Flora and Fauna assessment
Private Native Forestry

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Document history and status

Revision	*Date*	*Description*	*Author*	*Review*
Rev 0	28/02/2024	draft report	Tom Pollard	Nick Cameron
Rev 1	05/03/2024	V.1 report	Tom Pollard	Dungog Shire Council

Executive Summary

Birdwing Ecological Services has been engaged to complete a flora and fauna assessment in relation to a development application (DA) for proposed Private Native Forestry (PNF) operations on Lot/DP 86/753169 at 517 Main Creek Road, Main Creek.

The proposed forestry operations will be carried out under a PNF Plan approved under Part 5b of the *Local Land Services Act 2013* and undertaken in accordance with the minimum operating standards set out in the Northern NSW PNF Code of Practice (PNF Code).

Silvicultural techniques to be used within the Forest Management Plan (FMP) area consist of thinning, single tree selection (STS), and Australian group selection (AGS). Thinning and STS aims to remove between one quarter and one third of the basal area. This will commonly generate post-harvest basal areas of between 25m^2 and 30m^2 per hectare.

Areas excluded from the proposed operations (non-harvest areas) include: mapped rainforest, mapped old growth forest, steep slopes, rocky outcrops and cliffs and associated buffers, riparian buffer zones (applied to mapped and unmapped drainage lines), and threatened species records. In total these areas comprise approximately 28 hectares or one third of the assessment area.

The following biodiversity matters apply to the proposal:

- Plant Community Types (PCTs) at the site were assigned to (best fit): *PCT 3170 Northern Hinterland White Mahogany Moist Grassy Forest, PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest, PCT 3169 Northern Hinterland Tallowwood-Brush Box Wet Forest, PCT 3100 Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest,* and *PCT 3089 Lower North Waterhousea Riparian Rainforest*
- *PCT 3100 Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest, and PCT 3089 Lower North Waterhousea Riparian Rainforest* are also consistent with the characteristics of NSW and federally listed Threatened ecological communities (TECs). However, rainforests are excluded from harvesting in accordance with the PNF code, so no significant impact on these TECs would occur.
- The area planned for forestry operations covers approximately 58 hectares. It is proposal is to selectively harvest the forest within this area (the net harvest area) over a 10-15 year period. The main log products will be high quality logs, low-quality logs, and pulpwood. Mosaic low intensity burning is proposed to promote forest and understorey health, facilitate regeneration, and reduce fuel hazards. The operations will abide by the minimum standards for environmental protection set out in the PNF code which include prescriptions for threatened species.
- No NSW or federally listed threatened flora were recorded in the surveys. Assessment of significance (5-part test under BC Act and/or MNES

assessment of significance under the EPBC Act) were undertaken for four species that have potential to occur but which could not be adequately surveyed. The conclusion of the assessment of significance was that the proposed harvesting operations would be unlikely to result in a significant impact on any threatened flora species.
- The following NSW and/or federally listed threatened fauna were recorded in the surveys: Koala, Greater Glider, and Sooty Owl. A variety of other threatened fauna were considered potential occurrences that could not be adequately surveyed based on site habitats and previous records in the locality.

A statutory assessment was completed for the proposal with regard to:

- *Biodiversity Conservation Act 2016*.
- *Environment Protection and Biodiversity Conservation Act 1999*.
- *State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020)*.

Statutory assessments determined that:

- The proposal would be unlikely to result in a significant impact on any threatened species or ecological communities listed under the BC Act.
- The proposal would be unlikely to result in a significant impact on any Matters of National Environmental Significance (MNES) and therefore would not require referral to the federal Minister of the Department of Climate Change, Energy, the Environment and Water (DCCEEW).
- The site contains potential koala habitat under Koala SEPP 2020. Surveys indicated that no core koala habitat is present and therefore preparation of a Plan of Management is not required.

To minimise any residual environmental impacts of the proposal, several recommended mitigation measures have been adopted by the landholder. These measures which are in addition to the prescriptions of the PNF code include:

- Active control of lantana and other noxious weeds,
- Biosecurity protocols for harvesting and roading machinery,
- Survey of new road lines for threatened flora.

1. Introduction

1.1 Background

Birdwing Ecological Services has been engaged to complete a flora and fauna assessment in relation to a development application (DA) for proposed Private Native Forestry operations on Lot/DP 86/753169 at 517 Main Creek Road, Main Creek.

The forestry operations will be carried out under a Private Native Forestry (PNF) approved under Part 5b of the *Local Land Services Act 2013* and undertaken in accordance with the minimum operating standards set out in the Northern PNF Code of Practice (PNF Code).

The aims of the flora and fauna assessment are to:

- assess the potential of the site to support threatened species and communities listed in the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and determine whether the proposal would result in a significant impact on any of these species;
- identify the presence of key habitat features within the site, including areas containing high conservation value hollow-bearing trees;
- assess the proposal under relevant NSW and commonwealth environmental legislation; and
- identify potential impacts of the proposed development on biodiversity values and to provide recommended mitigation measures to minimise these impacts.

1.2 The proposal

The property is the subject of an existing Forest Stewardship Plan that was approved by Local Land Services under a Forest Stewardship Pilot Program in June 2023. The Plan sets out the broader forest management objectives for the property and activities to be undertaken to achieve those objectives.

The forestry operations proposed on the property are described in a separate Forest Management Plan which forms part of this Development Application. The stated objectives of the Forest Management Plan are:

1. To enhance the health and productive capacity of the forest while maintaining ecological processes.

2. To generate sufficient incomes from timber sales to cover the cost of forest ownership and management.

The proposed forestry operations will be spread in space and time with a total of approximately 58 hectares of forest to be lightly harvested over a 10-15 year period. Timber harvesting will generate a mix of high-quality logs, low-quality logs and pulpwood.

Areas excluded from forestry operations (non-harvest areas) include: mapped rainforest, mapped old growth forest, steep slopes, rocky outcrops and cliffs and associated buffers, riparian buffer zones (applied to mapped and unmapped drainage lines), and threatened species records. Together these areas account for one third of the assessment area.

The proposed forestry operations include:

- upgrading of access infrastructure used in the forest operations,
- selective timber harvesting and silvicultural treatment,
- fire management, and;
- pest and weed control.

An overview of the proposed forestry operations planned is provided below:

Upgrading of access infrastructure

This includes improving the drainage and alignment of existing roads and tracks to conform with the PNF Code; constructing new access roads and crossings to permit truck access, upgrading of existing log dumps and construction of new logs dumps.

Selective timber harvesting and silvicultural treatment

Selective harvesting techniques to be used within the net harvest area:

- thinning
- single tree selection
- Australian group selection

All three silvicultural techniques will be applied. Commercial thinning from below will be the most used technique. It will occur in the even-aged regrowth which dominate the net harvest area on the upper and lower slopes. Non-commercial thinning (stem treatment) will be applied in a subset of this area where tree stocking density is very high.

The aim of the thinning will be to retain and provide more room for co-dominant trees with good form and vigour to grow and develop and to remove subdominant and suppressed stems that have poor form and poor vigour. The activity will promote the health of the retained trees by proving them with more light and space.

Single tree selection (STS) will occur in stands that have groups of early mature trees as well as stands with a variety of tree ages and sizes. STS will remove individual trees that have reached commercial maturity and which

are not required for habitat retention under the PNF Code. Stands containing these trees are scattered throughout the property.

Australian group selection will be limited to the tall moist forests on the shelf and slopes in the middle of the property where there are groups of large commercially mature trees. AGS would consist of harvesting of groups (small patches or stands) of trees, thereby creating an opening in the forest canopy. AGS will be implemented to support regeneration of shade-intolerant eucalypt species that have difficulty regenerating in smaller canopy openings. On the FMP map AGS will be limited to the area coloured yellow in the middle of the property being the forest that is not defined as having high koala habitat suitability.

The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Thinning and STS aims to remove between one quarter and one third of the basal area. This will commonly generate post-harvest basal areas of between 25m^2 and 30m^2 per hectare. The intensity of the proposed harvesting may be described as light. Under the PNF Code the basal area may be reduced to 14m2/ha.

Fire management

A low intensity mosaic burn is proposed prior to harvesting. Following harvesting felled tree heads will be burnt to reduce fuel hazard and provide favourable conditions for regeneration.

Pest and weed management

Active control of *Lantana* and other exotic weeds is being implemented under the Forest Stewardship Plan and is proposed to continue to reduce the risk of spread by forestry operations.

LLS will be engaged to assist with wild dog control using bates and traps.

The operations will abide by the minimum standards for tree retention set out in the PNF code. These include:

- 10 hollow bearing trees per 2 hectares, where available.
- A maximum of 2 dead standing trees may contribute to the total of 10 hollow-
- bearing trees per 2 hectares (see bullet point directly above) where available.
- One recruitment tree, representing the range of species in the forest before
- forestry operations commenced, must be retained for every hollow bearing
- tree.
- Where the total number of hollow bearing trees is less than 10 trees per 2
- hectares, additional recruitment trees must be retained to bring the total
- number of retained hollow bearing and recruitment trees up to 20 trees per 2
- hectares.

- Up to half of all required recruitment trees can be located in a riparian exclusion zone where the subject 2-hectare area is within 200 metres of, and partly includes, that riparian exclusion zone.
- A minimum of 6 feed trees per 2 hectares should be retained where available.
- All feed trees that have marks or 'V' notches from sap-feeding mammals
- must be retained.
- All roost, nest or food resource trees to be retained.
- All trees with large stick nests (50cm or larger) must be retained and protected with a 50 metre radius exclusion zone around the nest.

Several additional threatened species-specific prescriptions as detailed in the PNF code will also apply.

1.3 The site

The site is located at 517 Main Creek Road, Main Creek (Lot 86 DP753169) approximately 10 km north of Dungog as shown in Figure 1.

The gross area of the property is 90 ha. The site area is 86 hectares being the forested land on the property. For the purposes of the ecological assessment, excluded areas as per the PNF Forest Management Map (~28 hectares) were not assessed in detail as these are not proposed for forestry operations.

The site has been the subject of previous major disturbances events including, broad scale clearing of the upper and lower sections (most likely in the early to mid 1900s), and several selective logging events in the mid-section in the mid to late 1900s.

Surrounding land uses include beef cattle grazing, forestry and environmental conservation.

Figure 1 The site

2. Methodology

2.1 Desktop Assessment

The following information review was completed to inform the site assessment:

- A search of the BioNet Atlas of NSW Wildlife within a 10 km radius centred on the subject site (completed 14th July 2023).
- A search of the Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) within a 5 km radius of the site (completed 14th July 2023).
- A search of the NSW DPI Fisheries Spatial Data Portal for waterways in the study area.
- Review of weeds listed under the *Biosecurity Act 2015* for the Dungog LGA.

2.2 Site Survey

A survey of the biodiversity features of the site was undertaken over the period of 1st-5th August 2023.

2.2.1 Flora survey

A selection of three floristic plots were undertaken using the Biodiversity Assessment Method (BAM) within representative vegetation types on the site. These plots will be permanent locations for future monitoring of vegetation condition.

Vegetation was mapped to NSW plant community type (PCT) and, where relevant, threatened ecological community (TEC), using a combination of existing vegetation mapping (NSW state vegetation type map (SVTM), State Government of NSW and Department of Planning and Environment 2022), a random meander of the site, and data collected from the floristic plots. Where the vegetation map in this report varies from that contained within the PNF Forest Management Plan (FMP), the map in the FMP prevails.

Searches for potentially occurring threatened flora were also conducted when traversing tracks and at BAM plot locations.

2.2.2 Fauna survey

The fauna survey consisted of spotlighting, Koala SAT plots, and passive fauna recording as detailed below.

Spotlighting was undertaken on two consecutive nights. Consisting of a minimum 1 km traverse for two teams of two people. Target fauna was Koala and Greater Glider.

Spot Assessment Technique (SAT) plots were assessed at four locations within the site to search for koala scats and evidence of usage.

Two sites were selected for passive fauna survey (remote cameras), primarily to target non-arboreal mammals (e.g. Long-nosed Potoroo, Parma Wallaby, Red-necked Pademelon, Spotted Tailed-Quoll).

Identification of areas containing key habitat features for threatened fauna (particularly areas of mature forest with abundant hollow-bearing trees) was also undertaken.

2.3 Survey Limitations

The best fit PCTs were selected based on species cover-abundance and rapid point data collected in the current survey and previous NSW state mapping of the area. Although these selections are the 'best fits', it should be noted that for some of these communities the cover-abundance data of dominant species in the PCT description did not match seamlessly to what was present on the site. Another confounding factor was the time since last bushfire over much of the property which has led to a moderate to dense midstorey of mesophyllous shrubs more common in wetter forest communities that are not typical components of these PCTs.

It was not possible to undertake targeted surveys across the site for all potentially occurring threatened flora species due to time and cost constraints. Where suitable habitat for a particular threatened flora species was present on the site, that species was assumed present and potential impacts were assessed by way of a test of significance (5-part test under the BC Act).

The fauna survey only provides a 'snapshot' of fauna usage at the time of the survey. It was not possible to undertake targeted surveys across the site for all potentially occurring threatened fauna species due to time and cost constraints. However, the techniques utilised provide suitable sampling for a range of fauna with an emphasis on targeting threatened species most likely to occur within the study area. Based on previous fauna records within the locality and knowledge of site vegetation communities and available fauna habitats, predictions of usage for a range of threatened fauna species not directly targeted can be made with a reasonable level of confidence. Potential impacts were assessed by way of a test of significance (5-part test under the BC Act).

3. Results

3.1 Desktop Assessment

3.1.1 BioNet Atlas search

Results of the BioNet Atlas of NSW Wildlife search returned the following records within a 10 km radius search area centred on the site (refer to Appendix A):

- 25 threatened ecological communities (5 of which have equivalent listings under the EPBC Act);
- 6 threatened flora species (5 of which are also listed under the EPBC Act); and
- 38 threatened fauna species (10 of which are also listed under the EPBC Act).

3.1.2 Protected Matters Search Tool (PMST)

Results of the EPBC Act Protected Matters Search indicated that the following threatened entities may occur within the 5 km radius search area centred on the site (refer to Appendix A):

- 4 threatened ecological communities (TECs);
- 14 threatened flora species;
- 33 threatened fauna species; and
- 13 migratory species.

3.1.3 NSW DPI Fisheries Mapping

DPI Fisheries Key Fish Habitat (KFH) mapping indicates that a very small length of approximately 250 m of an unnamed creek in the south-eastern section of the site is mapped as KFH. Topographic mapping identifies this waterway as non-perennial.

The DPI fisheries spatial data portal indicates that none of the waterways on the site are mapped as potential habitat for any threatened fish species listed under the Fisheries Management Act (FM Act).

3.1.4 Habitat connectivity

The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest.

The site does not coincide with any mapped key fauna corridors (Scotts 2003). However, there are several corridors within 500 m to the north of the site. Focal threatened forest fauna species identified for the nearest corridor to the site is the Yellow-bellied Glider. A small area of approximately 11 ha of key fauna habitat is also mapped over the westernmost section of the site.

3.1.5 Weeds

An online search of NSW DPI Weedwise indicates that there are 146 weeds listed under the *Biosecurity Act 2015* for the Hunter (including the Dungog LGA).

3.2 Flora survey

3.2.1 Threatened Flora

No threatened plant species were recorded as part of BAM plot assessments or opportunistically during other aspects of the survey.

3.2.2 Plant Community Types (PCTs)

The following Plant Community Types were identified as occurring at the site (refer to Figure 2):

- PCT 3170 Northern Hinterland White Mahogany Moist Grassy Forest
- PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest
- PCT 3169 Northern Hinterland Tallowwood-Brush Box Wet Forest
- PCT 3100 Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest
- PCT 3089 Lower North Waterhousea Riparian Rainforest

A description of each of these communities is provided below.

PCT 3170 Northern Hinterland White Mahogany Moist Grassy Forest

Mapped over 38.8 ha of the site, PCT 3170 occurs mostly on the moderate to steep eastern slopes (refer to Plate 3.1 and Figure 2).

The overstorey of this community is dominated by several eucalypts, with the most common a mix of Small-fruited Grey Gum (*E. propinqua*), White Mahogany (*E. acmenoides*) and Tallowwood (*E. microcorys*). Ironbarks (*E. placita* and *E. siderophloia*) and Turpentine (*Syncarpia glomulifera*) are also present, with the latter being common around drainage lines and protected aspects. Spotted Gum (*Corymbia maculata*) is not present or if present, rare.

The density of the midstorey varies, with lower slopes being sparser, and a dense layer of rainforest shrubs present on the mid and upper slopes. Common rainforest midstorey species include Guoia (*Guoia semiglauca*), Hard Alectryon (*Alectryon subdentatus*), Native Hibiscus (*Hibiscus heterophyllus*) and White Bolly Gum (*Neolitsea dealbata*). The exotic weed Lantana (*Lantana camara*) is also common.

