a period of 15 to 30 years, and is exacerbated by the absence of fire in proximity to urban areas.

---

<sup>12</sup> The period in which a soil area is waterlogged

*Reduction in integrity due to altered fire regimes*

Fire regimes have been changed throughout the extent of the ecological community, in association with the growth of agriculture and urban development. Fire is used to promote regrowth (green pick), and to maintain higher levels of native pasture species richness for livestock grazing; and for hazard reduction management. These practices can increase fire frequency. The burns can diminish the amount of fallen timber and other plant litter; this negatively impacts fauna using them for shelter and their other habitat values. Arson is also an issue, particularly on urban fringes.

Intensified disturbance regimes have the capacity to shift ecosystems to an alternate state (i.e., to one that is not ecologically representative of the prior state) (Bowman et al. 2013). Even in forests dominated by fire-tolerant resprouting eucalypts, short-interval high severity wildfires (e.g. < 6 years) are capable of reducing live above-ground biomass by close to 50%, via mortality and changes to regeneration patterns (Fairman et al. 2022).

In some areas, more high intensity or frequent fires may slow or prevent regeneration and recovery and lead to lower species richness. Sustained high frequency fire will lead to plant species loss, a reduction in vegetation structure, and a corresponding animal species loss (NSW OEH 2017c). The resulting habitat changes are also likely to detrimentally impact fauna such as bandicoots, gliders and potoroos (Tozer et al. 2010; NSW OEH 2017d). Even in areas where vegetation recovers quickly, the loss of animal species impedes the recovery, long term health and resilience of the ecological community.

**Conclusion**

The combination of impacts has damaged the structure, species assemblage and function of the ecological community, across its range. The long lag time to recover vegetation structure (e.g., adequate representation of mature trees and evidence of ongoing recruitment), lengthens the recovery timeframe. The intractability of other problems, such as the regional loss of many fauna species, increased fragmentation and the nature of existing land use in the ecological community's extent, further reduces its recovery potential. Most past damage is largely irreversible, given the current trajectory of human activity and population growth.

This represents a **severe** reduction in integrity across most of its geographic distribution, as indicated by a **severe** degradation of the community and of its habitat, and a **severe** disruption of important community processes. The Committee considers that the ecological community has met 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

	Category		
	Critically Endangered	Endangered	Vulnerable
<i>an observed, estimated, inferred, or suspected detrimental change over the immediate past, or projected for the immediate future (10 years or 3 generations), of at least:</i>	80%	50%	30%

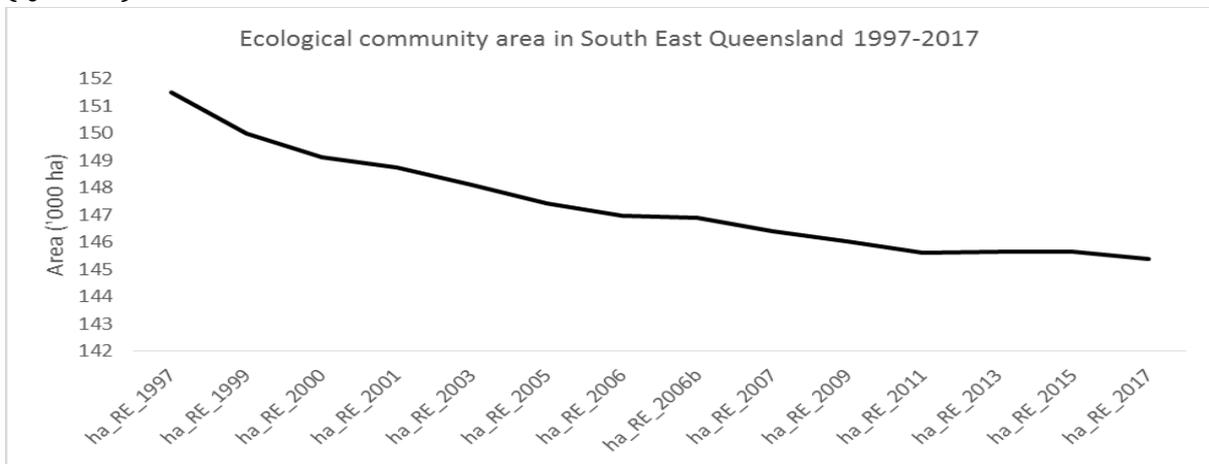
Source: TSSC (2017).

### Evidence

Historically the primary change affecting the ecological community was clearing for agriculture and grazing. More recently it has been clearing for urbanisation and coastal development. Data from the Australian Bureau of Statistics show that, at the national scale, since 1991, population growth was fastest near the coast. This trend was even stronger for 2011–2014, indicating that coastal population growth, and the environmental pressures it brings, are accelerating (Clark & Johnston 2016). As a consequence of this growth in population, housing, jobs, agribusiness and related infrastructure such as roads and airports, are expected to increase substantially over the next 20 years.

Recent rates of decline in extent, for the ecological community in New South Wales, are not available. In south eastern Queensland, the estimated rate of removal of the ecological community over recent years was point two percent per year. From 1997 to 2017 there was an estimated four percent decline in the extent of a selection of matched regional ecosystems in south east Queensland, with an estimated 6100 ha transformed to pasture, crops, settlement, mining, infrastructure or forestry (Figure 2).

**Figure 2: Declines in the area of a subset of matched Queensland Regional Ecosystems (Qld REs) from 1997 to 2017**



Source: Qld DES (2018); Data is for Qld REs 12.3.2, 12.3.3, 12.3.7, 12.3.11, 12.3.18 and 12.3.19.

With additional decline and degradation, due to weed invasion, overgrazing, trampling and other soil disturbance by domestic livestock and feral animals including pigs, changes to hydrology from flood mitigation and drainage works, inappropriate fire regimes, removal of dead wood, rubbish dumping and climate change, it is highly likely that there will be substantial detrimental change in the geographic distribution and substantial degradation across most of its geographic distribution of the ecological community.

Although there has been, and continues to be, detrimental change to the ecological community, as a result of continuing urbanisation and coastal development, data are insufficient to determine rates of loss in the recent past, or to predict them for the immediate future, across the range of the ecological community.

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
<i>timeframes</i>	<i>10 years or 3 generations (up to a maximum of 60 years)</i>	<i>20 years or 5 generations (up to a maximum of 100 years)</i>	<i>50 years or 10 generations (up to a maximum of 100 years)</i>

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.

## 6.3 Listing and Recovery Plan Recommendations

### 6.3.1 TSSC recommendations

The Threatened Species Scientific Committee recommends:

(i) that the list referred to in Section 181 of the EPBC Act be amended by **including** Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions in the list, in the **endangered** category;

AND

(ii) that there not be a recovery plan for this ecological community at this time.

This recommendation is in accordance with the provisions of the EPBC Act and the Committee's conservation planning principles as follows:

- the threats facing the ecological community and the priority actions needed to address them are well-understood;
- an approved Conservation Advice would be an effective, efficient and responsive document to guide the implementation of priority management actions, mitigate against key threats and support the recovery of this ecological community, at the national level; and
- having regard to the above factors, a national recovery plan is not recommended as it would not provide a significant conservation planning benefit in addition to this Conservation Advice and other existing mechanisms.

## Appendix A – Species lists

This Appendix records the assemblage of native species that characterises the ecological community throughout its range at the time of national-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 on the list may be abundant, rare, or absent in any given patch of the ecological community; and other native species, not recorded here, may be present. The total list of species that may be found in the ecological community is considerably larger than the species recorded 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 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 for vascular plants are nationally accepted names as per the Australian Plant Census (Council of Heads of Australasian Herbaria undated) and PlantNet/New South Wales Flora Online (Royal Botanic Gardens & Domain Trust 2020), as at the time of writing. Scientific names for fauna are nationally accepted names as per the Atlas of Living Australia (CSIRO undated), as at the time of writing. Indigenous names are included for some species.

### A1 Flora

Due to the large latitudinal range of this community, some species recorded here will only be relevant in certain parts of the ecological community's range. For some species, additional information is annotated (i.e., the approximate extent of the species are noted as either: typically over the entire extent of the ecological community (A); or typically hot temperate and subtropical, typically north of Sydney (S); and \*\* indicates some of the species that are generally indicative of wetter locations in the landscape (e.g., on the floodplain)). Species without a tick in any of the three columns (to indicate why they are included in this table), were suggested as additions by experts during the assessment process. For more indigenous names see Appendix C – Indigenous Australians and cultural values associated with the ecological community.

**Table 4: Characteristic, frequently occurring or threatened flora of the ecological community**

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
Canopy and emergent trees					
<i>Allocasuarina littoralis</i>	black sheoak			✓	✓
<i>Allocasuarina torulosa</i>	forest/ rose sheoak		✓	✓	✓
<i>Angophora bakeri</i> subsp. <i>bakeri</i> (syn. <i>A. paludosa</i> )	narrow-leaved apple		✓	✓	

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Angophora costata</i> (A)	smooth-barked apple			✓	
<i>Angophora floribunda</i> (A)	rough-barked apple			✓	✓
<i>Angophora Leiocarpa</i>	rusty gum				✓
<i>Angophora subvelutina</i> (A)	broad-leaved apple		✓	✓	✓
<i>Angophora woodsiana</i> (S)	smudgee		✓	✓	✓
<i>Brachychiton populneus</i> (A)	kurrajong		✓		✓
<i>Callitris columellaris</i> (S)	a native cypress pine		✓		
<i>Casuarina cunninghamiana</i> (A)	river oak, river sheoak		✓	✓	✓
<i>Casuarina glauca</i> (A)	swamp oak, swamp sheoak		✓	✓	✓
<i>Clerodendrum tomentosum</i>	lolly bush, pagoda flower, hairy clerodendrum, witches tongues, flowers of magic				✓
<i>Corymbia citriodora</i> subsp. <i>variegata</i> (syn. <i>C. variegata</i> )	northern spotted gum				✓
<i>Corymbia gummifera</i> (A)	red bloodwood			✓	
<i>Corymbia henryi</i> (S)	large-leaved spotted gum			✓	
<i>Corymbia intermedia</i> (syn. <i>Eucalyptus intermedia</i> ) (S)	pink bloodwood		✓	✓	✓
<i>Corymbia maculata</i> (A)	spotted gum			✓	
<i>Corymbia tessellaris</i> (S)	Moreton Bay ash, Carbeen				✓
<i>Corymbia torelliana</i>	Cadaghi, Cadaga				✓
<i>Corymbia trachyphloia</i> (syn. <i>Eucalyptus trachyphloia</i> )	brown bloodwood				✓
<i>Cryptocarya obovata</i>	pepperberry (tree), white walnut, purple laurel, she beech, long Tom				✓
<i>Cryptocarya triplinervis</i>	brown/ three-veined laurel, three-veined cryptocarya			✓	✓
<i>Cupaniopsis anacardioides</i>	tuckeroo, beach/ beech/ green-leaved tamarind, carrotwood, cashew leaf cupania			✓	✓
<i>Cupaniopsis parvifolia</i>	(small-leaved) tuckeroo, beach/ green-leaved tamarind			✓	✓
<i>Denhamia bilocularis</i>	orangebark			✓	✓
<i>Drypetes deplanchei</i> (S) (Supersedes <i>D. australasica</i> )	yellow tulipwood		✓	✓	✓

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Elaeocarpus obovatus</i>	hard quandong, blueberry ash			✓	✓
<i>Endiandra sieberi</i>	(hard) corkwood, corkbark, pink walnut, till			✓	✓
<i>Eucalyptus acmenoides</i> (syn. <i>E. portuensis</i> ) (S)	white mahogany		✓	✓	✓
<i>Eucalyptus amplifolia</i> (A)	cabbage gum		✓	✓	
<i>Eucalyptus bancroftii</i> (S)	Bancroft's red gum, orange gum			✓	✓
<i>Eucalyptus crebra</i> (S)	narrow-leaved ironbark			✓	✓
<i>Eucalyptus exserta</i>	(Queensland) peppermint, bendo, (yellow) messmate				✓
<i>Eucalyptus fibrosa</i>	(broad-leaved) red ironbark			✓	✓
<i>Eucalyptus grandis</i> (S)	flooded / gum			✓	✓
<i>Eucalyptus latisinensis</i>	white mahogany				✓
<i>Eucalyptus longifolia</i>	woollybutt			✓	
<i>Eucalyptus melanoleuca</i>	Yarraman ironbark				✓
<i>Eucalyptus melliodora</i>	yellow box				
<i>Eucalyptus melanophloia</i>	silver-leaved ironbark				✓
<i>Eucalyptus microcorys</i> (S)	tallowwood			✓	✓
<i>Eucalyptus moluccana</i> (S)	grey/ gum-topped box		✓	✓	✓
<i>Eucalyptus nobilis</i>	ribbon gum, giant white gum				
<i>Eucalyptus pilularis</i> (A)	blackbutt			✓	✓
<i>Eucalyptus populnea</i>	poplar/ bimple box				✓
<i>Eucalyptus propinqua</i> (S)	grey gum		✓	✓	✓
<i>Eucalyptus racemosa</i> (S) (supersedes <i>E. signata</i> )	scribbly gum			✓	✓
<i>Eucalyptus resinifera</i> (S)	red mahogany		✓	✓	✓
<i>Eucalyptus robusta</i> (A)	swamp mahogany/ messmate		✓	✓	✓
<i>Eucalyptus seeana</i> (S)	narrow-leaved red gum		✓	✓	✓
<i>Eucalyptus siderophloia</i> (S)	(Queensland/ northern) grey ironbark		✓	✓	✓
<i>Eucalyptus tereticornis</i> (A)	forest red gum, Queensland blue gum, red iron gum		✓	✓	✓
<i>Eucalyptus tindaliae</i>	Tindal's stringybark			✓	✓
<i>Eucalyptus umbra</i>	broad-leaved white mahogany			✓	✓

