











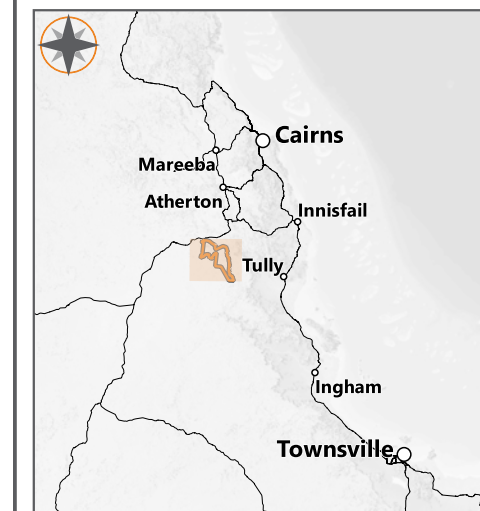


## Chalumbin Wind Farm Threatened Flora Observations

Figure 6.2

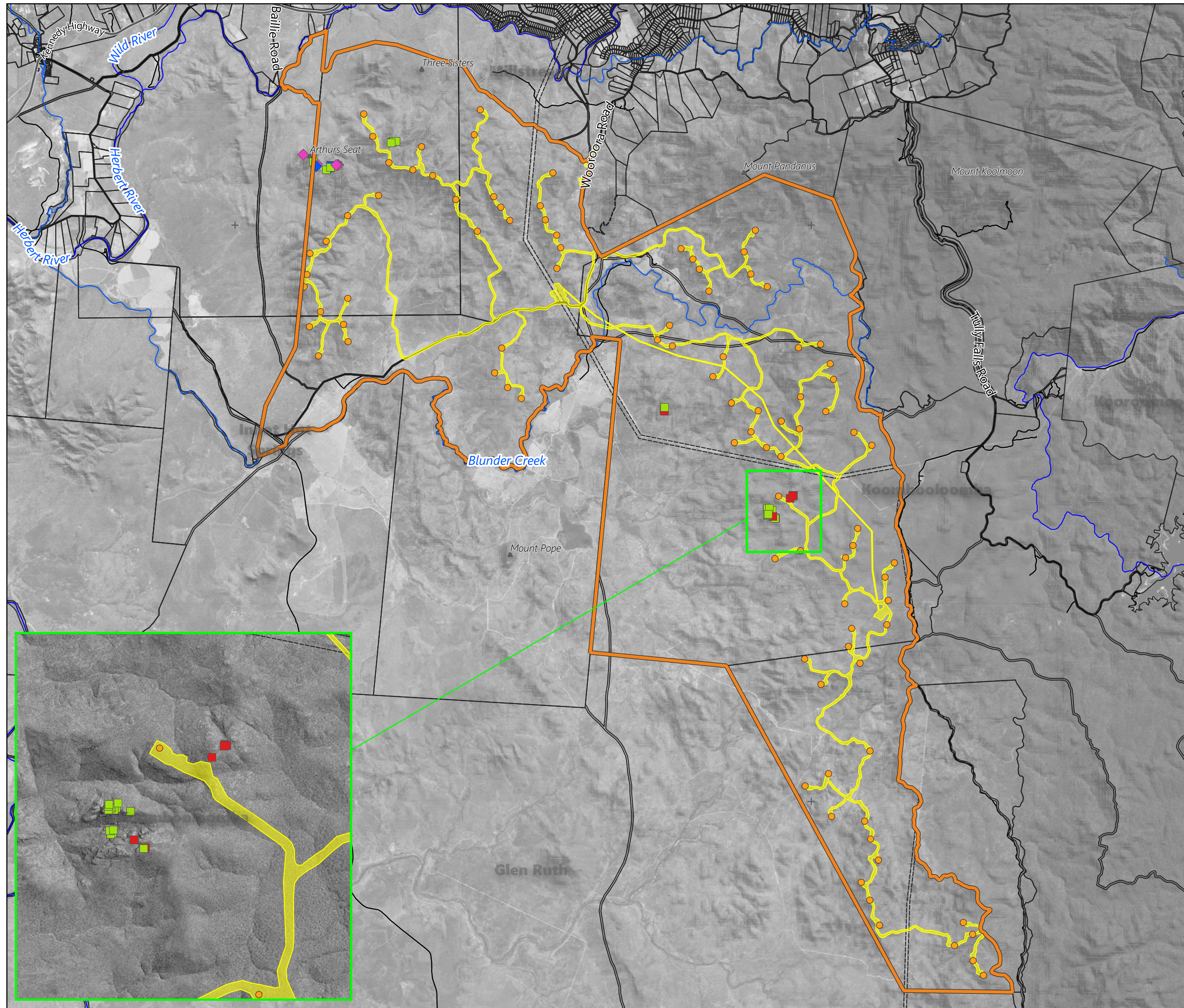
-  Project Area
-  Wind Turbine
-  Project Footprint
- Threatened Flora Record**
-  Homoranthus porteri
-  Homoranthus porteri & Triplarina nitchaga
-  Triplarina nitchaga
-  Prostanthera clotteniana
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-15  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





### 6.1.3 Pest Flora Species

*Lantana camara* (a category 3 weed under the *Biosecurity Act 2014* and a Weed of National Significance) was prevalent along alluvial zones and in moist gullies. No other significant pest flora species were observed in the Project area.

## 6.2 Fauna Survey Results

A revised likelihood of occurrence assessment has been undertaken based on the results of the desktop review and field surveys, this is presented in **Appendix C**.

### 6.2.1 Recorded Listed Threatened Fauna Species

Direct observation and / or evidence was recorded of the following EPBC Act-listed threatened and / or migratory species:

- Northern greater glider (*Petauroides volans minor*);
- Yellow-bellied glider (Wet Tropics subspecies) (*Petaurus australis* unnamed *subsp*);
- Ghost bat (*Macroderma gigas*);
- Fork-tailed swift (*Apus pacificus*);
- Black-faced monarch (*Monarcha melanopsis*);
- Red goshawk (*Erythrotriorchis radiatus*);
- White-throated needletail (*Hirundapus caudacutus*);
- Masked owl (*Tyto novaehollandiae kimberlii*); and
- Magnificent brood frog (*Pseudophryne covacevichae*).
















In addition, the following NC Act-listed species were recorded:

- Short-beaked echidna (*Tachyglossus aculeatus*);
- Platypus (*Ornithorhynchus anatinus*);
- Tube-nosed insectivorous bat (*Murina florium*); and
- Tapping green-eyed frog (*Litoria serrata*).

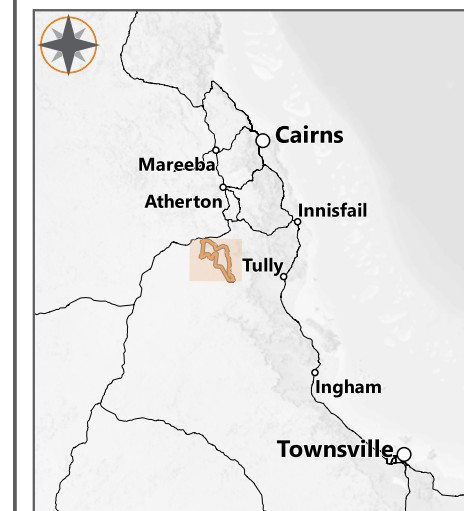
The locations of these observations are shown on **Figure 6-3**. Descriptions of these species and the habitats they were recorded in are provided in the following sections.

## Chalumbin Wind Farm Threatened Fauna Observations

Figure 6.3

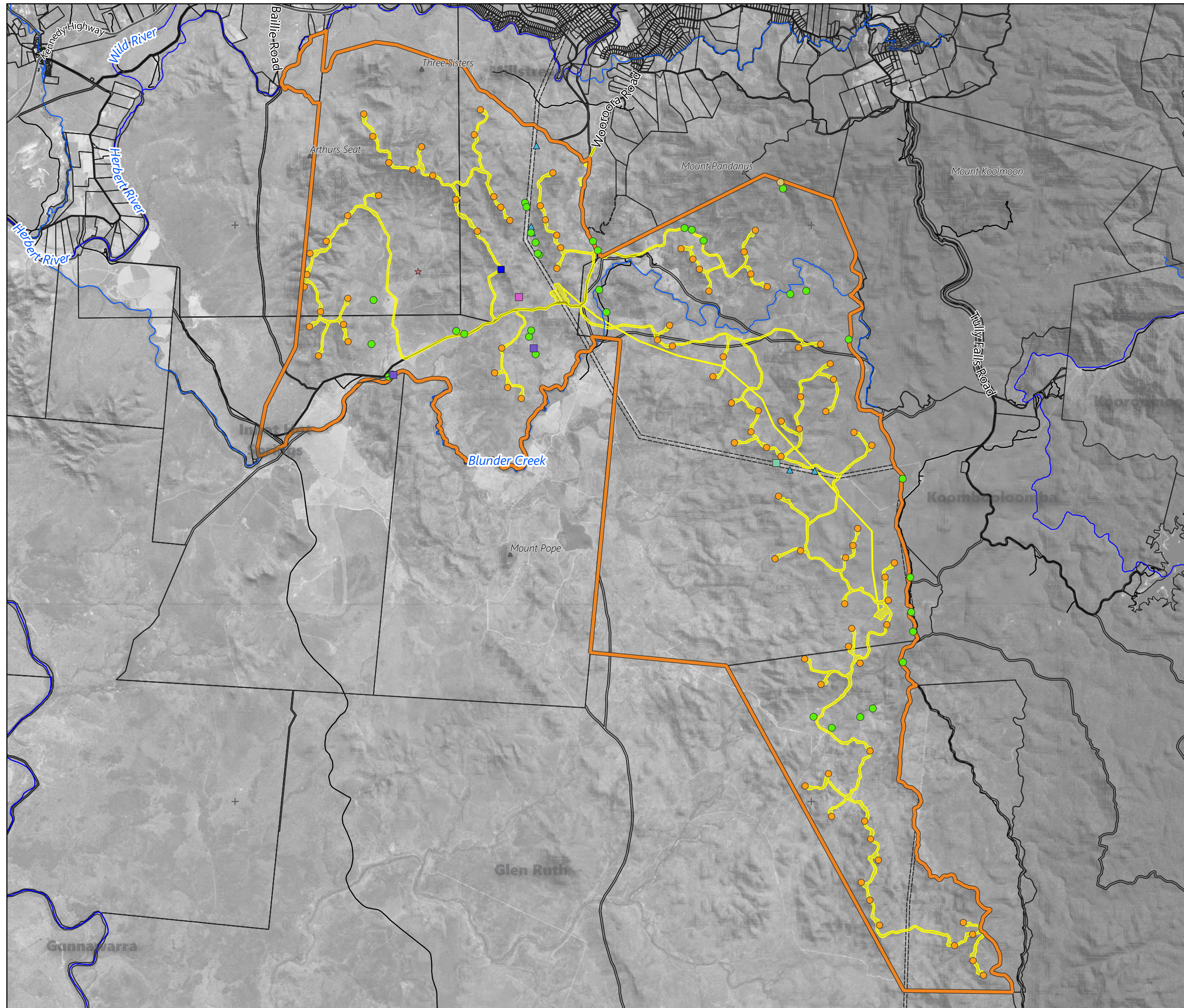
-  Project Area
  -  Wind Turbine
  -  Project Footprint
- Fauna Observations**
-  Ghost bat
  -  Greater glider
  -  Yellow-bellied glider
  -  Masked owl
  -  Red goshawk
  -  White-throated needletail
  -  Magnificent broodfrog
- Map Features**
-  Major Road
  -  River
  -  Creek
  -  Lot Type Parcel
  -  Easement

Date: 2021-06-22  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





### 6.2.1.1 Northern Greater Glider (*Petauroides volans minor*)

The northern greater glider is largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves and occasionally flowers. It is typically found in higher abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (TSSC 2016c). The species distribution may be patchy even in suitable habitat. Modelling has shown they require native forest patches of at least 160 km<sup>2</sup> to maintain viable populations (TSSC 2016c). The Project area provides suitable foraging and nesting habitat in the lower-lying and riparian areas which support larger trees with abundant hollows. The vegetation communities on the ridgelines are largely the same as those mapped over the lower-lying areas, but in many cases the vegetation condition on the ridgelines is considered less favourable for greater gliders (thin soils, less water availability, shorter trees with fewer hollows) as demonstrated by LiDAR analysis.

Northern greater gliders were observed on both properties during the nocturnal spotlighting surveys. In January 2021, 25 adult gliders were observed over a duration of 28 person-hours of spotlighting (on foot and vehicle transects). In March 2021 a further 14 gliders were observed over a duration of 40 person-hours of spotlighting, primarily on foot. MacHunter et al. 2011 defined a large population as > 10 individuals per km of spotlighting transect or > 2 / ha or > 15 per hour of spotlighting; following this, the population within the Project area (< 1 per hour of spotlighting) would not be considered 'large'. Surveys to date have focussed on lower lying parts of the site as ridgelines were difficult to safely access at night during the wet season. These lower lying areas support the tallest trees with the highest abundance of hollows, and would be expected to have the highest abundance of greater gliders. Additional greater glider surveys proposed for mid-June 2021 will focus on the ridgelines to confirm the findings of the LiDAR analysis.

### 6.2.1.2 Yellow-bellied Glider (Wet Tropics Subspecies)

This species is found in tall open wet eucalypt forest adjacent to rainforest on the western fringe of the Wet Tropics WHA. It is found at altitudes above 700 m altitude (SPRAT 2021). Known RE associations include 7.8.15ab, 7.8.16ab, 7.12.21ab, 7.12.22abde and 7.12.27b. These forests are typically dominated by *E. grandis* (required for denning) and *E. resinifera* (a preferred feeding tree), often with *B. integrifolia* and *Syncarpia glomulifera*.

One yellow-bellied glider was observed during spotlighting in March 2021, in a small patch of simple notophyll vine forest (RE 7.12.16a) surrounded by *E. grandis* open forest (RE 7.12.21) in the very north of the Wooroora property. This observation was within the Wet Tropics WHA and nearly 2 km from the nearest proposed Project infrastructure.

### 6.2.1.3 Ghost Bat (*Macroderma gigas*)

The ghost bat's range is discontinuous and only 14 breeding sites are currently known. It roosts in caves, rock crevices and old mines. It is carnivorous, feeding on small mammals (including other bats), birds, reptiles, frogs and large insects (TSSC 2016a).

One call file from the Anabat deployment in January 2021 potentially corresponds with the ghost bat, however the species is difficult to accurately identify based on call alone. A precautionary approach has been taken and the ghost bat is assumed to be present within the Project area.

The potential call was recorded adjacent to a farm dam within the Glen Gordon property however the ghost bat is an obligate cave-dweller. This suggests that some of the surrounding granite outcrops and boulder hills could have cave systems that support bat roosts. Other, non-listed cave dwelling bat species (such as eastern horseshoe bat, *Rhinolophus megaphyllus*) were definitively identified on the Anabat detectors during the surveys which supports this theory. LiDAR analysis has been undertaken to better delineate areas of rocky relief that may provide suitable cave roosts and these areas will be the focus of additional bat surveys (including harp trapping) in mid-June 2021.