Understorey species include Blady Grass (*Imperata cylindrica*), Snow Grass (*Poa sieberiana*), and Basket Grass (*Oplismenus* spp.) on the lower slopes where the midstorey is sparser, and Maidenhair Fern (*Adiantum formosum*), Sickle Fern (*Pellaea falcata*), Spiny-headed Mat-rush (*Lomandra longifolia*), and Blue Flax-lily (*Dianella caerulea*) in moister sites.

This forest is an even-aged regrowth that has been previously cleared (most likely for cattle grazing in the early to mid-1900s) and allowed to regenerate 40-60 years ago. Lantana is common, particularly in areas with a broken canopy. There are very few large old trees and tree hollows occur at low density and are small to medium in dimension. The overall condition of this community is moderate to high.

Plate 3.1 PCT 3170

PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest

Mapped over 28.6 ha of the site, PCT 3241 occurs mostly on the upper plateau and ridges (refer to Plate 3.2 and Figure 2).

The overstorey of this community is dominated by a mixture of several eucalypts, with the most common being Small-fruited Grey Gum (*E. propinqua*), White Mahogany (*E. acmenoides*), and Tallowwood (*E. microcorys*). Spotted Gum (*Corymbia maculata*) is also present and is dominant or sub-dominant in some areas. Ironbarks (*E. placita* and *E. siderophloia*) and Turpentine (*Syncarpia glomulifera*) are also present to a lesser degree, with the latter being common around drainage lines and protected aspects.

A moderate to dense midstorey of mostly rainforest shrubs is present with common species including False Rosewood (*Synoum glandulosum*), Black Plum (*Diospyros australis*), Lilly Pilly (*Acmena smithii*), Tree Heath (*Trochocarpa laurina*)

and Sweet Pittosporum (*Pittosporum undulatum*). Lantana (*Lantana camara*) is also common.

Common understorey species include Orange Thorn (*Pittosporum multiflorum*), Snow Grass (*Poa sieberiana*), Rasp Fern (*Doodia aspera*), Spiny-headed Mat-rush (*Lomandra longifolia*), and Pastel Flower (*Pseuderanthemum variabile*).

Similarly to 3170, most of this PCT was previously cleared, most likely in the early to mid 1900s, and allowed to grow back 40-60 years ago. Lantana is common in parts, particularly along tracks and in areas with a broken canopy. In general there are few large old trees and tree hollows occur mostly at a low density and are small to medium in dimension. The overall condition of this community is moderate to high.

Plate 3.2 PCT 3241

PCT 3169 Northern Hinterland Tallowwood-Brush Box Wet Forest

PCT 3169 Occurs on a relatively small area 6.2 ha of the mid and upper protected slopes, often adjacent to rainforest areas (refer to Plate 3.3 and Figure 2).

The overstorey of this particular community is dominated by Blue Gum (*E. saligna*) and Brush Box (*Lophostemon confertus*) with White Mahogany (*E. acmenoides*), and Tallowwood (*E. microcorys*) also present.

Common midstorey species include Tree Heath (*Trochocarpa laurina*), *Cryptocarya* spp., False Rosewood (*Synoum glandulosum*), Breynia (*Breynia oblongifolia*) and

Hairy Psychotria (*Psychotria loniceroides*). Vines are also prominent including Kangaroo Vine (*Cissus antarctica*) and Water Vine (*C. hypoglauca*).

The understorey species commonly include Rasp Fern (*Doodia aspera*), Blue Flax-lily (*Dianella caerulea*), and Pastel Flower (*Pseuderanthemum variabile*).

The condition of this PCT on the site varies from low to high, depending on the level of past disturbance. Some steep areas have old growth forest that has had limited disturbance. These areas containing very large mature trees with large hollows and are of high conservation value to hollow-dependent native fauna (note, these areas have been mapped as old growth and are excluded from forestry operations). Other areas are dominated by large semi-mature to mature regrowth with occasional over-mature trees often with damaged crowns. These areas have all been subject to selective logging in the past and include heavily disturbed areas with dense infestations of Lantana and kangaroo vine where the forest canopy hasn't regenerated.

Plate 3.3 Area of protected mapped old growth PCT 3169

PCT 3100 Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest

This rainforest PCT was mapped over an area of 11.1 ha of the site, occurring on sheltered aspects and within deep protected drainage lines (refer to Plate 3.4).

The overstorey is highly fragmented. Overstorey species include Giant Stinging Tree (*Dendrocnide excelsa*) and Brush Bloodwood (*Baloghia inophylla*). Blue Gum (*Eucalyptus saligna*) is present as a widely scattered emergent. Many areas of this community on the site are substantially disturbed and occur with a heavily broken canopy, reduced canopy tree species diversity and a dense Lantana (*Lantana camara*) midstorey.

Native Quince (*Alectryon subcinereus*), *Mischocarpus australis*, White Bolly Gum (*Neolistea dealbata*), *Daphnandra apetala*, Native Tamarind (*Diploglottis australis*), Black Plum (*Diospyros australis*), and Orange Thorn (*Pittosporum multiflorum*) are common in the midstorey. Extensive areas of Lantana are prominent where previous disturbance has occurred and opened up the canopy.

Kangaroo Vine (*Cissus antarctica*) is abundant, and the understorey includes various ferns such as Maidenhair Fern (*Adiantum formosum*), Sickle Fern (*Pellaea falcata*), and Pastel Flower (*Pseuderanthemum variabile*).

The accessible parts this forest have been heavily logged historically. The overall condition of this community is low to moderate depending on the degree of disturbance. Lantana is very common, particularly in areas with a broken canopy. Tree hollows are uncommon, but large hollows are present in mature emergent eucalypts (mostly Blue Gum (*E. saligna*) and stags).

Plate 3.4 PCT 3100 showing heavy disturbance and infestation with Lantana

PCT 3089 Lower North Waterhousea Riparian Rainforest

PCT description adapted from the NSW Vegetation Information System (this PCT was not surveyed on the site).

This PCT is mapped over a very small area of 0.7 ha in the far south-east section of the site associated with alluvial soils around a minor waterway (refer to Figure 2).

The overstorey is dominated by Weeping Lilly Pilly (*Waterhousea floribunda*). Sub-canopy and midstorey species typically include Sandpaper Fig (*Ficus coronata*) Cheese Tree (*Glochidion ferdinandi*) and Native Olive (*Notelaea longifolia*). and

Kangaroo Vine (Cissus antarctica), Bower Vine (*Pandorea pandorana*) are also common.

Understorey species include Mat Rush (*Lomandra hystrix*), Rasp Fern (*Doodia aspera*) and Orange Thorn (*Pittosporum multiflorum*).

The condition of this PCT is unknown, but likely to be low to moderate with substantial Lantana infestation, as for other rainforest communities surveyed on the site.

3.2.3 Biodiversity Assessment Method (BAM) vegetation integrity plots

Data was collected from three vegetation integrity survey plots within PCT 3170 Northern Hinterland White Mahogany Moist Grassy Forest and PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest. These are the most common PCTs on the site.

Vegetation integrity scores from sampled vegetation integrity survey plots are shown in Table 3.1 Vegetation integrity scores

Table 3.1 Vegetation integrity scores

PCT name	*VI plot ID*	*Location (easting, northing GDA 2020, zone 56)*	*Composition condition score*	*Structure condition score*	*Function condition score*	*VI score*
PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest	BAM plot 1, BAM plot 2	385096, 6424443 385806, 6423988	81.6	60.5	99.9	79
PCT 3170 Northern Hinterland White Mahogany Moist Grassy Forest	BAM plot 3	385723, 6424388	80.3	59.1	65	67.2

For PCT 3241 the overall condition was moderate to high. The BAM composition condition and function condition (fallen dead wood, hollows, tree size classes, leaf litter) were high. The structure condition structure condition was moderate. Note that data was only measured in two representative BAM plots within this PCT, which was not intended to measure the full variation in condition across the site.

For PCT 3170 the overall condition was moderate. The BAM composition condition was high, while structure condition and function condition (fallen dead wood, hollows, tree size classes, leaf litter) were moderate. Note that data was only measured in two representative BAM plots within this PCT, which was not intended to measure the full variation in condition across the site.

3.2.4 Threatened Ecological Communities (TECs)

Two TECs occur within the site coinciding with rainforest vegetation formations as listed below (refer to Figure 3):

- Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions (coincides with PCT 3100)
- Lowland rainforest on floodplain in the NSW North Coast Bioregion (coincides with PCT 3089)

PCT 3089 and part of PCT 3100 occurring on alluvium in the easternmost drainage line on the site may also be consistent with the equivalent EPBC Act listed TEC 'Lowland Rainforest of Subtropical Australia' if the vegetation meets key condition thresholds (Department of Sustainability, Environment, Water, Population and Communities 2011). PCT 3100 is not consistent with this EPBC Act TEC as this community does not occur on basalt or alluvium.

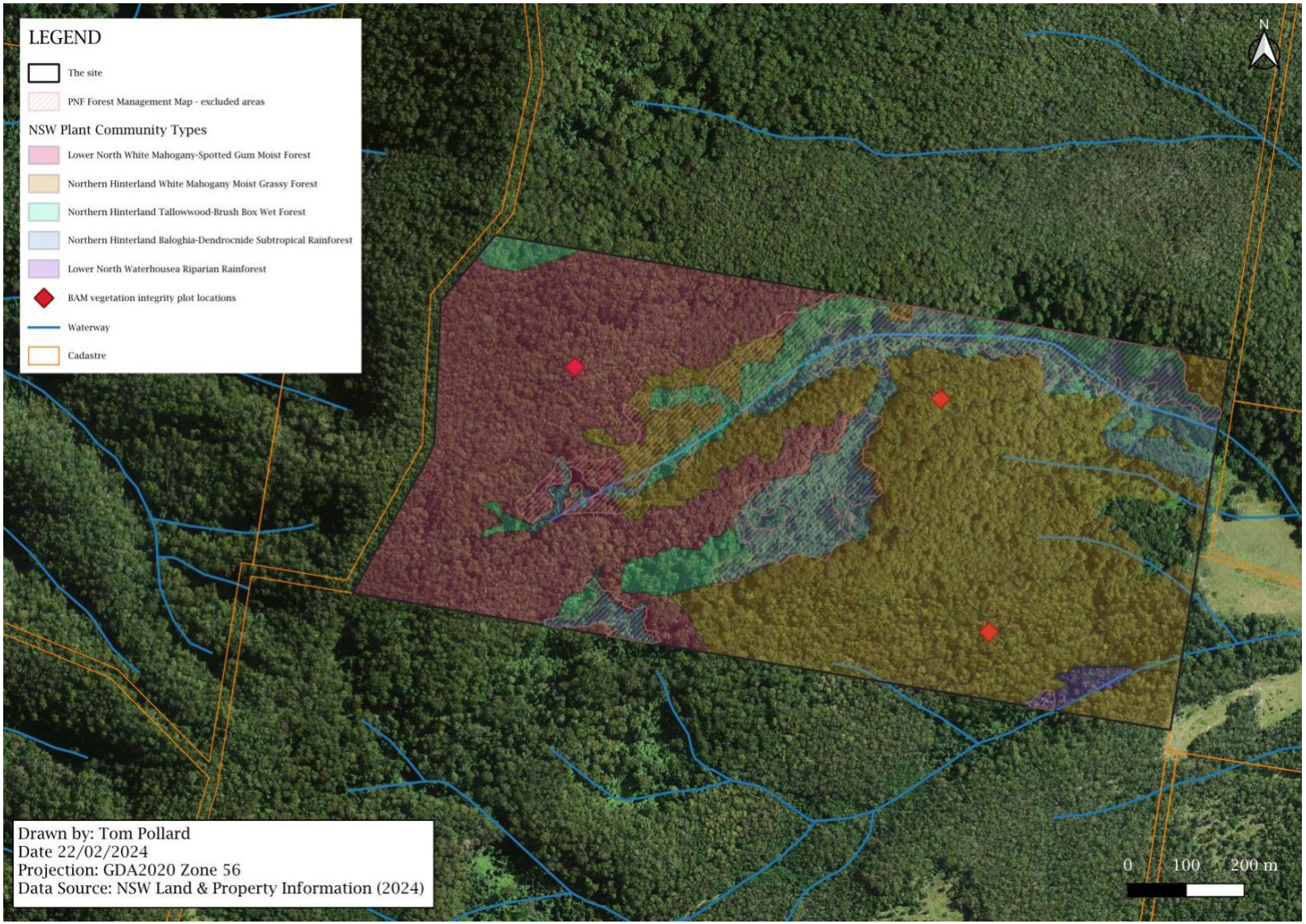

Figure 2 NSW Plant Community Types and BAM plot locations

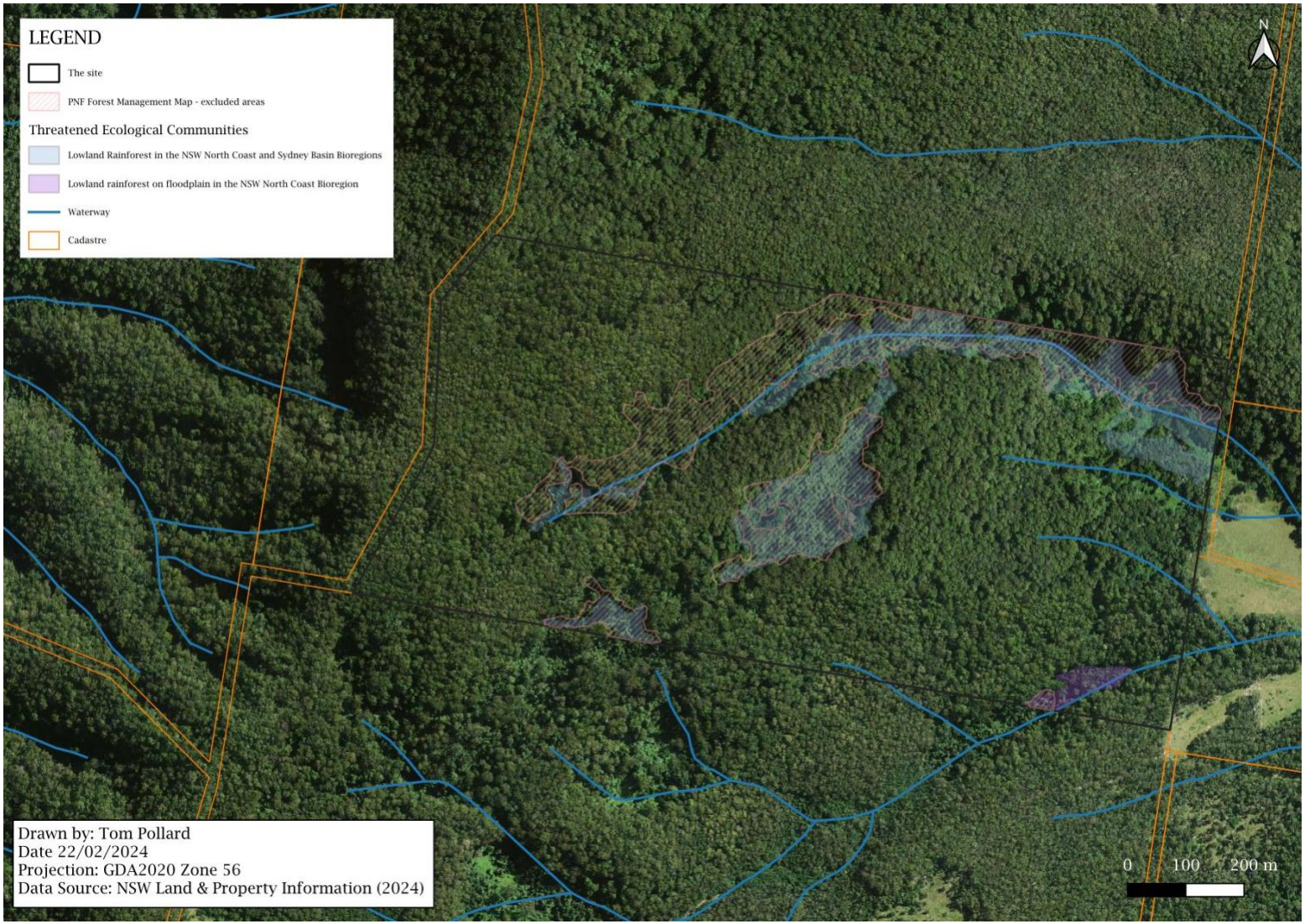

Figure 3 Threatened Ecological Communities

3.2.5 Weeds

Lantana (*Lantana camara*) is a common and widespread weed recorded in the surveys of the site. This species is listed with control measures within Dungog LGA under the *Biosecurity Act 2015*.

Lantana has a Regional Recommended Measure under the *Biosecurity Act 2015* stating that *'Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value'*.

Since the site was assessed in July 2023 the landholder has implemented a lantana control program the details for which are provided in the Forest Stewardship Plan.

3.3 Fauna Survey

3.3.1 Threatened fauna

The location of fauna surveys undertaken and threatened species recorded are shown in Figure 4.