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Euroschinus falcata</i>	ribbonwood, ribbon wood, (blush) cudgerie, Chinaman's cedar, pink poplar, Port Macquarie beech, Maiden's blush, Maiden's-bush wood				✓
<i>Ficus henneana</i> (syn. <i>F. superba</i> ) (A)	deciduous fig		✓	✓	
<i>Ficus macrophylla</i> (S)	Moreton Bay fig		✓		
<i>Ficus obliqua</i> (A)	small-leaved fig		✓		
<i>Flindersia australis</i>	crow's ash, (Australian) teak, flindosy, nutwood, flindersia				✓
<i>Glochidion ferdinandi</i> (A)	cheese tree		✓	✓	✓
<i>Glochidion sumatranum</i>	(Sumatran) buttonwood, (umbrella) cheesetree, pin flower tree			✓	✓
<i>Grevillea robusta</i>	(southern) silky oak, Koomkabang (Bundaberg), Tuggan (Brisbane River), Warra-garria (Richmond and Clarence River tribes)			✓	✓
<i>Hibiscus tiliaceus</i>	beach/ coast/ cottonwood/ sea hibiscus, cotton tree, (coast/ green) cottonwood				✓
<i>Jagera pseudorhus</i>	foambark, fern-tree, pink tamarind			✓	✓
<i>Lophostemon confertus</i> (S)	red/ scrub/ brush/ Brisbane/ pink/ Queensland (brush) box, vinegar tree, box scrub			✓	✓
<i>Lophostemon suaveolens</i> (S)	swamp box/ mahogany/ turpentine, apple		✓	✓	✓
<i>Scolopia braunii</i>	brown birch, flintwood, mountain cherry, scolopia				✓
<i>Symplocos stawellii</i>	white hazelwood				✓
<i>Syncarpia glomulifera</i> (A)	turpentine, Yanderra			✓	
<i>Toona ciliata</i>	(red) cedar			✓	✓
<i>Trochocarpa laurina</i>	waddywood, beech, axebreaker, laurel/ tree heath, sandberry, turkey bush, wheel fruit			✓	✓
<i>Syzygium floribundum</i> (syn. <i>Waterhousea floribunda</i> )	weeping myrtle/ satinash			✓	✓

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
Sub-canopy and mid-layer (highly variable)					
<i>Acacia aulacocarpa</i>	hickory/ brush ironbark/ black wattle, (brown/ golden-flowered) salwood, acacia tree, New Guinea wattle, lancewood			✓	
<i>Acacia blakei</i>	Blake's/ Wollomombi wattle				✓
<i>Acacia concurrens</i> (S)	Curracabah, black wattle		✓	✓	✓
<i>Acacia disparrima</i> (S)	southern salwood		✓		✓
<i>Acacia falcata</i>	burra, sickle-shaped acacia, Sally, hickory/ silver-leaved wattle				✓
<i>Acacia fimbriata</i> (A)	fringed/ Brisbane wattle				✓
<i>Acacia flavescens</i>	yellow/ red wattle				✓
<i>Acacia floribunda</i> (A)	white Sally/ gassomer wattle			✓	
<i>Acacia glaucocarpa</i>	glory wattle				✓
<i>Acacia irrorata</i> (A)	green wattle			✓	✓
<i>Acacia leiocalyx</i> (S)	(early flowering)/ Brisbane black wattle, curracabah			✓	✓
<i>Acacia maidenii</i>	Maiden's wattle				✓
<i>Acacia melanoxyton</i> (A)	blackwood, black wattle, Mudgerabah				✓
<i>Acacia salicina</i>	swamp/ (black) Sally/ Broughton/ sandy/ willow/ black/ wattle, Broughton/ native/ Murray willow, cooba(r), Dhulan (Yuwaalayaay name)				✓
<i>Acronychia imperforata</i>	beach acronychia, Fraser Island/ Logan apple, coastal aspen, green tree			✓	✓
<i>Acronychia oblongifolia</i>	common acronychia, hard aspen, yellow wood, white lilly pilly			✓	✓
<i>Alchornea ilicifolia</i>	native holly, dovewood				✓
<i>Alphitonia excelsa</i>	red ash , soapbush, soap tree		✓	✓	✓
<i>Alstonia constricta</i>	quinine (bush/ tree), bitterbark, fever bark			✓	✓
<i>Androcalva fraseri</i> (syn. <i>Commersonia fraseri</i> )	brush kurrajong, native hemp		✓		

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Aphananthe philippinensis</i>	native/ rough-leaved elm, axehandle/ greyhandle wood, asbestos tree, rough leaved hickory, wild holly			✓	✓
<i>Austromyrtus dulcis</i>	midgen (berry), midyim			✓	✓
<i>Backhousia myrtifolia</i> (A)	grey myrtle, ironwood			✓	✓
<i>Banksia integrifolia</i>	coast banksia, honeysuckle oak, white honeysuckle			✓	✓
<i>Billardiera scandens</i> (A)	appleberry, snotberry, apple dumplings			✓	
<i>Breynia oblongifolia</i> (A)	breynia, coffee bush		✓	✓	✓
<i>Bursaria spinosa</i> (A)	sweet bursaria blackthorn, Kurwan (D'harawal name)			✓	✓
<i>Callistemon salignus</i>	white bottlebrush		✓	✓	✓
<i>Callistemon viminalis</i> (syn. <i>Melaleuca viminalis</i> )	red/ river/ drooping/ creek/ weeping bottlebrush		✓		✓
<i>Capparis arborea</i>	wild orange/ lemon/ lime, native/ wild pomegranate, brush caper berry, (noble/ tree) caper, caper tree				✓
<i>Chorizema parviflorum</i>	eastern flame pea				✓
<i>Commersonia bartramia</i>	brown kurrajong		✓	✓	✓
<i>Cordyline congesta</i>	tooth-leaved palm lily		✓	✓	
<i>Cupaniopsis anacardioides</i>	tuckaroo		✓	✓	
<i>Cupaniopsis parvifolia</i>	small-leaved tuckaroo		✓	✓	
<i>Daviesia ulicifolia</i>	gorse bitter pea, native gorse, furze-like daviesia			✓	
<i>Daviesia umbellulata</i>	prickly daviesia, (northern) bitter pea				✓
<i>Dodonaea triquetra</i>	large-leaf hop-bush			✓	✓
<i>Elaeocarpus reticulatus</i> (A)	blueberry ash, blue olive-berry, ash quandong		✓	✓	✓
<i>Epacris microphylla</i>	coral heath			✓	✓
<i>Eremophila debilis</i>	winter apple, amulla			✓	✓
<i>Excoecaria agallocha</i>	blind-your-eye/ milky mangrove, blind-your-eye(s), river poison/ melky/ blinding tree				✓

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Exocarpos cupressiformis</i>	cherry ballart, native/ wild/ forest/ cypress cherry, mirrii			✓	✓
<i>Ficus coronata</i>	(creek) sandpaper/ creek fig, figwood			✓	✓
<i>Grevillea robusta</i>	(Australian/ southern) silky/ silk oak, silkoak				✓
<i>Hakea florulenta</i>	three-nerved willow/ sweet-scented hakea			✓	✓
<i>Hibbertia aspera</i>	rough Guinea flower			✓	
<i>Hibbertia vestita</i>	hairy Guinea-flower			✓	✓
<i>Hibiscus diversifolius</i>	swamp hibiscus		✓		
<i>Hibiscus tiliaceus</i>	cottonwood hibiscus		✓		
<i>Hovea acutifolia</i>	a native pea		✓	✓	✓
<i>Jacksonia scoparia</i>	dogwood, stinkwood, native broom, mountangarra, broom-like jacksonia			✓	✓
<i>Leptospermum polygalifolium</i>	tantoon			✓	✓
<i>Leucopogon affinis</i> (syn. <i>L. lanceolatus</i> )	lance(leaf) beard-heath			✓	
<i>Leucopogon juniperinus</i>	long flower beard-heath, prickly heath, juniper-leaved leucopogon			✓	
<i>Livistona australis</i> (A)	Eungella/ cabbage(-tree) fan palm, cabbage palm			✓	
<i>Livistona decora</i>	weeping cabbage/ ribbon (fan) palm				
<i>Lomatia silaifolia</i>	crinkle/ parsley bush, fern leaved lomatia, parsley fern, wild parsley			✓	✓
<i>Macadamia integrifolia</i>	(smooth shelled) macadamia/ Queensland/ bush nut (tree), nut oak	EPBC/ Qld V			
<i>Macadamia tetraphylla</i>	rough shelled bush nut, (rough-shelled) macadamia (nut), rough-leaved Queensland nut	EPBC/ NSW/ Qld V			
<i>Mallotus philippensis</i> (S)	red kamala		✓	✓	✓
<i>Melaleuca alternifolia</i> ** (S)	tea-tree (a paperbark)		✓	✓	
<i>Melaleuca bracteata</i>	black tea-tree, black/ river ti-tree				✓
<i>Melaleuca decora</i> ** (S)	white feather honey myrtle		✓	✓	

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Melaleuca irbyana</i> **	swamp tea-tree, scale-leaved/ bush-house/ weeping/ swamp paperbark, irbyana	NSW/ Qld E			✓
<i>Melaleuca linariifolia</i> ** (A)	flax-leaved paperbark, snow-in-summer			✓	✓
<i>Melaleuca nodosa</i>	pricklyleaf paperbark		✓	✓	✓
<i>Melaleuca quinquenervia</i> ** (S)	five-veined/ swamp/ broad-leaved paperbark, paper bark(ed)/ broad-leaved tea-tree, punk tree, niaouli		✓	✓	✓
<i>Melaleuca sieberi</i>	paperbark			✓	✓
<i>Melaleuca styphelioides</i> ** (A)	prickly-leaved paperbark/ tea-tree		✓	✓	✓
<i>Melaleuca thymifolia</i>	thyme (honey-)myrtle, thyme-leaved melaleuca				✓
<i>Melia azedarach</i>	white/ tulip cedar, Chinaberry/ bread tree, Persian lilac, wyndet				✓
<i>Myrsine howittiana</i> ** (A)	brush muttonwood				✓
<i>Myrsine variabilis</i>	muttonwood, rapanea			✓	✓
<i>Notelaea longifolia</i> ** (A)	native olive, (large) mock-olive		✓	✓	✓
<i>Notelaea ovata</i>	forest olive			✓	✓
<i>Notelaea venosa</i> (A)	(veined) mock olive				
<i>Persoonia media</i>	geebung				✓
<i>Persoonia stradbokensis</i>	(a geebung)		✓	✓	✓
<i>Phyllanthus gunnii</i>	scrubby spurge			✓	✓
<i>Phyllanthus hirtellus</i>	thyme spurge				
<i>Pimelea linifolia</i>	rice flower		✓	✓	✓
<i>Pittosporum revolutum</i> (A)	rough fruit/ hairy pittosporum		✓	✓	✓
<i>Syzygium smithii</i> (syn. <i>Acmena smithii</i> )** (A)	lilly pilly			✓	✓
<i>Wikstroemia indica</i>	bootlace bush		✓	✓	
Climbers, epiphytes and scramblers					
<i>Cissus hypoglauca</i> (A)	water vine		✓	✓	
<i>Desmodium rhytidophyllum</i>	hairy trefoil, perennial legume		✓	✓	✓
<i>Desmodium varians</i> (A)	slender tick-trefoil		✓	✓	
<i>Eustrephus latifolius</i> (A)	wombat berry		✓	✓	✓
<i>Geitonoplesium cymosum</i> (A)	scrambling lily		✓	✓	✓

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Glycine clandestina</i> (A)	twining glycine		✓	✓	✓
<i>Glycine tabacina</i>	glycine pea, variable glycine			✓	✓
<i>Gynochthodes jasminoides</i> (syn. <i>Morinda jasminoides</i> ) (A)	morinda vine		✓	✓	
<i>Hardenbergia violacea</i>	false sarsparilla, purple coral-pea, native lilac		✓	✓	✓
<i>Hibbertia scandens</i> (A)	climbing Guinea flower		✓	✓	✓
<i>Kennedia rubicunda</i>	red Kennedy pea		✓	✓	
<i>Maclura cochinchinensis</i>	cockspur thorn		✓	✓	✓
<i>Parsonsia straminea</i> (A)	common silkpod		✓	✓	✓
<i>Polymeria calycina</i>	slender bindweed			✓	
<i>Rubus parvifolius</i> (A)	native raspberry, small-leaved bramble			✓	
<i>Smilax australis</i> (A)	native sarsparilla, lawyer vine, wait-a-while		✓	✓	
<i>Smilax glycyphylla</i>	sweet sarsparilla		✓	✓	
<i>Stephania japonica</i> var. <i>discolor</i> (A)	snake vine		✓	✓	
<i>Veronica plebeia</i> (A)	trailing/ creeping speedwell			✓	
<b>Understorey (Grasses)</b>					
<i>Alloteropsis semialata</i>	cockatoo grass				✓
<i>Aristida vagans</i>	three-awn speargrass		✓	✓	✓
<i>Austrostipa ramosissima</i>	stout bamboo-grass				✓
<i>Bothriochloa bladhii</i>	forest blue-grass, Burnett River blue-grass				✓
<i>Bothriochloa decipiens</i>	pitted blue-grass, red(leg) grass				✓
<i>Capillipedium spicigerum</i>	scented-top grass				✓
<i>Cymbopogon refractus</i> (A)	barbed-wire grass		✓	✓	✓
<i>Dichanthium sericeum</i>	Queensland blue-grass				✓
<i>Dichelachne micrantha</i> (A)	shorthair plume grass		✓	✓	✓
<i>Digitaria parviflora</i> (A)	small-flowered finger grass		✓	✓	✓
<i>Echinopogon caespitosus</i>	hedgehog-grass		✓	✓	
<i>Entolasia marginata</i>	bordered panic		✓	✓	✓

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Entolasia stricta</i>	wiry panic		✓	✓	✓
<i>Eragrostis leptostachya</i>	paddock lovegrass		✓		✓
<i>Eremochloa bimaculata</i>	poverty grass				✓
<i>Heteropogon contortus</i>	black spear grass				✓
<i>Imperata cylindrica</i> (A)	blady grass		✓	✓	✓
<i>Microlaena stipoides</i> (A)	weeping grass		✓	✓	✓
<i>Oplismenus aemulus</i>	creeping shade grass		✓	✓	✓
<i>Oplismenus imbecillis</i>	creeping beard grass		✓	✓	✓
<i>Ottochloa gracillima</i>	pademelon grass			✓	✓
<i>Panicum effusum</i>	hairy/ poison panic				✓
<i>Panicum simile</i> (A)	two-colour panic		✓	✓	
<i>Paspalidium distans</i> (A)	shotgrass			✓	✓
<i>Paspalum distichum</i> **	water couch				
<i>Paspalum scrobiculatum</i>	ditch millet, scrobic				✓
<i>Sporobolus creber</i>	slender rat's-tail grass				✓
<i>Themeda triandra</i> (A) (syn. <i>T. australis</i> )	kangaroo grass		✓	✓	✓
Understorey (Forbs) - Graminoids					
<i>Brunoniella australis</i>	blue trumpet		✓	✓	✓
<i>Centella asiatica</i> ** (A)	pennywort		✓	✓	
<i>Commelina cyanea</i> (A)	scurvey-weed		✓	✓	
<i>Cyanthillium cinereum</i> (syn. <i>Vernonia cinerea</i> )	iron weed, (purple) fleabane			✓	
<i>Cymbidium suave</i>	snake orchid		✓		
<i>Dianella caerulea</i> (A)	blue flax lily, Paroo lily		✓	✓	✓
<i>Dianella longifolia</i>	a flax lily		✓	✓	
<i>Dichondra repens</i> (A)	kidney weed, Yilibili (D'harawal name)		✓	✓	✓
<i>Einadia hastata</i> (A)	berry saltbush, saloop			✓	
<i>Lagenophora stipitata</i> (syn. <i>Lagenifera stipitata</i> )	common/ blue bottle-daisy, common Lagenophora		✓	✓	
<i>Laxmannia gracilis</i> (A)	(slender) wire-lily, silverweed		✓	✓	
<i>Lobelia purpurascens</i> ** (A) (syn. <i>Pratia purpurascens</i> )	whiteroot		✓	✓	
<i>Lomandra filiformis</i> (A)	wattle mat-rush		✓	✓	
<i>Lomandra longifolia</i> (A)	spiny-headed mat-rush		✓	✓	✓
<i>Lomandra multiflora</i> subsp. <i>multiflora</i> (A)	many-flowered mat-rush		✓	✓	