#### 6.2.1.4 Fork-tailed Swift (*Apus pacificus*)

The fork-tailed swift is a non-breeding visitor to all states and territories of Australia. In Queensland, there are many coastal records of this species between Cooktown and Townsville, and they are also commonly found in drier habitat inland as far west as Longreach (SPRAT 2021). The species breeds in northern Asia and spends the non-breeding season (typically October – March inclusive) in Australia, moving further south as the summer progresses. In Australia, it is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1,000 m above the ground.

One individual fork-tailed swift was recorded during the diurnal bird counts in January 2021, flying at an approximate height of 40 m.

#### 6.2.1.5 Black-faced Monarch (*Monarcha melanopsis*)

The black-faced monarch is a migratory flycatcher that is widespread in eastern Australia, including Queensland. It mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll thicket, warm temperate rainforest and occasionally cool temperate rainforest (SPRAT 2021). It breeds in rainforest habitat and has been recorded breeding in the Atherton region. The species is insectivorous.

One black-faced monarch was observed during the diurnal bird surveys in January 2021.

#### 6.2.1.6 Red Goshawk (*Erythrotriorchis radiatus*)

The red goshawk is endemic to Australia. It occurs in a patchy, widespread distribution across coastal and sub-coastal regions of northern and eastern Australia. Historically it occurred from the northeast tip of New South Wales, across Queensland and the Northern Territory, to the north of Western Australia. However, there is evidence to suggest that the mainland population may now be smaller than previously estimated and that the species' range may have contracted to the north. The species inhabits biodiverse, extensive, multi-species mosaics of mostly Eucalypt-dominated open forests and woodlands, in permanently watered, varied terrain (Czechura et al. 2010). Its present association with rugged terrain may be an artefact of past patterns of habitat clearance, an interpretation supported by the pattern of early records (Czechura et al. 2010).

Nests are restricted to trees that are taller than 20 m (mean height = 31 m, DERM 2012) and within 1 km of a watercourse or wetland (TSSC 2015c). Pairs are believed to remain within the nesting territory all year but may expand their home range when not breeding (SPRAT 2021; TSSC 2015c). Breeding generally occurs in spring, with laying from May to October in the north (DERM 2012). The estimated home range is 120 km<sup>2</sup> for a breeding female and 200 km<sup>2</sup> for a male (TSSC 2015c; SPRAT 2021).

The red goshawk's diet is 95% birds (SPRAT 2021), especially those in the 100-250g range (DERM 2012). The usual method of capture is hunting from concealed, or occasionally exposed, perches. They occasionally use rapid contour hunting and often seize prey in flight (SPRAT 2021).

They actively perch hunt early and late in the day, while flying for much of the time between 1200 and 1600 hours (SPRAT 2021). They fly for prolonged periods (up to 60 minutes) through and just above the canopy, occasionally soaring up to approximately 1,000 m for up to 30 minutes (SPRAT 2021).

No red goshawk were observed during the diurnal bird surveys in January 2021. A nest considered highly likely to belong to red goshawk was observed in the Glen Gordon property, in riparian vegetation to the north of the main property access road (see **Plate 6-4**). The nest was unoccupied (as would be expected in late January) but appeared to have been recently built (no older than the 2019-20 breeding season). Photographs of the nest were sent to a number of recognised red goshawk experts; one (a QPWS ranger) confirmed the nest as belonging to the red

goshawk while two others considered it was 'possibly' belonging to the red goshawk. A precautionary approach has been taken for the purposes of this referral, and it is assumed that the Project area supports red goshawk.



**Plate 6-4 Potential Red Goshawk Nest**

#### 6.2.1.7 White-throated Needletail (*Hirundapus caudacutus*)

The white-throated needletail is widespread in eastern and south-eastern Australia. It is recorded in all coastal regions of Queensland, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (SPRAT 2021). The species breeds in northern Asia and spends the non-breeding season (typically October – March inclusive) in Australia where it is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1,000 m above the ground.

The white-throated needletail occurs over most types of habitat, including cleared areas, but is most often recorded above wooded areas (SPRAT 2021).

One white-throated needletail was observed during the March 2021 field surveys. The specimen was found deceased within the existing transmission line corridor (**Plate 6-5**) as shown on **Figure 6-3**.



**Plate 6-5 White-throated Needletail**

#### 6.2.1.8 Masked Owl (northern subspecies) (*Tyto novaehollandiae kimberlii*)

The masked owl is native to Australia, Indonesia and Papua New Guinea (BirdLife International 2018). The distribution of the masked owl (northern) within Australia is poorly known, and three subpopulations have been suggested: Kimberley, Northern Territory and Cape York (SPRAT 2021). In Queensland it occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide (SPRAT 2021).

The masked owl (northern) has been recorded from riparian forest, open forest, *Melaleuca* swamps and the edges of mangroves, as well as the edges of sugar cane fields (SPRAT 2021). It requires large old-growth trees with large hollows for nesting (SPRAT 2021). It usually nests in patches of closed forest and feeds largely on small to medium sized terrestrial mammals. The subspecies probably breeds in March-October and nests are 7-8 km apart (SPRAT 2021). It is sedentary and territorial (SPRAT 2021).

The most likely cause of the species' decline is a shortage of food, as small and medium-sized native mammals are becoming increasingly uncommon across much of northern Australia (TSSC 2015b). The current regime of more intense, frequent and extensive fires may also reduce the availability of the large trees and hollows required for nesting (TSSC 2015b). One study has found that possums (specifically, common brushtail possums) monopolise hollows in woodland fragments at the expense of other species (TSSC 2015b).

During the January 2021 surveys masked owl was recorded vocalising at two locations on the Glen Gordon property; on multiple occasions alongside Blunder Creek (within riparian vegetation dominated by *Eucalyptus tereticornis* and *Casuarina cunninghamiana*) and once within mixed Eucalypt woodland dominated by *Corymbia intermedia*, *E. resinifera* and *E. portuensis*.

#### 6.2.1.9 Magnificent Brood Frog (*Pseudophryne covacevichae*)

The magnificent brood frog is range-restricted and is only known to occur on rhyolites of the Glen Gordon volcanics at altitudes greater than 800 m. The species was known only from the Ravenshoe and Herberton areas (including the Ravenshoe State Forest immediately to the north of the Project area) until 2013 when it was found approximately 160

km to the southeast. The magnificent brood frog is known to breed in and around seepage areas in open eucalypt forests with an understorey comprising kangaroo grass, grass trees, sedges, swamp box and she-oaks.

Magnificent brood frogs were observed at six locations within the Project area during the March 2021 surveys, as indicated in **Figure 6-3**. The two observations on the Wooroora property each comprised a relatively large group of male frogs (numbering approximately 15 and 20 individuals). The majority of observations were below 800 m, which is in contrast to the documented records for the species.



**Plate 6-6 Magnificent Brood frog**

## 6.2.2 Non-EVNT Fauna Observations

All observations of non-listed native fauna species were recorded during the fauna field surveys. A total of 200 vertebrate species were recorded during the surveys, including 18 amphibians, 115 birds, 14 bats, 23 non-volant mammals and 30 reptiles. A full species list is provided in Appendix B.

## 6.2.3 Fauna Habitats

Four broad habitat types were characterised across the Project area, as described below. Variations of these generalised habitats are typically associated with elevational gradients and geological attributes. Faunal assemblages that have potential to occur in these groups are cited where appropriate.

### 6.2.3.1 Eucalypt Woodland

Over a third of the Project area supports moist to dry open forests to woodlands dominated by white mahogany (*Eucalyptus portuensis*), Queensland stringybark (*E. reducta*), red mahogany (*E. resinifera*) and/or pink bloodwood (*Corymbia citriodora*) on igneous hills and/or granite or rhyolite uplands (corresponding to REs 9.12.2, 7.12.34 and 7.12.27). The understorey is typically comprised of shrubs and grasses including *Xanthorrhoea johnsonii*, *Grevillea* spp., *Acacia* spp. and kangaroo grass (*Themeda triandra*) whilst trees range in heights from 2-30 metres and canopy cover of 20-50%. In most instances these communities support large, hollow-bearing trees which are recognised to





provide habitat for glider species and hollow nesting birds whilst microhabitat such as cracks and crevices of exposed rocks, fallen timber and dense leaf litter provide habitat for reptiles and small ground-dwelling mammals.

### 6.2.3.2 Rocky Pavement Shrub Complex

Rocky pavements are characteristic of granite and rhyolite rock outcrops and correspond with RE 7.12.65k. Rocky pavement within the Project area is associated with the drier western areas, often with shrublands to closed forests with vegetation communities dominated by *Acacia spp.* and/or *Lophostemon spp.* and/or *Allocasuarina spp.* and/or *Eucalyptus spp.*. Complex rocky pavements associated with increasing altitude and the formation of caves, fissures and crevices provide critical microhabitat for roosting, nesting and breeding of obligate cave-dwelling bat species such as the EPBC-listed ghost bat (*Macroderma gigas*). Rocky outcrops also support threatened flora species with restricted range such as *Prostanthera clotteniana*, *Triplarina nitchaga* and *Homoranthus porteri*.

### 6.2.3.3 Riparian Zones

Riparian habitats corresponding to REs 9.3.16, 9.3.15, 7.3.26 and 7.3.43 are represented as narrow communities primarily consisting of eucalypt woodlands on alluvium with occasional small sections of dry rainforest type communities fringing ephemeral drainage and creek lines. These communities typically consist of large forest red gums (*Eucalyptus tereticornis*) with sub-dominance of river she-oak (*Casuarina cunninghamiana*) and/or poplar gum (*E. platyphylla*). The canopy and mid-storey are fairly low with trees <20 metres tall and shrubs 1-4 metres. The understorey is characterised by tussock species including black speargrass (*Heteropogon contortus*) and *Imperata cylindrica*, and provides rich habitat for small invertebrates and amphibian species such as the magnificent brood-frog (*Pseudophryne covacevichae*). These areas also represent preferred habitats for folivores such as greater glider as associated moisture expression provides both favoured foraging tree species as well as large hollows for denning. They also provide potential nesting habitat for the masked owl and red goshawk.

### 6.2.3.4 Notophyll Vine Forests

Several small patches of simple notophyll vine forest (SNVF) are present in the Project area, corresponding with REs 7.12.7 and 7.12.16. Larger SNVF communities generally occupy valleys or slopes with southerly aspects on richer soils, whilst smaller patches of SNVF occur as a result of lower soil moisture availability, impeded drainage, drier climate, increased elevation and exposure, and less fertile soils. This community is characterised by leaf size (medium sized leaves, 7.5-12.5 cm long) and described by the uniformity of tree basal diameter and the regularity of spacing between canopy trees which, as a result, provides even canopy height and crown cover. The provision of dense canopy cover offers sheltering opportunities for multiple faunal classes including threatened species such as the southern cassowary (*Casuarius casuarius johnsonii*) and the spectacled flying fox (*Pteropus conspicillatus*). The ground layer of these communities also provides terrestrial microhabitat such as rocks and crevices with abundant leaf litter.

## 6.2.4 Pest Fauna Species

Seven pest fauna species were recorded during field surveys, including one amphibian, one bird and five mammals as follows:

- Domestic dog (*Canis lupus familiaris*);
- Domestic cat (*Felis catus*);
- Domestic cattle (*Bos taurus*);

- Feral pig (*Sus scrofa*);
- House mouse (*Mus musculus*);
- Common myna (*Acridotheres tristis*); and
- Cane toad (*Rhinella marina*).



**Plate 6-7 Pest Fauna Species**



## 7.0 Candidate MNES

Following the results of the desktop review and completed field surveys, a refined likelihood of occurrence for the potential MNES associated with the Project area was undertaken, using the definitions listed in **Section 4.3**.

The refined likelihood of occurrence assessments are presented in **Appendix C**. Those species determined as known or likely to occur in the Project area are summarised in the following sections. No TECs have been included based on the results of the flora surveys and vegetation mapping that has been undertaken for the Project area.

### 7.1 Candidate Flora Species

A refined likelihood of occurrence assessment was completed for the 26 EPBC Act-listed threatened flora species based on desktop analysis (see **Appendix C**) and the field survey results. As a result, this assessment determined that three EPBC Act-listed threatened flora species are known to occur. Candidate threatened flora species are listed in **Table 7.1**. Further details about habitat for these species are provided in **Section 8.0**.

**Table 7.1 Candidate Threatened Flora Species**

Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
<i>Homoranthus porteri</i>	Vulnerable	Vulnerable	<b>Known to occur</b> Recorded in four discrete locations within the Project area. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Prostanthera clotteniana</i>	Critically endangered	Endangered	<b>Known to occur</b> Recorded in a single broad location within the Project area. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Triplarina nitichaga</i>	Vulnerable	Vulnerable	<b>Known to occur</b> Recorded in a single distinct location within the Project area, at Arthur's Seat, which is a known population. Project infrastructure has been relocated to avoid any direct disturbance to this species.

### 7.2 Candidate Fauna Species

A refined likelihood of occurrence assessment was completed for the 27 EPBC Act-listed threatened fauna species based on desktop analysis (see Appendix C) and the field survey results. As a result, this assessment determined that eight EPBC Act-listed threatened fauna species are known to occur and six are considered likely to occur. Candidate threatened fauna species are listed in **Table 7.2**. Note that although koala was not assessed as known or likely to occur, it has been included as a candidate fauna species for assessment given the Department's focus on this species. Further details about habitat for these species are provided in **Section 8.0**.