Three threatened fauna species listed under the BC Act and/or EPBC Act were recorded during the site surveys; the Koala (*Phascolarctos cinereus*), Greater Glider (*Petauroides volans*), and Sooty Owl (*Tyto tenebricosa*) (details shown in Figure 4). No migratory species listed under the EPBC Act were recorded.

Koala (Phascolarctos cinereus)

The Koala is common within the locality (182 NSW BioNet records within the 10 km search area surrounding the site). With reference to Koala SEPP 2020, the site contains the preferred food tree Tallowwood (*Eucalyptus microcorys*). Areas of potential koala habitat containing >15% preferred food trees in the overstorey or understorey was mapped on the site (refer to Figure 4). This potential habitat covers approximately 17.6 ha of the site.

The PNF Koala and Vegetation Map also shows High Koala Habitat Suitability on the site. This covers a much larger area (estimated to be approximately 60 ha) than the Koala SEPP 2020 potential koala habitat (refer to Figure 4). This map is based on a broader definition of suitable koala habitat, and includes areas of eucalypt forest with koala presence and a range of Koala feed, shelter and use trees, such as Small-leaved Grey Gum (*E. propinqua*), a very common species on the site.

A male koala was heard calling at GPS point 385919, 6424357 in October 2023 (pers. comm. Nick Cameron). Koala scats were recorded at each of 4 SAT plot locations (refer to details in Table 3.2 Koala Spot Assessment Technique data). The results indicate that koala use is mostly within the low category (Phillips & Callaghan (2011) within the sampled areas, with a single SAT plot site recording

medium use. It should be noted that as indicated in Phillips & Callaghan (2011), a mean activity level of >22.52% but ≤ 32.84% for east coast (medium-high) area/population density category is consistent with medium (normal) use. For SAT plot 3, the mean activity level only just reached the level to be considered moderate (normal) use (refer to Table 3.2 Koala Spot Assessment Technique data). Phillips & Callaghan (2011) discuss that where the results of a SAT site returns an activity level within the low use range, the level of use by *P. cinereus* is likely to be transitory. Conversely, where a given SAT site returns an activity level within the prescribed range for medium (normal) to high use - the level of use is indicative of more sedentary ranging patterns and is thus within an area of major activity. It can therefore be concluded that a transitory koala population is likely to be present over much of the site. With some better quality habitat areas supporting a medium (normal) use, suggesting a more sedentary population in these areas.

No koalas (including no breeding females with young) were recorded either during the spotlighting or opportunistically during other ecological surveys. Based on the above survey data, there is no supporting evidence for the land to be mapped as core koala habitat according to SEPP 2020.

Table 3.2 Koala Spot Assessment Technique data

	SAT plot 1		***SAT plot 2***		***SAT plot 3***		***SAT plot 4***	
Tree species	***count***	***scat presence (tree count)***	***count***	***scat presence (tree count)***	***count***	***scat presence (tree count)***	***count***	***scat presence (tree count)***
Eucalyptus microcorys	20	4	16	1	8	3	24	1
Eucalyptus propinqua	4	1	8	0	17	3	-	n/a
Corymbia maculata	2	1	2	0	3	1	-	n/a
Eucalyptus acmenoides	1	0	2	0	-	n/a	4	0
Eucalyptus saligna	2	0	-	n/a	1	0	-	n/a
Rainforest tree spp.	-	n/a	2	0	1	0	2	0
Allocasuarina torulosa	1	0	-	n/a	-	n/a	-	n/a
Mean activity level (%)	20		3		23		3	
Use category (as per Philips & Callaghan 20211)	Low use		Low use		Medium use (normal)		Low use	

Greater Glider (Petauroides volans)

Seven Greater Glider observations were made during spotlight surveys (refer to Figure 4). The records were mostly clustered at higher elevation and within proximity to areas of mature forest containing trees with large hollows.

Foraging habitat for this species was determined to occupy 13 ha based on a maximum home range around records of 4 ha (as per the Greater Glider species information in the PNF code). Of this area, approximately 15% is excluded from harvesting (mapped old growth and rainforest, steep areas, rocky areas, riparian buffers) (refer to Figure 4).

Sooty Owl (Tyto tenebricosa)

A call of the Sooty Owl was heard within the rainforest gully line containing PCT 3100 in the north-east part of the site.

Figure 4 Threatened fauna records

3.3.2 Habitat values

Habitat values for fauna at the site would include:

- foraging resources for birds (pollen and nectar, fruit, seeds, insects, prey species (for owls and raptors)):
- foraging resources for arboreal mammals (eucalypt leaves, insects, pollen and nectar);
- foraging resources within understorey vegetation for ground foraging birds, mammals and reptiles (insects, fungi, seeds, fallen fruit);
- aerial foraging habitat for microbats;
- nesting opportunities for birds and possums within overstorey/midstorey vegetation; and
- nesting opportunities within tree hollows for hollow-dependent birds, hollow-dependent mammals and microbats.
- refuges and dens for reptiles and marsupials in rocky outcrops
- refuge and water for birds, mammals and amphibians within moist and sheltered riparian zones

3.3.3 Potential for threatened species occurrence

Flora

Although no threatened species were recorded in the site surveys. The surveys were insufficient to determine occurrence potential across the entire site. With consideration of available site habitats and previous NSW BioNet records, the following species with suitable habitat on the site are considered potential occurrences (refer to Appendix B):

- *Senna acclinis* (Rainforest Cassia)
- *Rhodamnia rubescens* (Scrub Turpentine)
- *Rhodomyrtus psidioides* (Native Guava)

These species were subject to an assessment of significance (five-part tests under the BC Act) to assess if the proposal would be likely to result in a significant impact (refer to Appendix C).

Fauna

The following threatened fauna species (based on past records, available site habitats and the results the site survey) were considered to be potential or known occurrences at the site for which impacts of the proposal need to be considered (refer to Appendix B):

Frogs

- *Mixophyes balbus* (Stuttering Frog)

Birds

- *Calyptorhynchus lathami* (Glossy Black-Cockatoo)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Petroica phoenicea* (Flame Robin)
- *Ptilinopus magnificus* (Wompoo Fruit-dove)
- *Ninox strenua* (Powerful Owl)
- *Tyto novaehollandiae* (Masked Owl)
- *Tyto tenebricosa* (Sooty Owl)

Mammals

- *Notomacropus parma* (Parma Wallaby)
- *Thylogale stigmatica* (Red-legged Pademelon)
- *Petaurus norfolcensis* (Squirrel Glider)
- *Petauroides volans* (Greater Glider)
- *Phascogale tapoatafa* (Brush-tailed Phascogale)
- *Potorous tridactylus tridactylus* (Long-nosed Potoroo)
- *Phascolarctos cinereus* (Koala)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Micronomus norfolkensis* (Eastern Freetail-bat)
- *Miniopterus australis* (Little Bent-winged Bat)
- *Phoniscus papuensis* (Golden-tipped Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Miniopterus orianae oceanensis* (Large Bent-winged bat)

Reptiles

Hoplocephalus stephensii (Stephens' Banded Snake)

All of the remaining threatened fauna species were subject to an assessment of significance (five-part tests under the BC Act) to assess if the proposal would be likely to result in a significant impact (refer to Appendix C).

The DPI fisheries spatial data portal indicates that none of the waterways on the site are mapped as potential habitat for any threatened fish species listed under the *Fisheries Management Act* (FM Act).

No migratory species listed under the EPBC Act were recorded. Several EPBC Act listed migratory species may opportunistically forage within the study area (e.g. White-throated Needletail, Fork-tailed Swift, Rufous Fantail, Black-faced Monarch, Satin Flycatcher). However, no migratory species are likely to be significantly affected by the proposal given that no key breeding habitat would be affected.

4. Statutory Assessment

The following sections assess the findings of the site assessment with regard to relevant statutory requirements.

4.1 Biodiversity Conservation Act 2016 (BC Act)

This flora and fauna assessment was prepared to assess for potential significant impacts on threatened species and communities, as is required under section 7.3 of the BC Act. Based on the potential for several threatened ecological communities and threatened species to occur, 5-part tests of significance were conducted (refer to (Appendix C) and concluded that the proposal would be unlikely to significantly increase the risk of extinction for any flora or fauna species.

4.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act protects/ regulates matters of national environmental significance (MNES), including:

- World heritage properties.
- National heritage places.
- Wetlands of international importance.
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

Based on the search results and site assessment, no significant impacts to any MNES would be likely to result from the proposal (refer to Table 4.1), therefore referral to the Minister for the Environment and Energy is not required.

Table 4.1 Assessment of MNES

Matter	***Impact***
Any impact on a World Heritage property?	
No World Heritage properties occur within the locality (5 km radius around the site).	Nil
Any impact on a National Heritage place?	
No National Heritage places occur within the locality.	Nil
Any impact on a wetland of international importance (RAMSAR convention)?	
One wetland of international importance (RAMSAR) were identified in the MNES search:	Nil

Matter	*Impact*
Hunter estuary wetlands. The site is 50-90 km upstream from this wetland. Considering the nature of the proposal there would be no impacts on this wetland.	
Any impact on nationally listed threatened species or communities?	
Habitat for four threatened ecological communities, 47 threatened species (14 flora and 33 fauna species), and 13 migratory species is identified in the MNES search. The results of the site survey indicated that PCT 3089 and part of PCT 3100 occurring on alluvium in the easternmost drainage line on the site may also be consistent with the equivalent EPBC Act listed TEC 'Lowland Rainforest of Subtropical Australia' if the vegetation meets key condition thresholds (Department of Sustainability, Environment, Water, Population and Communities 2011). However, the PNF excludes areas of rainforest and therefore no direct impact on these occurrences would occur. Therefore, a significant impact on this TEC is unlikely, and an assessment of significance was not required. Several NSW BC Act threatened species that are potential occurrences at the site are also listed under the EPBC Act (refer to Appendix B). An assessment of significance for each of these species was undertaken (refer to Appendix D). The conclusion of these assessment of significance is that the proposal is unlikely to impact on national listed threatened species or communities and referral to the Australian Government Minister for the Environment (the Minister) for assessment is not required.	Minor
Any impact on migratory species?	
Habitat for 23 migratory species was identified within the MNES search. No migratory species are likely to be significantly affected by the proposal given that no significant breeding habitat would be affected for any of these species.	Nil
Any impact on a Commonwealth marine area?	
No Commonwealth marine areas occur within the MNES search area	Nil
Any impact on the Great Barrier Reef Marine Park?	
The Great Barrier Reef Marine park is distant from the site.	Nil
Does the Proposal involve a nuclear action (including uranium mining)?	
The proposal does not involve a nuclear action.	Nil
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	
The proposal does not involve any impact on a water resource, in relation to coal seam gas development and large mining development.	Nil

4.3 State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020)

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:

(a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and

(b) by encouraging the identification of areas of core koala habitat, and

(c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.

Schedule 1 of SEPP (Koala Habitat Protection) 2020 lists LGAs for which the SEPP applies, which includes Dungog Shire Council.

Part 2 of SEPP (Koala Habitat Protection) 2020 assesses the presence of potential koala habitat and core koala habitat on the land and whether development consent can be granted in relation to core koala habitat.

This Part applies to land:

(a) that is land to which this Policy applies, and

(b) that is land in relation to which a development application has been made, and

(c) that:

(i) has an area of more than 1 hectare, or

(ii) has, together with any adjoining land in the same ownership, an area of more than 1 hectare, whether or not the development application applies to the whole, or only part, of the land.

The site meets the above requirements and is therefore land to which Part 2 applies.

Step 1 - Is the land potential koala habitat?

Schedule 2 lists ten eucalypt species which are primary koala feed trees:

Potential koala habitat is defined as areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

On Schedule 2 listed koala food tree species, Tallowwood (*Eucalyptus microcorys*) is present on the subject land. Within some parts of the site Tallowwood constitutes at least 15% of the total number of trees in the upper or lower strata of the tree component. These areas are therefore mapped as potential koala habitat under the Koala SEPP 2020.

The survey recorded koala scats at each of 4 SAT plot locations assessed. This indicated that koala use is mostly within the low category (Phillips & Callaghan (2011) within the sampled areas, with a single SAT plot site recording medium use (refer to section 3.3.1 for further details). It was concluded from the results of the SAT plots that a transitory koala population is likely to be present over much of the site. With some better quality habitat areas supporting a medium (normal) use, suggesting a more sedentary population in these areas. No koalas (including no breeding females with young) were recorded either during the targeted spotlighting, however, a male koala was heard calling opportunistically in October 2023 (Nick

Cameron pers. comm.). Based on the above survey data, there is no supporting evidence for the land to be mapped as core koala habitat according to SEPP 2020.

No further provisions of the policy apply to the DA, and no individual plan of management is required.

5. Impacts and Mitigation

5.1 Potential impacts

Potential biodiversity impacts of the proposal would include the following.

5.1.1 Habitat removal

The proposal is to selectively harvest the site for high quality logs, low quality logs and pulpwood over a 10-15 year period. Assuming a net harvest area of 58 hectares, excluding non-harvestable areas of rainforest, old growth, steep slopes, rocky outcrops, riparian zones, threatened species records, the area subject to harvesting will be approximately 5 hectares per year on average.

Only small areas of the harvestable area (tall moist forests on the shelf and slopes in the middle of the property where there are groups of large commercially mature trees) will be subject to Australian group selection (AGS). AGS would consist of harvesting of groups (small patches or stands) of trees. The remainder of the site will be selectively harvested.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Some midstorey and understorey will inevitably be impacted during removal of the harvestable trees. However, this will regrow in the long-term as the majority of trees/shrubs that can reseed the disturbed area will remain to allow for regeneration.

A proportion of the forests mature trees will be removed during the operations. This will only occur after habitat (hollow-bearing) trees and habitat recruitment trees are retained at the minimum standards for tree retention set out in the PNF code. Namely;

Removal of mature native vegetation for the proposal could potentially impact (directly or indirectly) on habitat for the following threatened fauna species as indicated:

- *Mixophyes balbus* (Stuttering Frog) – riparian foraging and breeding habitat (indirectly)
- *Calyptorhynchus lathami* (Glossy Black-Cockatoo), *Daphoenositta chrysoptera* (Varied Sittella), *Petroica phoenicea* (Flame Robin), *Ptilinopus magnificus* (Wompoo Fruit-dove) - foraging and breeding habitat;
- *Glossopsitta pusilla* (Little Lorikeet) - foraging and breeding habitat (small diameter tree hollows);
- *Ninox strenua* (Powerful Owl), *Tyto novaehollandiae* (Masked Owl), *Tyto tenebricosa* (Sooty Owl) – foraging habitat (prey) and breeding habitat (large hollows in mature trees);

- *Notomacropus parma* (Parma Wallaby), *Thylogale stigmatica* (Red-legged Pademelon) – foraging and breeding habitat;
- *Petaurus norfolcensis* (Squirrel Glider), *Petauroides volans* (Greater Glider), *Phascogale tapoatafa* (Brush-tailed Phascogale) - foraging and breeding habitat (tree hollows);
- *Potorous tridactylus tridactylus* (Long-nosed Potoroo) – foraging and breeding habitat;
- *Dasyurus maculatus maculatus* (Spotted-tailed Quoll) – opportunistic foraging habitat;
- *Phascolarctos cinereus* (Koala) – foraging habitat;
- *Scoteanax rueppellii* (Greater Broad-nosed Bat), *Micronomus norfolkensis* (Eastern Freetail-bat), *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) - foraging habitat and roosting (breeding) habitat (tree hollows)
- *Miniopterus australis* (Little Bent-winged Bat) - foraging habitat and roosting (non-breeding) habitat (tree hollows);
- *Phoniscus papuensis* (Golden-tipped Bat) - foraging habitat and roosting (breeding) habitat (abandoned bird nests);
- *Miniopterus orianae oceanensis* (Large Bent-winged bat) – foraging habitat
- *Pteropus poliocephalus* (Grey-headed Flying-fox) - foraging habitat
- *Hoplocephalus stephensii* (Stephens' Banded Snake) – foraging and breeding habitat (tree hollows and loose bark);

5.1.2 Impacts on native fauna

During tree clearing (particularly removal of hollow-bearing trees) there is a risk of adverse impacts relating to injury/ mortality to native fauna.

Several protections are in the PNF code (koala prescriptions) in relation to this, including:

- damage to retained koala feed trees must be minimised by directional felling techniques; and
- each tree must be visually assessed for koalas immediately prior to it being felled.

The requirement to visually assess for koalas at the time of harvesting will also aid the identification of other at risk species.

Under the Forest Management Plan a tree mark-up is planned prior to the commencement of operations. This will provide opportunity to visually assess individual trees for the presence of fauna as well as fauna habitat resources.

5.1.3 Weeds and pathogens

There is a risk of introducing or spreading noxious/environmental weeds and pathogens when machinery is moving to and from the site.

Mitigation measures are recommended, specifically for the purpose of:

- Minimising the risk of machinery transporting weed and pathogen propagules.