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<i>Murdannia graminea</i>	grass lily			✓	✓
<i>Philydrum lanuginosum</i> (A)	woolly waterlily, frogsmouth			✓	
<i>Phyllanthus hirtellus</i>	thyme spurge				
<i>Phyllanthus virgatus</i>	-		✓	✓	
<i>Poranthera microphylla</i>	small poranthera			✓	
<i>Sigesbeckia orientalis</i>	Indian weed		✓		
<i>Tricoryne elatior</i>	yellow rush/ yellow autumn/ star lily		✓		
<i>Viola banksii</i>	wild violet			✓	
<i>Viola hederacea</i> ** (A)	native/ ivy-leaved violet		✓	✓	
Understorey (Ferns and cycads)					
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> (A)	poison rock fern	NSW E	✓	✓	
<i>Macrozamia communis</i>	burrawang				
<i>Pteridium esculentum</i> (A)	bracken fern		✓	✓	✓
Understorey (Sedges and rushes) - Graminoids					
<i>Carex appressa</i> **	tall sedge				
<i>Chorizandra cymbaria</i> ** (A)	heron bristle sedge			✓	
<i>Cyperus enervis</i>	a sedge		✓		
<i>Fimbristylis dichotoma</i> (A)**	common fringe-sedge/ fringe-rush				✓
<i>Gahnia aspera</i> (A)	round/ rough/ red-fruit(ed) saw-sedge, saw/ razor/ sword grass, cut sedge, (large-seeded) gahnia		✓	✓	
<i>Gahnia clarkei</i> ** (A)	tall saw-sedge		✓	✓	
<i>Gahnia melanocarpa</i> ** (A)	black-fruit saw-sedge				
<i>Juncus</i> spp.**	rushes			✓	✓
<i>Lepidosperma laterale</i> (A)	variable saw-sedge			✓	
<i>Machaerina articulata</i> (syn. <i>Baumea articulata</i> ) ** (A)	jointed twigrush			✓	
<i>Machaerina rubiginosa</i> (syn. <i>Baumea rubiginosa</i> ) ** (A)	soft twigrush			✓	
Understorey (Other) – e.g., small shrubs					
<i>Plectranthus parviflorus</i> (A)	cockspur flower				

Scientific name	Common name	Conservation status March 2022 <sup>1</sup>	NSW SCFF TEC <sup>2</sup>	NSW PCTs <sup>3</sup>	Qld RES <sup>4</sup>
<b>Notes</b>					
<sup>1</sup> Conservation status refers to species listed as threatened, under the relevant national and state legislative acts, at the time this document was prepared (DAWE 2022a).					
<sup>2</sup> Species identified as characteristic of the NSW listed Subtropical coastal floodplain forest of the NSW North Coast bioregion threatened ecological community (NSW SC 2010a).					
<sup>3</sup> Species found in the NSW Plant Community Types (NSW DPIE 2021) matched to the national Subtropical eucalypt floodplain forest and woodland ecological community (see footnote 10 on page 51).					
<sup>4</sup> Species identified as characteristic of one or more of the Queensland Regional Ecosystems (Qld Herbarium 2021) matched to the national ecological community (see footnote 10 on page 51).					

## A2 Fauna

**Table 5: Fauna recorded in the ecological community**

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
Mammals				
<i>Acrobates pygmaeus</i>	feathertail glider			
<i>Aepyprymnus rufescens</i>	Rufous bettong		V	
<i>Antechinus flavipes</i>	yellow-footed antechinus			
<i>Antechinus stuartii</i>	brown antechinus			
<i>Cercartetus nanus</i>	eastern pygmy possum		V	
<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		V	
<i>Dasyurus maculatus</i>	spot-tailed quoll (SE mainland population)	E	V	
<i>Falsistrellus tasmaniensis</i>	eastern false pipistrelle, eastern falsistrelle		V	
<i>Hydromys chrysogaster</i>	water rat, rakali, rabe			
<i>Isoodon macrourus</i>	northern brown bandicoot			
<i>Macropus giganteus</i>	eastern grey kangaroo			
<i>Micronomus norfolkensis</i>	eastern free-tail/ eastern little mastiff bat		V	
<i>Miniopterus australis</i>	little bentwing(ed) bat		V	
<i>Miniopterus oriana oceanensis</i>	eastern bentwing bat		V	
<i>Myotis macropus</i>	large-footed/ southern myotis		V	
<i>Notamacropus dorsalis</i>	black-striped wallaby		E	
<i>Notamacropus parma</i>	Parma wallaby		V	
<i>Notamacropus rufogriseus</i>	red-necked wallaby			
<i>Nyctophilus bifax</i>	eastern long-eared bat		V	
<i>Ornithorhynchus anatinus</i>	platypus			
<i>Ozimops lumsdenae</i> (syn. <i>Mormopterus lumsdenae</i> )	northern free-tailed bat		V	

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
<i>Perameles nasuta</i>	(southern) long-nosed bandicoot			
<i>Petauroides volans</i>	greater glider	V		V
<i>Petaurus australis</i>	yellow bellied glider		V	
<i>Petaurus breviceps</i>	sugar glider			
<i>Petaurus norfolcensis</i>	squirrel glider		V	
<i>Phascogale tapoatafa</i>	brush-tailed phascogale		V	
<i>Phascolarctos cinereus</i>	koala (note EPBC listing is for combined populations of Qld, NSW and the ACT)	E	V	V
<i>Phoniscus papuensis</i>	golden-tipped bat		V	
<i>Planigale maculata</i>	common planigale		V	
<i>Potorous tridactylus</i>	long-nosed potoroo	V	V	V
<i>Pseudocheirus peregrinus</i>	common ringtail possum			
<i>Pseudomys novaehollandiae</i>	New Holland mouse, Pookila	V		V
<i>Pteropus alecto</i>	black flying-fox			
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	V	V	
<i>Pteropus scapulatus</i>	little red flying-fox			
<i>Rattus lutreolus</i>	swamp rat, koota			
<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		V	
<i>Scoteanax rueppellii</i>	greater broad-nosed bat		V	
<i>Syconycteris australis</i>	eastern/ Queensland blossom-bat		V	
<i>Tachyglossus aculeatus</i>	short-beaked echidna			
<i>Trichosurus caninus</i>	mountain brushtail/ short-eared possum, bobuck			
<i>Trichosurus cunninghami</i>	mountain brushtail possum, southern bobuck			
<i>Trichosurus vulpecula</i>	common brushtail possum			
<i>Vombatus ursinus</i>	common/ bare-nosed wombat			
<i>Xeromys myoides</i>	water mouse, false water rat, Yirrkoo	V		V
Birds				
<i>Accipiter novaehollandiae</i>	grey goshawk			
<i>Amaurornis moluccana</i>	(pale-vented) bush-hen		V	
<i>Anthochaera phrygia</i>	regent honeyeater	CE	CE	E
<i>Ardea modesta</i> (syn. <i>Ardea alba modesta</i> )	eastern great egret			
<i>Bubulcus ibis</i> (syn. <i>Ardea ibis</i> )	cattle egret			
<i>Callocephalon fimbriatum</i>	gang-gang cockatoo	E	V	
<i>Calyptorhynchus lathami</i>	glossy black-cockatoo		V	V
<i>Carterornis leucotis</i>	white-eared monarch		V	
<i>Ceyx azureus</i>	azure kingfisher			

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales  
North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
<i>Climacteris picumnus subsp. victoriae</i>	brown treecreeper (eastern subspecies)		V	
<i>Coracina lineata</i>	barred cuckoo-shrike		V	
<i>Daphoenositta chrysoptera</i>	varied sittella		V	
<i>Dasyornis brachypterus</i>	eastern bristlebird	E	E	E
<i>Dicaeum hirundinaceum</i>	mistletoebird			
<i>Dromaius novaehollandiae</i>	emu			
<i>Egretta garzetta</i>	little egret			
<i>Egretta novaehollandiae</i>	white-faced heron			
<i>Ephippiorhynchus asiaticus</i>	black-necked stork		E	
<i>Erythrotriorchis radiatus</i>	red goshawk	V	CE	E
<i>Gymnorhina tibicen</i>	Australian magpie			
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		V	
<i>Haliastur indus</i>	brahminy kite			
<i>Haliastur sphenurus</i>	whistling kite			
<i>Hieraaetus morphnoides</i>	little eagle		V	
<i>Ixobrychus flavicollis</i>	black bittern		V	
<i>Lathamus discolor</i>	swift parrot	CE	E	E
<i>Leucosarcia melanoleuca</i>	wonga pigeon			
<i>Lophoictinia isura</i>	square-tailed kite		V	
<i>Malurus cyaneus</i>	superb fairy-wren			
<i>Malurus lamberti</i>	variegated fairy-wren (central east coast)			
<i>Malurus melanocephalus</i>	red-backed fairy-wren			
<i>Manorina melanocephala</i>	noisy miner			
<i>Manorina melanophrys</i>	bell miner			
<i>Melithreptus gularis</i>	black-chinned honeyeater (eastern)		V	
<i>Merops ornatus</i>	rainbow bee-eater			
<i>Neochmia temporalis</i>	red browed finch/ firetail			
<i>Neophema pulchella</i>	turquoise parrot		V	
<i>Nettapus coromandelianus</i>	cotton pygmy goose		E	
<i>Ninox connivens</i>	barking owl		V	
<i>Ninox strenua</i>	powerful owl		V	V
<i>Numenius madagascariensis</i>	(far) eastern curlew	CE, M		E
<i>Nycticorax caledonicus</i>	Nankeen night heron			
<i>Oxyura australis</i>	blue-billed duck		V	
<i>Pachycephala rufiventris</i>	rufous whistler			
<i>Pandion cristatus (syn. P. haliaetus)</i>	eastern osprey	M	V	
<i>Parvipsitta pusilla</i>	little lorikeet		V	

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales  
North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
<i>Petroica boodang</i>	scarlet robin		V	
<i>Petroica phoenicea</i>	flame robin		V	
<i>Pezoporus wallicus</i>	eastern ground parrot		V	V
<i>Phalacrocorax spp.</i>	cormorants			
<i>Pomatostomus temporalis</i>	grey-crowned babbler		V	
<i>Ptilinopus superbus</i>	superb fruit-dove		V	
<i>Rhipidura albiscapa</i>	grey fantail			
<i>Rostratula australis</i>	Australian painted snipe	E	E	E
<i>Stagonopleura guttata</i>	diamond firetail		V	
<i>Stictonetta naevosa</i>	freckled duck		V	
<i>Stipiturus malachurus</i>	southern emu-wren			V
<i>Synoicus ypsilophorus (syn. Coturnix ypsilophora)</i>	brown quail			
<i>Threskiornis spinicollis</i>	straw-necked ibis	M		
<i>Todiramphus chloris</i>	collared kingfisher		V	
<i>Todiramphus sanctus</i>	sacred kingfisher			
<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet			
<i>Trichoglossus haematodus</i>	rainbow lorikeet			
<i>Tringa nebularia</i>	common greenshank	M		
<i>Tringa stagnatilis</i>	marsh sandpiper	M		
<i>Turnix maculosus</i>	red-backed button-quail		V	
<i>Tyto longimembris</i>	eastern grass owl		V	
<i>Tyto novaehollandiae</i>	masked owl		V	
<i>Tyto tenebricosa</i>	sooty owl		V	
<i>Xenus cinereus</i>	Terek sandpiper	M	V	
<i>Zanda funereal (syn. Calyptorhynchus funereus)</i>	yellow-tailed black-cockatoo			
Reptiles				
<i>Amphibolurus muricatus</i>	Jacky lizard			
<i>Bellatorias major</i>	land mullet			
<i>Boiga irregularis</i>	brown tree snake			
<i>Chelodina longicollis</i>	eastern long-necked turtle			
<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard			
<i>Cyclodomorphus michaeli</i>	mainland she-oak skink			
<i>Egernia mcpheeii</i>	eastern crevice skink			
<i>Eelseya albagula</i>	white-throated snapping turtle	CE		E
<i>Elusor macrurus</i>	Mary River turtle	E		E
<i>Emydura macquarii</i>	Murray River turtle			

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
<i>Hemiaspis signata</i>	black-bellied swamp snake			
<i>Hoplocephalus bitorquatus</i>	pale-headed snake		V	
<i>Intellagama lesueurii</i>	eastern water dragon			
<i>Pseudechis porphyriacus</i>	red-bellied black snake			
<i>Pseudonaja textilis</i>	eastern brown snake			
<i>Tropidechis carinatus</i>	rough-scaled snake			
<i>Wollumbinia georgesi</i>	Bellinger River snapping turtle	CE	CE	
Amphibians				
<i>Adelotus brevis</i>	tusked frog			V
<i>Crinia parinsignifera</i>	beeping froglet			
<i>Crinia tinnula</i>	tinkling frog, wallum froglet		V	V
<i>Lechriodus fletcheri</i>	Fletcher's frog			
<i>Limnodynastes dumerilii</i>	eastern banjo frog (pobblebonk)			
<i>Limnodynastes peronii</i>	brown-striped frog			
<i>Limnodynastes tasmaniensis</i>	spotted grass-frog			
<i>Litoria aurea</i>	green and golden bell frog	V	E	
<i>Litoria brevipalmata</i>	green-thighed frog		V	
<i>Litoria caerulea</i>	green tree frog			
<i>Litoria chloris</i>	red-eyed tree frog			
<i>Litoria citropa</i>	Blue Mountains tree frog			
<i>Litoria dentata</i>	bleating tree frog			
<i>Litoria ewingii</i>	brown tree frog			
<i>Litoria fallax</i>	dwarf green tree frog			
<i>Litoria freycineti</i>	Freycinet's tree frog, wallum rocket frog			V
<i>Litoria jervisiensis</i>	Jervis Bay tree frog			
<i>Litoria latopalmata</i>	broad-palmed frog			
<i>Litoria revelata</i>	revealed tree frog			
<i>Mixophyes iteratus</i>	giant barred frog	E	E	E
<i>Platyplectrum ornatum</i>	ornate burrowing frog			
Invertebrates				
<i>Argynnis hyperbius inconstans</i>	laced fritillary	CE	E	E
<i>Ocybadistes knightorum</i>	black grass-dart, Knight's dart		E	
<i>Petalura gigantea</i>	giant dragonfly		E	
<i>Petalura litorea</i>	coastal petaltail		E	
<i>Thersites mitchellae</i>	Mitchell's rainforest snail	CE	E	
<i>Trapezites symmokus</i>	splendid ochre			
<i>Australothele nambucca</i>	large curtain web spider			

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales  
North Coast and South East Queensland bioregions

Scientific name	Common name	Conservation status <sup>1</sup>		
		EPBC	NSW	Qld
<i>Delias aganippe</i>	spotted Jezebel			
<i>Hypochrysops delicia</i>	moonlight jewel			
<i>Megadolomedes australianus</i>	giant water spider			
<i>Nephila spp.</i>	golden orb weaving spider			
<i>Psychonotis caelius taygetus</i>	small green-banded blue			
<i>Spodoptera picta</i>	lily caterpillar			
<i>Tetragonula carbonaria</i>	stingless native bees			
<i>Tisiphone abeona</i>	varied sword grass brown			
<p><b>Notes</b>  <sup>1</sup>Conservation status refers to species listed as threatened under the relevant national and state legislative acts, at the time this document was prepared (DAWE 2022a).</p>				

Source: DAWE (2022a); Marchant & Higgins (1990, 1993); Higgins & Davies (1996); Higgins (1999); Higgins et al (2001); Higgins & Peter (2002); Van Dyck & Strahan (2008); Cogger (2014).