**Table 7.2 Candidate Threatened Fauna Species**

Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
<b>Mammals</b>			
<i>Phascolarctus cinereus</i> , koala	Vulnerable	Vulnerable	<b>Potential to occur</b> There are two historical records for koala within the Study area, both are > 5 km from the Project area. The species has not been recorded within the Project area and no evidence was observed during the field surveys. Nevertheless, suitable habitat is present within the Project area.
<i>Petauroides volans minor</i> , northern greater glider	Vulnerable	Vulnerable	<b>Known to occur</b> Recorded at multiple locations across the Project area during wet season fauna surveys.
<i>Petaurus australis</i> unnamed subsp., yellow-bellied glider – Wet Tropics subspecies	Endangered	Endangered	<b>Known to occur</b> Recorded during wet season surveys in the north-eastern most part of the Project area, within the Wet Tropics QHA.
<i>Dasyurus hallucatus</i> , northern quoll	Endangered	Least concern	<b>Likely to occur</b> There is record of the species dating from 2010 in the northwest of the Study area, near Mount Garnet, as well as much older records from Ravenshoe (to the north) and Tully Falls National Park (to the east), also both within the Study area. There is suitable habitat distributed across the Project area.
<i>Dasyurus maculatus gracilis</i> , spotted-tailed quoll – northern subspecies	Endangered	Endangered	<b>Likely to occur</b> The species has not been recorded within the Project area but there are a number of historic records within the broader Study area, from Tully Falls National Park to the east (the most recent of these dating from 1994). There is limited preferred habitat for the species within the Project area, mostly along the eastern boundary.
<i>Macroderma gigas</i> , ghost bat	Vulnerable	Endangered	<b>Known to occur</b> There is an undated record of the species outside the Study area to the west, at Mount Garnet. A call signal potentially belonging to ghost bat was recorded on an anabat during the wet season surveys. There is potential roosting habitat within the Project area.
<i>Pteropus conspicillatus</i> , spectacled flying-fox	Endangered	Endangered	<b>Likely to occur</b> The National Flying Fox Monitoring programme reports a spectacled flying-fox camp at Malaan, east of Ravenshoe and just outside the Study area. The desktop assessment also indicates the species' presence in the Ravenshoe Forest Reserve 1 which is within the Study area, and abuts the Project area immediately to



Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
			the north. There is limited rainforest habitat within the Project area to support a camp, but potential foraging habitat is widespread.
<b>Birds</b>			
<i>Casuarius casuarius johnsonii</i> , Southern cassowary – southern population	Endangered	Endangered	<b>Known to occur</b> There are recent records of southern cassowary within the Study area (Wildnet). The species was not observed during the field surveys. There are small isolated patches of three vegetation communities listed as Essential Habitat for the southern cassowary within the Project area.
<i>Erythrotriorchis radiatus</i> , red goshawk	Vulnerable	Endangered	<b>Known to occur</b> The species was known to nest historically on the Bush Heritage property 'Yourka' immediately to the south of the Project area, with the last recorded sighting in ALA dating from 2007. The Project area supports foraging and breeding habitat for the species. A potential nest (unoccupied) was recorded during the wet season surveys, after the end of the nesting season. Adopting the precautionary principle, this nest has been assumed to belong to a breeding pair of red goshawk.
<i>Hirundapus caudacutus</i> , white-throated needletail	Vulnerable, migratory	Vulnerable	<b>Known to occur</b> There are a number of historical records of white-throated needletail within the Study area, to the north, south and east of the Project area. One white-throated needletail was observed during the March 2021 field surveys, deceased apparently due to collision with the existing transmission line.
<i>Tyto novaehollandiae Kimberli</i> , masked owl	Vulnerable	Vulnerable	<b>Known to occur</b> There are a number of historical records of masked owl within the Study area, to the north and south of the Project area. During the January 2021 surveys masked owl was recorded vocalising at two locations on the Glen Gordon property; on multiple occasions alongside Blunder Creek (within riparian vegetation dominated by <i>Eucalyptus tereticornis</i> and <i>Casuarina cunninghamiana</i> ) and once within mixed Eucalypt woodland dominated by <i>Corymbia intermedia</i> , <i>E. resinifera</i> and <i>E. portuensis</i> .
<b>Amphibians</b>			
<i>Pseudophryne covacevichae</i> , magnificent brood frog	Vulnerable	Vulnerable	<b>Known to occur</b> Magnificent brood frog were recorded at multiple locations within the Project area during the March 2021 wet season surveys.



### 7.3 Candidate Migratory Species

A likelihood of occurrence assessment was completed for the 22 listed migratory species based on desktop analysis (see Appendix C) and the field survey results. As a result, this assessment determined that four migratory species are known to occur within the Project area. Candidate migratory species are listed in **Table 7.3**.

**Table 7.3 Candidate Migratory Species**

Species name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
<i>Apus pacificus</i> , fork-tailed swift	Migratory, marine	Special Least Concern	<b>Known to occur</b> Recorded within the Project area during the diurnal bird surveys in January 2021.
<i>Monarcha melanopsis</i> , black-faced monarch	Migratory, marine	Special Least Concern	<b>Known to occur</b> Recorded within the Project area during the diurnal bird surveys in January 2021.
<i>Gallinago hardwickii</i> , Latham's snipe	Migratory, marine	Special Least Concern	<b>Known to occur</b> The species has been historically recorded within the Project area (ALA 2021).



## 8.0 Threatened Species Habitat Mapping

Habitat constraints mapping has been prepared for those MNES identified as known or likely to occur based on desktop assessments and field surveys, as listed in **Section 7.0**. The mapping has been informed by Attexo's field assessments, spatial datasets and best available information regarding each species' habitat requirements. Vegetation community mapping combined with required habitat features and other environmental attributes (such as distance to water) has been applied to model potential habitat. Where available, habitat suitability information from published sources such as SPRAT profiles, Recovery Plans and Conservation Advice statements was also used.

The habitat modelling is generally conservative. Some species were not recorded during field surveys and their distributions are more difficult to predict based on sometimes limited desktop information alone.

For the purposes of this report, it is important to differentiate *potential* habitat for a given species from habitat *critical to the survival* of the species, as this is a tool through which potential significant residual impacts can be more appropriately identified. This report therefore attempts to make this distinction wherever possible for each species.












### 8.1 *Prostanthera clotteniana, Homoranthus porteri and Triplarina nitshaga*

All recorded observations of these species during the field surveys were in association with the rocky pavement shrub complex habitat, corresponding with RE 7.12.65k. This vegetation community occurs on the granite and rhyolite outcrops favoured by all three listed plant species. The mapped distribution of this community, and hence habitat critical to the survival of *Prostanthera clotteniana*, *Homoranthus porteri* and *Triplarina nitshaga* is illustrated in **Figure 8-1**.

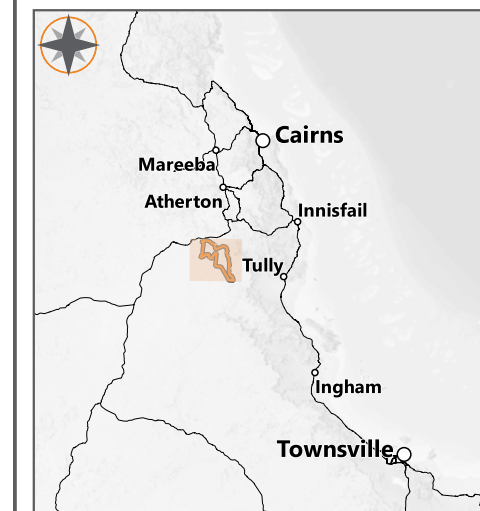
## Chalumbin Wind Farm

Prostanthera clotteniana,  
Homoranthus porteri and  
Triplarina nitchaga

Figure 8.1

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Survey Observation
-  Habitat critical to the survival of the species
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

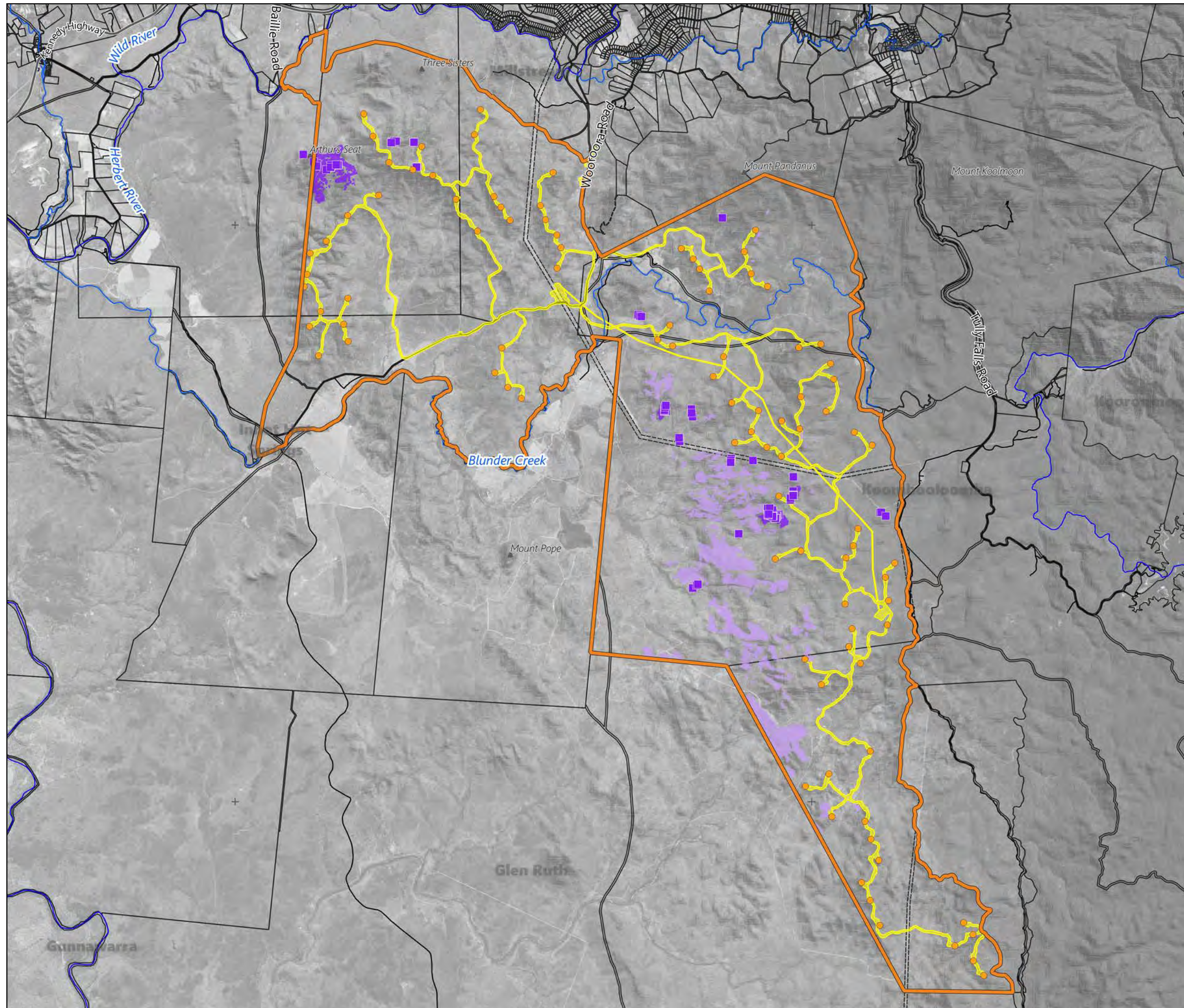
Date: 2021-06-15  
Author: TOD  
Reviewed: CC  
Project: EPU-004



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**Data Source(s):**  
Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
Queensland Imagery Whole Of State  
Satellite Public Basemap Service







## 8.2 Koala

No evidence of koalas was observed in the Project area during field surveys. Both landholders report never having seen koalas on their properties and its occurrence on the Bush Heritage property, Yourka, immediately to the south, is rare. The Project area is not a stronghold for any koala population and if koalas are present within the Project area, it is likely to be on a very sporadic basis and/or in low numbers.

The Project area is assessed as having a habitat score of 4 (out of 10) according to the Referral Guidelines for the Vulnerable Koala (refer to **Section 2.1.5**). Therefore, the Project area does not contain habitat critical to the survival of the koala. Conservatively, any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees is considered potential koala habitat (DoEE 2014). Koala food trees typically consist of the following genera in order of general preference:

- *Eucalyptus*;
- *Corymbia*;
- *Angophora*;
- *Lophostemon*; and
- *Melaleuca*.










Koala habitat in the Project area has been categorised according to the RE and presence of foraging trees within that vegetation community:

- Preferred potential habitat: involves any eucalypt dominated RE in Land Zone 3 and more diverse, densely structured Eucalypt communities on ridgelines;
- Marginal potential habitat: includes all other areas of vegetation (remnant and regrowth) that contain eucalypt species; or
- Unlikely to be habitat: includes rainforest patches.

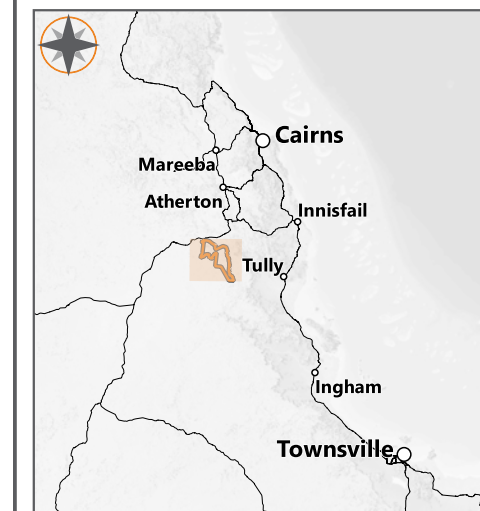
Potential koala habitat within the Project area is mapped in **Figure 8-2**.

## Chalumbin Wind Farm Koala Habitat

Figure 8.2

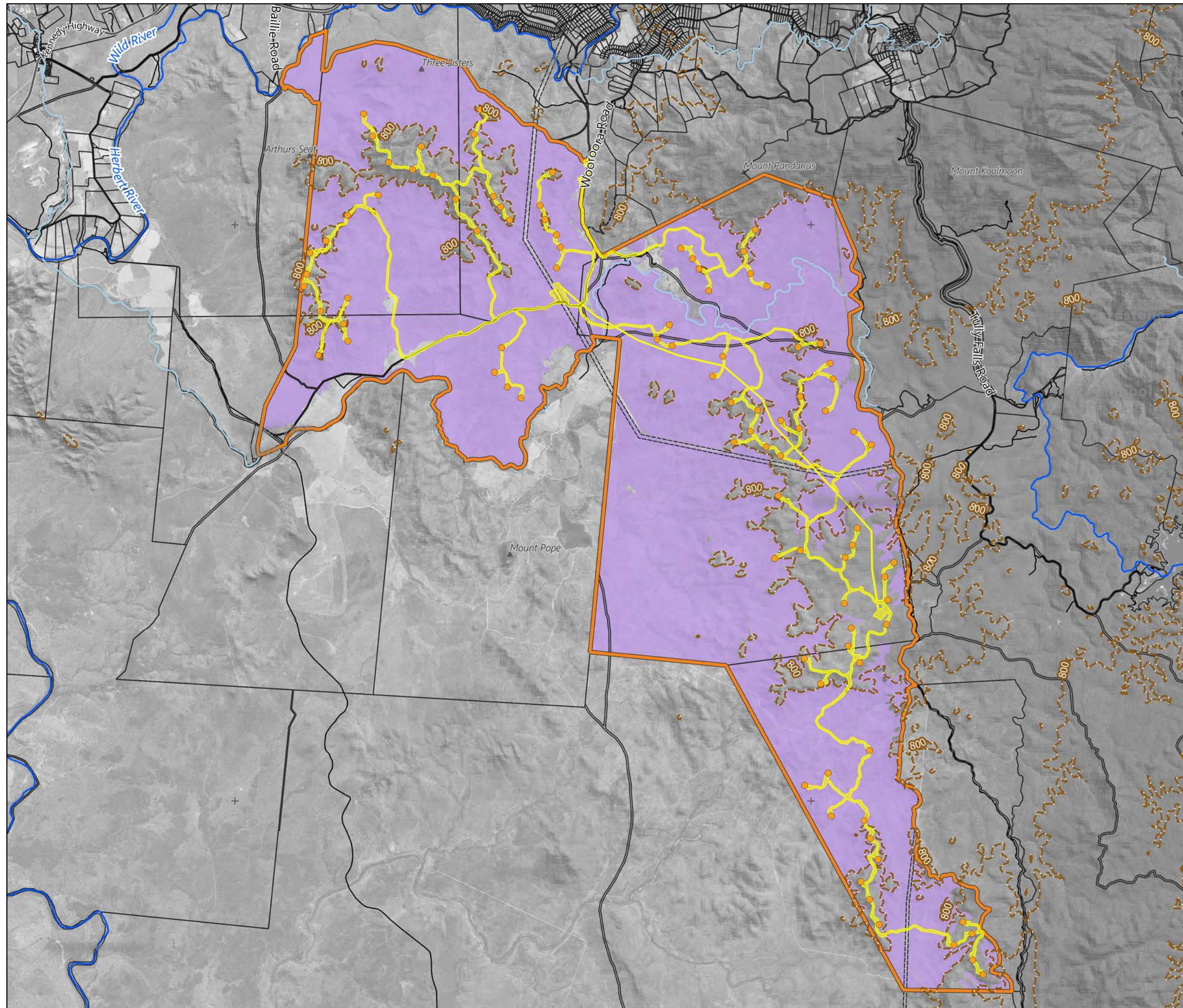
-  Project Area
-  Wind Turbine
-  Project Footprint
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-13  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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Data Source(s):  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





### 8.3 Greater Glider

Northern greater gliders were observed on both properties during the nocturnal spotlighting surveys. In January 2021, 25 adult gliders were observed over a duration of 28 person-hours of spotlighting (on foot and vehicle transects). In March 2021, a further 14 gliders were observed over a duration of 40 person-hours of spotlighting, primarily on foot.