5.2 Recommended mitigation measures

To minimise ecological impacts that may result from the proposal, the following mitigation measures are recommended in addition to the prescriptions of the PNF code:

1. If a native animal is injured at the site, WIRES is to be contacted (Ph: 1800 094 737) to arrange for capture/ removal of the animal from the works area.
2. Ensure that a hygiene protocol (wash-down) is implemented for plant entering and exiting the site to avoid transporting weeds and pathogens. It is noted that this requirement has been included in clause 2.6 (page 9) of the Forest Management Plan.

References

Department of Planning, Industry and Environment (2024). Threatened Species Profiles. Available at https://www.environment.nsw.gov.au/threatenedspeciesapp/

NSW Office of Environment and Heritage (2018). A review of koala tree use across New South Wales. NSW Office of Environment and Heritage, Sydney, Australia.

State Government of NSW and Department of Planning and Environment (2022). NSW State Vegetation Type Map – Extant PCT (Release C1.1.M1.1). [Quickview (Vector Data - Geodatabase Format) and SVTM NSW Extant PCT 5m (Raster Data - TIFF format)].

Certification

This Flora and Fauna assessment provides a true and fair review of the proposal in relation to its potential effects on biodiversity. It addresses to the fullest extent possible all matters affecting or likely to affect biodiversity as a result of the proposal.

Dr Tom Pollard

Ecologist

Birdwing Ecological Services

Date: 6th March 2024

Appendices

Appendix A – Biodiversity database search results

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Plants in selected area [North: -32.21 West: 151.69 East: 151.89 South: -32.41] returned a total of 212 records of 6 species.

Report generated on 14/07/2023 9:18 AM

Kingdom	Class	Family	Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Apocynaceae	1226	*Cynanchum elegans*	White-flowered Wax Plant	E1	E	70	
Plantae	Flora	Fabaceae (Caesalpinioideae)	8772	*Senna acclinis*	Rainforest Cassia	E1		5	
Plantae	Flora	Myrtaceae	4096	*Eucalyptus glaucina*	Slaty Red Gum	V	V	100	
Plantae	Flora	Myrtaceae	4113	*Eucalyptus largeana*	Craven Grey Box	E1	E	9	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	27	
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*	Native Guava	E4A	CE	1	

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Jul-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	47
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	3
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Hunter estuary wetlands	50 - 100km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Atrichornis rufescens			
Rufous Scrub-bird [655]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
[Pycnoptilus floccosus](#) Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FROG			
[Litoria aurea](#) Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Litoria daviesae](#) Davies' Tree Frog [78964]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Mixophyes balbus](#) Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Mixophyes iteratus](#) Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat may occur within area	In feature area
INSECT			
[Austrocordulia leonardi](#) Sydney Hawk Dragonfly [84741]	Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notamacropus parma			
Parma Wallaby [89289]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pseudomys oralis			
Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
Arthraxon hispidus			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In feature area
Cryptostylis hunteriana			
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vincetoxicum woollsii listed as Tylophora woollsii [40080]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Telstra Corporation Limited [11367]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Bubulcus ibis as Ardea ibis](#) Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Black Bulga	State Conservation Area	NSW	In buffer area only
Killarney	Nature Reserve	NSW	In buffer area only
Monkerai	Nature Reserve	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix B - Potential occurrence assessment for threatened entities

Table B.1 and B.2 detail the results of an assessment of likelihood of occurrence for threatened species identified from the BioNet Atlas of NSW Wildlife (state) database searches. This assessment was based on the results of the database searches, presence or absence of suitable habitat within the study area, results of the field survey, and professional judgement. Five categories for likelihood of occurrence are defined below:

- known: the species has been observed on the site (either historically or in the current field survey)
- likely: a medium to high probability that a subject species would use the site
- potential: suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as 'likely' or 'unlikely' to occur
- unlikely: a very low to low probability that a subject species would use the site
- no: habitat in the study area is unsuitable for a subject species.

Table B.1 Assessment of likelihood of occurrence for threatened flora

Scientific Name	*Common Name*	*Status*		*Habitat Requirement:* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act	*EPBC Act*				
Cynanchum elegans	White-flowered Wax Plant	E	E	Occurs primarily at the transition zone (ecotone) between dry subtropical rainforest and sclerophyll forest/woodland communities in eastern NSW, from Brunswick Heads on the north coast to the Illawarra region.	The site does not support dry subtropical rainforest.	Unlikely	Test of significance is not required.
Senna acclinis	Rainforest Cassia	E	-	Occurs in coastal districts and adjacent tablelands of NSW from the Illawarra in NSW to Queensland. Edges of subtropical and dry rainforest.	The site supports small areas of subtropical rainforest and associated ecotone.	**Potential** Not recorded in the site surveys. However, the surveys were insufficient to determine occurrence potential across the entire site.	**Test of significance is required.**
Eucalyptus largeana	Craven Grey Box	E	E	Confined to Gloucester-Craven district and near Pokolbin, although a number of unsubstantiated records exist from outside the currently accepted range. Often found in wet forest on subcoastal ranges.	Broadly suitable wet forest habitat is present	Unlikely Not recorded in traverses of the site. Readily identifiable.	Test of significance is not required.
Eucalyptus glaucina	Slaty Red Gum	V	V	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	No suitable habitat is present.	No	Test of significance is not required.

Scientific Name	*Common Name*	*Status*		*Habitat Requirement:* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act	*EPBC Act*				
Rhodamnia rubescens	Scrub Turpentine	CE	CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Broadly suitable wet forest habitat is present.	**Potential** Not recorded in the site surveys. However, the surveys were insufficient to determine occurrence potential across the entire site.	**Test of significance is required.**
Rhodomyrtus psidioides	Native Guava	CE	CE	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised as being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Broadly suitable wet forest habitat is present.	**Potential** Not recorded in the site surveys. However, the surveys were insufficient to determine occurrence potential across the entire site.	**Test of significance is required.**

V = Vulnerable; E = Endangered; CE = Critically Endangered

Table B.2 Assessment of likelihood of occurrence for threatened fauna

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Birds							
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	No suitable habitat is present	Unlikely	Test of significance is not required.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (A. *torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta,* and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata).*	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
				Dependent on large hollow-bearing eucalypts for nest sites.			
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range, and less commonly on coastal plains and ranges.	No suitable habitat is present.	Unlikely	Test of significance is not required.
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Broadly suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	No suitable habitat is present.	No	Test of significance is not required.
Glossopsitta pusilla	Little Lorikeet	V	_	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or	Broadly suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
				trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). Riparian trees often chosen, including species like Allocasuarina.			
Haliaeetus leucogaster	White-bellied Sea Eagle	V	-	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	No suitable habitat is present.	No	Test of significance is not required.
Hirundapus caudacutus	White-throated Needletail	-	V	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.	Suitable aerial foraging habitat is present. No breeding habitat is present.	**Potential**	As this species is an aerial forager that does not breed in mainland Australia, no foraging or breeding habitat would be removed for the proposal. Therefore, an EPBC MNES Significant impact assessment is not required.

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Ninox connivens	Barking Owl	V	-	Habitat includes eucalypt woodland, open forest, swamp woodlands and timber along watercourses. Potential nest trees are living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground. The species uses paddock trees to extend foraging area from intact woodland. The Barking Owl is likely to breed and forage within very small patches of vegetation (< 5 ha), especially when the patch is riparian vegetation or where the small patch is within 400 m of another larger patch of vegetation. They are unlikely to nest in the hollows of a paddock tree if the tree is separated from a larger patch of vegetation by more than 400 m of cleared habitat.	No suitable habitat is present.	Unlikely	Test of significance is not required.
Ninox strenua	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest, common along drainage lines. The species can breed and forage in very small patches of vegetation, although this is hugely variable across their range. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	Broadly suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Pachycephala olivacea	Olive Whistler	V	-	Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes.	No suitable habitat is present.	Unlikely The site is not above 500 m altitude	Test of significance is not required.
Petroica phoenicea	Flame Robin	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	No suitable habitat is present.	No	Test of significance is not required.

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests. Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal.	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Pyrrholaemus saggitatus	Speckled Warbler	V	-	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	No suitable habitat is present.	Unlikely	Test of significance is not required.
Tyto novaehollandiae	Masked Owl	V	-	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides.	Broadly suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Tyto tenebricosa	Sooty Owl	V	-	Dry, subtropical and warm temperate rainforests and wet eucalypt forests. Nest in large tree hollows.	Suitable foraging and breeding habitat is present.	**Known** **Recorded in site survey**	**Test of significance is required.**
Frogs							

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Mixophyes balbus	Stuttering Frog	V	V	The Stuttering Frog inhabits naturally vegetated streams typically in hilly or mountainous topography, in a wide range of vegetation types including: subtropical, warm and cool temperate rainforest, and wet and dry sclerophyll forest. In north-eastern NSW it has been found along small first-order tributaries and larger third or fourth-order streams. in the north of its range it occurs above 200 m to 1,420 m ASL.	Broadly suitable habitat is present	**Potential** Known from Black Bulga SCA and Killarney NR in the locality	**Test of significance is required**
Litoria daviesea	Davies' Tree Frog	V	-	Davies' Tree Frog occurs as a series of small populations along the eastern escarpment of the Great Divide and adjacent tablelands above 400 m elevation. Its habitat is highly fragmented and restricted to the region from Carrai Plateau to the Barrington Tops area. Davies' Tree Frog occurs in permanent, slow-flowing small streams above 400 m elevation, mostly in the headwaters of eastern-flowing streams (although it does occur in the headwaters of the western-flowing Peel River). On the tablelands, riparian habitat may be montane heath or dry open forest with fringing tea tree, tussocks and ferns. Escarpment habitat is typically rainforest and wet sclerophyll with a rainforest understorey.	No suitable habitat is present in the study area.	No	Test of significance is not required.
Mammals							

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Inhabits drier forests and woodlands with hollow-bearing trees and sparse ground cover.	Broadly suitable habitat is present.	**Potential**	**Test of significance is required.**
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. This species usually roosts in tree hollows, but has also been found in buildings.	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Notomacropus parma	Parma Wallaby	V	-	The range of the Parma Wallaby is now confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Habitat is moist eucalypt forest with thick shrubby understorey, often with nearby grassy areas and rainforest margins.	Broadly suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Thylogale stigmatica	Red-legged Pademelon	V	-	Patchily distributed along coastal and subcoastal eastern Australia from Cape York to the Hunter Valley in NSW. Southern range records are from the Watagan Mountains and the Wyong district. There are unconfirmed records from the western New England Tablelands (e.g. west of Emmaville). Rainforest, vine scrub, moist eucalypt forest with dense understorey and ground cover.	Broadly suitable habitat is present.	**Potential**	**Test of significance is required.**
Micronomus norfolkensis	Eastern Freetail-bat	V	-	The Eastern Freetail-bat is found along the east coast from south Queensland to southern	Suitable foraging and	**Potential**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
				NSW. Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows.	breeding habitat is present.		
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum forest inland. Key habitat requirements include; abundant tree hollows for refuge and nesting, areas with more than one eucalypt species and/or an understorey of wattles.	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Near cave entrances and crevices in cliffs.	No suitable habitat is present in the study area.	No	Test of significance is not required.
Aepyprymnus rufescens	Rufous Bettong	V	-	Tall moist eucalypt forest to open woodland with tussock grass understorey.	No suitable habitat is present in the study area.	Unlikely	Test of significance is not required.
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	V	Cool temperate rainforest, moist and dry forests, and wet heathland, inhabiting dense layers of grass, ferns, vines and shrubs.	Suitable habitat is present.	**Potential**	**Test of significance is required.**
Petauroides volans	Greater Glider	E	E	Inhabits a variety of eucalypt forests and woodlands. Presence and density of Greater Gliders is related to soil fertility, eucalypt tree species, disturbance history and density of suitable tree hollows.	Suitable foraging and breeding habitat is present.	**Known** **Recorded in site survey**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Suitable foraging habitat is present.	**Likely**	Test of significance is not required. Impacts would be limited to minor impacts on foraging habitat as a small part of a much larger foraging range. No impacts on breeding habitat (flying-fox camps) would occur. Therefore, a significant impact from the proposal is highly unlikely.
Phascolarctos cinereus	Koala	V	E	Appropriate food trees in forests and woodlands, and treed urban areas.	Suitable foraging habitat is present.	**Likely** **Scats recorded in the survey**	**Test of significance is required.**
Miniopterus australis	Little Bent-winged Bat	V	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings. Only five nursery sites /maternity colonies within caves are known in Australia.	Suitable foraging and roosting habitat (hollows) is present.	**Potential**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
Myotis macropus	Southern Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	No suitable habitat is present	No	Test of significance is not required.
Phoniscus papuensis	Golden-tipped Bat	V	-	The Golden-tipped Bat is distributed along the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to south of Eden in southern NSW. It also occurs in New Guinea. Rainforest and adjacent sclerophyll forest. Roost in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests.	Suitable foraging and breeding habitat is present.	**Potential**	**Test of significance is required.**
Dasyurus maculatus maculatus	Spotted-tailed Quoll	V	E	Habitat includes dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	Suitable foraging habitat is present. No key breeding habitat features are present.	**Potential**	Test of significance is not required. Impacts would be limited to minor impacts on foraging habitat as a small part of a much larger home range. No impacts on breeding habitat are likely. Therefore, a significant impact from the proposal is highly unlikely.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Moist and dry eucalypt forest and rainforest, particularly at high elevations. Hunts beetles,	Suitable foraging and breeding	**Potential**	**Test of significance is required.**

Scientific Name	*Common Name*	*Status*		*Habitat Requirement* *DPE Threatened Species Profiles and other sources as specified*	*Habitat Suitability*	*Potential Occurrence*	*Requirement for Test of Significance (5-part test under BC Act/MNES assessment of significance under EPBC Act)*
		BC Act/FM Act	*EPBC Act*				
				moths, weevils and other flying insects above or just below the tree canopy	habitat is present.		
Miniopterus orianae oceanensis	Large Bent-winged bat	V	-	Forest or woodland, roost in caves, old mines and stormwater channels.	Suitable foraging habitat is present.	**Potential**	**Test of significance is required.**
Reptiles							
Hoplocephalus stephensii	Stephens' Banded Snake	V	-	Habitat consists of rainforest and eucalypt forests and rocky areas up to 950 m. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. The species uses very old primary forest with many large old hollow bearing trees. Habitat needs to be well connected and geographically large.	Broadly suitable. Small areas of primary forest (old growth forest) are present at the site.	**Potential**	**Test of significance is required.**

V = Vulnerable; E = Endangered; CE = Critically Endangered

Appendix C - Tests of Significance

Assessment of Significance (Five-part test of significance under Section 7.3 of the BC Act) for Threatened Flora

- *Senna acclinis* (Rainforest Cassia)
- *Rhodamnia rubescens* (Scrub Turpentine)
- *Rhodomyrtus psidioides* (Native Guava)

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Senna acclinis

Senna acclinis is a shrub to 3 m tall. It grows on the margins of subtropical, littoral and dry rainforests and is often found as a gap phase shrub. Primarily pollinated by a variety of native bees, this species produces seeds that are likely dispersed by water or in mud sticking to animals.

Threatening processes for this species include:

- Clearing of habitat for agriculture.
- Clearing of habitat for development.
- Invasion by introduced weeds, particularly lantana, bitou bush and exotic and native vines.
- Accidental removal during weed-control programs.
- Disturbance and habitat damage from domestic stock.
- Timber harvesting activities.
- Disturbance during road/track maintenance activities.
- Inappropriate fire regime, either too intense/frequent or too infrequent, preventing growth and recruitment.
- Potential for disturbance or degradation of habitat close to walking tracks.
- Poor knowledge of the species distribution and population dynamics.

Rhodamnia rubescens

Rhodamnia rubescens is a shrub or small tree to 25 m high. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.

This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.

Threatening processes for this species include:

- Decline in health/loss of mature plants and a lack of seed based recruitment due to infection by *Austropuccinia psidii* (Myrtle Rust).
- Degradation of habitat and competition from transformer weed species.

- Clearing from rural, agricultural and urban development leading to edge effects, degradation and further fragmentation.
- Habitat degradation and clearing due to forestry operations.
- Too frequent/intense fire destroying habitat and individual plants.
- Damage caused by inappropriate use of four-wheel drive vehicles.
- Road and track development and maintenance.

Rhodomyrtus psidioides

Rhodomyrtus psidioides is a shrub or small tree to 12 m high. A pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.

This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.

Threatening processes for this species include:

- Decline in health/loss of mature plants and a lack of seed based recruitment due to infection by *Austropuccinia psidii* (Myrtle Rust).
- Degradation of habitat and competition from transformer weed species.
- Clearing from rural, agricultural and urban development leading to edge effects, degradation and further fragmentation.
- Habitat degradation and clearing due to forestry operations.
- Too frequent/intense fire destroying habitat and individual plants.
- Damage caused by inappropriate use of four-wheel drive vehicles.
- Road and track development and maintenance.

Potential impacts of the proposal on the subject threatened flora

None of the potentially occurring subject threatened flora species were recorded at the site in the site surveys. However, the survey was insufficient to rule out occurrence within potential habitats across the entire site.