## 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 in this Conservation Advice, 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 diagnostic characteristics and minimum condition thresholds. Conversely, areas mapped or described as, other units may sometimes meet the key diagnostic characteristics 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 the minimum condition thresholds ([Section 2.3](#)).

State vegetation mapping units are not the listed ecological community. 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 definitively determine if any patch is part of the ecological community.

### B1 New South Wales vegetation classifications

New South Wales (NSW) has a comprehensive state-wide vegetation classification system that identifies Plant Community Types (NSW PCTs). The NSW PCT classification is designed to be the state standard for community-level vegetation mapping. Each NSW PCT has a description of its relationship and degree-of-fit to NSW state-listed threatened ecological communities, where applicable. The NSW PCT classification was recently updated for the east coast area. Examples of NSW PCTs that are likely to correspond (wholly, or in part) to the national ecological community are outlined in [Table 6](#).

**Table 6: Examples of current New South Wales Plant Community Types that are likely to correspond (wholly, or in part) to the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (i.e., where key diagnostic characteristics are met).**

NSW PCT ID	NSW PCT Name
3060	Clarence Lowland Waterhousea Riparian Forest
3067	Far North Floodplain Wet Layered Forest
3088	Lower North Valleys Red Gum Wet Forest
3102	Northern Lowland Swamp Turpentine Wet Forest
3425	Far North Hinterland Swamp Turpentine-Apple Forest
3428	Northern Lowland Red Gum-Swamp Turpentine Grassy Forest
3435	Hunter Coast Lowland Flats Damp Forest
3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub
3553	Northern Sands Bloodwood-Swamp Turpentine Forest
3557	Banyabba Creekflat Orange Gum-Paperbark Forest
3984	Clarence Lowland Paperbark Sedge Swamp Woodland
3991	Far North Sands Swamp Turpentine-Paperbark Forest

NSW PCT ID	NSW PCT Name
4002	Northern Lowland Orange Gum Dry Swamp Forest
4003	Northern Lowland Swamp Turpentine-Mahogany Forest
4020	Coastal Creekflat Layered Grass-Sedge Swamp Forest
4021	Coastal Creekline Dry Shrubby Swamp Forest
4032	Far North Floodplain Red Gum Sedge Forest
4033	Far North Hinterland Flats Mesic Apple Forest
4034	Far North Swamp Oak-Tuckeroo Swamp Fringe Forest
4036	Hunter Coast Lake Flats Apple Forest
4039	Hunter Range Creekflat Apple-Red Gum Forest
4042	Lower North Riverflat Eucalypt-Paperbark Forest
4043	Mid North Lowland Riparian Wet Forest
4045	Northern Lowland Swamp Turpentine-Paperbark Forest
4046	Northern Lowland Swamp Turpentine-Red Gum Forest
4077	Northern Coastal River Oak Wet Forest
4087	Upper Orara Riparian Wet Forest

Source: NSW DPIE (2021); Tozer et al. (in press).

Historically, several other NSW mapping or classification schemes were used that relate, to a greater or lesser degree, to the national ecological community. NSW SC (2010a) records map units from several vegetation surveys and mapping studies that may include components of the NSW state-listed ecological community (whilst noting that there may be additional or unmapped occurrences beyond these surveyed areas). For example, NSW SC (2010a) says that on the Tweed lowlands, this community includes ‘*Eucalyptus tereticornis* - *E. intermedia* - *Lophostemon suaveolens* tall to very tall open forest’ (F5) of Pressey & Griffith (1992) and parts of the ‘Floodplain Wetland Complex’ (FL) dominated by *eucalypts* or *Lophostemon suaveolens* (Pressey & Griffith 1992); and the NSW state-listed ecological community is within the ‘Coastal Floodplain Wetlands’ vegetation class of Keith (2002, 2004).

Table 7 outlines the PCTs in use before the 2021 NSW PCT revisions, that were identified as known to be associated with the NSW state-listed ‘Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion’ (NSW OEH 2020a). They are likely to include patches of the ecological community.

**Table 7: Previous New South Wales vegetation types (as at 2019/20) that may include patches of the ecological community**

Vegetation formations	Vegetation classes	Vegetation types	Previous numeric classifications
Dry sclerophyll forests (shrub/grass sub-formation)	Clarence Dry Sclerophyll Forests	Grey Box - Grey Ironbark grassy open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion	PCT 852 (NSW OEH 2018b) & FE 21 (NSW NPWS 1999)
		Orange Gum ( <i>Eucalyptus bancroftii</i> ) open forest of the NSW North Coast Bioregion	PCT 1062 (NSW OEH 2018b) & NRAC Floristic Group 83 (NRAC 1995)
		Red Ironbark open forest of the coastal lowlands of the NSW North Coast Bioregion	PCT 1091 (NSW OEH 2018b) & FE 71 (in part) (NPWS 1999)
		Yellow Box - Grey Box grassy open forest in the Glenugie area of the NSW North Coast Bioregion	PCT 1333 (NSW OEH 2018b)

Vegetation formations	Vegetation classes	Vegetation types	Previous numeric classifications
	Hunter-Macleay Dry Sclerophyll Forests	Grey Ironbark - Broad-leaved Mahogany - Forest Red Gum shrubby open forest on Coastal Lowlands of the Central Coast	-
Forested wetlands	Coastal Floodplain Wetlands	Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	-
		Forest Red Gum grassy open forest on floodplains of the lower Hunter	PCT 1598 (NSW OEH 2018b) & MU080 (Siverstsen et al. 2011)
	Coastal Swamp Forests	Swamp Box swamp forest of the coastal lowlands of the NSW North Coast Bioregion	PCT 1227 (NSW OEH 2018b)
Grassy woodlands	Coastal Valley Grassy Woodlands	Cabbage Gum - Broad-leaved Apple open forest of the eastern escarpment, NSW North Coast Bioregion and South Eastern Queensland Bioregion	PCT 761 (NSW OEH 2018b) & FE 46 (NSW NPWS 1999)
		Cabbage Gum open forest or woodland on flats of the North Coast	PCT 762 (NSW OEH 2018b)
		Cabbage Gum open forest or woodland on flats of the NSW North Coast Bioregion and New England Tableland Bioregion	PCT 763 (NSW OEH 2018b) & FE 46 (NSW NPWS 1999)
		Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion	PCT 837 (NSW OEH 2018b) & FE 73 (NPWS 1999)
		Grey Box - Forest Red Gum - Grey Ironbark open forest of the hinterland ranges of the North Coast	-
		Narrow-leaved Red Gum woodlands of the lowlands of the North Coast	PCT 971 (NSW OEH 2018b) & NRAC Floristic Group 19 (NRAC 1995)
Wet sclerophyll forests (grassy sub-formation)	Northern Hinterland Wet Sclerophyll Forests	Red Mahogany open forest of the coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	-
Wet sclerophyll forests (shrubby sub-formation)	North Coast Wet Sclerophyll Forests	Blackbutt - Pink Bloodwood shrubby open forest of the coastal lowlands of the NSW North Coast Bioregion	-

Source: NSW OEH (2020a). Further details on previously associated NSW vegetation formations, classes and types is available via the regional distribution and habitat section of the NSW Threatened Ecological Community (TEC) Profile for state-listed ecological community (NSW OEH 2020a).

## B2 Queensland vegetation classifications

Queensland has a comprehensive state-wide vegetation classification system using Regional Ecosystem (Qld REs) designations. Regional ecosystems are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. They were derived from a broad range of information sources including land system, vegetation and geology mapping and reports. The Regional Ecosystem Description Database (REDD) supersedes the regional ecosystem descriptions in Sattler & Williams (1999); and it includes additional regional ecosystems and vegetation communities recognised since 1999.

South Eastern Queensland Bioregion REs that are likely to correspond (wholly, or in part) to the ecological community are outlined in [Table 8](#).

**Table 8: Queensland Regional Ecosystems (Qld REs) that are associated with the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (i.e., where key diagnostic characteristics are met)**

Qld RE	Qld RE Short Description (+ extra descriptive elements if relevant)	BD Status*
12.3.2	<i>E. grandis</i> (flooded gum) +/- <i>E. microcorys</i> (tallowwood), <i>L. confertus</i> (brush box) tall open forest with vine forest understorey (wet sclerophyll) on alluvial plains	Of Concern
12.3.2a	Open forest of <i>E. resinifera</i> (red mahogany) and <i>S. glomulifera</i> subsp. <i>glomulifera</i> (turpentine) with a wet heath understorey	
12.3.3	<i>E. tereticornis</i> (Queensland blue gum) woodland on Quaternary alluvium	Endangered
12.3.3a	<i>E. crebra</i> (narrow-leaved ironbark), <i>C. tessellaris</i> (Moreton Bay ash) woodland to open forest	
12.3.3b	This is now mapped as 12.3.19 and has been superseded and removed from use – it may appear in older versions of Qld RE vegetation mapping and regulations.	
12.3.3d	<i>E. moluccana</i> (grey box) woodland	
12.3.4a	<i>E. bancroftii</i> (orange gum) open woodland, often with <i>M. quinquenervia</i> (broad-leaved paperbark)#	
12.3.7	<i>E. tereticornis</i> (Queensland blue gum) and <i>Casuarina cunninghamiana</i> (river oak) Narrow fringing woodland	Of Concern
12.3.7c	Billabongs and ox-bow lakes containing either permanent or periodic water bodies. Often fringed with <i>E. tereticornis</i> (Queensland blue gum). Old river beds now cut off from regular flow.	
12.3.7d	Aquatic vegetation usually fringed with <i>E. tereticornis</i> (Queensland blue gum). Closed depressions on alluvial plains.	
12.3.10	<i>E. populnea</i> (poplar box) +/- <i>E. tereticornis</i> (Queensland blue gum) grassy woodland/tall woodland on alluvial plains	Endangered
12.3.11	<i>E. tereticornis</i> (Queensland blue gum) +/- <i>E. siderophloia</i> (grey ironbark), <i>C. intermedia</i> (pink bloodwood) open forest on alluvial plains, usually near coast	Of concern
12.3.11a	Open forest of <i>E. tereticornis</i> (Queensland blue gum) and/or <i>E. siderophloia</i> (grey ironbark), <i>L. confertus</i> (brush box) with vine forest understorey	
12.3.11b	<i>E. tereticornis</i> (Queensland blue gum) and/or <i>E. racemosa</i> subsp. <i>racemosa</i> (scribbly gum) +/- <i>E. siderophloia</i> (grey ironbark), <i>L. suaveolens</i> (swamp box), <i>E. seeana</i> (narrow-leaved red gum), <i>E. fibrosa</i> subsp. <i>fibrosa</i> (red ironbark), <i>E. propinqua</i> (grey gum) and <i>A. leiocarpa</i> (rusty gum) open forest	
12.3.12	<i>E. latisinensis</i> (white mahogany) or <i>E. exserta</i> (Queensland peppermint), <i>M. viridiflora</i> var. <i>viridiflora</i> (broad-leaved paperbark) woodland on alluvial plains	No concern at present
12.3.14a	<i>E. racemosa</i> subsp. <i>racemosa</i> (scribbly gum) woodland to open forest.	

Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Qld RE	Qld RE Short Description (+ extra descriptive elements if relevant)	BD Status*
12.3.15	<i>C. intermedia</i> (pink bloodwood), <i>Syncarpia glomulifera</i> (turpentine) open forest on granite outwash +/- <i>E. portuensis</i> (broad-leaved stringybark), <i>C. trachyphloia</i> (brown/white bloodwood), <i>L. suaveolens</i> (swamp box).	Of concern
12.3.19 was 12.3.3b	<i>E. moluccana</i> (grey box) and/or <i>E. tereticornis</i> (Queensland blue gum) and <i>E. crebra</i> (narrow-leaved ironbark) open forest to woodland	Endangered
<p><b>Notes</b></p> <p>Myrtaceae abbreviations: <i>A.</i> = <i>Angophora</i>, <i>C.</i> = <i>Corymbia</i>, <i>E.</i> = <i>Eucalyptus</i>, <i>L.</i> <i>Lophostemon</i>, <i>M.</i> = <i>Melaleuca</i>, <i>S.</i> = <i>Syncarpia</i>.</p> <p>BD Status* = Queensland biodiversity status (unavailable for subdivided REs). The biodiversity status is based on an assessment of the condition of remnant vegetation in addition to the criteria used to determine the class under the Queensland <i>Vegetation Management Act 1999</i>.</p> <p># Will overlap with the nationally-listed Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (e.g., where <i>Melaleuca quinquenervia</i> (broad-leaved paperbark) dominates).</p>		

Source: Qld Herbarium (2021); DAWE (2022a); T Ryan Pers Comm.