The Project area provides suitable foraging and nesting habitat in the lower-lying and riparian areas which support larger trees with abundant hollows. The vegetation communities on the ridgelines are largely the same as those mapped over the lower-lying areas, but in many cases the vegetation condition on the ridgelines is considered less favourable for greater gliders (thin soils, less water availability, shorter trees with fewer hollows) as demonstrated by LiDAR analysis. Riparian habitats are represented as narrow communities primarily consisting of eucalypt woodlands on alluvium (corresponding to REs 9.3.16, 9.3.15, 7.3.26 and 7.3.43). They typically consist of forest red gum (*E. tereticornis*) with sub-dominant river she-oak (*Casuarina cunninghamiana*) and/or poplar gum (*E. platyphylla*). These areas represent preferred habitats for species that nest or den in large hollows, such as greater glider.












Across the Project area, the following habitat mapping has been undertaken for greater glider:

- Habitat critical to the survival of the species – RE occurring on landzone 3 (i.e. alluvium) or remnant vegetation within 50 m of a mapped watercourse and within a patch of vegetation that has a maximum height greater than 20 m; or
- Potential habitat – RE dominated by Eucalyptus species and within a patch of vegetation that has a maximum height greater than 20 m.

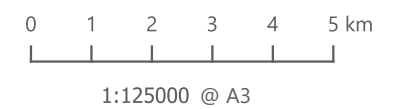
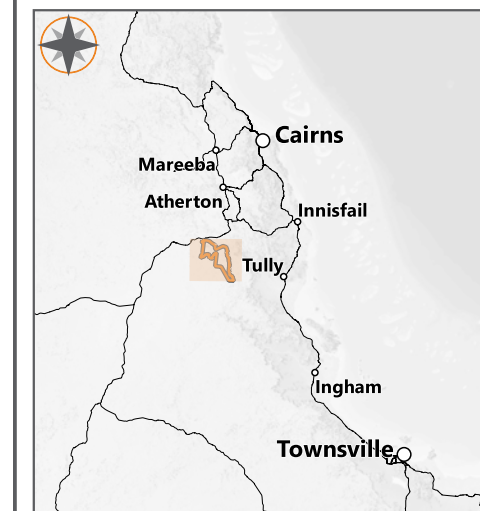
Habitat mapping for the greater glider is presented in **Figure 8-3**.

## Chalumbin Wind Farm Greater glider Habitat

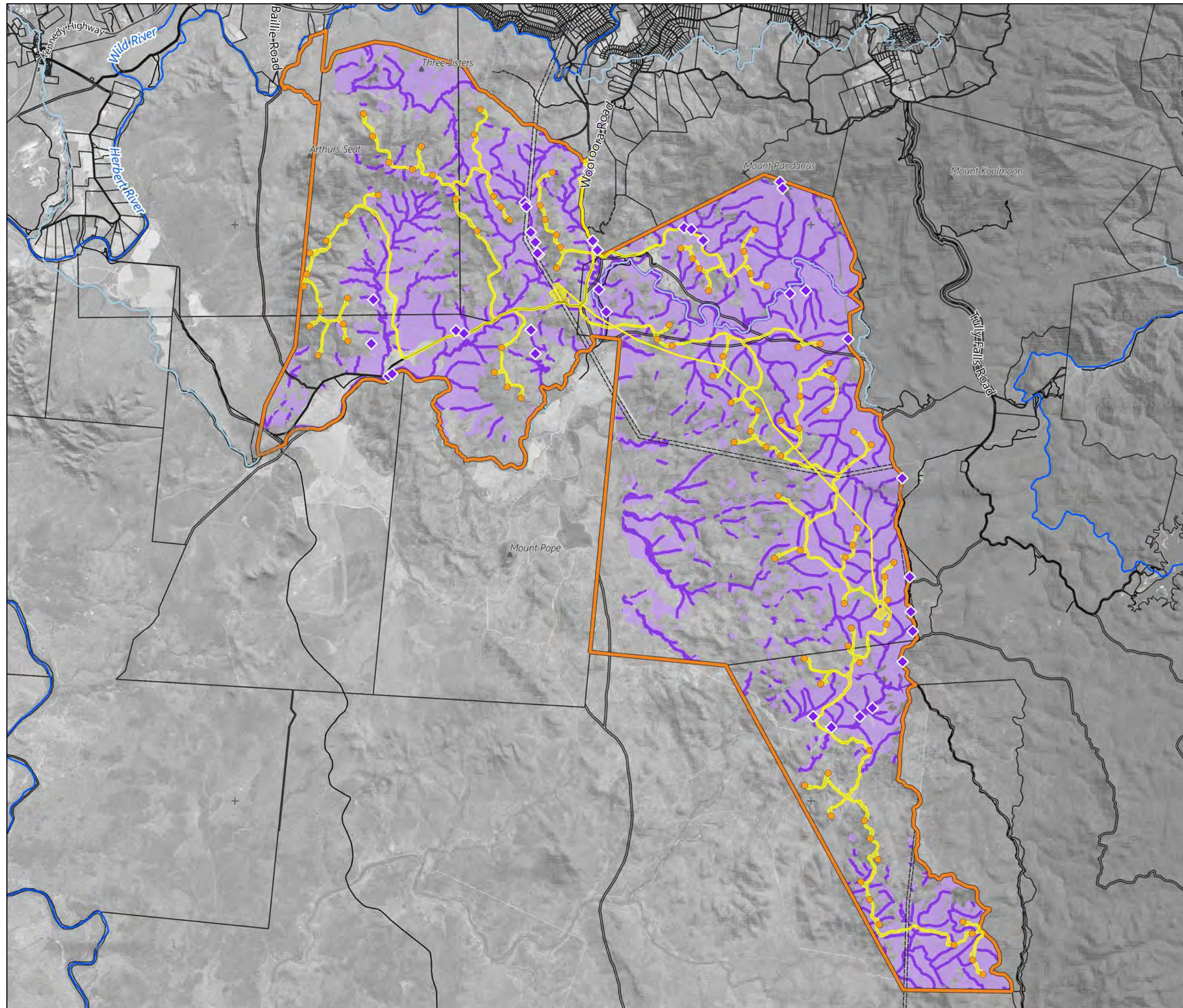
Figure 8.3

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Survey Observation
-  Critical habitat
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 8.4 Yellow-bellied Glider

One yellow-bellied glider (Wet Tropics) was heard during spotlighting in March 2021, in a small patch of simple notophyll vine forest (RE 7.12.16a) surrounded by *Eucalyptus grandis* open forest (RE 7.12.21) in the very north of the Wooroora property. This observation was within the Wet Tropics WHA and nearly 2 km from the nearest proposed Project infrastructure.

The yellow-bellied glider (Wet Tropics) is largely restricted to a narrow band of wet eucalypt open forest (also called wet sclerophyll forest) adjacent to rainforest on the western fringe of the Wet Tropics WHA. It is typically found at altitudes above 700 m altitude (SPRAT 2021). The species has known RE associations which include 7.8.15ab, 7.8.16ab, 7.12.21ab, 7.12.22abde and 7.12.27b. These wet eucalypt open forests are typically dominated by *Eucalyptus grandis* (a preferred den tree) and *E. resinifera* (a preferred feeding tree); the presence of these two trees is considered essential for the yellow-bellied glider.









Across the Project area, the following habitat mapping has been undertaken for greater glider:

- Habitat critical to the survival of the species – vegetation belonging to REs 7.8.15ab, 7.8.16ab, 7.12.21ab, 7.12.22abde and 7.12.27b above an altitude of 700 m, with the distinction made between denning and foraging habitat depending on the dominant species.

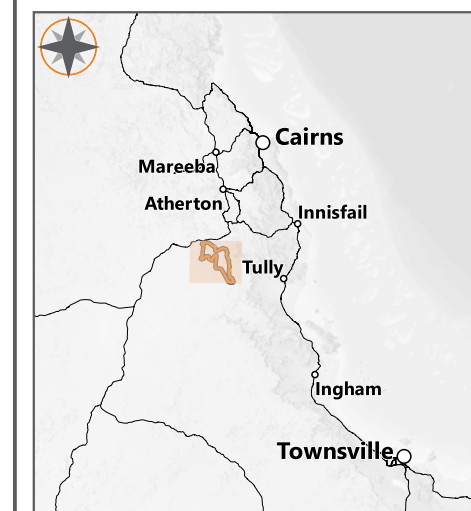
Habitat mapping for the yellow-bellied glider is presented in **Figure 8-4**.

## Chalumbin Wind Farm Potential Habitat for Yellow-bellied Glider

Figure 8.4

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Habitat critical to the survival of the species (shelter habitat)
-  Potential foraging and dispersal
-  700m Contour
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

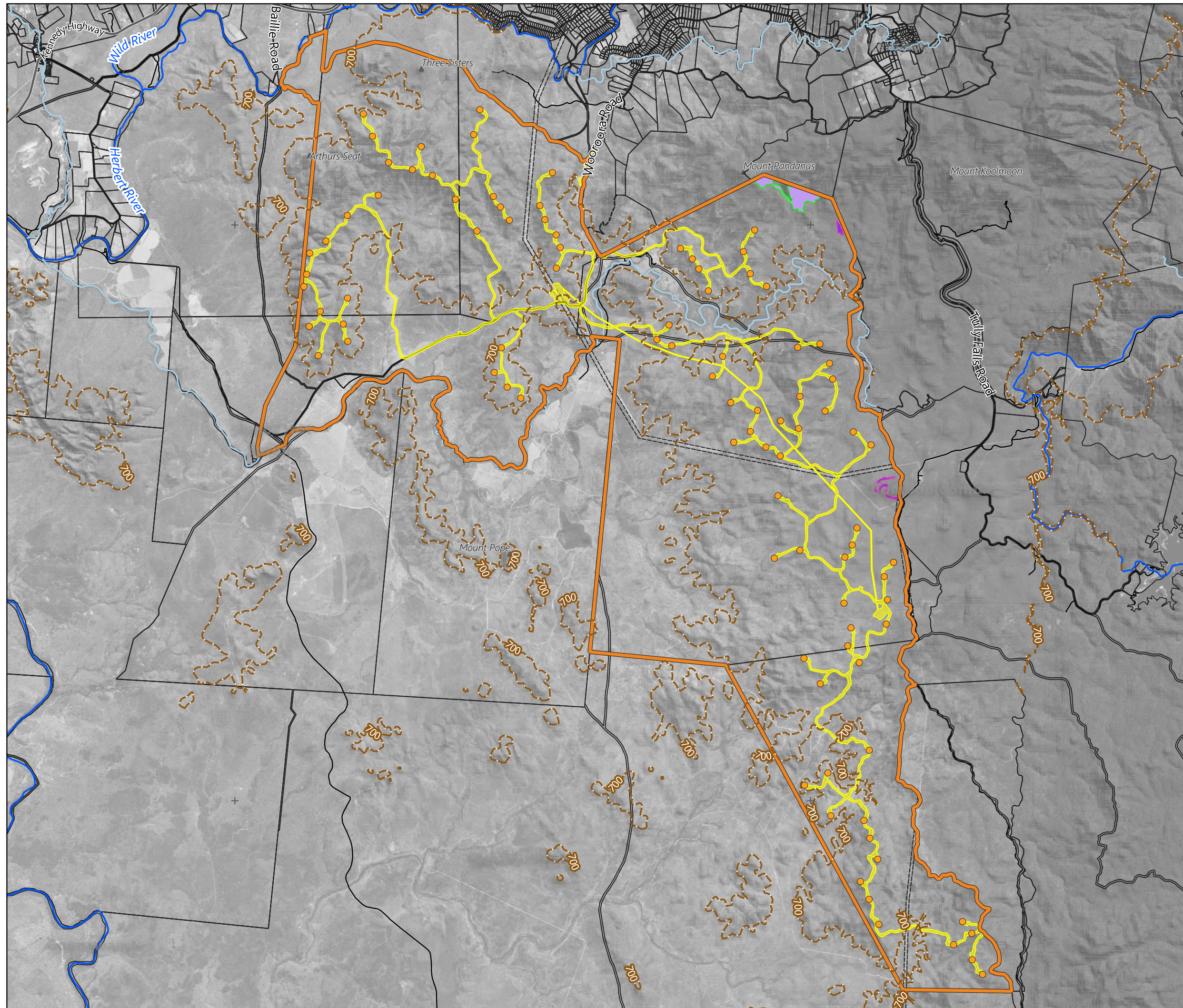
Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 8.5 Northern Quoll













There are no known records of the species within the Project area and it was not recorded during the field surveys despite a search effort of 1,953 camera trap nights. Large boulder habitat is generally absent from the Project area, with rocky habitat typically comprising smaller rocks on scree slopes or flat areas of exposed bedrock. However, there are open eucalypt woodlands which provide potential foraging and dispersal habitat.

In the absence of a confirmed population of northern quoll, no habitat critical to the survival of the species has been mapped within the Project area. *Potential* habitat has been mapped as follows (see **Figure 8-5**):

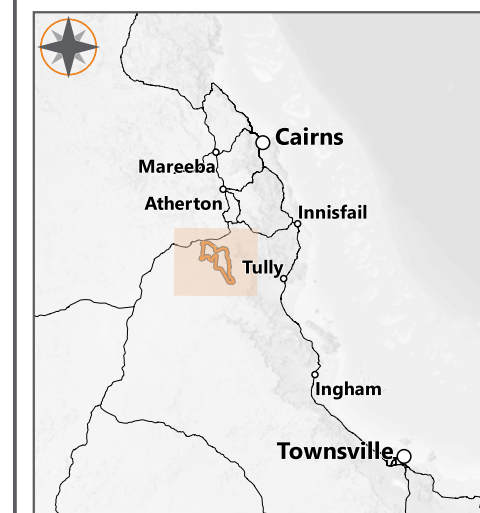
- Potential shelter habitat – areas of rocky relief as identified through the analysis of LiDAR (see Section 4.4); and
- Potential foraging and dispersal habitat – eucalypt woodland within 1 km of potential shelter habitat and gullies connecting potential shelter habitat.