In relation to the subject threatened flora, the proposed harvesting operations will impact on some midstorey and understorey that is potential habitat within an area of up to 5 ha per year over a 10-15 year period, during removal of the harvestable trees.

Despite the removal of this potential habitat for the subject threatened flora, the proposal is considered unlikely to significantly affect any potentially occurring local population for the following reasons:

- only a relatively small proportion of the potential habitat for the subject threatened flora that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat the vast majority of the

forests available to harvest at the site will not be impacted by the forestry operations in any given year;
- areas of potential habitat on the site would likely be protected in excluded areas (mapped rainforest/riparian areas/steep slopes adjacent to rainforest) and therefore not impacted by the proposed harvesting; and
- alternative habitat of equivalent or better quality within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of any of the subject threatened flora species would occur such that a viable local population is placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not relevant to assessment of threatened species.

c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

In relation to the subject threatened flora, the proposed harvesting operations will impact on some midstorey and understorey that is potential habitat within an area of up to 5 ha per year over a 10-15 year period, during removal of the harvestable trees.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposal would predominantly consist of selective logging (removal of between one quarter and one third of the basal area and disturbance to some midstorey and understorey during removal of the harvestable trees). Only a small amount of the site will potentially be subject to AGS silviculture. Gaps created by the harvesting operations will be relatively small (up to 0.1 ha for the AGS patches).

Therefore, no substantial fragmentation or isolation of habitat for any of the subject threatened flora is likely. Post-works the capacity of these species to cross pollinate

and disperse across the relatively small gaps created by the harvesting operations at the site would be retained.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Site habitats are considered to be of limited importance for the subject species, as alternative habitat of equivalent or better quality for all subject species occurs extensively within forests in the broader locality. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. These habitats would not be affected by the proposal.

iv) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No areas of outstanding biodiversity value have been declared in Dungog LGA.

d) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A key threatening process (KTP) is defined under the BC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in Table C.1.

Table C.1 Key Threatening Processes

Key Threatening Process (as per Schedule 4 of the BC Act)	***Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?***		
	Likely	***Possible***	***Unlikely***
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change		✓	

Key Threatening Process (as per Schedule 4 of the BC Act)	***Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?***		
	Likely	***Possible***	***Unlikely***
Bushrock removal		✓	
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners		✓	
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis		✓	
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓

Key Threatening Process (as per Schedule 4 of the BC Act)	***Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?***		
	Likely	***Possible***	***Unlikely***
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)	✓		
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss of hollow-bearing trees	✓		
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (*Canis lupus familiaris*)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the feral cat (*Felis catus*)			✓
Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees	✓		

As shown in Table C.1 the following four KTPs are likely to be contributed to by the proposal:

Clearing of native vegetation: Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands.

In relation to the subject threatened flora, the proposed harvesting operations will impact on some midstorey and understorey that is potential habitat within an area of up to 5 ha per year on average over a 10-15 year period, during removal of the harvestable trees.

Considering the relatively small area of native vegetation to be removed (in relation to the forested area in the broader locality), it is unlikely that the proposal would contribute significantly to this KTP.

Invasion, establishment and spread of Lantana (*Lantana camara*): Harvesting operations that create larger canopy gaps (predominantly AGS silviculture areas) may facilitate the spread of Lantana into new areas of the site.

However, considering the relatively small area that will potentially be subject to AGS silviculture and recommended weed control within these areas to facilitate the recruitment of target harvestable eucalypts, the contribution of the proposal to this KTP will be minor.

Loss of hollow-bearing trees: In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 81 birds, 31 reptiles and 16 frogs.

An uncertain number of hollow-bearing trees will be removed during the operations. Retention of hollow-bearing trees will occur at the minimum standards for tree retention set out in the PNF code, consisting of 10 hollow bearing trees per 2 hectares, where available.

Considering the relatively small amount of hollow trees that will be removed and PNF code requirements for hollow tree retention, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

Removal of dead wood and dead trees: during harvesting operations some dead wood and dead trees will inevitably be removed. However, in relation to the amount of dead wood and dead trees in the remainder of the site and in the broader locality, this would not contribute significantly to this KTP more broadly.

Conclusion

It is considered unlikely that a local occurrence of any of the subject threatened fauna species would be placed at risk of extinction as a result of the proposal.

References

Department of Planning, Industry and Environment (2024). Threatened Species Profiles. Available at https://www.environment.nsw.gov.au/threatenedspeciesapp/

Assessment of Significance (Five-part test of significance under Section 7.3 of the BC Act) for Threatened Fauna

Birds

- *Calyptorhynchus lathami* (Glossy Black-Cockatoo)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Petroica phoenicea* (Flame Robin)
- *Ptilinopus magnificus* (Wompoo Fruit-dove)
- *Ninox strenua* (Powerful Owl)
- *Tyto novaehollandiae* (Masked Owl)
- *Tyto tenebricosa* (Sooty Owl)

Frogs

- *Mixophyes balbus* (Stuttering Frog)

Mammals

- *Notomacropus parma* (Parma Wallaby)
- *Thylogale stigmatica* (Red-legged Pademelon)
- *Petaurus norfolcensis* (Squirrel Glider)
- *Petauroides volans* (Greater Glider)
- *Phascogale tapoatafa* (Brush-tailed Phascogale)
- *Potorous tridactylus tridactylus* (Long-nosed Potoroo)
- *Phascolarctos cinereus* (Koala)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Micronomus norfolkensis* (Eastern Freetail-bat)
- *Miniopterus australis* (Little Bent-winged Bat)
- *Phoniscus papuensis* (Golden-tipped Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Miniopterus orianae oceanensis* (Large Bent-winged bat)

Reptiles

Hoplocephalus stephensii (Stephens' Banded Snake)

Depending on the nature of the impacts, part (a), (c), (d) and (e) are answered per species or as a collective group of species when they have similar life histories (e.g. raptors or hollow-dependent mammals).

Part (b) deals specifically with threatened ecological communities, and hence is not relevant to the subject threatened species assessment.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Birds - Parrots (order Psittaciformes)

***Calyptorhynchus lathami* (Glossy Black-cockatoo)**

The Glossy Black-cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods.

Inland populations feed on a wide range of sheoaks, including Drooping Sheoak (*Allocasuaraina diminuta*), and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.

The Glossy Black-cockatoo is dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

Threatening processes for this species include:

- Reduction of suitable habitat through clearing for development.
- Decline of hollow bearing trees over time due to land management activities.
- Excessively frequent fire which eliminates sheoaks from areas, prevents the development of mature sheoak stands, and destroys nest trees.
- Firewood collection resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, and disturbance of breeding attempts.
- Decline in extent and productivity of sheoak foraging habitat due to feral herbivores.
- Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat.
- Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts.
- Forestry activity resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, degradation of foraging habitat, and disturbance of breeding attempts.

- Decline in extent and productivity of sheoak foraging habitat caused by moisture stress due to climate change.
- Degradation of foraging habitat and reduced regeneration of sheoak stands due to grazing by domestic stock.
- Loss of foraging habitat due to slashing/underscrubbing.
- Change in the spatial and temporal distribution of foraging resources due to global warming.
- Illegal bird smuggling and egg-collecting.
- Habitat infestation by weeds such as African boxthorn, Gazania, buffel grass and other invasive grasses.

***Glossopsitta pusilla* (Little Lorikeet)**

Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). Riparian trees often chosen, including species like *Allocasuarina*.

Threatening processes for this species include:

- Given that large old *Eucalyptus* trees on fertile soils produce more nectar, the extensive clearing of woodlands for agriculture has significantly decreased food for the lorikeet, thus reducing survival and reproduction. Small scale clearing, such as during roadworks and fence construction, continues to destroy habitat and it will be decades before revegetated areas supply adequate forage sites.
- The loss of old hollow bearing trees has reduced nest sites, and increased competition with other native and exotic species that need large hollows with small entrances to avoid predation. Felling of hollow trees for firewood collection or other human demands increases this competition.
- Competition with the introduced Honeybee for both nectar and hollows exacerbates these resource limitations.
- Infestation of habitat by invasive weeds.
- Inappropriate fire regimes.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.
- Climate change impacts including reduction in resources due to drought.
- Degradation of woodland habitat and vegetation structure due to overgrazing.

Potential impacts from the proposal on subject Parrots (order Psittaciformes)

The proposal would potentially impact on up to 5 hectares of foraging and breeding habitat for the subject species per year over a 10-15 year period.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees would mostly consist of eucalypt species, which may provide foraging habitat (nectar and pollen) for the Little Lorikeet.

Disturbance to some of the midstorey and understorey will occur during removal of the harvestable trees. The midstorey vegetation that may be disturbed includes a low density of Forest Oak (*Allocasuarina torulosa*) which are a feed tree for the Glossy Black-cockatoo.

An uncertain number of hollow-bearing trees will be removed during the operations. However, retention of hollow-bearing trees will occur at the minimum standards for tree retention set out in the PNF code, consisting of 10 hollow bearing trees per 2 hectares, where available. In the PNF code, priority is given to retention of larger hollows in trees. It was observable that with the exception of mature areas of forest (within excluded mapped old growth areas and areas other around the switchbacks on Middle Shelf Road and within the previously logged Blue Gum/ rainforest area on the shelf) much of the forest is relatively young regrowth (40-60 years age) with only predominantly small hollows present). It is therefore likely that any hollow tree removal will mostly consist of small hollows that are potentially suitable for nesting of the Little Lorikeet. Removal of larger hollows (>15 cm DBH) that are suitable for the Glossy Black-cockatoo is unlikely.

Despite the removal of this potential foraging and breeding habitat for the subject Parrots, the proposal is considered unlikely to significantly affect any potentially occurring local population for the following reasons:

- only a relatively small proportion of the potential habitat for the subject Parrots that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat within the vast majority of the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- the majority of potential foraging and breeding habitat for the subject Parrots will remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- no removal of breeding habitat (larger hollows >15 cm DBH) for the Glossy Black-cockatoo is likely; and
- alternative foraging and breeding habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with

forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of either of the subject Parrots would occur such that a viable local population is placed at risk of extinction.

Birds - Passerines (order Passeriformes)

***Daphoenositta chrysoptera* (Varied Sittella)**

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.

The Varied Sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. This species feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. The nest is cup-shaped and built of plant fibres and cobwebs placed in an upright tree fork high in the living tree canopy. The same fork or tree is often re-used in successive years.

Threatening processes for this species include:

- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches.
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.
- Infestation of habitat by invasive weeds. Inappropriate fire regimes.
- Climate change impacts including reduction in resources due to drought.
- Overgrazing by stock impacting on leaf litter and shrub layer.

***Petroica phoenicea* (Flame Robin)**

The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.

The Flame Robin breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes.

Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration.

In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). These open habitats include dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees, and occasionally in heathland or other shrublands in coastal areas.

Birds forage from low perches, from which they sally or pounce onto small invertebrates, which they take from the ground or off tree trunks, logs and other coarse woody debris. Flying insects are often taken in the air and sometimes invertebrates are gleaned from foliage and bark.

In its autumn and winter habitats, the Flame Robin often sallies from fence- posts or thistles and other prominent perches in open habitats.

The Flame Robin builds an open cup nest made of plant materials and spider webs. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks.

Threatening processes for this species include:

- Clearing and degradation of breeding and wintering habitats.
- Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris from depletion by grazing, firewood collection and 'tidying up' of rough pasture.
- Predation by over-abundant populations of Pied Currawong (*Strepera graculina*) which are supported by planted exotic berry- producing shrubs; this pressure, is addition to that from other native and exotic predators, may be a potentially severe threat to the breeding success of Scarlet Robin populations.
- Habitat for the Scarlet Robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances.
- Competitive exclusion by over-abundant Noisy Miners (*Manorina melanocephala)* within habitat.
- Isolation of patches of habitat, particularly where these patches are smaller than 10 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing.
- Habitat modification due to overgrazing.
- Reduction of the native ground cover in favour of exotic grasses. Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter.

- Reduction of size of remnant patches.

Potential impacts of the proposal on Passerines (order Passeriformes)

The proposal would potentially impact on foraging and breeding habitat for the subject Passerines being an average of 5 ha per year over a 10-15 year period.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will impact on potential foraging habitat for the subject Passerines.

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject Passerines for the following reasons:

- only a relatively small proportion of the potential habitat for the subject Passerines that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat within 90% of the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- the majority of potential foraging and breeding habitat for the subject Passerines will remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- alternative foraging and breeding habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of either of the subject Passerines would occur such that a viable local population is placed at risk of extinction.

Birds - Doves and Pigeons (order Columbiformes)

***Ptilinopus magnificus* (Wompoo Fruit-dove)**

Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests.

Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal.

Threatening processes for this species include:

- Clearing and fragmentation of low to mid-elevation rainforest due to coastal development and grazing.
- Logging and roading in moist eucalypt forest with well-developed rainforest understorey.
- Burning, which reduces remnant rainforest habitat patches.
- Infestation of rainforest habitat by invasive weeds.

Potential impacts of the proposal on Doves and Pigeons

Partial disturbance during harvesting operations to the mesophyllous midstorey vegetation containing suitable fruiting rainforest trees and shrubs may impact on potential foraging and breeding habitat for the Wompoo Fruit-dove with an average area of up to 5 ha per year over a 10-15 year period.

Despite impacts on this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the Wompoo Fruit-dove for the following reasons:

- Areas of rainforest and old growth forest at the site containing suitable habitat for the Wompoo Fruit-dove (total area of 13.5 ha) will be excluded from forest operations in accordance with the PNF code;
- the majority of potential foraging and breeding habitat for the Wompoo Fruit-dove will remain within a logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- alternative foraging and breeding habitat within rainforests and wet sclerophyll forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of the Wompoo Fruit-dove would occur such that a viable local population is placed at risk of extinction.

Birds - Owls (Order Strigiformes)

***Ninox strenua* (Powerful Owl)**

The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.

The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera*), Black She-oak (*Allocasuarina littoralis*), Blackwood (*Acacia melanoxylon*), Rough-barked Apple (*Angophora floribunda*), Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species.

The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.

Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4,000 ha.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.

Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.

Threatening processes for this species include:

- Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development. This loss also affects the populations of arboreal prey species, particularly the Greater Glider which reduces food availability for the Powerful Owl.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees. Loss of hollow-bearing trees reduces the availability of suitable nest sites and prey habitat.

- Can be extremely sensitive to disturbance around the nest site, particularly during pre-laying, laying and downy chick stages. Disturbance during the breeding period may affect breeding success.
- High frequency hazard reduction burning may also reduce the longevity of individuals by affecting prey availability.
- Road kills.
- Secondary poisoning.
- Predation of fledglings by foxes, dogs and cats.

***Tyto novaehollandiae* (Masked Owl)**

Lives in dry eucalypt forests and woodlands from sea level to 1,100 m. A forest owl, but often hunts along the edges of forests, including roadsides.

The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

Threatening processes for this species include:

- Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future.
- Clearing of habitat for grazing, agriculture, forestry or other development.
- A combination of grazing and regular burning is a threat, through the effects on the quality of ground cover for mammal prey, particularly in open, grassy forests.
- Secondary poisoning from rodenticides.
- Being hit by vehicles.

***Tyto tenebricosa* (Sooty Owl)**

Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.

Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) or Sugar Glider (*Petaurus breviceps*).

Nests in very large tree-hollows.

Threatening processes for this species include:

- Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future.
- Clearing of habitat for grazing, agriculture, forestry or other development.
- A combination of grazing and regular burning is a threat, through the effects on the quality of ground cover for mammal prey, particularly in open, grassy forests.

- Secondary poisoning from rodenticides.

Potential impacts of the proposal on Forest Owls

The proposal would potentially impact 5 hectares of foraging habitat (supporting prey) for the subject forest owls on average per year over a 10-15 year period.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will potentially impact on prey densities and in turn impact on the subject forest owls.

A proportion of the site's mature trees will be removed during the operations. However, retention of habitat (hollow-bearing) and habitat recruitment trees will occur at the minimum standards for tree retention set out in the PNF code, namely 20 trees per 2 hectares on average. In the PNF code, priority is given to retention of larger hollows in trees. It was observable that with the exception of mature areas of forest (within excluded mapped old growth areas and areas other around the switchbacks on Middle Shelf Road and within the previously logged Blue Gum/ rainforest area on the shelf) much of the forest is relatively young regrowth (40-60 years age) with few on no hollows present. The removal of these trees will not interfere with breeding habitat requirements of the subject forest owls.

Despite the removal of this area of potential foraging habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject species for the following reasons:

- only a relatively small proportion of the potential habitat for the subject forest owls that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (average of 5 ha out of 58 ha that is available). This also means that habitat within the vast majority of the forests available to harvest at the site will not be impacted by the forestry operations in any given year;
- the foraging habitat that may be impacted represents only a tiny portion of the home range of the subject forest owls, which are at least 400 ha or more in size;
- the majority of potential foraging habitat for the subject forest owls will remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- no removal of large hollows suitably sized for breeding of the subject forest owls is likely; and
- alternative foraging and breeding habitat for forest owls within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large

forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of any of the subject forest owls would occur such that a viable local population is placed at risk of extinction.