## Appendix C – Indigenous Australians and cultural values associated with the ecological community

### C1 Indigenous Australian groups within the distribution of the ecological community

Queensland	Registered Aboriginal Party
Fraser Island and adjacent mainland areas	Butchulla Native Title Aboriginal Corporation
Cherbourg Aboriginal Shire Council, Gympie Regional Council, North Burnett Regional Council, South Burnett Regional Council	Wakka People
Mulgumpin (Moreton Island), Peel Island (Teerk Roo Ra), Minjerribah (Stradbroke Island), the Southern Moreton Bay Islands and the mainland coast (Belmont, Chandler, Tingalpa, Wynnum and Redlands)	Quandamooka Yoolooburrabee Aboriginal Corporation
Brisbane City Council, Bundaberg Regional Council, Fraser Coast Regional Council, Gympie Regional Council, Moreton Bay Regional Council, Noosa Shire Council, North Burnett Regional Council, Somerset Regional Council, Sunshine Coast Regional Council	Kabi First Nation Traditional Owners Native Title Claim Group
Brisbane City Council, Ipswich City Council, Lockyer Valley Regional Council, Logan City Council, Scenic Rim Regional Council, Somerset Regional Council, Southern Downs Regional Council, Toowoomba Regional Council	Yuggera Ugarapul People
Brisbane City Council, Ipswich City Council, Lockyer Valley Regional Council, Logan City Council, Scenic Rim Regional Council, Somerset Regional Council	Jinibara People Aboriginal Corporation
Brisbane City Council, Gold Coast City Council, Logan City Council, Redland City Council, Scenic Rim Regional Council	Danggan Balun (Five Rivers) People
Brisbane City Council	Jagera Daran Pty Ltd, Turrbal Association Inc
Gold Coast City Council, Logan City Council, Scenic Rim Regional Council	Gold Coast Native Title Claim Group
Southern Downs	Githabul Nation Aboriginal Corporation
New South Wales	
Lake Macquarie LGA	Awabakal Local Aboriginal Land Council (LALC)
Richmond Valley Council	Bandjalang People
Lake Macquarie City Council	Bahtabah LALC
Areas surrounding Lake Macquarie	Biraban LALC
Central Coast Council	Darkinjung LALC
Mid-Coast Council	Purfleet-Taree LALC
Mid-Coast Council	Forster Local Aboriginal Land Council
Port Stephens	Worimi LALC
Clarence Valley Council	Gumbaynggirr People
Tenterfield and Kyogle Local Government	Githabul Nation Aboriginal Corporation
Tweed Shire Council	Tweed Byron LALC
Byron Shire Council, Gold Coast City Council, Tweed Shire Council	Tweed River Bundjalung People

Source: NNTT (2021).

## C2 Indigenous names and uses for eucalypt tree species in the ecological community

This glossary is not exhaustive and does not attempt to reflect the diversity or richness of relevant language terms. However, it does aim to acknowledge the ways in which species, that are part of the ecological community, were first voiced in Indigenous Australian languages.

The eucalypts from the ecological community have been named and used by Indigenous people for tens of thousands of years.

The explorer Ludwig Leichhardt travelled with Indigenous people in south-east Queensland during 1843–44. Leichhardt’s record of indigenous taxonomy in Yagara, Wakka, Kabi, and other languages has been related to the current taxonomy of the eucalypts in the ecological community (Fensham 2021), see [Table 9](#). Most species names could be associated across cultures, and they verify the intimate understanding of Indigenous peoples with tree species that are difficult to distinguish in the field.

**Table 9: Summary of indigenous names for eucalypt species from south-east Queensland, according to Ludwig Leichhardt’s Aboriginal informants**

Species	Language group (Informants/guides)				
	Wakka (Charly)	Duungidjawa Wakka (Paddy)	Kabi (Nikki)	Yagara (Pinky, Jacky, plus convict Baker and missionary Eipper)	Wakka, or uncertain (Gumerigo)
<i>Angophora leiocarpa</i>	Mangagaborri, Mingagabarre, Mingagaborri	Bugginagauri			
<i>Angophora subvelutina</i>	Bulburri	Nuckurr	Buppo	Ngukkur	Nickkurr, Nukkur
<i>Angophora woodsiana</i>				Dandorro	
<i>Corymbia citriodora</i>	Manarm	Manarm	Manarm	Gurrar	Benjoe
<i>Corymbia gummifera/ Corymbia intermedia</i>	Bunnair	Bunner	Bunnah		Bun
<i>Corymbia henryi</i>	Damban, Tamban, Dambamm, Dambam	Dambam	Dambam	Urgorka, Uurka, Dambam	
<i>Corymbia tessellaris</i>	Gurran, Wanga	Gudden	Kurrandarr, Kidambar	Gnarran	
<i>Corymbia trachyphloia</i>	Gala	Gaga	Gallai		

Species	Language group (Informants/guides)				
	Wakka (Charly)	Duungidjawan Wakka (Paddy)	Kabi (Nikki)	Yagara (Pinky, Jacky, plus convict Baker and missionary Eipper)	Wakka, or uncertain (Gumerigo)
Mahogany eucalypts ( <i>Eucalyptus acmenoides</i> / <i>E. latisinensis</i> )	Dibilpalam	Jimbiom	Dibilpalam	Turra	
<i>Eucalyptus crebra</i> / <i>E. fibrosa</i> / <i>E. siderophloia</i>	Durro	Tandurr	Malling	Kanei Perah, Jandurro	
<i>Eucalyptus grandis</i>	Buddul	Gnamborro	Dullarr	Hanbru-call	
<i>E. propinqua</i>	Dambirri	Tambir	Dambir	Dambirr	
<i>Eucalyptus melanophloia</i>	Bullah, Bull-la	Kakkarr	Kannaibalam, Tunninbin		
<i>Eucalyptus microcorys</i>	Dil	Jimbiom	Dil		
<i>Eucalyptus moluccana</i>	Mundelli, Mingall	Boargan	Mingall	Mundeli, Mundelli, Gnarran	Bea
<i>Eucalyptus pilularis</i>	Binaroan		Doai		Bundinbil, Binargan
<i>Eucalyptus racemosa</i>	Manderoljam	Manderra	Killambarr	Gerur, Gorr, Gargar Karger, Kangar, Gargar	
<i>Eucalyptus resinifera</i>	Gnauarr	Gnar	Dalla-la		
<i>Eucalyptus robusta</i>	Dadangba	Dadangaba	Dannangen		
<i>Eucalyptus seeana</i>	Binnamdall	Binnamda	Binnamda		
<i>Eucalyptus tereticornis</i>	Mangorri	Manburrir	Yarra-ra	Mongra, Manborri, Mongorr	
<i>Eucalyptus tindaliae</i>	Boa	Boa	Biggin		Mundile
<i>Lophostemon confertus</i>	Tabillillah, Tangpalam	Tangimbam	Uirrauah		
<i>Lophostemon suaveolens</i>	Gnarrabill, Ngarabill	Guannarr	Burrabi, Kurrabi	Bolorta, Bulluritju, Bullorta	Mgarrai
<i>Syncarpia glomulifera</i>	Burrawam, Burrawom	Biuam	Burrumbam		

Note: "/" symbol indicates "or".

Source: Fensham (2021). The language group of the informants assigned according to Jefferies (2013).

Leichhardt's record, together with that of Gairabau (a Dungidau man from south-east Queensland), verifies a broad array of uses for eucalypts (Fensham 2021). The indigenous people who acted as Leichhardt's guides had a precise understanding of the eucalypt species and their uses. The ethnobotany recorded by Leichhardt is greatly enhanced by Gairabau, an Aboriginal man with a thorough knowledge of the language and culture of his people; see [Table 10](#).

**Table 10: Uses of eucalypts recorded by Leichhardt, Gairabau and others from south-east Queensland**

Eucalypt genus/species	Indigenous use
<i>Angophora</i>	Growths contain water. Burns smoky, good for sending signals. A camp was never made where apple trees grew because: 1) they always lean over and interfere with the pitching of humpies and the general arrangement of the camp; and 2) the wood of these trees makes a lot of smoke when it is burnt, and this might blow across the camp. Possums are fat when apple is in flower.
<i>Angophora woodsiana</i>	Swollen growths contain water which can be accessed after opening a fissure evident on the outside of the swelling.
<i>Angophora subvelutina</i>	Medicine. Tapping swelling can yield water, which is mixed with sap and not pleasant, but it will alleviate thirst.
<i>Corymbia citriodora</i>	Wood for clubs.
<i>Corymbia citriodora/ C. henryi</i>	Gum used to treat tooth-ache. Burns without smoke.
<i>Corymbia gummifera/ C. intermedia</i>	Bees' nest, bought down by Nikki. The honey watery, tasting like the liquid in the flowers of <i>Doryanthes excelsa</i> . Gum used as a red dye for staining possum rugs.
<i>Corymbia tessellaris</i>	Burns without smoke.
<i>Eucalyptus acmenoides</i>	For making little canoes.
Mahogany eucalypts: <i>Eucalyptus acmenoides/ E. latisinensis</i>	[Bark] used for canoes.
<i>Eucalyptus crebra/ E. fibrosa/ E. siderophloia</i>	[Swellings] provide water, more drinkable than <i>Angophora</i> . Could also be used to make honey buckets, but was less preferred because the gum tainted the honey. Burns without smoke. Tough wood. Wood for making waddies, Nullah Nullahs (gnirimm), spears (called Pi-lar). Treatment of wounds with hot fire from ironbark. Poultice of powdered ironbark [ashes?] applied to a woman's breasts to purify milk. Powdered [burnt?] bark of ironbark trees rubbed on windows for cleansing after funeral ceremony. Powdered bark, after being burnt, makes a very permanent black paint used for colouring newborn babies and for colouring/ cleansing mothers after they return to camp after childbirth.
<i>Eucalyptus melanophloia</i>	Hollow logs (silver-leaved ironbark preferred because its centre decays quickly) could be used as a fish trap to catch jewfish, eels and turtles.

Eucalypt genus/species	Indigenous use
<i>Eucalyptus moluccana</i> / <i>E. microcorys</i> / <i>E. tindaliae</i> / <i>Syncarpia glomulifera</i>	Bark for huts (e.g., covering).
<i>Eucalyptus pilularis</i>	Bark used for huts. Buckets made from bark, sewn together and sealed with beeswax to hold honey.
<i>Eucalyptus tereticornis</i>	The sap under the bark provided a sweet fluid. Bark for covering hut (in this case European).
yellow jacket [ <i>Eucalyptus tereticornis</i> ?]	Gum when soaked in water with its own bark makes a very lasting yellow stain.
<i>Eucalyptus seeana</i>	Bees' nest found in Binnamdall, containing little or no honey, but containing a mealy substance which tasted like gingerbread. When soft the substance is quite sour. Bee larvae in the lower part of the hive.
common turpentine ( <i>Lophostemon confertus</i> ?)	Medicine, recipe provided incorporating gum to reduce swelling. Spears made from young saplings.
<i>Lophostemon suaveolens</i>	[Bark] preferred for making canoes.
gum tree	Burls on gum trees used to make drinking vessels. Sap sweet for chewing.
stringy bark	Buckets made from bark, sewn together and sealed with beeswax to hold honey. Sap sweet for chewing. Used for wrapping a corpse.

Source: Adapted from Fensham (2021), who cited: Petrie (1904); Arousseau (1968); Winterbotham & Mackenzie (1957); and Darragh & Fensham (2013). Square brackets [ ] are Fensham's insertions.

## Appendix D – Landforms and soils

Further information is included here (and in [Table 11](#)) to help identify floodplains and alluvial soils, for the purposes of identifying the ecological community.

Although floodplains may be occasionally, or more often, saturated, water-logged or inundated, in this document the definition of floodplains is NOT limited to areas of any particular flood frequency. Rather, for the purposes of defining the ecological community, the floodplain is defined by the presence of alluvial landforms.

The ecological community occurs on alluvial landforms related to river floodplains and associated sites where transient water accumulates, including floodplains, river-banks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans.

Compared to the surrounding landscape, the terrain of the floodplains is remarkably flat, and slopes rarely exceed 5° from horizontal, except on localized terraces and river-banks. However, there may be local variation associated with river channels, local depressions, natural levees and river terraces (Keith & Scott 2005).

The edge of the floodplain (and the edge of the alluvial soils) is typically indicated by the break in slope between the river-flat (i.e., the net depositional zone) and the steeper foot slopes (i.e., the net erosional zone) of the adjoining higher land. Changes in slope within the depositional zone (i.e., because of localised terraces and river-banks), are not indicative of the edge of the floodplain. However, as terrain slope decreases, it can be more difficult to locate the edge of the floodplain.

The edge of the floodplain may also be indicated by changes in the vegetation. Vegetation on alluvial deposits is typically more diverse than vegetation in the surrounding landscape – with a denser tree canopy and ground-layer, due to greater water availability because the groundwater in alluvial systems is typically contained in unconfined aquifers within the rooting depth of the vegetation. The greater diversity and abundance of groundcover vegetation (as compared to adjacent slopes) may be visible, particularly of species associated with moister environments, including grasses, forbs, sedges and ferns.

The ecological community occurs on alluvial soils of a variety of textures, including (but not limited to) silts, clay loams and sandy loams, gravel and cobbles. Alluvial soils are very diverse, including examples from many of the major soil groups of the Australian Soil Classification (Isbell 2016) and usually reflect the properties of their parent material in the upper catchment. They may include in-situ subsoils, and colluvial fans where they overlay the alluvial floodplain.

The ecological community is typically found on deep (greater than one metre) alluvial soils; but it may also be found on shallower soils on the margins of the floodplain and in the smaller narrow alluvial systems and floodplain pockets.

Where the alluvial soil is shallower, or occurs as a veneer of alluvial soil over soils derived from other geomorphological processes, it should be considered an alluvial soil for the purposes of identifying the ecological community (if the majority of the root zone is confined to the part of the soil horizon dominated by alluvial processes).

The ecological community does not typically occur on soils that are primarily marine or aeolian sands, but it may occur on such substrates after they have been modified by fluvial activity.