## Chalumbin Wind Farm Northern quoll Habitat

Figure 8.5

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Major Road
-  WildNet Record
-  Study Area
-  Potential shelter habitat
-  Potential foraging habitat
-  River
-  Creek
-  Lot Type Parcel
-  Easement

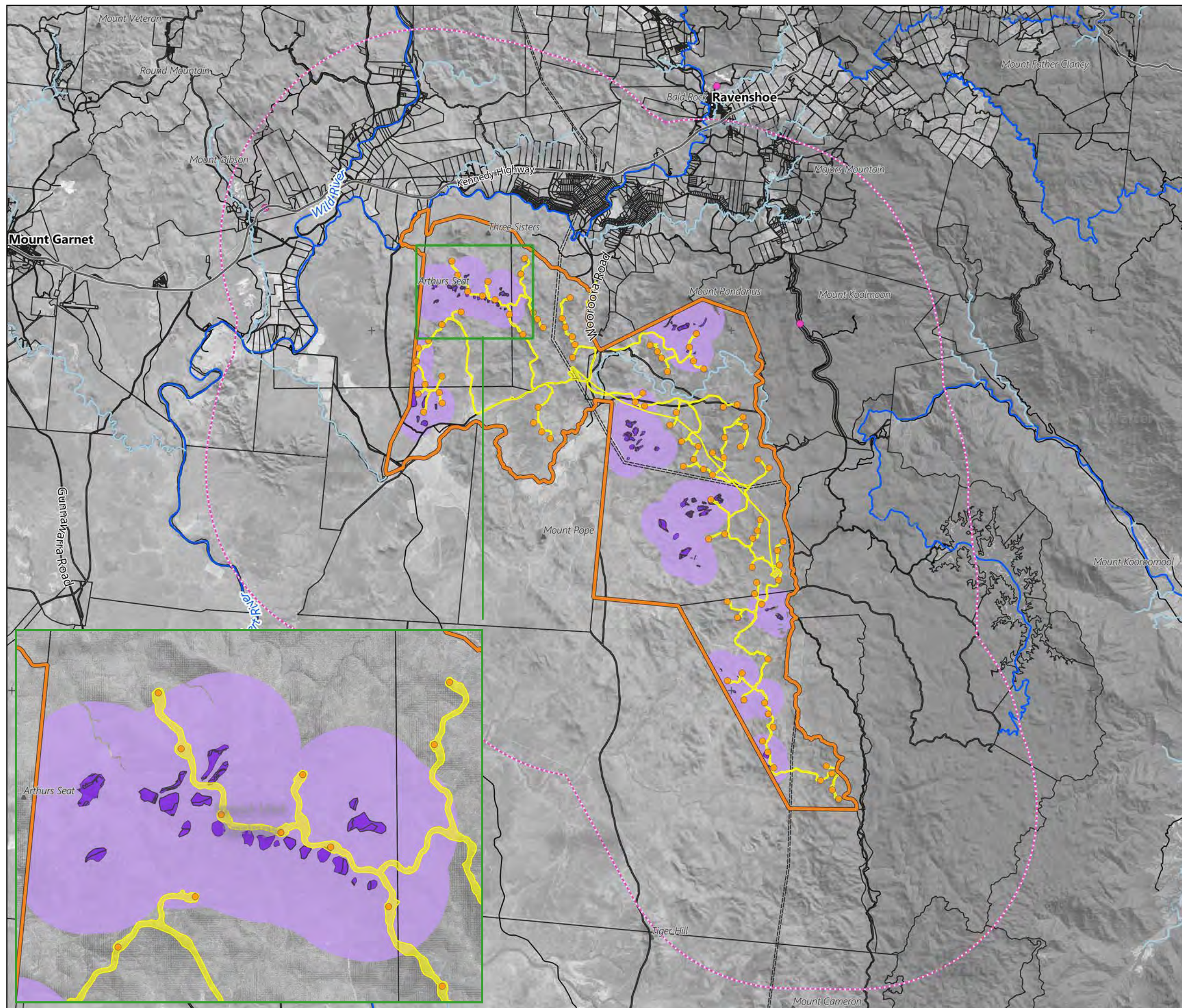
Date: 2021-06-14  
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 Reviewed: CC  
 Project: EPU-004



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Data Source(s):  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service







## 8.6 Spotted-tailed Quoll











The spotted-tailed quoll (North Queensland subspecies) is mostly confined to the relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers draining east and west of the Eastern Escarpment in the Wet Tropics bioregion of north-eastern Queensland (SPRAT 2021). It has also been suggested that the species occurs in lower altitude notophyll, mesophyll and wet sclerophyll forests in lesser numbers. Vegetation types typical of this habitat are simple and complex notophyll vine forest, simple microphyll vine-fern forest and simple microphyll vine-fern thicket (SPRAT 2021).

Habitat that is critical to the survival of the species includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey. However, the threshold densities of these critical components required to support quoll populations are unknown. As a result, it is not currently possible to define or map habitat critical to the survival of the spotted-tailed quoll. Given the threat status of the spotted-tailed quoll, all habitats within its current distribution that are known to be occupied are considered important (DELWP 2016).

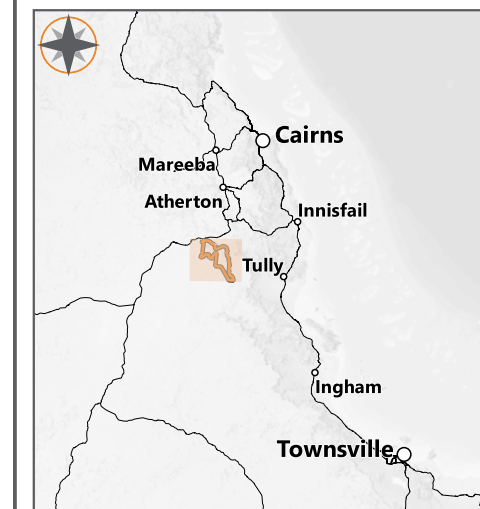
No habitat critical to the survival of the species has been mapped within the Project area, as there are no known records of the species within the Project area and it was not recorded during field surveys. There is limited potential habitat for the spotted-tailed quoll within the Project area and this has been conservatively mapped as all notophyll, mesophyll and wet sclerophyll forest (above and below 900 m) within the Project area, see **Figure 8-6**.

## Chalumbin Wind Farm Potential habitat for Spotted-tailed quoll

Figure 8.6

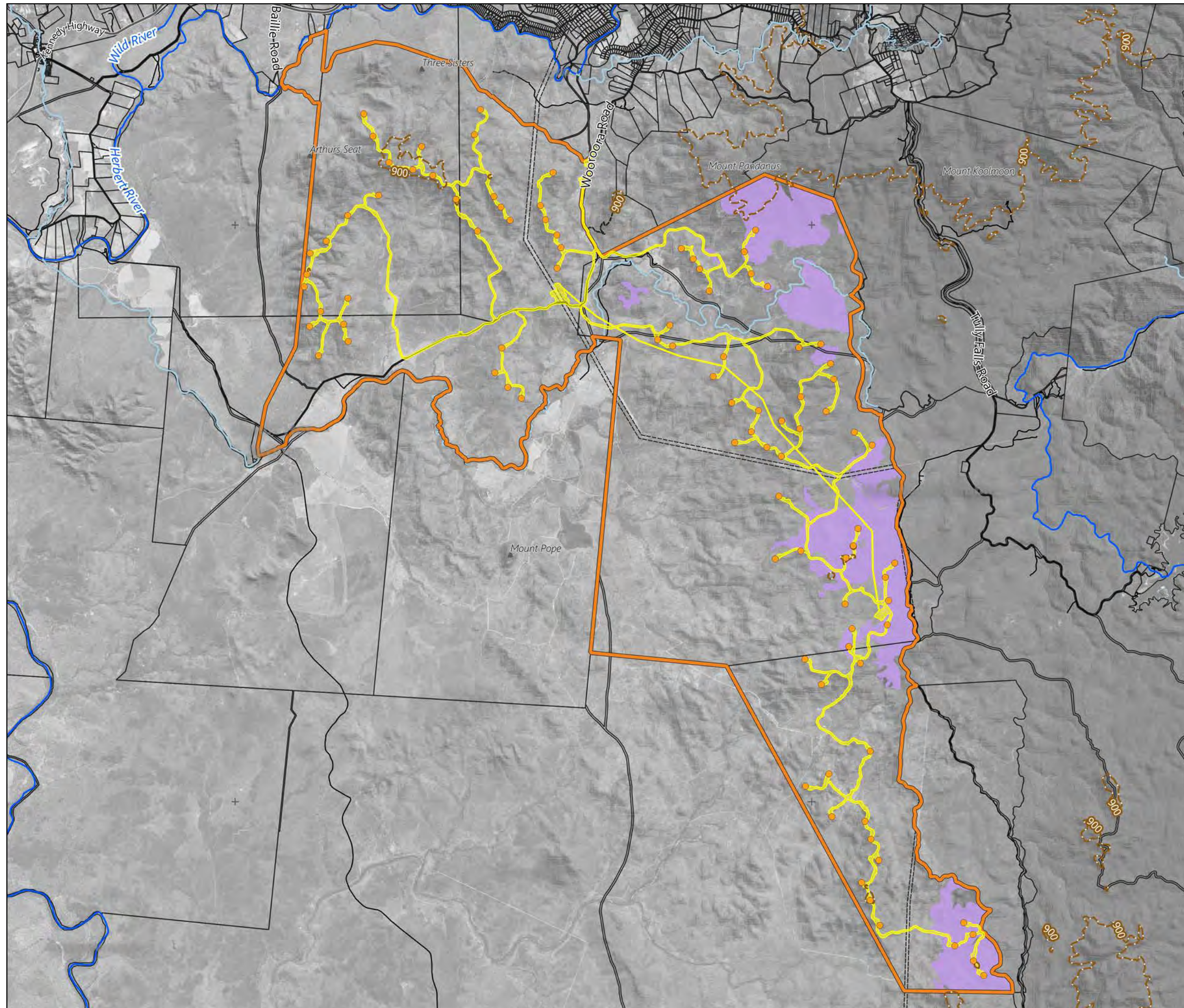
-  Project Area
-  Wind Turbine
-  Project Footprint
-  Potential habitat
-  900m Contour
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 8.7 Ghost Bat





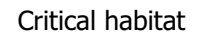



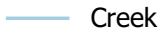

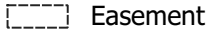
Ghost bats roost in natural caves commonly in deeper limestone caves, tower karst and sinkholes, sandstone formations, granite boulder piles and ironstone rocky landscapes preferring multiple entrance points (TSSC 2016a) and require a range of these preferred cave sites for dispersal. Foraging sites are an average distance of 1.9 km from roosts (TSSC 2016a).

An echolocation call potentially belonging to the ghost bat was recorded by Anabat adjacent to a dam within the Project area during the January 2021 surveys. It is difficult to definitively identify the ghost bat based on call alone, as it is similar to insect noise. A precautionary approach has been taken, and the ghost bat is assumed to be present within the Project area.

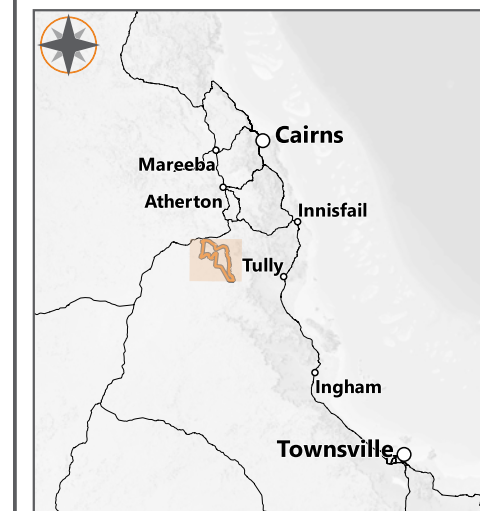
The ghost bat is an obligate cave dweller. As outlined in **Section 4.4**, analysis of LiDAR data has been undertaken to identify areas of rocky relief within the Project area that have the potential to support caves suitable for ghost bat roosting. These areas have been as habitat critical to the survival of the species, with woodland habitats within 2 km of potential roost sites mapped as potential habitat (**Figure 8-7**). These habitats are likely to be suitable for foraging in the event that ghost bat are roosting within the Project area.

## Chalumbin Wind Farm Potential habitat for Ghost bat

Figure 8.7

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Survey Observation
-  Critical habitat
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

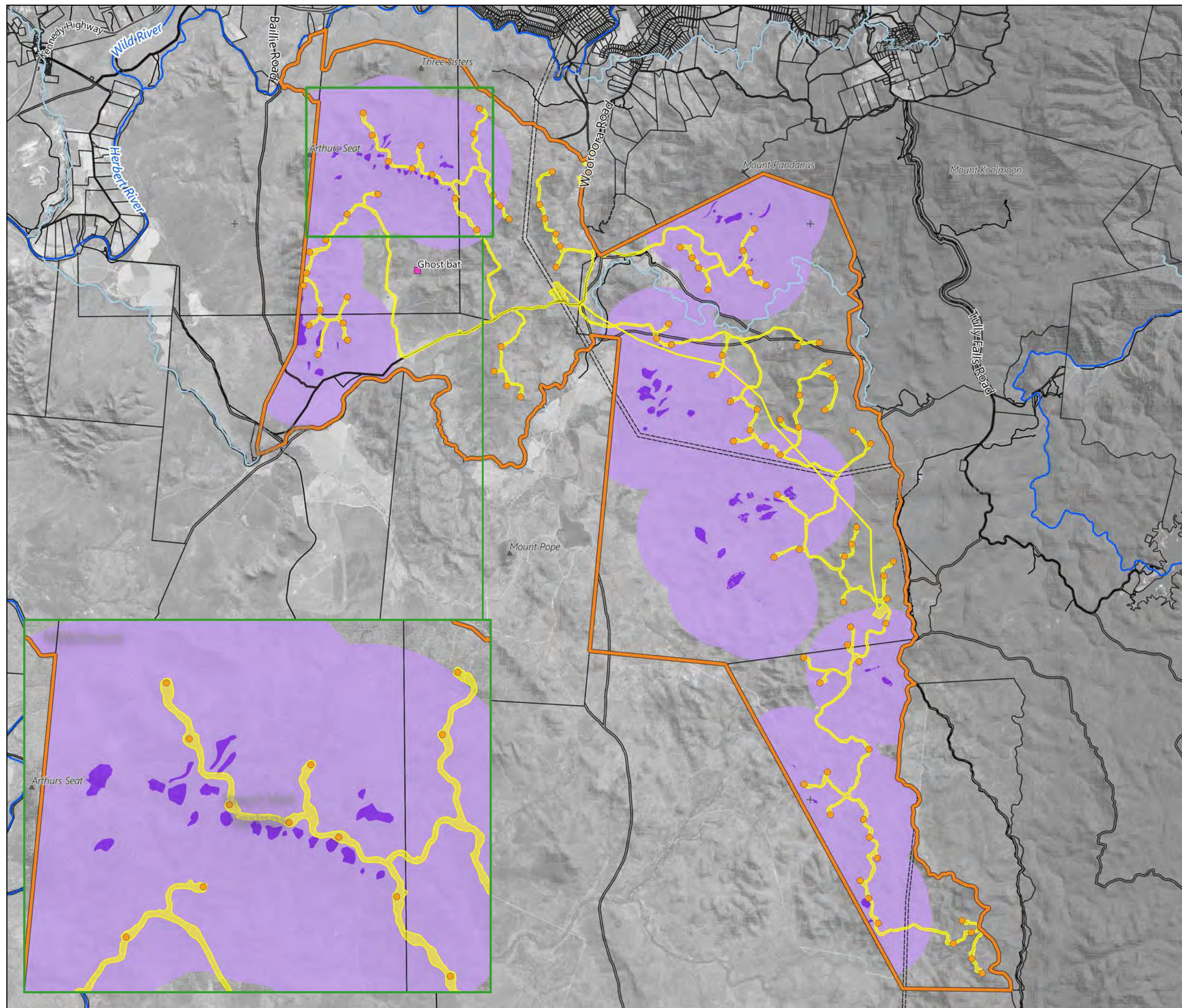
Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service

















## 8.8 Spectacled Flying-fox

The spectacled flying-fox forages on a wide variety of rainforest and non-rainforest species, including eucalypts (*Eucalyptus* spp., *Corymbia* spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems. It will forage within 50 km of a camp and the Mabi Forest TEC is considered a key habitat for the spectacled flying-fox (SPRAT 2021).