Frogs - *Mixophyes balbus* (Stuttering Frog)

Mixophyes balbus is found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.

Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Breed in streams during summer after heavy rain.

Threatening processes for this species include:

- Modification and loss of habitat.
- Disease - chytrid fungus.
- Changes to natural water flows and water quality.
- Predation of eggs and tadpoles by introduced fish.
- Damage to habitat and impacts on water quality from forestry activities.
- Damage (vegetation removal, disturbance, turbidity) to habitat by domestic stock, feral cattle and pigs.
- Poor knowledge of the species' distribution, taxonomy and history of local extinction.

Potential impacts of the proposal on the subject threatened frogs

The proposal may impact on small sections of potential foraging and breeding habitat for the Stuttering Frog within and adjacent to drainage lines on the site. Impacts would primarily relate to the construction and maintenance of drainage crossing features, but more broadly through sediment flowing into waterways off roads.

Despite the potential for these impacts on foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of Stuttering Frog for the following reasons:

- only a relatively small area of potential foraging and breeding habitat associated with crossings for the Stuttering Frog would be impacted;
- more broadly, drainage line exclusion zones (minimum 10m depending on stream order) will be implemented as required by the PNF code. Habitat for the Stuttering Frog in these exclusion zones will not be directly impacted by the forestry operations;

- drainage crossing structures and erosion control on roads will be implemented in accordance with the PNF code to minimise any indirect impacts on waterways from the forestry operations; and
- the majority of potential foraging and breeding habitat present on the site will not be impacted by the forestry operations. Furthermore, alternative habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis it would be highly unlikely that an adverse effect on the life cycle of the Stuttering Frog will occur such that a viable local population is likely to be placed at risk of extinction.

Mammals – Macropods (suborder Macropodiformes)

***Notomacropus parma* (Parma Wallaby)**

Preferred habitat for *Notomacropus parma* is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. During the day they shelter in dense cover.

Notomacropus parma typically feeds at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas.

Threatening processes for this species include:

- Predation by foxes.
- Predation by domestic and wild dogs/dingos.
- Loss and fragmentation of habitat through clearing and under scrubbing.
- Inappropriate fire regime reducing or degrading habitat, especially as a result of overly frequent or intense fires and regular burning of forest margins.
- Climate change altering habitat and increasing risks associated with fire.
- Removal of the understorey and shrub layer by grazing stock.
- Predation by feral cats.
- Habitat degradation and grazing competition by feral horses, cattle, pigs and rabbits.
- Intensive forestry practices resulting in, or exacerbating, habitat loss and fragmentation.
- Difficulty obtaining reliable and robust population estimates
- Vehicle strike
- Lack of information about disease prevalence and susceptibility.
- Weed invasion following disturbances such as fire and timber harvesting, changing structure and composition of vegetation and reducing food availability

- Lack of knowledge around threatening processes and their interactions.

***Thylogale stigmatica* (Red-legged Pademelon)**

Preferred habitat for *Thylogale stigmatica* is forest with a dense understorey and ground cover, including rainforest, moist eucalypt forest and vine scrub. Wet gullies with dense, shrubby ground cover provide shelter from predators.

In NSW, rarely found outside forested habitat.

They disperse from dense shelter areas to feed from late afternoon to early morning, favouring native grasses and herbs on the edge of the forest. Also known to feed on fruits, young seedling leaves and stems, fungi and ferns.

Threatening processes for this species include:

- Loss or fragmentation of habitat due to land clearing and under scrubbing.
- Predation by domestic and wild dogs/dingos.
- Predation by foxes.
- Inappropriate fire regime reducing or degrading habitat, especially as a result of overly frequent or intense fires and regular burning of forest margins.
- Habitat degradation and grazing competition by feral horses, cattle, pigs, and rabbits.
- Predation by feral cats.
- Habitat degradation and grazing competition by domestic stock.
- Climate change altering habitat and increasing risks associated with fire.
- Intensive forestry practices resulting in, or exacerbating, habitat loss and fragmentation.
- Broad scale lantana removal resulting in habitat loss.
- Lack of information about disease prevalence and susceptibility.
- Lack of knowledge around threatening processes and their interactions.

Potential impacts of the proposal on subject Macropods

The proposal would potentially impact on up to 5 hectares of foraging and breeding habitat for the subject Macropods per year on average over a 10-15 year period.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will impact on potential foraging habitat for the subject Macropods.

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject Macropods for the following reasons:

- only a relatively small proportion of the potential habitat for the subject Macropods that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year on average over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat within 90% of the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- the majority of potential foraging and breeding habitat for the subject Macropods will remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- alternative foraging and breeding habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of either of the subject Macropods would occur such that a viable local population is placed at risk of extinction.

Mammals – Gliders and Brush-tailed Phascogale

Petaurus norfolcensis **(Squirrel Glider)**

Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites.

Petaurus norfolcensis live in family groups of a single adult male one or more adult females and offspring.

Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.

Threatening processes for this species include:

- Habitat loss and degradation.
- Fragmentation of habitat.
- Loss of hollow-bearing trees.
- Loss of understorey food resources.
- Inappropriate fire regimes.
- Reduction in food resources due to drought.
- Mortality due to entanglement on barbed wire.
- Occupation of hollows by exotic species.

- Mortality due to collision with vehicles.
- Predation by exotic predators.
- Changes in spatial and temporal distribution of habitat due to climate change

Petauroides volans **(Greater Glider)**

Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.

Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 4 ha and are very loyal to their territory.

Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age.

Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent.

Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees.

Threatening processes for this species include:

- Reduction in habitat area and quality is predicted to occur as a result of urban and rural development which poses a significant threat to this population of Greater Gliders. Specific threats are listed below.
- Loss of habitat including fragmentation and lack of connectivity to surrounding habitat as a result of urban and rural development.
- Loss of hollow-bearing trees.
- Too frequent or high severity fires impacting the population and hollow bearing trees
- Small population size susceptible to unmanageable threats including loss of individuals (e.g. from powerful owl predation) and threats impacting habitat quality and food availability (e.g. climate change and drought).
- Too frequent or high severity fires impacting the population and hollow bearing trees.
- Small population size susceptible to unmanageable threats including loss of individuals (e.g. from powerful owl predation) and threats impacting habitat quality and food availability (e.g. climate change and drought).
- Barbed wire fences can entangle gliders and damage their gliding membranes.

Mammals - ***Phascogale tapoatafa*** **(Brush-tailed Phascogale)**

Preferred habitat is dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter, but also inhabit heath, swamps, rainforest and wet sclerophyll forest.

Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates.

Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha.

Threatening processes for this species include:

- Loss and fragmentation of habitat.
- Loss of hollow-bearing trees.
- Predation by foxes and cats.
- Competition for nesting hollows with the introduced honeybee.

Potential impacts of the proposal on Gliders and Brush-tailed Phascogale

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will potentially impact on foraging resources for the subject gliders and Brush-tailed Phascogale. It has been observed in the south-east forests of NSW that Greater Glider populations could be maintained post-logging if 40% of the original tree basal area is left (Kavanagh 2000). The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area.

The proposal would potentially impact on up to 5 hectares of foraging habitat for the subject gliders and Brush-tailed Phascogale per year on average over a 10-15 year period. Foraging habitat for this species was determined to occupy 13 ha based on a maximum home range around records of 4 ha. Of this area, approximately 15% is excluded from harvesting (mapped old growth and rainforest, steep areas, rocky areas, riparian buffers) Therefore, impacts on Greater Glider foraging habitat is likely to be substantially less than 5 hectares per year.

A proportion of the sites mature trees will be removed during the operations. However, retention of habitat (hollow-bearing) trees, and habitat recruitment trees will occur at the minimum standards for tree retention set out in the PNF code, namely 20 trees per 2 hectares on average. In the PNF code, priority is given to retention of larger hollows in trees. It was observable that with the exception of mature areas of forest (within excluded mapped old growth areas and areas other around the switchbacks on Middle Shelf Road and within the previously logged Blue Gum/ rainforest area on the shelf) much of the forest is relatively young regrowth (40-60 years age) which is yet to develop hollows. It is therefore highly unlikely that any hollow tree suitable for denning or breeding of the Greater Glider, Squirrel Glider or Brush-tailed Phascogale will be impacted.

Despite the removal of trees with potential foraging and habitat value, the proposal is considered unlikely to significantly affect any potentially occurring local

population of the subject gliders and Brush-tailed Phascogale for the following reasons:

- only a relatively small proportion of the potential habitat for the Squirrel Glider and Brush-tailed Phascogale that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations in any given year;
- 15% of the Greater Glider foraging habitat on the site is within excluded areas under the PNF code and therefore will not be impacted by the harvesting operations;
- the majority of potential foraging habitat for the subject gliders and Brush-tailed Phascogale will remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and limited disturbance to midstorey and understorey to extract the trees);
- The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area which is more than the level of 40% retention that has been observed to be adequate in other forests to maintain Greater Glider populations (Kavanagh 2000);
- no removal of large hollows suitably sized for breeding of the Greater Glider is likely;
- PNF code prescriptions for the subject gliders and Brush-tailed Phascogale would be implemented for records of these species at the site (buffer zones applied); and
- alternative foraging and breeding habitat for the subject gliders and Brush-tailed Phascogale within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of any of the subject gliders and Brush-tailed Phascogale would occur such that a viable local population is placed at risk of extinction.

Mammals - Potorous tridactylus tridactylus **(Long-nosed Potoroo)**

Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.

The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil.

Often digs small holes in the ground in a similar way to bandicoots.

Mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours.

Individuals are mainly solitary, non-territorial and have home range sizes ranging between 2-5 ha.

Breeding peaks typically occur in late winter to early summer and a single young is born per litter. Adults are capable of two reproductive bouts per annum.

Threatening processes for this species include:

- Habitat loss and fragmentation from land clearing for residential and agricultural development.
- Predation from foxes, wild dogs and cats.
- Inappropriate fire regimes reduce the density and floristic diversity of understorey vegetation.
- Logging or other disturbances that reduce the availability and abundance food resources, particularly hypogeous fungi, and ground cover.
- Unplanned clearing in areas where the species occurs on private property is likely to degrade the species' habitat.
- Need to better understand how or if native or introduced predators impact Long-nosed Potoroo abundance in the long-term.

Potential impacts of the proposal on the Long-nosed Potoroo

The proposal would potentially impact on up to 5 hectares of foraging and breeding habitat for the Long-nosed Potoroo per year on average over a 10-15 year period. This would be primarily in relation to partial disturbance to the midstorey and understorey during harvesting operations.

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the Long-nosed Potoroo for the following reasons:

- only a relatively small proportion of the potential habitat for the Long-nosed Potoroo that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of the habitat within the forests available to harvest at the site will not be impacted by the forestry operations in any given year;

- the majority of potential foraging and breeding habitat for the Long-nosed Potoroo will remain within the logged area after the harvesting operations have occurred (primarily related to limited disturbance to midstorey and understorey to extract the trees);
- alternative foraging and breeding habitat for the Long-nosed Potoroo within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of the Long-nosed Potoroo would occur such that a viable local population is placed at risk of extinction.

Phascolarctos cinereus **(Koala)**

Inhabit eucalypt woodlands and forests.

Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.

Spend most of their time in trees, but will descend and traverse open ground to move between trees.

Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.

Threatening processes for this species include:

- Loss, modification and fragmentation of habitat
- Vehicle strike
- Predation by roaming or domestic dogs
- Intense prescribed burns or wildfires that scorch or burn the tree canopy
- Koala disease
- Heat stress through drought and heatwaves
- Inadequate support for fauna rehabilitation and emergency response
- Small population size or geographically isolated populations.
- Poor understanding of population distribution and trend
- Poor understanding of animal movements and use of habitat
- Poor understanding of social and economic value of koalas to community

Potential impacts of the proposal on the Koala

The results of the survey indicated that a transitory koala population is likely to be present over much of the site, with some better quality habitat areas supporting medium (normal) use, suggesting a more sedentary population in these areas. No

koalas (including no breeding females with young) were recorded either during the spotlighting or opportunistically during other ecological surveys (however a bellowing male was recorded in October 2023 after the surveys were completed (Nick Cameron pers. comm.). Based on the above survey data, there is no supporting evidence for the land to be mapped as core koala habitat according to SEPP 2020.

Vegetation removal within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. This would include removal of individuals of two Koala feed tree species within the Central Coast Koala Management Area, consisting of the primary tree species Tallowwood (*Eucalyptus microcorys*) and secondary tree species Grey Gum (*E. propinqua*) (PNF Code of Practice for Northern NSW).

The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will potentially impact on foraging resources and shelter for the Koala. The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area.

Prescriptions for the Koala in the PNF code include that within areas mapped as 'high suitability Koala habitat' (refer to Figure 4) harvesting operations will retain of a minimum of 15 primary koala feed trees and 5 secondary koala feed trees, where available.

Despite the removal of this area of potential foraging habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject gliders of Koala for the following reasons:

- only a relatively small proportion of the potential habitat for the Koala that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that foraging habitat over the vast majority of the forests available to harvest at the site will not be impacted by the forestry operations in any given year. Note also, not all of the vegetation being removed would be suitable foraging habitat for the Koala;
- the results of the survey indicated that a transitory koala population is likely to be present over most of the site;
- PNF code prescriptions for the Koala would be implemented; and
- alternative foraging (and breeding) habitat for Koalas within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of Koala would occur such that a viable local population is placed at risk of extinction.

Microbats

***Scoteanax rueppellii* (Greater Broad-nosed Bat)**

Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.

Although this species usually roosts in tree hollows, it has also been found in buildings.

Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m.

Threatening processes for this species include:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees.
- Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores.
- Changes to water regimes are likely to impact food resources, as is the use of pesticides and herbicides near waterways.

***Micronomus norfolkensis* (Eastern Freetail-bat)**

Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.

Roost mainly in tree hollows but will also roost under bark or in man-made structures.

Usually solitary but also recorded roosting communally, probably insectivorous.

Threatening processes for this species include:

- Loss of hollow-bearing trees.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Artificial light sources spilling onto foraging and/or roosting habitat
- Large scale wildfire or hazard reduction burns on foraging and/or roosting habitat

***Miniopterus australis* (Little Bent-winged Bat)**

Habitat consists of moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.

Miniopterus australis roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.

They often share roosting sites with the *Miniopterus schreibersii* and, in winter, the two species may form mixed clusters.

In NSW the largest maternity colony is in close association with a large maternity colony of *Miniopterus schreibersii* and appears to depend on the large colony to provide the high temperatures needed to rear its young.

Only five nursery sites /maternity colonies are known in Australia.

Threatening processes for this species include:

- Disturbance of colonies, especially in nursery or hibernating caves, may be catastrophic.
- Extractive mining activity that destroys or disturbs caves and resident bats. Includes maternity, staging and over-wintering roosting caves.
- Illegal extraction of guano causing disturbance to resident bats
- Changes to habitat, especially surrounding maternity/nursery caves and winter roosts.
- Pesticides on insects and in water consumed by bats bio accumulates, resulting in poisoning of individuals.
- Predation from foxes, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges.
- Predation from feral cats, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges
- Woody weeds such as Lantana or blackberry that can overgrow cave entrances and block access or provide an entanglement risk
- Introduction of exotic pathogens such as the White-nosed fungus.
- Hazard reduction and wildfire fires during the breeding season.
- Large scale wildfire or hazard reduction can impact on foraging resources.
- Poor knowledge of reproductive success and population dynamics.

Miniopterus orianae oceanensis **(Large Bent-winged bat)**

Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.

Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. Cold caves are used for hibernation in southern Australia.

At other times of the year, populations disperse within about 300 km range of maternity caves.

Breeding or roosting colonies can number from 100 to 150,000 individuals.

Hunt in forested areas, catching moths and other flying insects above the tree tops.

Threatening processes for this species include:

- Disturbance by recreational cavers and general public accessing caves and adjacent areas particularly during winter or breeding.
- Loss of high productivity foraging habitat.
- Introduction of exotic pathogens, particularly white-nose fungus.
- Cave entrances being blocked for human health and safety reasons, or vegetation (particularly blackberries) encroaching on and blocking cave entrances.
- Hazard reduction and wildfire fires during the breeding season.
- Predation by feral cats.

***Phoniscus papuensis* (Golden-tipped Bat)**

Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests.

Bats will fly up to two kilometres from roosts to forage in rainforest and sclerophyll forest on mid and upper-slopes.

Roost mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes.

Bats will use multiple roost and change roosts regularly.

Maternity roots may occur away from water sources with one maternity roost found 450m upslope of the nearest water course in a broken bough.

Specialist feeder on small web-building spiders.