**Table 11: Landform glossary**

Term	Definition
Alluvium/alluvia (alluvial deposits)	Sediment transported and deposited by channelled or overbank stream flow (Speight & Isbell 2009).
Alluvial systems or landforms	Alluvial systems include landform patterns such as alluvial fan, alluvial plain, anastomotic plain, bar plain, covered plain, delta, flood plain, meander plain, playa plain, stagnant alluvial plain, and terrace. Each landform pattern contains one or more landform elements including back plain, bank (stream bank), bar (stream bar), channel bench, drainage depression, fan, flood-out, lagoon, lake, levee, lunette, ox-bow, playa, prior stream, scroll, stream bed, stream channel, swamp, terrace flat, terrace plain, and valley flat. In all these landforms, there may be frequent active erosion and aggradation by channel and overbank stream flow, or the landform may be a relict (residual) from these processes (Speight 2009).
Alluvial terrace (fill terrace, terrace)	Typically a relatively flat (planar), valley marginal feature that is perched above the contemporary channel and/or floodplain. These abandoned floodplains are no longer active. They are generally separated from the contemporary floodplain by a steep slope called a terrace riser. Terraces can be paired or unpaired and are often found as a flight of terraces. (Fryirs & Brierly 2013; River Styles 2020).
Colluvium (colluvial deposits)	Unconsolidated material at the base of a slope, due mainly to gravity, which includes sheet wash as a result of diffuse overland sheet erosion and deposition (Speight & Isbell 2009).
Colluvial fan	When an alluvial fan is built by debris flow, then it is referred to as a debris cone, or colluvial fan.
Floodplain (alluvial flat, river-flat; includes alluvial terraces)	Floodplains are areas of sediment accumulation made up of alluvial materials between or adjacent to (active or abandoned) stream/river/channel banks and the valley margin. They are typically tabular and elongated parallel to active channels. However, they may be highly variable, ranging from featureless, flat-topped landforms, to inclined landforms (typically tilted away from the channel), to irregularly reworked (scoured) landforms (River Styles 2020). Floodplains are often poorly drained, acting as a stilling basin in which fine-grained suspended sediments settle out from over-bank flows. Older, elevated floodplain deposits, along valley margins, are referred to as alluvial terraces (Fryirs & Brierley 2013).
Floodplain pockets	In the middle to upper catchment of a river system, floodplains typically occur as isolated pockets; as opposed to discontinuous, alternating pockets in the sediment transfer zone downstream. Floodplain pockets tend to alternate, as the river switches from one side of the valley to the other, creating planform-controlled floodplain pockets. As slope decreases even further (into the lower catchment), and the valley widens further, floodplain pockets become more frequent, eventually becoming continuous along both banks (adapted from Fryirs & Brierley 2013).
Fluvial sediments	Sediments deposited by the channels of stream flow. This definition includes outwash and landforms that are characteristically produced by flooding conditions (i.e., point bars, floodplains, and terraces).
Nick point	A nick point (or knick point) is part of a river or channel where there is a sharp change in channel slope, such as a waterfall or lake.
Quaternary alluvial systems	Alluvial systems that formed during the last two point five million years.
River-flat	A river-flat is a planar landform element that is neither a crest nor a depression and is level or very gently inclined (less than three percent tangent approximately). Some flats and slopes may have the same inclination (between one and three percent). The slope line on a River-flat often runs parallel to the course line in a nearby open depression (such as a stream channel or river). The slope line of a slope seldom does, instead it makes an angle with the course line (Speight 2009).

## References

- ABARES [Australian Bureau of Agricultural and Resource Economics and Sciences] (2018). *Catchment Scale land use of Australia - Update December 2018*. National compilation of catchment scale land use data for Australia (CLUM). Publication date: 19 March 2019. Last viewed February 2022. <https://www.agriculture.gov.au/abares/aclump/land-use/catchment-scale-land-use-of-australia-update-december-2018>
- Alexander D (1980). *Diet of the tiger quoll (Dasyurus maculatus Kerr) in an area of New England National Park, northeastern New South Wales*. Bachelor of Natural Resources thesis, University of New England, Armidale, New South Wales, Australia.
- Andrade CF, Duarte JB, Barbosa MLF, Andrade MD, Oliveira RO, Delgado RC, Pereira MG, Batista TS & Teodoro PE (2019). Fire outbreaks in extreme climate years in the State of Rio de Janeiro, Brazil. *Land Degradation & Development* 30, 11, 1379–1389. <https://doi.org/10.1002/ldr.3327>
- Arentz F (1974). *Studies on Phytophthora cinnamomi Rands*. PhD Thesis, Australian National University, Canberra. [https://openresearch-repository.anu.edu.au/bitstream/1885/142251/2/b10172014-Arentz\\_F.pdf](https://openresearch-repository.anu.edu.au/bitstream/1885/142251/2/b10172014-Arentz_F.pdf)
- Auld TD & Keith DA (2009). Dealing with threats: Integrating science and management. *Ecological Management & Restoration* 10, 79–87.
- Aurousseau M (1968). *The letters of F.W. Ludwig Leichhardt. Volume 2*. Cambridge University Press, Cambridge.
- Belcher CA (1995). Diet of the tiger quoll *Dasyurus maculatus* in East Gippsland, Victoria. *Wildlife Research* 22, 341–357.
- Berry L (2001). Edge effects of the distribution and abundance of birds in a southern Victorian forest. *Wildlife Research* 28, 239–245.
- Bland L, Keith D, Miller R, Murray N & Rodriguez J (eds) (2017). *Guidelines for the application of IUCN Red List of Ecosystem Categories and Criteria, Version 1.1*. IUCN, Switzerland. <https://www.iucn.org/es/content/guidelines-application-iucn-red-list-ecosystems-categories-and-criteria>
- Blowes WM (1980). *A comparison of the occurrence, sporulation and survival of Phytophthora cinnamomi Rands in soils supporting native forest in south-eastern New South Wales and south-western Western Australia*. PhD Thesis, Australian National University, Canberra. Last viewed March 2022. <https://openresearch-repository.anu.edu.au/handle/1885/10699>
- BOM [Bureau of Meteorology] (2012). *National Water Account. South East Queensland*. Last viewed March 2022. <http://www.bom.gov.au/water/nwa/2012/seq/contextual/physicalinformation.shtml>
- Boulton AJ & Brock MA (1999). *Australian freshwater wetlands: processes and management*. Gleneagles Publishing, Glen Osmond.
- Bowman DMJS, Murphy B, Boer MM, Bradstock R, Cary GJ, Cochrane MA, Fensham RJ, Krawchuk MA, Price OF & Williams RJ (2013). Forest fire management, climate change, and the risk of catastrophic carbon losses. *Frontiers in Ecology and the Environment* 11, 66–68.
- Braby MF (2004). *The complete field guide to butterflies of Australia*. CSIRO Publishing, Collingwood.
- Bradshaw CJA (2012). Little left to lose: deforestation and forest degradation in Australia since European colonization. *Journal of Plant Ecology* 5, 1, 109–120. <https://academic.oup.com/jpe/article/5/1/109/1294916>

- Burnett S (2000). *The ecology and endangerment of the spotted tailed quoll*, *Dasyurus maculatus gracilis*. Ph.D. dissertation, James Cook University of North Queensland, Townsville, Australia.
- Byrne D (1988). *Aboriginal heritage of the North Coast*. Discussion paper prepared by the NSW Department of Planning and the National Parks and Wildlife Service.
- Canadell JG, Meyer CPM, Cook GD, Dowdy A, Briggs PR, Knauer J, Pepler A & Haverd V (2021). Multi-decadal increase of forest burned area in Australia is linked to climate change. *Nature Communications* 12, article 6921. <https://doi.org/10.1038/s41467-021-27225-4>
- Capon S, James C & Reid M (eds) (2016). *Vegetation of Australian Riverine Landscapes: Biology, Ecology and Management*. CSIRO Publishing.
- Carritt R (1999). *Natural tree hollows - essential for wildlife*. Formerly produced by NSW National Parks and Wildlife Service, as Land for Wildlife Note 5. <https://www.environment.nsw.gov.au/resources/nature/Factsheet5TreeHollows.pdf>
- Clark GF & Johnston EL (2016b). Coasts: Population growth and urban development, in *Australia state of the environment 2016*. Department of the Environment and Energy, Canberra.
- Cogger HG (2000). *Reptiles and Amphibians of Australia*, 6<sup>th</sup> edition. Reed New Holland, Sydney.
- Cole I, Lunt ID & Koen T (2004). Effects of soil disturbance, weed control and mulch treatments on establishment of *Themeda triandra* (Poaceae) in a degraded White Box (*Eucalyptus albens*) woodland in central western New South Wales. *Australian Journal of Botany* 52, 629-637. <https://www.publish.csiro.au/bt/bt04010>
- Council of Heads of Australasian Herbaria (undated). *Australian Plant Census*. Last viewed April 2022. <https://biodiversity.org.au/nsl/services/search/taxonomy>
- Cousens R, Kennedy D, Maguire G & Williams K (2013). *Just how bad are coastal weeds? Assessing the geo-eco-psycho-socio-economic impacts*. RIRDC Publication No. 13/032. Rural Industries Research and Development Corporation, Canberra. [http://birdlife.org.au/documents/BNB-Coastal\\_weeds\\_report.pdf](http://birdlife.org.au/documents/BNB-Coastal_weeds_report.pdf)
- CSIRO (undated). *Atlas of Living Australia*. Last viewed April 2022. <https://www.ala.org.au/>
- Dai A (2012). Increasing drought under global warming in observations and models. *Nature Climate Change* 3, 52–58. <https://doi.org/10.1038/NCLIMATE1633>
- Darragh T & Fensham R (eds) (2013). The Leichhardt diaries. Early travels in Australia during 1842-1844. *Memoirs of the Queensland Museum- Culture* 7, i-x, 1–540. <https://network.qm.qld.gov.au/About+Us/Publications/Memoirs+of+the+Queensland+Museum/893+MQM-C+Vol+7>
- Davis NE, Bennett A, Forsyth DM, Bowman DMJS, Lefroy EC, Wood SW, Woolnough AP, West P, Hampton JO & Johnson CN (2016). A systematic review of the impacts and management of introduced deer (family Cervidae) in Australia. *Wildlife Research* 43, 515–532.
- Davis NE, Coulson G & Forsyth DM (2008). Diets of native and introduced mammalian herbivores in shrub-encroached grassy woodland, south-eastern Australia. *Wildlife Research* 35, 684–694.
- DAWE [Department of Agriculture, Water and the Environment] (2020a). Pteropus poliocephalus — Grey-headed Flying-fox *SPRAT Profile*. Species Profile and Threats Database. Last viewed April 2022. [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=186](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=186)
- DAWE (2020b). *The Australian Google Earth Engine Burnt Area Map (AUS GEEBAM) dataset*. Developed by The Remote Sensing and Landscape Science Branch, Science Economics and Insights Division, New South Wales Department of Planning, Industry and Environment. <http://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B8CE7D6BE-4A82-40D7-80BC-647CB1FE5C08%7D>

- DAWE (2020c). *Australia, World Heritage Areas*. Commonwealth of Australia.  
<http://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B6C54FE6C-2773-47C6-8CBC-4722F29081EF%7D>
- DAWE (2020d). *Ramsar Wetlands of Australia*. Australian Government: with data compiled through cooperative efforts of the States/Territories Government wetland agencies.  
<http://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7BF49BFC55-4306-4185-85A9-A5F8CD2380CF%7D>
- DAWE (2020e). *Collaborative Australian Protected Areas Database (CAPAD) 2020 - Terrestrial*. Data supplied to the Commonwealth for compilation by States and Territories of Australia, as well as a number of large environmental non-government organisations.  
<http://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B4448CACD-9DA8-43D1-A48F-48149FD5FCFD%7D>
- DAWE (2021a). *Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*.  
<http://www.environment.gov.au/biodiversity/threatened/communities/pubs/171-conservation-advice.pdf>.
- DAWE (2021b). *Flying-foxes and national environmental law*. Last viewed April 2022.  
<https://www.awe.gov.au/environment/biodiversity/threatened/species/flying-fox-law>
- DAWE (2022a). *Species Profile and Threats Database*. Last viewed March 2022.  
<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- DAWE (2022b). *Fire regimes that cause declines in biodiversity as a key threatening process*.  
<https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/fire-regimes-that-cause-declines-in-biodiversity>
- DCC [Department of Climate Change] (2009). *Climate Change Risks to Australia's Coast: A First Pass National Assessment*. Commonwealth of Australia. Last viewed April 2022.  
<https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-risks-australias-coasts>
- DoE [Department of the Environment] (2013). *Interim Biogeographic Regionalisation for Australia (Subregions - States and Territories) Version 7*. Last viewed March 2022.  
<https://environment.gov.au/land/nrs/science/ibra>
- DoE (2015). *Arrive Clean, Leave Clean: guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems*. Commonwealth of Australia. Last viewed March 2022. [www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean](http://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean)
- DEE [Department of Environment and Energy] (2016a). *Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis*. Commonwealth of Australia. Last viewed March 2022.  
[www.environment.gov.au/biodiversity/threatened/publications/tap/infection-amphibians-chytrid-fungus-resulting-chytridiomycosis-2016](http://www.environment.gov.au/biodiversity/threatened/publications/tap/infection-amphibians-chytrid-fungus-resulting-chytridiomycosis-2016)
- DEE (2016b). *Threat Abatement Advice for the key threatening process 'Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species'*. Commonwealth of Australia. Last viewed March 2022. <https://www.environment.gov.au/biodiversity/threatened/threat-abatement-advice/beak-feather-disease>
- DEE (2018). *Conservation advice (incorporating listing advice) for the Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*. <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/141-conservation-advice.pdf>.
- Dorrough J, Yen A, Turner V, Clark S, Crossthwaite J & Hirth J (2004). Livestock grazing management and biodiversity conservation in Australian temperate grassy landscapes. *Australian Journal of Agricultural Research* 55, 279–295.