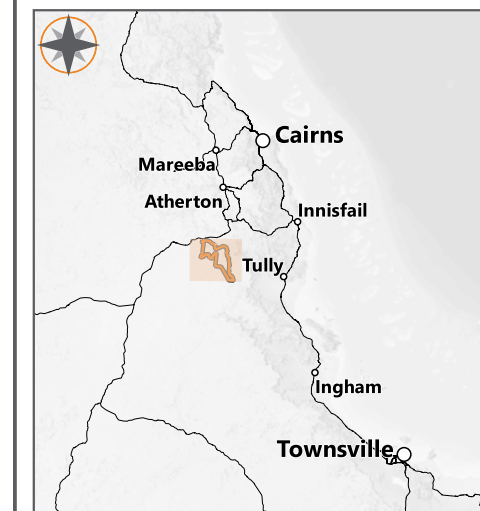
The National Flying Fox Monitoring programme (DAWE 2021b) reports a spectacled flying-fox camp at Malaan, east of Ravenshoe and just outside the Study area. The desktop assessment also indicates the species' presence in the Ravenshoe Forest Reserve 1 which is within the Study Area, and abuts the Project area immediately to the north. There is limited rainforest habitat within the Project area to support a camp, and none of its key foraging habitat (Mabi Forest TEC) has been ground-truthed within the Project area. Therefore, no habitat critical to the survival of the species has been mapped within the Project area. Potential foraging habitat has been mapped as eucalypt forest within 50 km of the known camp at Malaan (**Figure 8-8**).

## Chalumbin Wind Farm Potential Habitat for Spectacled flying-fox

Figure 8.8

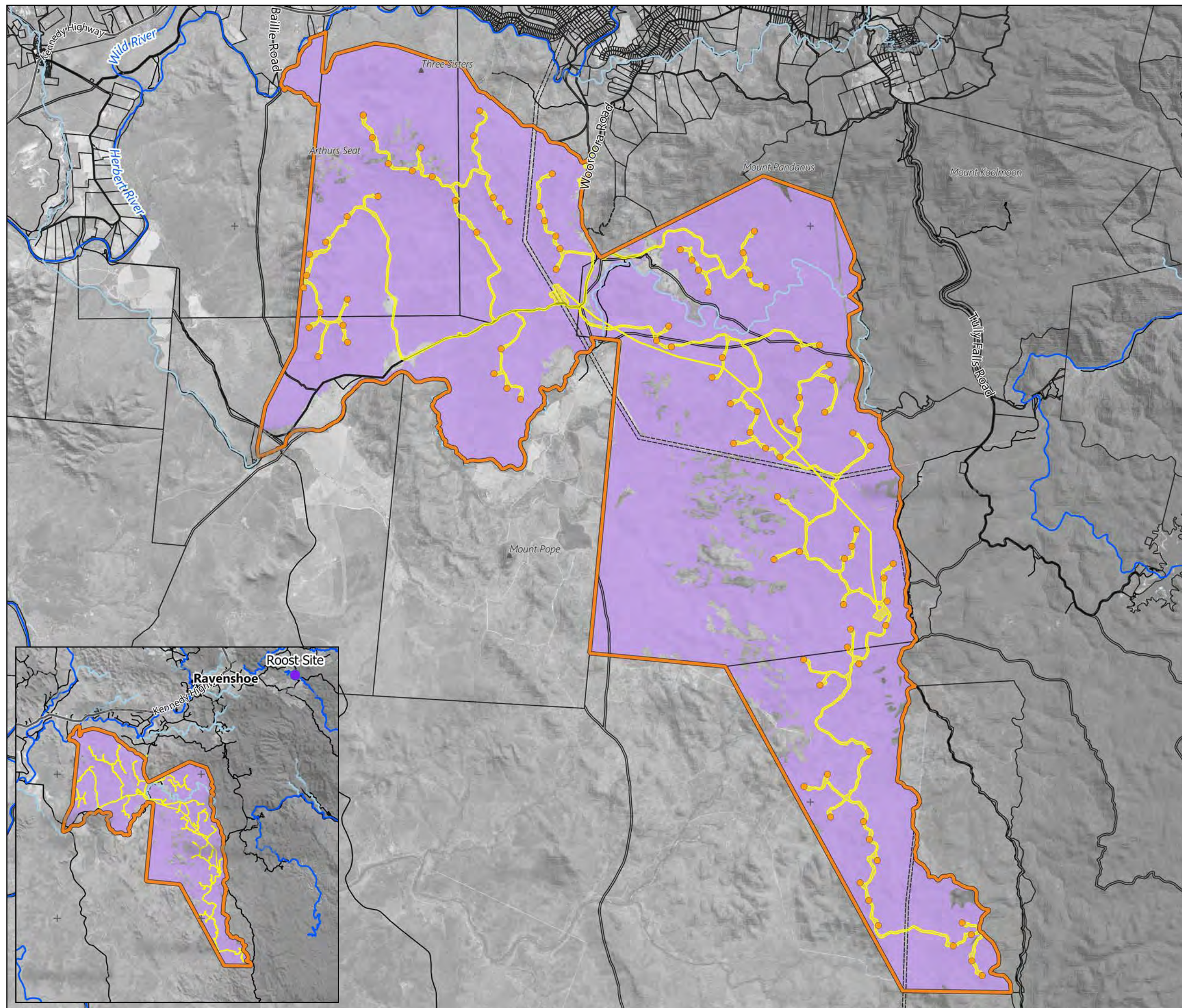
-  Project Area
-  Wind Turbine
-  Project Footprint
-  Roost Site
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement
-  Road Reserve
-  Watercourse

Date: 2021-06-15  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service














## 8.9 Southern Cassowary

The southern cassowary requires a high diversity of fruiting trees to provide year-round supply of fleshy fruit; the species occurs primarily in rainforests but also woodlands, melaleuca swamps, mangroves and beaches. The Recovery Plan for the Southern Cassowary (Latch 2007) identifies three categories of habitat for the southern cassowary (essential habitat, general habitat and rehabilitating habitat); the category of Essential Habitat is the best estimate of habitat that is critical to the survival of the species (Latch 2007). The Recovery Plan lists 91 REs that comprise Essential Habitat for the southern cassowary, of which three have been ground-truthed within the Project area, REs 7.12.7, 7.3.8 and 7.8.7. These have been mapped as habitat critical to the survival of the species in

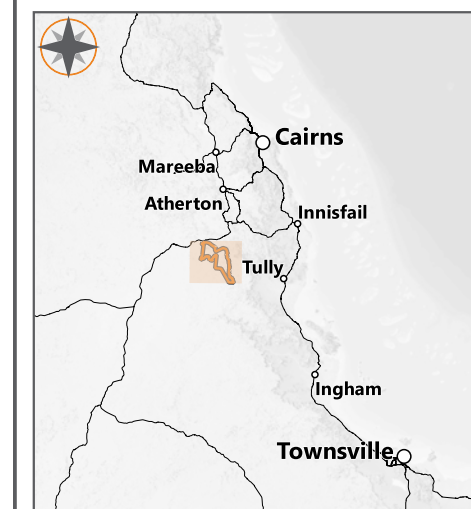
**Figure 8-9** while potential habitat has been mapped as any habitat within 1.5 km of a permanent water source within the Wet Tropics bioregion.

## Chalumbin Wind Farm Potential Habitat for Southern Cassowary

Figure 8.9

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Sightings (WildNet)
-  Habitat critical to the survival of the species
-  Watercourse
-  Major Road
-  Lot Type Parcel
-  Easement

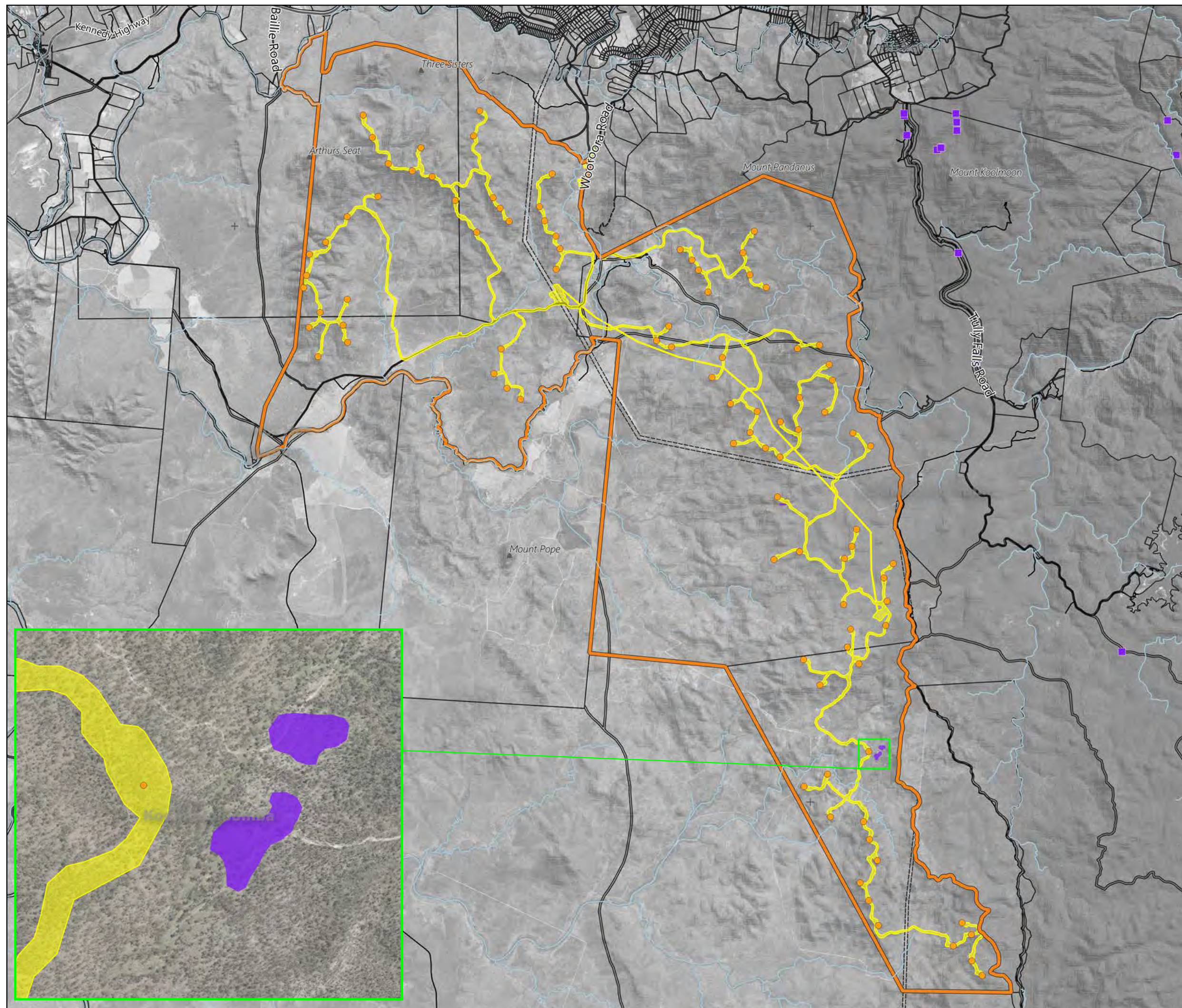
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 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service


















## 8.10 Red Goshawk

Habitat critical to the survival of the red goshawk includes all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal, buffer areas and sites required for the future recovery of the species (DERM 2012). The following has been mapped across the Project area (**Figure 8-10**):

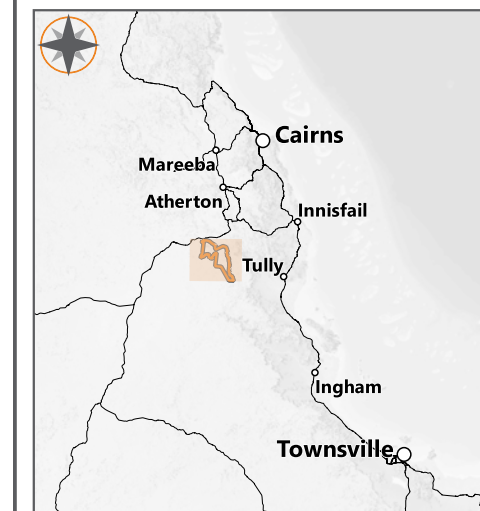
- Habitat critical for the survival of the species: trees > 20 m within 1 km of a watercourse AND Eucalypt-dominated open forests and woodlands in or within 1 km to permanent water; and
- Potential habitat: remainder of open forests within the Project area.