Threatening processes for this species include:

- Loss of riparian rainforest for roosting and foraging habitat.
- Loss of understorey habitat on mid and upper slopes for foraging.
- Habitat fragmentation.
- Lack of knowledge of the threats to the species.
- Inappropriately planned hazard reduction burns and unplanned wildfire events that produce fires of a high intensity that burn into rainforest habitat.
- Pesticides and other chemicals used in or adjacent to habitat areas.

- Exotic weeds, particularly lantana and vines, that degrade habitat and alter the structure of rainforest and adjacent wet and dry sclerophyll forest vegetation communities.
- Unlawful forestry operations that fragment habitat or result in impacts to roosting or foraging habitat.
- Loss of yellow-throated scrub-wren and brown gerygone nests in riparian areas that are used by golden-tipped bats for roosting.

***Falsistrellus tasmaniensis* (Eastern False Pipistrelle)**

Prefers moist habitats, with trees taller than 20 m.

Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.

Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.

Threatening processes for this species include:

- Disturbance to winter roosting and breeding sites.
- Loss of roosting habitat, primarily hollow-bearing eucalypts.
- Loss and fragmentation of foraging habitat, particularly extensive areas of continuous forest and areas of high productivity.

Potential impacts of the proposal on microbats

The proposal would require the removal of potential aerial foraging habitat for the subject microbats. This would consist of potential impacts on up to 5 hectares of foraging habitat for the subject microbats per year over a 10-15 year period.

Retention of habitat (hollow-bearing) trees and habitat recruitment trees will occur at the minimum standards for tree retention set out in the PNF code, namely, 20 trees per 2 hectares on average. There is potential however for some trees to be harvested (limited to mature forest areas with a higher number of hollow resources) that contain hollows which are suitable for microbat roosting (all species except Large Bent-winged Bat) and breeding (all species except for Little Bent-winged Bat and Large Bent-winged Bat).

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of the subject microbats for the following reasons:

- only a relatively small proportion of the potential aerial foraging habitat and breeding habitat (tree hollows) for the subject microbats that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also

means that habitat within 90% of the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- the majority of potential aerial foraging and breeding habitat (hollow trees) for the subject microbats is likely to remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and PNF prescriptions for retention of hollow trees);
- alternative foraging and breeding habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of the subject Microbats would occur such that a viable local population is placed at risk of extinction.

Reptiles

***Hoplocephalus stephensii* (Stephens' Banded Snake)**

Rainforest and eucalypt forests and rocky areas up to 950 m in altitude.

Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.

At night it hunts frogs, lizards, birds and small mammals.

Threatening processes for this species include:

- Clearing and fragmentation of habitat.
- Forestry practices which result in loss of old or dead trees.
- Too frequent burning for fuel reduction or grazing management which destroys old and dead trees and removes understorey vegetation.
- Illegal collection of snakes from the wild.
- Poor knowledge of the species' habitat preferences.

Potential impacts of the proposal on Stephen's Banded Snake

The proposal would require the removal of potential foraging and breeding habitat for Stephen's Banded Snake.

Impacts on foraging habitat would consist of removal/disturbance of up to 5 hectares of foraging habitat per year over a 10-15 year period.

Retention of habitat (hollow-bearing) trees and habitat recruitment trees will occur at the minimum standards for tree retention set out in the PNF code, namely, 20 trees per 2 hectares on average. There is potential however for some trees to be harvested (limited to mature forest areas with a higher number of hollow resources) that contain hollows which are suitable for sheltering/breeding of Stephen's Banded Snake.

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to significantly affect any potentially occurring local population of Stephen's Banded Snake for the following reasons:

- only a relatively small proportion of the potential foraging habitat and breeding habitat (tree hollows) for Stephen's Banded Snake that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- a relatively large area of rocky outcrop with a 20 m buffer will be excluded from the forestry operations, This would be potential foraging and shelter habitat for Stephen's Banded Snake;
- the majority of potential foraging and sheltering/breeding habitat (hollow trees) for Stephen's Banded Snake is likely to remain within the logged area after the harvesting operations have occurred (based on selective logging retaining a majority of the tree basal area and PNF prescriptions for retention of hollow trees);
- alternative foraging and breeding habitat within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of Stephen's Banded Snake would occur such that a viable local population is placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not relevant to assessment of threatened species.

c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The proposal is to selectively harvest the site for high quality logs, low quality logs and pulpwood over a 10-15 year period. Assuming a net harvest area of 58 hectares excluding non-harvestable areas of mapped rainforest, mapped old growth, steep slopes, rocky outcrops, mapped and unmapped riparian buffer zones, threatened species records, the area subject to harvesting would be approximately 5 hectares per year on average.

Only small areas of the harvestable area (tall moist forests on the shelf and slopes in the middle of the property where there are groups of large commercially mature trees) will be subject to Australian group selection (AGS). AGS would consist of harvesting of groups (small patches or stands) of trees. The remainder of the site will be selectively harvested.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Some midstorey and understorey will inevitably be impacted during removal of the harvestable trees. However, this will regrow in the long-term as the majority of trees/shrubs that can reseed the disturbed area will remain to allow for regeneration.

The proposed operations will include the removal of mature trees. This will be mitigated, however, by retention of habitat (hollow-bearing) and habitat recruitment trees at the minimum standards for tree retention set out in the PNF code, namely, 20 trees per 2 hectares on average.

Removal of this native vegetation could potentially impact (directly or indirectly) on habitat for the following threatened fauna species as indicated:

- *Calyptorhynchus lathami* (Glossy Black-Cockatoo), *Daphoenositta chrysoptera* (Varied Sittella), *Petroica phoenicea* (Flame Robin), *Ptilinopus magnificus* (Wompoo Fruit-dove) - foraging and breeding habitat;
- *Glossopsitta pusilla* (Little Lorikeet) - foraging and breeding habitat (small diameter tree hollows);
- *Ninox strenua* (Powerful Owl), *Tyto novaehollandiae* (Masked Owl), *Tyto tenebricosa* (Sooty Owl) – foraging habitat (prey) and breeding habitat (large hollows in mature trees);
- *Mixophyes balbus* (Stuttering Frog) – riparian foraging and breeding habitat (indirectly)
- *Notomacropus parma* (Parma Wallaby), *Thylogale stigmatica* (Red-legged Pademelon) – foraging and breeding habitat;

- *Petaurus norfolcensis* (Squirrel Glider), *Petauroides volans* (Greater Glider), *Phascogale tapoatafa* (Brush-tailed Phascogale) - foraging and breeding habitat (tree hollows);
- *Potorous tridactylus tridactylus* (Long-nosed Potoroo) – foraging and breeding habitat;
- *Phascolarctos cinereus* (Koala) – foraging habitat;
- *Scoteanax rueppellii* (Greater Broad-nosed Bat), *Micronomus norfolkensis* (Eastern Freetail-bat), *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) - foraging habitat and roosting (breeding) habitat (tree hollows)
- *Miniopterus australis* (Little Bent-winged Bat) - foraging habitat and roosting (non-breeding) habitat (tree hollows);
- *Phoniscus papuensis* (Golden-tipped Bat) - foraging habitat and roosting (breeding) habitat (abandoned bird nests);
- *Miniopterus orianae oceanensis* (Large Bent-winged bat) – foraging habitat
- *Hoplocephalus stephensii* (Stephens' Banded Snake) – foraging and breeding habitat (tree hollows and loose bark);

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposal would predominantly consist of selective harvesting (removal of between one quarter and one third of the basal area and disturbance to some midstorey and understorey during removal of the harvestable trees). Only a small amount of the site will potentially be subject to AGS silviculture. Gaps created by the harvesting operations will be relatively small (up to 0.1 ha for the AGS patches).

Therefore, no substantial fragmentation or isolation of habitat for any of the subject species is likely.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The harvestable area of the site predominantly consists of regrowth forest of between 40-60 years age. Areas of more mature forest are mostly within excluded areas (e.g. mapped as old growth, rainforest or on steep slopes).

Site habitats are considered to be of limited importance for the subject species, as alternative foraging and breeding habitat of equivalent or better quality for all subject species occurs extensively within forests in the broader locality. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. These habitats would not be affected by the proposal.

iv) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No areas of outstanding biodiversity value have been declared in Dungog LGA.

d) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A key threatening process (KTP) is defined under the BC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in Table C.2.

Table C.2 Key Threatening Processes

Key Threatening Process (as per Schedule 4 of the BC Act)	*Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?*		
	Likely	*Possible*	*Unlikely*
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change		✓	
Bushrock removal		✓	
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners		✓	
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations			✓

Key Threatening Process (as per Schedule 4 of the BC Act)	***Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?***		
	Likely	***Possible***	***Unlikely***
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis		✓	
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)	✓		
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss of hollow-bearing trees	✓		
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (*Canis lupus familiaris*)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the feral cat (*Felis catus*)			✓
Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)			✓

Key Threatening Process (as per Schedule 4 of the BC Act)	*Is the development or activity a key threatening process or part of a key threatening process or likely to increase the impact of a key threatening process?*		
	Likely	*Possible*	*Unlikely*
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees	✓		

As shown in Table C.2 the following four KTPs are likely to be contributed to by the proposal:

Clearing of native vegetation: Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands.

The proposal is to selectively harvest the site for high quality logs, low quality logs and pulpwood over a 10-15 year period. Assuming a net harvest area of approximately 58 hectares excluding non-harvestable areas of rainforest, old growth, steep slopes, rocky outcrops, riparian zones, and threatened species records, the area subject to harvesting would be approximately 5 hectares per year on average.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Some midstorey and understorey will inevitably be impacted during removal of the harvestable trees. However, this will regrow in the long-term as the majority of trees/shrubs that can reseed the disturbed area will remain to allow for regeneration.

Considering the relatively small area of native vegetation to be removed (in relation to the forested area in the broader locality), it is unlikely that the proposal would contribute significantly to this KTP.

Invasion, establishment and spread of Lantana (*Lantana camara*): Harvesting operations that create larger canopy gaps (predominantly AGS silviculture areas) may facilitate the infiltration of Lantana into new areas of the site.

However, considering the relatively small area that will potentially be subject to AGS silviculture and recommended weed control within these areas to facilitate the

recruitment of target harvestable eucalypts, the contribution of the proposal to this KTP will be minor.

Loss of hollow-bearing trees: In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 81 birds, 31 reptiles and 16 frogs.

In general hollow-bearing trees are unsuited to timber production and are avoided due to their internal defect. It is therefore unlikely that trees containing hollows will be harvested. The risk is further reduced by the requirement to retain habitat (hollow-bearing) and habitat recruitment trees at the minimum standards specified for tree retention in the PNF code, namely, 20 trees per 2 hectares on average.

Considering the small quantity of hollow trees that could be removed and PNF code requirements for hollow tree retention, it is unlikely that the proposal would contribute significantly to this KTP more broadly.

Removal of dead wood and dead trees: during harvesting operations some dead wood may be removed for firewood. However, in relation to the amount of dead wood and dead trees in the remainder of the site and in the broader locality, this would not contribute significantly to this KTP more broadly.

Conclusion

It is considered unlikely that a local occurrence of any of the subject threatened fauna species would be placed at risk of extinction as a result of the proposal.

References

Department of Planning, Industry and Environment (2024). Threatened Species Profiles. Available at https://www.environment.nsw.gov.au/threatenedspeciesapp/

Assessment of Significance (EPBC Act Matters of National Environmental Significance assessment) for Threatened Species

Flora

- Scrub Turpentine (*Rhodamnia rubescens*)
- Native Guava (*Rhodomyrtus psidiodes*)

Flora

Both *Rhodamnia rubescens* and *Rhodomyrtus psidioides* are listed as Critically Endangered species under the EPBC Act.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of a population

None of the potentially occurring subject threatened flora species were recorded at the site in the site surveys. However, the survey was insufficient to rule out occurrence within potential habitats across the entire site.

In relation to the subject threatened flora, the proposed harvesting operations will impact on some midstorey and understorey that is potential habitat within an area of up to 5 ha per year on average over a 10-15 year period, during removal of the harvestable trees.

Despite the removal of this potential habitat for the subject threatened flora, the proposal is considered unlikely to significantly affect any potentially occurring local population for the following reasons:

- only a relatively small proportion of the potential habitat for the subject threatened flora that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations on average per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations in any given year;
- areas of potential habitat on the site would likely be protected in excluded areas (mapped rainforest/riparian areas/steep slopes adjacent to rainforest) and therefore not impacted by the proposed harvesting; and
- alternative habitat of equivalent or better quality within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

Therefore, the proposal would be unlikely to lead to a long-term decrease in the size of a population of either of the subject threatened flora.

b) reduce the area of occupancy of the species

Only small areas of the harvestable area (tall moist forests on the shelf and slopes in the middle of the property where there are groups of large commercially mature trees) will be subject to Australian group selection (AGS). AGS would consist of harvesting of groups (small patches or stands) of trees, potentially leading to a gap of up to 0.1 ha per patch. The remainder of the site will be selectively harvested.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Some midstorey and understorey will inevitably be impacted during removal of the harvestable trees. However, this will regrow in the long-term as the majority of trees/shrubs that can reseed the disturbed area will remain to allow for regeneration.

Considering the above, overall, the current area of potential occupancy of the subject threatened flora species on the site would be retained post-harvesting.

c) fragment an existing population into two or more populations

The proposal would predominantly consist of selective logging (removal of between one quarter and one third of the basal area and disturbance to some midstorey and understorey during removal of the harvestable trees). Only a small amount of the site will potentially be subject to AGS silviculture. Gaps created by the harvesting operations will be relatively small (up to 0.1 ha for the AGS patches).

Therefore, no substantial fragmentation or isolation of habitat for any of the subject threatened flora is likely.

d) adversely affect habitat critical to the survival of a species

Site habitats are considered to be of limited importance (non-critical) for the subject threatened flora species, as alternative habitat of equivalent or better quality occurs extensively within forests in the broader locality. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. These habitats would not be affected by the proposal.

e) disrupt the breeding cycle of a population

Post-works the capacity of the subject threatened flora species to cross pollinate and disperse across the relatively small gaps created by the harvesting operations at the site would be retained.

f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

As mentioned previously, only a relatively small proportion of the potential habitat for the subject threatened flora that is present on the site will be impacted at any one time, with the vast majority of potential habitat in the forests available to harvest at the site not impacted by the forestry operations in any given year. Furthermore, other areas of potential habitat on the site would likely be protected in excluded areas (mapped rainforest/riparian areas/steep slopes adjacent to rainforest) and therefore not impacted by the proposed harvesting. Alternative habitat of equivalent or better quality within forests in the broader locality is widespread.

Therefore, the proposed harvesting operations would be unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that either of the subject threatened flora species is likely to decline.

g) result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

Lantana (*Lantana camara*) is a common weed on the property, especially along roads and tracks, in areas subject to previous disturbance, and where there are large canopy gaps. Harvesting operations that create larger canopy gaps (predominantly AGS silviculture areas) may facilitate the spread of Lantana into new areas of the site that are potential habitat for the subject threatened flora species.

However, considering the relatively small area that will potentially be subject to AGS silviculture and recommended weed control within these areas to facilitate the recruitment of target harvestable eucalypts, the contribution of the proposed harvesting operations to Lantana expansion will be minor.

h) introduce disease that may cause the species to decline, or

The subject threatened flora species have been heavily affected by Myrtle Rust over an extensive area of NSW and Qld since the accidental introduction in 2010, including within the broader Dungog region. The proposed harvesting operations are unlikely to introduce a novel introduction of Myrtle Rust to the site that would cause the subject threatened flora to decline.

i) interfere with the recovery of the species.

There is no adopted or made Recovery Plan for the subject threatened flora species. However, known threats to this species include:

- Decline in health/loss of mature plants and a lack of seed based recruitment due to infection by *Austropuccinia psidii* (Myrtle Rust).

- Degradation of habitat and competition from transformer weed species.
- Clearing from rural, agricultural and urban development leading to edge effects, degradation and further fragmentation.
- Habitat degradation and clearing due to forestry operations.
- Too frequent/intense fire destroying habitat and individual plants.
- Damage caused by inappropriate use of four-wheel drive vehicles.
- Road and track development and maintenance.

The proposed harvesting operations would be unlikely to substantially increase any of the acknowledged threats, and therefore would be unlikely interfere with any of the recovery actions for this species.

Conclusion

The proposal is unlikely to result in a significant impact on a local population of the subject threatened flora species and therefore would not require referral to the federal Minister of the Department of Climate Change, Energy, the Environment and Water.

Fauna

- Stuttering Frog (*Mixophyes balbus*)
- Greater Glider (*Petauroides volans*)
- Koala (*Phascolarctos cinereus*)

Mixophyes balbus

Mixophyes balbus is listed as a Vulnerable species under the EPBC Act.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of an important population of a species

According to the EPBC Act Significant Impact Guidelines v 1.1, an 'important population' is a population that is necessary for a species' long-term survival and recovery.

This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

No important populations have been identified in the recovery plan for the Stuttering Frog (Hunter & Gillespie 2011).

A potentially occurring local population of the Stuttering Frog at the site is unlikely to consist of a key source populations either for breeding or dispersal, or

populations that are necessary for maintaining genetic diversity. This is based on the limited habitat quality of the (mostly) regrowth forest at the site, and presence of limited breeding habitat.