- DSEWPC [Department of Sustainability, Environment, Water, Population and Communities] (2011). *Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC*. Commonwealth of Australia. Last viewed April 2022. <http://www.environment.gov.au/resource/survey-guidelines-australias-threatened-mammals-guidelines-detecting-mammals-listed>
- Dunlop M & Brown PR (2008). *Implications of climate change for Australia's National Reserve System: A preliminary assessment*. Report to the Department of Climate Change. Commonwealth of Australia.
- Duursma DE, Gallagher RV, Roger E, Hughes L, Downey PO & Leishman MR (2013). Next-generation invaders? Hotspots for naturalised sleeper weeds in Australia under future climates. *PLoS One* 8, 12.
- Eby P & Law B (2008). *Ranking the feeding habitats of Grey-headed flying foxes for conservation management* – a report for The Department of Environment and Climate Change (NSW) & The Department of Environment, Water, Heritage and the Arts. <https://www.environment.nsw.gov.au/resources/threatenedspecies/GHFFmainreport.pdf>
- Ellis WAH, Melzer A, Green C, Newgrain K, Hindell MA & Carrick FN (1995). Seasonal variation in water flux, field metabolic rate and food consumption of free ranging koalas. *Australian Journal of Zoology* 43, 59–68.
- Ewers RM & Didham RK (2007). The effect of fragment shape and species' sensitivity to habitat edges on animal population size. *Conservation Biology* 21, 926–936.
- Eyre T, Maron M, Mathieson MT & Haseler M (2009). Impacts of grazing, selective logging and hyper-aggressors on diurnal bird fauna in intact forest landscapes of the Brigalow Belt, Queensland. *Austral Ecology* 34, 705–716.
- Fairman TA, Nitschke CR & Bennett LT (2022). Carbon stocks and stability are diminished by short-interval wildfires in fire-tolerant eucalypt forests. *Forest Ecology and Management* 505.
- Fensham RJ (2021). Leichhardt's ethnobotany for the eucalypts of south-east Queensland. *Australian Journal of Botany* 69, 4, 185–214. Abstract at: <https://www.publish.csiro.au/bt/BT21007>
- Fensham RJ, Laffineur B, Collingwood TD, Beech E, Bell S, Hopper SD, Phillips G, Rivers MC, Walsh N & White M (2020). Rarity or decline: Key concepts for the Red List of Australian eucalypts. *Biological Conservation* 243. <https://doi.org/10.1016/j.biocon.2020.108455>
- Fleming PA, Amnderson H, Prendergast AS, Bretz MR, Valentine LE & Hardy GESTJ (2014). Is the loss of Australian digging mammals contributing to a deterioration in ecosystem function? *Mammal Review* 44, 94–108.
- Fryirs KA & Brierley GJ (2013). *Geomorphologic Analysis of River Systems: An approach to Reading the Landscape*. John Wiley and Sons, Chichester.
- Gallagher RV & Leishman MR (2015). Invasive plants and invaded ecosystems in Australia: implications for biodiversity, in A Stow, N Maclean & GI Holwell (eds) *Austral ark: the state of wildlife in Australia and New Zealand*. Cambridge University Press. pp. 105–133.
- Gerrettson-Cornell L (1986). *Phytophthora cinnamomi in New South Wales*. Forestry Commission of NSW. Government Printer, Sydney.
- Gibbons P & Lindenmayer D (2002). *Tree hollows and wildlife conservation in Australia*. CSIRO Publishing.
- Goldin SR & Hutchinson MF (2014). Coarse woody debris reduces the rate of moisture loss from surface soils of cleared temperate Australian woodlands. *Soil Research* 52, 637–644.
- Good M, Smith R & Pettit N (2017). Forests and Woodlands of Australia's Rivers and Floodplains, in DA Keith (ed), *Australian Vegetation*, 3<sup>rd</sup> edition. Cambridge University Press. pp. 281–313.

- Gooden B, French K & Turner PJ (2009a). Invasion and management of a woody plant, *Lantana camara* L., alters vegetation diversity within wet sclerophyll forest in southeastern Australia. *Forest Ecology and Management* 257, 960–967.
- Gooden B, French K, Turner PJ & Downey PO (2009b). Impact threshold for an alien plant invader, *Lantana camara* L., on native plant communities. *Biological Conservation* 142, 2631–2641
- Goodrick GN (1970) *A survey of wetlands of coastal New South Wales*. Technical Memorandum No. 5. CSIRO, Canberra.
- Haering R & Fox BJ (1997). Habitat use by sympatric populations of *Pseudomys novaehollandiae* and *Mus domesticus* in coastal heathland. *Australian Journal of Ecology* 22, 1, 69–80.
- Harrison S & Kelley D (2017). Projected changes in Australian fire regimes during the 21st century and consequences for ecosystems. *International Journal of Wildland Fire* 26, 9.
- Higgins PJ (ed) (1999). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 4). Oxford University Press, Melbourne.
- Higgins PJ & Davies SJJF (eds) (1996). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 3). Oxford University Press, Melbourne.
- Higgins PJ & Peter JM (eds) (2002). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 6). Oxford University Press, Melbourne.
- Higgins PJ, Peter JM & Steele WK (eds) (2001). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 5). Oxford University Press, Melbourne.
- HLW [Healthy Land & Water] (2016a). *Regional Ecosystems of South East Queensland: RE 12.3.11*. Factsheet 6. Uploaded in November 2018 to: <https://hlw.org.au/download/re-12-3-11-queensland-blue-gum-queensland-grey-ironbark-and-pink-bloodwood/>
- HLW (2016b). *Regional Ecosystems of South East Queensland: RE 12.3.3*. Factsheet 3. Uploaded in November 2018 to: <https://hlw.org.au/download/re-12-3-3-queensland-blue-gum-woodland-to-open-forest-on-alluvial-plains/>
- HLW (2017a). *Regional Ecosystems of South East Queensland: RE 12.3.2*. Factsheet 2. Uploaded in November 2018 to: <https://hlw.org.au/download/re-12-3-2-flooded-gum-tall-open-forest-on-alluvial-plains/>
- HLW (2017b). *Regional Ecosystems of South East Queensland: RE 12.3.7*. Factsheet 5. Uploaded in November 2018 to: <https://hlw.org.au/download/re-12-3-7-queensland-blue-gum-and-river-oak-fringing-woodlands/>
- Isbell R (2016). *The Australian Soil Classification*. National Committee on Soil and Terrain, CSIRO.
- James T (1994). Observations on the effects of mowing on native species in remnant bushland, western Sydney. *Cunninghamia* 3, 3, 515–519.
- Jefferies A (2013). Leichhardt: his contribution to Australian Aboriginal linguistics and ethnography. *Memoirs of the Queensland Museum* 7, 633–652.
- Johnston SG, Slavich PG & Hirst P (2003) Alteration of groundwater and sediment geochemistry in a sulfidic backswamp due to *Melaleuca quinquenervia* encroachment. *Australian Journal of Soil Research* 41, 1343–1367.
- Jones ME & Baramatu LA (2000). Niche differentiation among sympatric Australian dasyurid carnivores. *Journal of Mammalogy* 81, 434–447.
- Jones ME, Rose RK & Burnett S (2001). *Dasyurus maculatus*. *Mammalian Species* 676, 1–9. <https://academic.oup.com/mspecies/article/doi/10.2307/0.676.1/2600795>
- Keith DA (2002). *A compilation map of native vegetation for New South Wales*. NSW Biodiversity Strategy. NSW National Parks and Wildlife Service, Sydney.
- Keith DA (2004). *Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT*. NSW Department of Environment and Conservation, Sydney.

- Keith DA, Allen SP, Gallagher RV, Mackenzie BDE, Auld TD, Barrett S, Buchan A, English V, Gosper C, Kelly D, McIllwee A, Melrose RT, Miller BJ, Neldner J, Tolsma AD, White MD, Rogers D, van Leeuwen S, Yates CJ & Tozer MG (in press). Fire-related threats and transformational change in Australian ecosystems. *Global Ecology and Biogeography*, in press. <https://doi.org/10.1111/geb.13500>
- Keith DA & Scott J (2005). Native vegetation of coastal floodplains – a diagnosis of the major plant communities in New South Wales. *Pacific Conservation Biology* 11, 81–84.
- Kemper CM & Wilson BA (2008). New Holland Mouse, *Pseudomys novaehollandiae*, in S Van Dyck & R Strahan (eds), *The Mammals of Australia*, 3<sup>rd</sup> edition. Reed New Holland, Sydney. pp. 643–644.
- Laurance WF, Lovejoy TE, Vasconcelos HL, Bruna EM, Didham RK, Stouffer PC, Gascon C, Bierregaard RO, Laurance SG & Sampaio E (2002). Ecosystem Decay of Amazonian Forest Fragments: a 22-Year Investigation. *Conservation Biology* 16, 3, 605–618  
<https://doi.org/10.1046/j.1523-1739.2002.01025.x>
- Law BS (1994). Nectar and pollen: dietary items affecting the abundance of the common blossom bat *Syconycteris australis* in south-eastern Australia. *Austral Ecology* 19, 425–434.
- Law BS, Chidel M & Turner G (2000). The use by wildlife of paddock trees in farmland. *Pacific Conservation Biology* 6, 130–143.
- Lindenmayer DB, Claridge AW, Gilmore AM, Michael D & Lindenmayer BD (2002) The ecological roles of logs in Australian forests and the potential impacts of harvesting intensification on log-using biota. *Pacific Conservation Biology* 8, 121–140.
- Littlejohn MJ, Roberts JD, Watson GF & Davies M (1993). Ch. 7 Family Myobatrachidae, in *Fauna of Australia 2A - Amphibia*. Australian Government Publishing Services.  
<https://www.environment.gov.au/system/files/pages/dc11235d-8b3b-43f7-b991-8429f477a1d4/files/07-fauna-2a-amphibia-myobatrachidae.pdf>
- Lunt ID (2005). Technical Report 18. *Effects of Stock Grazing on Biodiversity Values in Temperate Native Grasslands and Grassy Woodlands in SE Australia: A Literature Review*. Environment ACT.  
[http://client5.matrix01.act.gov.au/\\_data/assets/pdf\\_file/0007/576817/Technical\\_Report\\_18.pdf](http://client5.matrix01.act.gov.au/_data/assets/pdf_file/0007/576817/Technical_Report_18.pdf)
- Marchant S & Higgins PJ (eds) (1990). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 1). Oxford University Press, Melbourne.
- Marchant S & Higgins PJ (eds) (1993). *Handbook of Australian, New Zealand and Antarctic Birds* (Volume 2). Oxford University Press, Melbourne.
- Marsh J, Bal P, Fraser H, Umbers K, Greenville A, Rumpff L & Woinarski J (2021). *Assessment of the impacts of the 2019-20 wildfires of southern and eastern Australia on invertebrate species*. NESP Threatened Species Recovery Hub Project 8.3.1 Final report, Brisbane.  
[https://www.nespthreatenedspecies.edu.au/media/b2oi2hyc/8-3-1-assessment-of-the-impacts-of-the-2019-20-wildfires-of-southern-and-eastern-australia-on-invertebrate-species-final-report\\_v3.pdf](https://www.nespthreatenedspecies.edu.au/media/b2oi2hyc/8-3-1-assessment-of-the-impacts-of-the-2019-20-wildfires-of-southern-and-eastern-australia-on-invertebrate-species-final-report_v3.pdf)
- McDougall KL & Summerell BA (2003). The impact of *Phytophthora cinnamomi* on the flora and vegetation of New South Wales a re-appraisal, in J McComb, G Hardy & I Tommerup (eds), *Phytophthora in Forests and Natural Ecosystem*. Proceedings of the 2nd International IUFRO Meeting, Western Australia, September 2001. pp. 49–56.
- Mitchell PJ, O'Grady AP, Pinkard EA, Brodribb TJ, Arndt SK, Blackman CJ, Duursma RA, Fensham RJ, Hilbert DW, Nitschke CR, Norris J, Roxburgh SH, Ruthrof KX & Tissue DT (2016). An ecoclimatic framework for evaluating the resilience of vegetation to water deficit. *Global Change Biology* 22, 1677–1689. <https://doi.org/10.1111/gcb.13177>

- Makinson RO, Pegg GS & Carnegie AJ (2020). *Myrtle Rust in Australia – A National Action Plan*. Australian Plant Biosecurity Science Foundation, Canberra. Last viewed April 2022.  
<https://www.anpc.asn.au/myrtle-rust/>
- MRCCC [Mary River Catchment Coordinating Committee] (2005). *Fauna fact sheet Tusked frog*.  
<https://mrccc.org.au/wp-content/uploads/2013/10/Fact-sheet-Tusked-frog.pdf>
- National Committee on Soil and Terrain (2009). *The Australian Soil and Land Survey Field Handbook*. CSIRO.
- Neldner VJ, Wilson BA, Dillewaard HA, Ryan TS, Butler DW, McDonald WJF, Addicott EP & Appelman CN (2020). *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1*. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.  
<https://www.publications.qld.gov.au/dataset/d8244c14-d879-4a11-878c-2b6d4f01a932/resource/6dee78ab-c12c-4692-9842-b7257c2511e4/download/methodology-mapping-surveying-v5-1.pdf>
- NNTT [National Native Title Tribunal] (2021). *Search National Native Title Register*.  
[www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/Search-National-Native-Title-Register.aspx](http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/Search-National-Native-Title-Register.aspx)
- Nolan RH, Boer MM, Collins L, Resco de Dios V, Clarke H, Jenkins M, Kenny B & Bradstock RA (2020). Causes and consequences of eastern Australia's 2019-20 season of mega-fires. *Global Change Biology*, 26, 1039–1041.
- NRAC [National Resources Audit Council]. (1995). *Vegetation Survey and Mapping of Upper North East New South Wales*. NSW National Parks & Wildlife Service. Coffs Harbour.
- NSW DEC [Department of Environment and Conservation] (2005). *Recovering Bushland on the Cumberland Plain: Best Practice Guidelines for the Management and Restoration of Bushland*.  
<https://www.environment.nsw.gov.au/resources/nature/RecoveringCumberlandPlain.pdf>
- NSW DECC [Department of Environment and Climate Change] (2008). *Recovery plan for the koala (Phascolarctos cinereus)*. Last viewed April 2022.  
<https://www.environment.nsw.gov.au/research-and-publications/publications-search/recovery-plan-for-the-koala-phascolarctos-cinereus>
- NSW DECCW [Department of Environment, Climate Change and Water] (2010). *Cumberland Plain Recovery Plan*. Last viewed March 2022.  
<https://www.environment.nsw.gov.au/research-and-publications/publications-search/cumberland-plain-recovery-plan> and <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Recovery-plans/cumberland-plain-recovery-plan-100501.pdf>
- NSW DPE [Department of Planning and Environment] (2022). *Threatened ecological communities*. Last viewed April 2022.  
<https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/threatened-ecological-communities>
- NSW DPIE [Department of Planning, Industry and Environment] (2020). *Seven reasons to love our flying-foxes*. Last viewed April 2022.  
<https://www.environment.nsw.gov.au/news/seven-reasons-to-love-our-flying-foxes>
- NSW DPIE (2021). *NSW State Vegetation Type Map (SVTM). Pre-Release v1.1.0 Eastern NSW Extant Plant Community Type*. Full package. <https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map>. Data is available on request under a Restricted Data Licence – Contact [bionet@environment.nsw.gov.au](mailto:bionet@environment.nsw.gov.au)