## Chalumbin Wind Farm Potential Habitat for Red goshawk

Figure 8.10

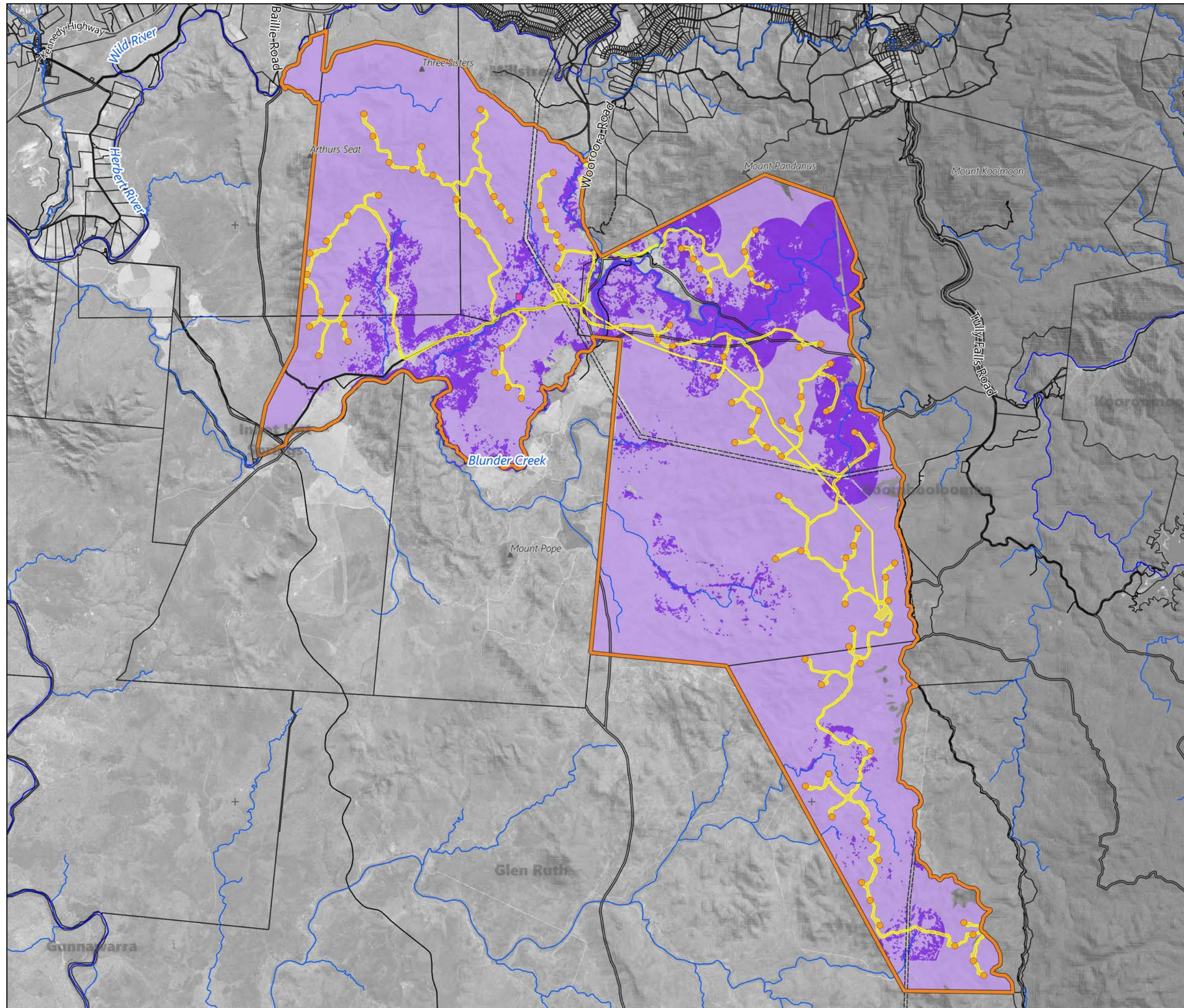
-  Project Area
-  Wind Turbine
-  Project Footprint
-  Survey Observation
-  Habitat critical to the survival of the species
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 8.11 White-Throated Needle-tail

No mapping has been undertaken for white-throated needle-tail as this species could occur in any airspace over the Project area. It is a migratory species that occurs in Australia only during the summer months but is highly aerial and only rarely alights while in Australia (roosting in the canopy of mature trees).

## 8.12 Masked Owl

The masked owl is known to use a range of habitat types in Queensland including riparian forest, rainforest, open forests, Melaleuca swamps and mangrove edges, as well as along the margins of sugar cane fields (SPRAT 2021).












It requires large old-growth trees with large hollows for nesting (SPRAT 2021). It usually nests in patches of closed forest and feeds largely on small to medium sized terrestrial mammals. The subspecies probably breeds in March-October and nests are 7-8 km apart (SPRAT 2021).

During field surveys, the species was observed (through calls) at two locations along Blunder Creek within the Glen Gordon property.

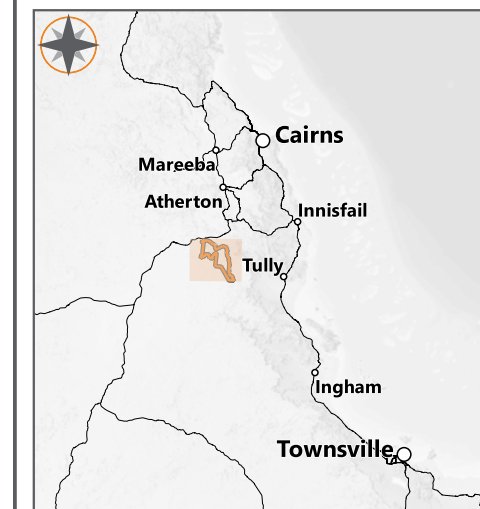
The majority of the Project area, with the exception of cleared areas and rainforest patches, comprises potential habitat for the masked owl. The limited amount of ecological information available prevents any tight definition of habitat critical to the survival of the species, but it is dependent on tree hollows (Woinarski 2004). The riparian environments of the higher stream order waterways within the Project area comprise high value foraging, breeding and roosting habitat for the species. These areas have therefore been mapped as habitat critical to the survival of the masked owl, see **Figure 8-11**.

## Chalumbin Wind Farm Potential Habitat for Masked owl

Figure 8.11

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Survey Observation
-  Habitat critical to the survival of the species
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

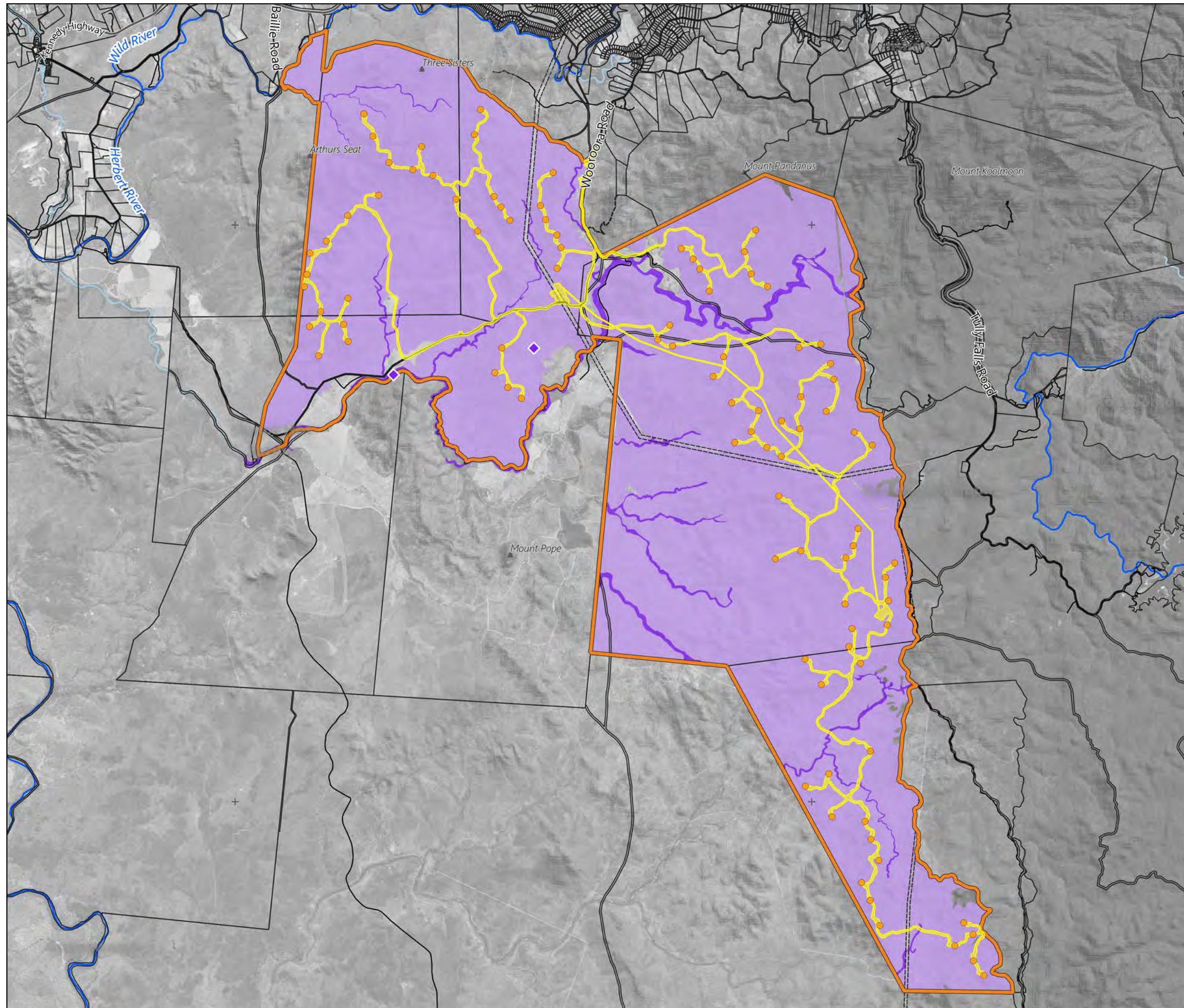
Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



0 1 2 3 4 5 km

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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





### 8.13 Magnificent Brood-frog












The magnificent brood-frog is range-restricted and is only known to occur on rhyolites of the Glen Gordon volcanics at altitudes greater than 800 m. During field surveys, the species was observed in six locations (out of 21 survey locations), with two locations recording large groups of male frogs (15-20 individuals). Two of the six recorded observations were above the 800 m contour, forming the lower limit of the species' published range.

The following habitat was mapped for magnificent brood-frog across the Project area (**Figure 8-12**):

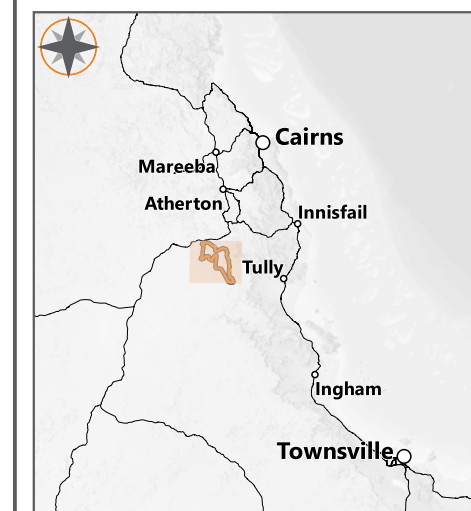
- Habitat critical to the survival of the species is open eucalypt forest within 50 m of a stream order 1 watercourse on rhyolites of the Glen Gordon volcanics, above 800 m; and
- Potential habitat is open eucalypt forest within 50 m of a stream order 1 watercourse on rhyolites of the Glen Gordon volcanics, below 800 m.

## Chalumbin Wind Farm Potential Habitat for Magnificent brood-frog

Figure 8.12

-  Project Area
-  Wind Turbine
-  Project Footprint
-  800m Contour
-  Habitat critical to the survival of the species
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

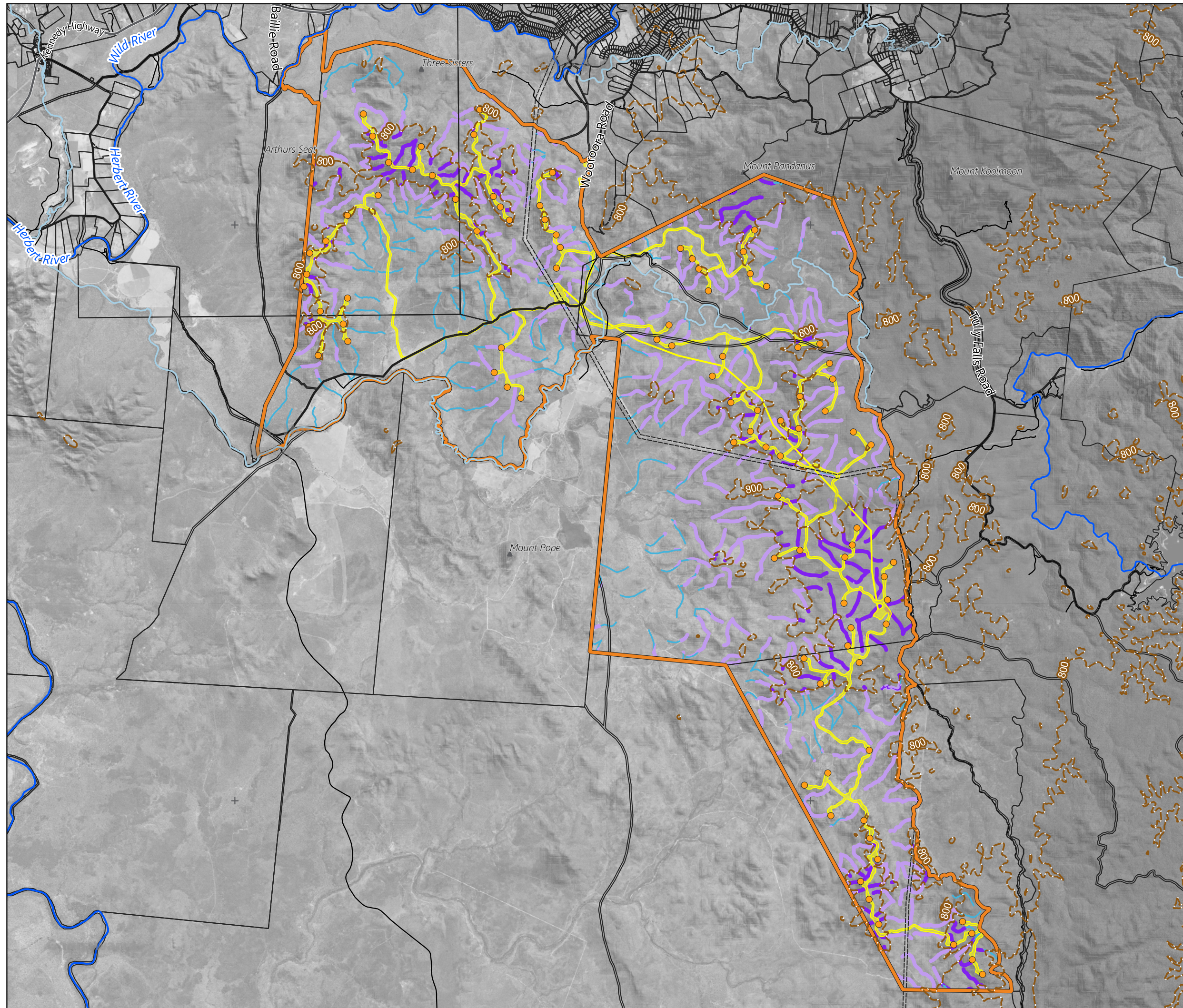
Date: 2021-06-15  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



0 1 2 3 4 5 km

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**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 8.14 Fork-tailed Swift

No mapping has been undertaken for the fork-tailed swift as this species could occur in any airspace over the Project area. It is a migratory species that does not breed in Australia. It exhibits foraging and movement that is completely aerial.