The location is not near the limit of the species range as the distribution extends from south-east Victoria to the Clarence River catchment well north of the site.

A potentially occurring local population of the Stuttering Frog at the site would therefore not be considered an important population. It follows that the proposed harvesting operations would not lead to a long-term decrease in the size of an important population of the Stuttering Frog.

b) reduce the area of occupancy of an important population

As established previously, a potentially occurring local population of the Stuttering Frog at the site would not be considered an important population. It follows that the proposed harvesting operations would not reduce the area of occupancy of an important population of the Stuttering Frog.

c) fragment an existing important population into two or more populations

As established previously, a potentially occurring local population of the Stuttering Frog at the site would not be considered an important population. It follows that the proposed harvesting operations would not fragment an existing important population of the Stuttering Frog into two or more populations.

d) adversely affect habitat critical to the survival of a species

The majority of potential foraging and breeding habitat present on the site will not be impacted by the forestry operations. Furthermore, alternative habitat of equivalent or better quality within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

e) disrupt the breeding cycle of an important population

As established previously, a potentially occurring local population of the Stuttering Frog at the site would not be considered an important population. It follows that the proposed harvesting operations would not disrupt the breeding cycle of an important population.

f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

As mentioned previously, the majority of potential foraging and breeding habitat present on the site will not be impacted by the forestry operations. Furthermore,

alternative habitat of equivalent or better quality within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

Therefore, the proposed harvesting operations would be unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that a local population of Stuttering Frog is likely to decline.

g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Lantana (*Lantana camara*) is already a common weed on the property, particularly along roads and tracks, in areas that have been subject to previous disturbance, and areas with large canopy gaps. Harvesting operations that create larger canopy gaps (predominantly AGS silviculture areas) may facilitate the infiltration of Lantana into new areas of the site that are potential habitat for the Stuttering Frog.

However, considering the relatively small area that will potentially be subject to AGS silviculture and recommended weed control within these areas to facilitate the recruitment of target harvestable eucalypts, the contribution of the proposed harvesting operations to Lantana expansion will be minor.

h) introduce disease that may cause the species to decline, or

The pathogenic Amphibian Chytrid Fungus causes the disease chytridiomycosis in frogs and the Stuttering Frog is likely to be highly susceptible to this pathogen (Hunter & Gillespie 2011).

The proposed harvesting activities have the potential to introduce this disease to a local population of Stuttering Frogs at the site. Mitigation measures are recommended to minimise this risk.

i) interfere substantially with the recovery of the species.

There is an Approved Recovery Plan for the Stuttering Frog (Hunter & Gillespie 2011). Recovery objectives of the recovery plan are to:

- Determine the distribution, habitat requirements, conservation status, taxonomy, population demography and genetic structure of Stuttering Frog populations.
- Identify and address the causal factors of the decline, and prevent the local extinction of important populations of the Stuttering Frog across its geographic range.
- Build community support for the Stuttering Frog recovery program.

The proposed harvesting operations would be unlikely to interfere with any of the recovery actions for this species.

Conclusion

The proposal is unlikely to result in a significant impact on a local population of the Stuttering Frog and therefore would not require referral to the federal Minister of the Department of Climate Change, Energy, the Environment and Water.

Greater Glider

The Greater Glider is listed as an Endangered species under the EPBC Act.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of a population

The proposal would potentially impact on up to 5 hectares of foraging habitat for the Greater Glider per year on average over a 10-15 year period. Foraging habitat for this species was determined to occupy 13 ha based on a maximum home range around records of 4 ha. Of this area, approximately 15% is excluded from harvesting (mapped old growth and rainforest, steep areas, rocky areas, riparian buffers). Therefore, impacts on Greater Glider foraging habitat is likely to be substantially less than 5 hectares per year.

Vegetation removal/disturbance within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of overstorey eucalypt trees will potentially impact on foraging resources for the Greater Glider. It has been observed in the south-east forests of NSW that Greater Glider populations could be maintained post-logging if 40% of the original tree basal area is left (Kavanagh 2000). The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area.

Mature trees will be removed during the operations. However, retention of habitat (hollow-bearing) and habitat recruitment trees will occur at the minimum standards for tree retention set out in the PNF code, namely, 20 trees per 2 hectares on average . In the PNF code, priority is given to retention of larger hollows in trees. It was observable that with the exception of mature areas of forest (within excluded mapped old growth areas and areas other around the switchbacks on Middle Shelf Road and within the previously logged Blue Gum/ rainforest area on the shelf) much of the forest is relatively young regrowth (40-60 years age) with only predominantly smaller hollows present). It is therefore likely that any hollow tree removal will mostly consist of smaller hollows that are unsuitable for breeding of the Greater Glider.

Despite the removal of this area of potential foraging and breeding habitat, the proposal is considered unlikely to lead to a long-term decrease in the size of a population Greater Glider for the following reasons:

- only a relatively small proportion of the potential habitat for the Greater Glider that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations in any given year;
- 15% of the Greater Glider foraging habitat on the site is within excluded areas under the PNF code and therefore will not be impacted by the harvesting operations;
- The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area which is more than the level of 40% retention that has been observed to be adequate in other forests to maintain Greater Glider populations (Kavanagh 2000);
- no removal of large hollows suitably sized for breeding of the Greater Glider is likely;
- PNF code prescriptions for the Greater Glider would be implemented for records of these species at the site (buffer zones applied); and
- alternative foraging and breeding habitat for the Greater Glider within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

On this basis, it is highly unlikely that an adverse effect on the life cycle of any of the subject gliders and Brush-tailed Phascogale would occur such that a viable local population is placed at risk of extinction.

b) reduce the area of occupancy of the species

The proposed harvesting operations are unlikely to reduce the area of occupancy of the Greater Glider for the following reasons:

- 15% of the Greater Glider foraging habitat on the site is within excluded areas under the PNF code and therefore will not be impacted by the harvesting operations;
- The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area which is more than the level of 40% retention that has been observed to be adequate in other forests to maintain Greater Glider populations (Kavanagh 2000); and

- no removal of large hollows suitably sized for breeding of the Greater Glider is likely.

c) fragment an existing population into two or more populations

The proposal would predominantly consist of selective harvesting (removal of between one quarter and one third of the basal area and disturbance to some midstorey and understorey during removal of the harvestable trees). Only a small amount of the site will potentially be subject to AGS silviculture. Gaps created by the harvesting operations will be relatively small (up to 0.1 ha for the AGS patches).

Therefore, no substantial fragmentation or isolation of habitat for the Greater Glider is likely.

d) adversely affect habitat critical to the survival of a species:

The proposed harvesting operations are unlikely to adversely affect habitat critical to the survival of the Greater Glider for the following reasons:

- areas that will be subject to harvesting are predominantly regrowth forest 40-60 years old. Areas of old growth forest with large hollow-bearing trees at the site are excluded under the PNF code;
- retention of hollow-bearing trees will occur at the minimum standards for tree retention set out in the PNF code, consisting of 10 hollow bearing trees per 2 hectares, where available. In the PNF code, priority is given to retention of larger hollows in trees. It was observable that with the exception of mature areas of forest (within excluded mapped old growth areas and areas other around the switchbacks on Middle Shelf Road and within the previously logged Blue Gum/ rainforest area on the shelf) much of the forest is relatively young regrowth (40-60 years age) with only predominantly smaller hollows present). It is therefore likely that any hollow tree removal will mostly consist of smaller hollows that are unsuitable for breeding of the Greater Glider; and
- areas of better quality alternative foraging and breeding habitat for the Greater Glider is present within forests in the broader locality. Including within Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park.

e) disrupt the breeding cycle of a population

As mentioned previously, breeding habitat (large hollows in mature trees) for the Greater Glider are unlikely to be impacted by the proposed harvesting operations.

Therefore, the proposal is unlikely to disrupt the breeding cycle of an important population of this species.

f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline:

The proposed harvesting operations are considered unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline for the following reasons:

- only a relatively small proportion of the potential habitat for the Greater Glider that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat within 90% of the forests available to harvest at the site will not be impacted by the forestry operations in that year;
- 15% of the Greater Glider foraging habitat on the site is within excluded areas under the PNF code and therefore will not be impacted by the harvesting operations;
- The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area which is more than the level of 40% retention that has been observed to be adequate in other forests to maintain Greater Glider populations (Kavanagh 2000);
- no removal of large hollows suitably sized for breeding of the Greater Glider is likely;
- PNF code prescriptions for the Greater Glider would be implemented for records of these species at the site (buffer zones applied); and
- alternative foraging and breeding habitat for the Greater Glider within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

g) result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposed harvesting operations would be unlikely to introduce or facilitate the establishment of any invasive species at the site that that would be harmful to habitat of the Greater Glider.

h) introduce disease that may cause the species to decline

The proposal would not be likely to introduce any new disease to the site that is not already present within the population of the Greater Glider.

i) interfere with the recovery of the species

There is no adopted or made Recovery Plan for this species. However, known threats to this species include habitat loss, too intense or frequent fires, climate change,

timber production, barbed-wire fencing (entanglement), hyper-predation by owls, competition from Sulphur-crested Cockatoos, and *Phytophthora* root fungus.

Although timber production is one of the acknowledged threats to the Greater Glider, considering that only a relatively small area of foraging habitat for the Greater Glider would be impacted by the proposed harvesting operations, and that impacts on breeding habitat (suitably sized hollow-bearing trees) are unlikely, the proposed harvesting operations are considered unlikely to interfere with any of the recovery actions for this species.

Conclusion

The proposal is unlikely to result in a significant impact on a local population of the Greater Glider and therefore would not require referral to the federal Minister of the Department of Climate Change, Energy, the Environment and Water.

Koala

The Koala is listed as an Endangered species under the EPBC Act.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

a) lead to a long-term decrease in the size of a population

The results of the survey (SAT plots and spotlighting) indicated that a transitory koala population is likely to be present over much of the site, with some better quality habitat areas supporting medium (normal) use, suggesting a more sedentary population in these areas. No koalas (including no breeding females with young) were recorded either during the spotlighting or opportunistically during other ecological surveys (however a bellowing male was recorded after the surveys were completed (Nick Cameron pers. comm.).

Vegetation removal within the selectively harvested forest would consist of removal of between one quarter and one third of the tree basal area. This would include removal of individuals of several Koala feed tree species, including regional high use species Tallowwood (*Eucalyptus microcorys*) and Grey Gum (*E. propinqua*), and significant use species Blue Gum (*E. saligna*), Grey Ironbark (*E. siderophloia*), White Mahogany (*E. acmenoides*), and Turpentine (*Syncarpia glomulifera*) (NSW Office of Environment and Heritage 2018).

The pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will potentially impact on foraging resources and shelter for the Koala. The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area.

Prescriptions for the Koala in the PNF code include that within areas mapped as 'high suitability Koala habitat' (refer to Figure 4) harvesting operations will retain of

a minimum of 15 primary koala feed trees and 5 secondary koala feed trees, where available.

Despite the removal of this area of potential foraging habitat, the proposal is considered unlikely to lead to a long-term decrease in the size of a population of Koala at the site for the following reasons:

- only a relatively small proportion of the potential habitat for the Koala that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that habitat within 90% of the forests available to harvest at the site will not be impacted by the forestry operations in that year. Of this area, not all of the vegetation being removed would be suitable foraging habitat for the Koala;
- the results of the survey indicated that a transitory koala population is likely to be present over most of the site;
- PNF code prescriptions for the Koala would be implemented; and
- alternative foraging (and breeding) habitat for Koalas within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichister State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

b) reduce the area of occupancy of the species

The proposal is considered unlikely to reduce the area of occupancy for the Koala for the following reasons:

- the pre-harvest basal area averages around 40m^2/ha across the site with a range mostly between 30m^2/ha and 50m^2/ha. Removal of trees and disturbance to the midstorey and understorey during harvesting operations will potentially impact on foraging resources and shelter for the Koala. The proposed harvesting aims to retain a minimum of 66% of the pre-harvest tree basal area;
- prescriptions for the Koala in the PNF code include that within areas mapped as 'high suitability Koala habitat' (refer to Figure 4) harvesting operations will retain of a minimum of 15 primary koala feed trees and 5 secondary koala feed trees, where available; and
- only a relatively small proportion of the potential habitat for the Koala that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations

in any given year. Note also, not all of the vegetation being removed would be suitable foraging habitat for the Koala;

c) fragment an existing population into two or more populations

The proposal would predominantly consist of selective logging (removal of between one quarter and one third of the basal area and disturbance to some midstorey and understorey during removal of the harvestable trees). Only a small amount of the site will potentially be subject to AGS silviculture. Gaps created by the harvesting operations will be relatively small (up to 0.1 ha for the AGS patches).

Therefore, no substantial fragmentation or isolation of habitat for the Koala is likely.

d) adversely affect habitat critical to the survival of a species

As mentioned previously, the results of the survey (SAT plots and spotlighting) indicated that a transitory koala population is likely to be present over much of the site, with some better quality habitat areas supporting medium (normal) use, suggesting a more sedentary population in these areas. No koalas (including no breeding females with young) were recorded either during the spotlighting or opportunistically during other ecological surveys (however a bellowing male was recorded after the surveys were completed in Oct 2023 (Nick Cameron pers. comm.).

Therefore, it is considered unlikely that the proposed harvesting operations would adversely affect habitat critical to the survival of the Koala.

e) disrupt the breeding cycle of a population

No koalas (including no breeding females with young) were recorded either during the spotlighting or opportunistically during other ecological surveys (however a bellowing male was recorded after the surveys were completed (Nick Cameron pers. comm.).

Considering the relatively high mobility of the Koala, and availability of alternative habitat within the site that would be unaffected by harvesting operations in any given year, it is unlikely that the proposal would disrupt the breeding cycle of a population of the Koala.

f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposed harvesting operations are considered unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline for the following reasons:

- only a relatively small proportion of the potential habitat for the Koala that is present on the site will be impacted at any one time. On average, habitat within 10% of the forests available to harvest will be impacted by the forestry

operations per year over 10-15 years (5 ha out of approximately 58 ha that is available). This also means that the vast majority of habitat within the forests available to harvest at the site will not be impacted by the forestry operations in that year. Of this area, not all of the vegetation being removed would be suitable foraging habitat for the Koala;
- the results of the survey indicated that a transitory koala population is likely to be present over most of the site;
- PNF code prescriptions for the Koala would be implemented; and
- alternative foraging (and breeding) habitat for Koalas within forests in the broader locality is widespread. The site has excellent habitat connectivity and is contiguous with forested areas to the north, west and south. Within this large forested block that includes the site are the protected areas of Killarney Nature Reserve, Monkerai Nature Reserve and Barrington Tops National Park, and State Forests including Fosterton State Forest, Chichester State Forest and Trevor State Forest. This habitat would not be affected by the proposal.

g) result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

Lantana (*Lantana camara*) is already a common weed on the property, dominating areas that have been subject to previous disturbance and large canopy gaps. Harvesting operations that create larger canopy gaps (predominantly AGS silviculture areas) may facilitate the infiltration of Lantana into new areas of the site that could potentially hinder access of Koalas to foraging trees.

However, considering the relatively small area that will potentially be subject to AGS silviculture and recommended weed control within these areas to facilitate the recruitment of target harvestable eucalypts, the contribution of the proposed harvesting operations to Lantana expansion will be minor.

h) introduce disease that may cause the species to decline

The proposal is unlikely to contribute to the existing disease burden or introduce any new disease to a local population that may cause the Koala to *decline*.

i) interfere with the recovery of the species

There is an Approved National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DAWE 2022). This lists objectives of the recovery plan as:

- the area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased;
- The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased;
- Metapopulation processes are maintained or improved; and

- Partners, communities and individuals have a greater role and capability in listed Koala monitoring, conservation and management.

As has been previously established in above responses; the harvesting operations are unlikely to lead to a long-term decrease in the size of a population, reduce the area of occupancy of the species, fragment an existing population into two or more populations, or adversely affect habitat critical to the survival of a species. On this basis, the proposed harvesting operations would be unlikely to interfere with any of the recovery actions for this species.

Conclusion

The proposal is unlikely to result in a significant impact on a local population of the Koala and therefore would not require referral to the federal Minister of the Department of Climate Change, Energy, the Environment and Water.

References

DAWE (2022). National Recovery plan for the Koala: *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory). Department of Agriculture, Water and the Environment, Canberra.

Hunter, D. and Gillespie, G.R. (2011). National Recovery Plan for the Stuttering Frog *Mixophyes balbus*. Department of Sustainability and Environment, Melbourne.

Kavanagh, R. P. (2000). Effects of variable-intensity logging and the influence of habitat variables on the distribution of the Greater Glider *Petauroides volans* in montane forest, southeastern New South Wales. Pacific Conservation Biology 6, 18-30.

NSW Office of Environment and Heritage (2018). A review of koala tree use across New South Wales. NSW Office of Environment and Heritage, Sydney, Australia.