- NSW NPWS [National Parks and Wildlife Service] (1999). *Forest Ecosystem Classification and Mapping for the Upper and Lower North East CRA regions*. A project undertaken for the Joint Commonwealth NSW Regional Forest Agreement Steering Committee as part of the NSW Comprehensive Regional Assessments. Project number NA35/EH. CRA Unit, Northern Zone NPWS, Coffs Harbour.
- NSW OEH [Office of Environment and Heritage] (2017a). *Eastern Pygmy-possum – profile*. Last viewed September 2021. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10155>
- NSW OEH (2017b). *Southern Myotis - profile*. Last viewed April 2022. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549>
- NSW OEH (2017c). *High frequency fires resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition - key threatening process listing*. Last viewed April 2022. <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/high-frequency-fire-disruption-of-life-cycle-processes-key-threatening-process-listing>
- NSW OEH (2017d). *Bandicoots*. Last viewed April 2022. <https://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/native-animal-facts/bandicoots>
- NSW OEH (2018a). *A review of koala tree use across New South Wales*. Last viewed April 2022. <https://www.environment.nsw.gov.au/research-and-publications/publications-search/a-review-of-koala-tree-use-across-new-south-wales>
- NSW OEH (2018b). *BioNet Vegetation Classification*. Last viewed March 2022. <http://www.bionet.nsw.gov.au/>
- NSW OEH (2019). *Responding to heat stress in flying-fox camps*. Last viewed December 2021. <https://www.environment.nsw.gov.au/topics/animals-and-plants/wildlife-management/flying-fox-management/flying-fox-camp-management/responding-to-heat-stress-in-flying-fox-camps>
- NSW OEH (2020a). *Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion – profile*. Last viewed February 2022. <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10944>
- NSW OEH (2020b) *Common Blossom-bat – profile*. Last viewed February 2022. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10785>
- NSW OEH (2021). *Brush-tailed Phascogale - profile*. Last viewed March 2022. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10613>
- NSW OEH (2022). *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – profile*. Last viewed March 2022. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10787>
- NSW SC [Scientific Committee] (2002a). *Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands - Key threatening process listing*. Last viewed April 2022. <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/alteration-to-the-natural-flow-regimes-key-threatening-process-listing>
- NSW SC (2002b). *Infection of native plants by Phytophthora cinnamomi - key threatening process listing*. Last viewed April 2022. <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/infection-of-native-plants-by-phytophthora-cinnamomi-key-threatening-process-listing>

- NSW SC (2010a). *Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion - Determination to make minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act*. Last viewed March 2022.  
<https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/subtropical-coastal-floodplain-forest-minor-amendment-determination>
- NSW SC (2010b). *Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions - Determination to make minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act*. Last viewed March 2022.  
<https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/freshwater-wetlands-coastal-floodplains-determination-amendment>
- NSW SC (2011). *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions – Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act*. Last viewed April 2022.  
<https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2011-2012/river-flat-eucalypt-forest-on-coastal-floodplains-minor-amendment-determination>
- Pahl L (2019). Macropods, feral goats, sheep and cattle. 2. Equivalency in what and where they eat. *The Rangeland Journal* 41.
- Paice R & Chambers J (2016). *Climate change impacts on coastal ecosystems*. Impact Sheet 8. National Climate Change Adaptation Research Facility, Gold Coast.  
[https://coastadapt.com.au/sites/default/files/factsheets/T312\\_9\\_Coastal\\_Ecosystems.pdf](https://coastadapt.com.au/sites/default/files/factsheets/T312_9_Coastal_Ecosystems.pdf)
- Petrie C (1904). *Tom Petrie's reminiscences of early Queensland dating from 1837*. Watson Ferguson, Brisbane.
- Pocock Z & Lawrence RE (2005). How far into a forest does the effect of a road extend? Defining road edge effect in eucalypt forests of south-eastern Australia.  
*Australian Mammalogy* 36, 1, 1–14 <https://doi.org/10.1071/AM13005>
- Pressey RL (1989a). Wetlands of the lower Clarence floodplain, northern coastal New South Wales. *Proceedings of the Linnean Society of NSW* 111, 143–155.
- Pressey RL (1989b) Wetlands of the lower Macleay floodplain, northern coastal New South Wales. *Proceedings of the Linnean Society of NSW* 111, 157–168.
- Pressey RL & Griffith SJ (1992). Vegetation of the coastal lowlands of Tweed shire, northern New South Wales, species and conservation. *Proceedings of the Linnean Society of NSW* 113, 203–243.
- Pressey RL & Middleton MJ (1982). Impacts of flood mitigation works on coastal wetlands. *Wetlands* 2, 27–45.
- Qld DES [Queensland Department of Environment and Science] (2018). Land cover change in Queensland 2016-17 and 2017-18: Statewide Landcover and Trees Study (SLATS), from *Data summaries 1988–2018* version 1.0. DES, Brisbane. December 2018.  
<https://www.data.qld.gov.au/dataset/land-cover-change-in-queensland/resource/1dbc127a-a72b-4b10-96bf-c637a515847a>
- Qld DES (2021). *Bremer Catchment Story*. WetlandInfo Queensland. Last viewed April 2022.  
<https://wetlandinfo.des.qld.gov.au/wetlands/ecology/processes-systems/water/catchment-stories/transcript-bremer.html>
- Qld [Queensland] Herbarium (2021). *Regional Ecosystem Description Database (REDD)*. Version 12.1 (December 2021). Qld DES Brisbane. Last downloaded March 2022.  
<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/download>

- River Styles (2020). *River Styles, Geomorphic Unit Quick Reference Guide*. McQuarrie University, the University of Auckland, NSW Department of industry, Australian research Council. <https://riverstyles.com/river-styles-toolkit/geomorphic-unit-quick-reference-guide/>
- Roger E, Duursma DE, Downey PO, Gallagher RV, Hughes L, Steel J & Leishman MR (2015). A tool to assess potential for alien plant establishment and expansion under climate change. *Journal of Environmental Management*, 159, 121–127.
- Royal Botanic Gardens & Domain Trust (2020). *PlantNET – New South Wales Flora Online* (The Plant Information Network System of The Royal Botanic Gardens and Domain Trust Version 2.0). Last viewed April 2022. <http://plantnet.rbg Syd.nsw.gov.au/>
- Ryan T (2022). Personal communication 7 & 11 February. Science Leader, Ecosystem Survey and Mapping, Department of Environment and Science.
- Sanchez-Bayo F & Wyckhuys KAG (2019). Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation* 232, 8–27.
- Sattler P & Williams R (eds) (1999). *The conservation status of Queensland's bioregional ecosystems*. Queensland Environmental Protection Agency, Queensland Government. Brisbane.
- Saunders DL & Tzaros C (2011). *National Recovery Plan for the Swift Parrot Lathamus discolor*. Last viewed April 2022. <http://www.environment.gov.au/resource/national-recovery-plan-swift-parrot-lathamus-dicolor>
- SCEE [Standing Committee on the Environment and Energy] (2017) *Inquiry into flying-fox management in the eastern states – Flying-foxes: background and impacts*. Last viewed April 2022. [https://www.aph.gov.au/Parliamentary\\_Business/Committees/House/Environment\\_and\\_Energy/Flyingfoxmanagement/Report/section?id=committees%2Freportrep%2F024037%2F24314](https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/Flyingfoxmanagement/Report/section?id=committees%2Freportrep%2F024037%2F24314)
- Seebeck J, Menkhorst P, Wilson BA & Lowe KM (compilers) (1996). *Flora and Fauna Guarantee Action Statement No. 74, New Holland Mouse Pseudomys novaehollandiae*. Victoria Department of Sustainability and Environment (prepared for web publication 2003). [https://www.environment.vic.gov.au/data/assets/pdf\\_file/0019/32356/New\\_Holland\\_Mouse\\_Pseudomys\\_novaehollandiae.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0019/32356/New_Holland_Mouse_Pseudomys_novaehollandiae.pdf)
- Shea G (2004). Sheoak skinks (*Cyclodomorphus casuarinae* complex), in R Hitz, G Shea, A Hauschild, K Henle & H Werning (eds), *Blue-tongued skinks: Contributions to Tiliqua and Cyclodomorphus*. Matthias Schmidt Publications, USA.
- Silver MJ & Carnegie AJ (2017). *An independent review of bell miner associated dieback*. Final report prepared for the Project Steering Committee: systematic review of bell miner associated dieback. <https://www.environment.nsw.gov.au/resources/vegetation/bell-miner-associated-dieback-independent-review.pdf>
- Sivertsen D (2009). *Native Vegetation Interim Type Standard*. NSW Department of Environment, Climate Change and Water, Sydney. <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Maps-and-data/native-vegetation-interim-type-standard-100060.pdf>
- Sivertsen D, Roff A, Somerville M, Thonell J & Denholm B (2011). *Greater Hunter Native Vegetation Mapping Geobase Guide (Version 4.0)*. Internal report for the Office of Environment and Heritage, Department of Premier and Cabinet, Sydney.
- Simberloff D & Rejmánek M (eds) (2011). *Encyclopedia of biological invasions* (No. 3). University of California Press.
- Smith AP & Quin D (1996). Patterns and causes of extinction and decline in Australian conilurine rodents. *Biological Conservation* 77, 243–267.

- Smith P & Smith J (2010). Urban Edge Effects in the Blue Mountains, New South Wales: Implications for Design of Buffers to Protect Significant Habitats. *Pacific Conservation Biology* 16, 2, 92–100.
- Specht RL (1970). Vegetation, in GW Leeper (ed), *The Australian Environment*, 4<sup>th</sup> edition. CSIRO and Melbourne University Press, Melbourne. pp. 44–67.
- Speight JG (2009). Landform, in *Australian soil and land survey field handbook*, 3<sup>rd</sup> edition. National Committee on Soil and Terrain. CSIRO Publishing, Melbourne.
- Speight JG & Isbell RF (2009). Substrate, in *Australian soil and land survey field handbook*, 3<sup>rd</sup> edition. National Committee on Soil and Terrain. CSIRO Publishing, Melbourne.
- Standards Reference Group SERA (2021). *National Standards for the Practice of Ecological Restoration in Australia*, edition 2.2. Society for Ecological Restoration Australasia. Last viewed February 2021. <http://www.seraaustralasia.com/pages/standards.html>
- State of NSW (2021). *Rural boundary clearing code for New South Wales*. NSW Rural Fire Service. [https://www.rfs.nsw.gov.au/\\_data/assets/pdf\\_file/0014/231422/Rural-Boundary-Clearing-Code-for-New-South-Wales.pdf](https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0014/231422/Rural-Boundary-Clearing-Code-for-New-South-Wales.pdf)
- State of NSW & the NSW EPA [Environment Protection Authority] (2021). *NSW State of the Environment 2021*. Tabled Report. <https://www.soe.epa.nsw.gov.au/> Last viewed February 2021. [https://www.soe.epa.nsw.gov.au/sites/default/files/2022-02/21p3448-nsw-state-of-the-environment-2021\\_0.pdf](https://www.soe.epa.nsw.gov.au/sites/default/files/2022-02/21p3448-nsw-state-of-the-environment-2021_0.pdf)
- Tidemann CR (1998). Grey-headed Flying-fox, *Pteropus poliocephalus*, Temminck, 1824. In: R Strahan (ed). *The Mammals of Australia*. Frenchs Forest: New Holland Publishers Pty Ltd.
- Tozer M (2003). The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* 8, 1, 1–75.
- Tozer MG, Turner K, Keith DA, Tindall D, Pennay C, Simpson C, Mackenzie B, Beukers P & Cox S (2010). Native Vegetation of Southeast NSW: A revised classification and map for the coast and eastern tablelands. *Cunninghamia* 11, 359–406.
- Tozer MG, Simpson CS & Keith DA (in press). Subtropical-temperate forested wetlands of coastal south-eastern Australia – an analysis of vegetation data to support ecosystem risk assessment at regional, national and global scales. *Pacific Conservation Biology*.
- Trimble S (2019). *The forest canopy: structure, roles and measurement*. Last viewed April 2022. <https://cid-inc.com/blog/the-forest-canopy-structure-roles-measurement/>
- Troughton E (1954). The marsupial "tiger" cat. *The Australian Museum Magazine* 11, 168–170.
- TSSC [Threatened Species Scientific Committee] (2001). *Commonwealth Listing Advice on Pteropus poliocephalus (Grey-headed Flying-fox)*. Last viewed April 2022. <http://www.environment.gov.au/biodiversity/threatened/species/p-poliocephalus.html>
- TSSC (2011). *Advice on the presence of hybrids in listed ecological communities*. Last viewed January 2022. <https://www.environment.gov.au/biodiversity/threatened/publications/advice-presence-hybrids-listed-ecological-communities>
- TSSC (2017). *Guidelines for nominating and assessing the eligibility for listing of ecological communities as threatened according to the Environment Protection and Biodiversity Conservation Act 1999 and the EPBC Regulations 2000*. <http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/guidelines-ecological-communities.pdf>
- Turner V (1983). Nonflying mammal pollination: an opportunity in Australia, in EG Williams, RB Knox, JH Gilbert & P Bernhardt (eds), *Pollination '82*. Melbourne University Press. pp. 110–22.

- Van Dyck S & Strahan R (2008). *The Mammals of Australia*, 3<sup>rd</sup> edition. Reed New Holland, Sydney.
- Welbergen J, Klose S, Markus, N & Eby P (2008). Climate change and the effects of temperature extremes on Australian flying-foxes. *Proceedings of the Royal Society of London B* 275, 419–425. [https://espace.library.uq.edu.au/view/UQ:135282/A629\\_Welbergen.pdf](https://espace.library.uq.edu.au/view/UQ:135282/A629_Welbergen.pdf) (and <https://doi.org/10.1098/rspb.2007.1385>)
- Wilson BA & Laidlaw WS (2003). Habitat characteristics for New Holland mouse *Pseudomys novaehollandiae* in Victoria. *Australian Mammalogy* 25, 1–11.
- Wilson PR & Taylor PM (2012). *Land Zones of Queensland*. Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane.
- Winterbotham LP & Mackenzie W (1957). *Gaiarbau's story of the Jinibara tribe of South East Queensland and its neighbours*. Fryer Library manuscript on file at University of Queensland, Australia.
- Woinarski JCZ, Burbidge AA & Harrison PL (2015). Ongoing unravelling of a continental fauna: Decline and extinction of Australian mammals since European settlement. *Proceedings of the National Academy of Sciences of the United States of America* 112, 15, 4531–4540. <https://doi.org/10.1073/pnas.1417301112>

### Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

### Creative Commons licence

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to [copyright@awe.gov.au](mailto:copyright@awe.gov.au).

### Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Climate Change, Energy, the Environment and Water (2022), *Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions*, Canberra.

This publication is available at the [SPRAT profile for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions](#)

Department of Climate Change, Energy, the Environment and Water  
GPO Box 3090, Canberra ACT 2601  
Telephone 1800 803 772  
Web [www.dcceew.gov.au](http://www.dcceew.gov.au)

The Australian Government acting through the Department of Climate Change, Energy, the Environment and Water has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Climate Change, Energy, the Environment and Water, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

### Version history table

Document type	Title	Date
Consultation draft	Draft Conservation Advice for the Subtropical eucalypt forest on the floodplains of eastern Australia	10/12/2021
Approved Conservation Advice	Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	5/10/2022