## 8.15 Black-faced Monarch












The black-faced monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. It breeds in rainforest habitat and feeds mostly in rainforest but also in open eucalypt forest (SPRAT 2021).

The following habitat has been mapped for the black-faced monarch across the Project area (**Figure 8-13**):

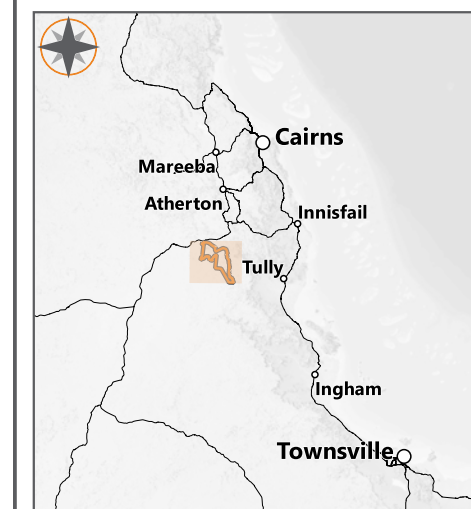
- Important habitat – rainforest communities which are not prevalent within the Project area); and
- Potential habitat – open eucalypt forest within 1 km of rainforests.

## Chalumbin Wind Farm Potential Habitat for Black-faced monarch

Figure 8.13

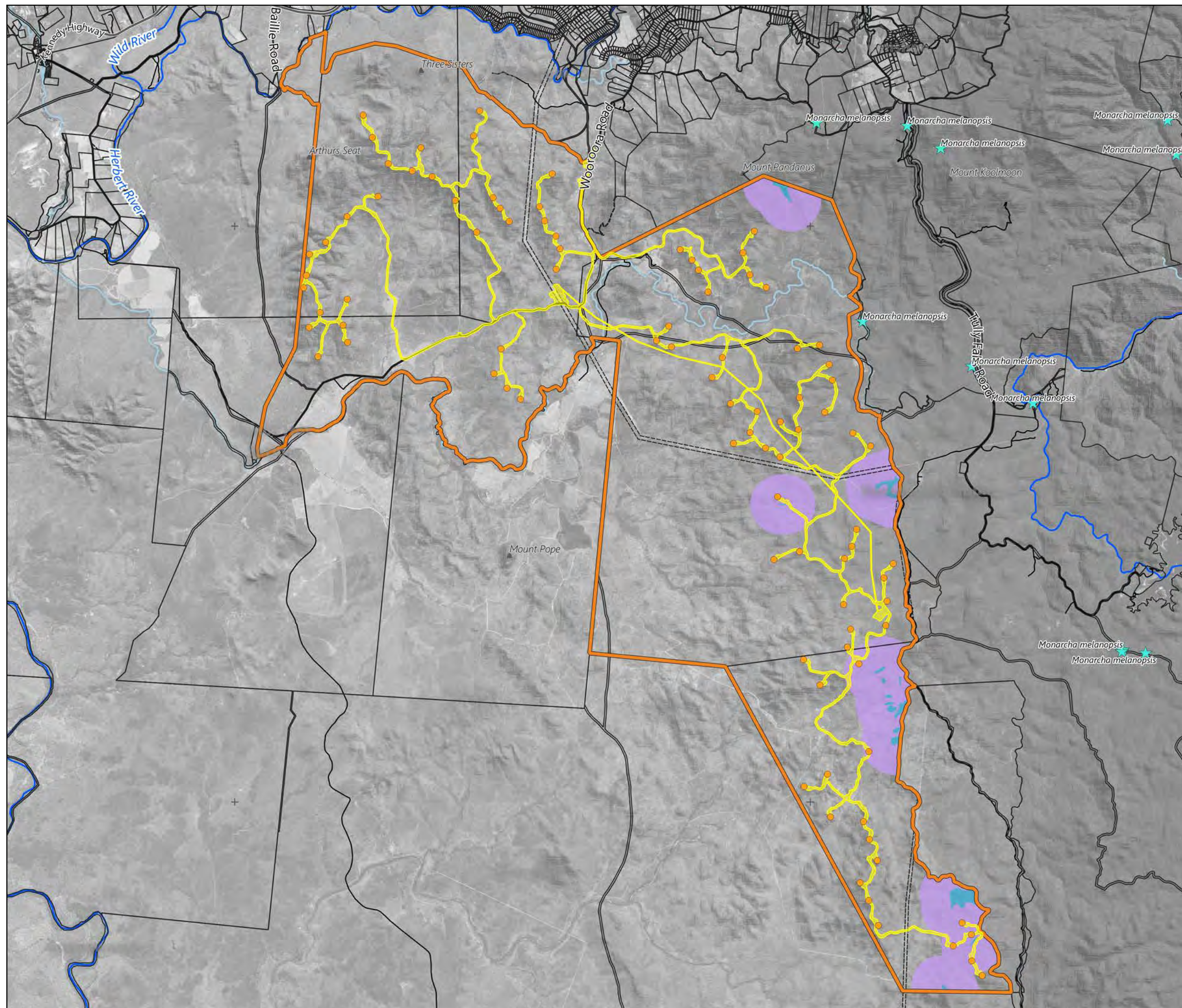
-  Project Area
-  Wind Turbine
-  Project Footprint
-  Important habitat
-  Potential habitat
-  Threatened Fauna Records (WildNET)
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



1:125000 @ A3

**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources, Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service
















## 8.16 Latham's Snipe

The species occurs in permanent and ephemeral wetlands at altitudes up to 2,000 m above sea level. Its preferred habitat includes open, freshwater wetlands with low, dense vegetation (swamps, flooded grasslands or heathlands, bogs) or habitat with saline or brackish water during migration and have been found in modified or artificial habitats close to human activity. Foraging and roosting habitat are characterised by areas of mud exposed or beneath shallow water with low, dense vegetation. The species is highly dispersive, moving in response to rainfall and availability of food (SPRAT 2021).

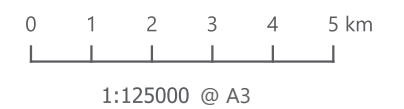
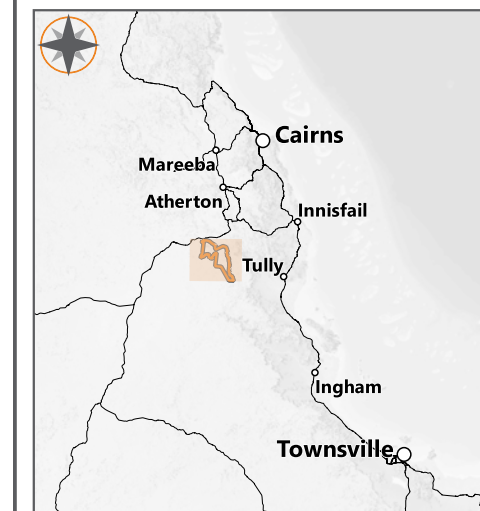
Wetlands within the Project area have been mapped as potential habitat for Latham's snipe, see **Figure 8-14**.

## Chalumbin Wind Farm Potential habitat for Latham's snipe

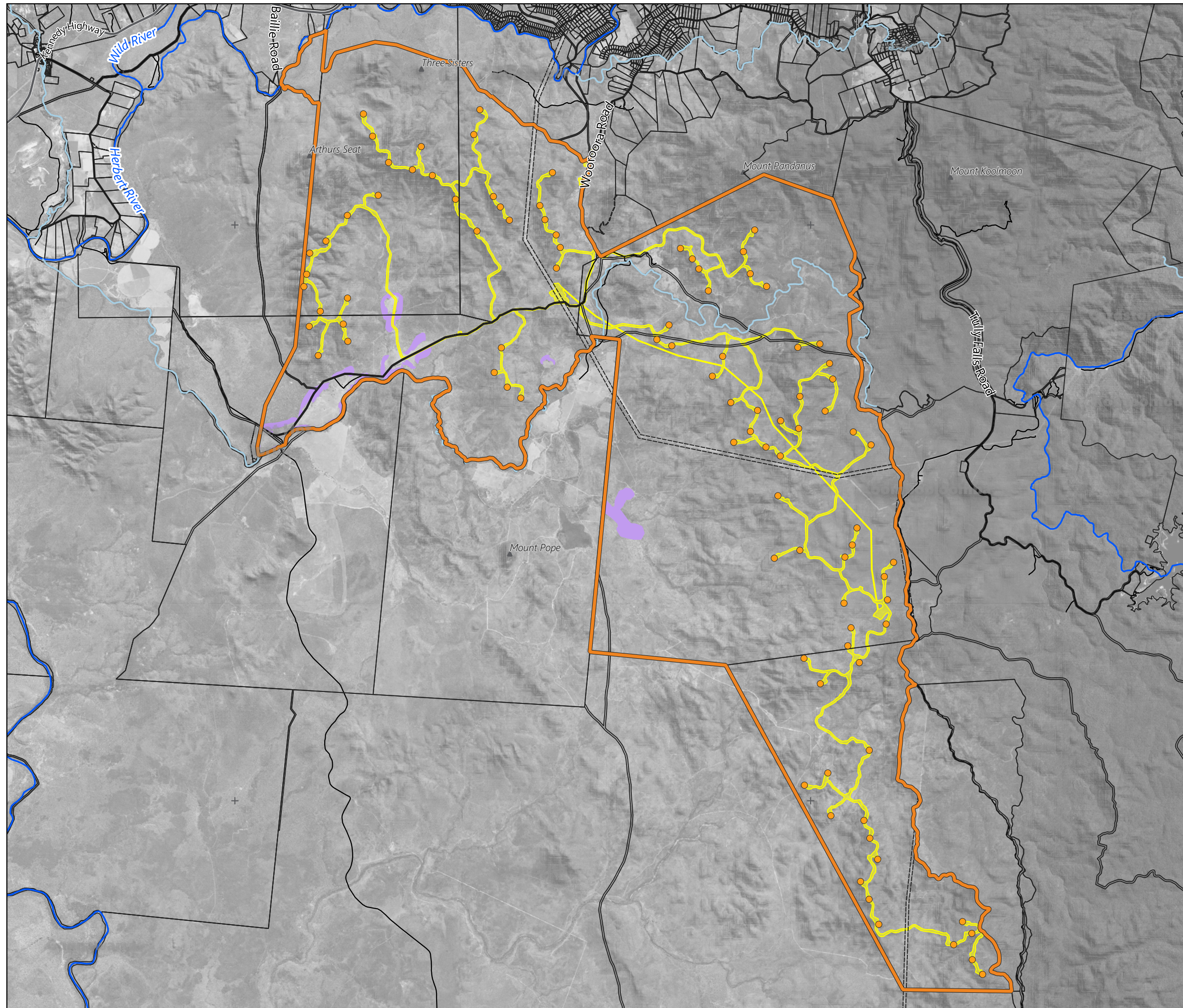
Figure 8.14

-  Project Area
-  Wind Turbine
-  Project Footprint
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-06-14  
 Author: TOD  
 Reviewed: CC  
 Project: EPU-004



**Data Source(s):**  
 Digital Cadastral Database - Department of Natural Resources,  
 Mines and Energy (2021)  
 Queensland Imagery Whole Of State  
 Satellite Public Basemap Service





## 9.0 Impact Assessment

The following sections describe and quantify the potential impacts associated with construction and operation of the Project in broad terms. Significant impact assessments for each of the candidate MNES identified in **Section 7.0** have been undertaken and are presented in **Section 11.0**.

### 9.1 Project Footprint

The Project footprint has been defined based on the Project description in **Section 3.0**, including the extent of earthworks required to provide a maximum direct impact area. The Project footprint mapped and assessed within this report includes areas permanently required for infrastructure such as turbines, access roads, substations, etc., and the extent of earthworks required across the varying terrain. The Project footprint also accommodates required fire breaks around above-ground infrastructure such as turbines and overhead powerline poles. Some of the Project footprint will also include areas of temporary disturbance such as laydown areas that will be rehabilitated on completion of construction.

The total Project footprint is approximately 1,250.26 ha (3.93 % of the Project area). Within this, areas of temporary disturbance are estimated to be up to 25 % of the Project footprint, subject to detailed design. In many instances, the access track width required for operation of the Project will be less than that required for construction – where appropriate to do so, the access tracks will be reduced in width prior to operation, with those parts no longer required for operations to be rehabilitated.

The Project will not clear any additional habitat outside the maximum disturbance limits identified, but will have flexibility in certain locations to microsite infrastructure within the Project footprint in response to site-specific constraints, including ecological constraints such as large habitat trees.

### 9.2 Potential Construction Impacts

Throughout the construction phase the Project has the potential to impact MNES values via the following:

- Vegetation clearing resulting in loss of habitat;
- Habitat fragmentation and reduced connectivity;
- Fauna injury or mortality during vegetation clearing and potential entrapment in trenches when installing underground powerlines;
- Fauna injury or mortality due to vehicle strike;
- Wildlife disturbance due to dust, noise, light and vibration emissions;
- Reduced water quality due to erosion and sedimentation;
- Potential spills of hazardous materials;
- Introduction or increased prevalence of pests and weeds due to increased vehicle movements and vegetation clearing; and
- Increased risk of bushfire due to potential ignition sources on site associated with increased activity.

These are discussed in more detail in the following sections.



## 9.2.1 Vegetation Clearing

The Project area supports large areas of remnant vegetation dominated by open eucalypt woodland with small pockets of scattered rainforest communities close to the eastern boundary (i.e. closer to the Wet Tropics WHA). The Project has been designed to avoid any clearing of rainforest vegetation therefore threatened species specifically associated with these communities are not expected to be impacted.

Clearing of eucalypt woodland will reduce breeding, foraging and sheltering habitat for flora and fauna species, and the process of vegetation clearance has the potential to result in injury to or mortality of native fauna species. Some species are more sedentary and hence more susceptible to impacts than others. Conversely, more mobile species such as migratory birds are unlikely to be disturbed by vegetation clearing as they are able to disperse more easily.

The total estimated area of vegetation clearing is 1,189.38 ha of remnant and regrowth vegetation, as outlined in **Table 9.1**. **Table 9.2** presents a summary of clearing of potential MNES habitat. Specific impacts for each MNES are discussed and assessment for significance in **Section 11.0**, with reference to the differentiation between potential habitat and critical habitat for each MNES.

**Table 9.1 Summary of Vegetation Clearing**

Regional Ecosystem	Clearing Area within Project Footprint (ha)	Area within Project Area (ha)	Clearing Area as % of Project Area
7.3.16 <i>Eucalyptus platyphylla</i> woodland to open forest on alluvial plains. Gently sloping to flat, moderately to poorly drained alluvial lowlands, foot slopes and piedmont fans	3.46	18.72	18.48
7.3.26 <i>Casuarina cunninghamiana</i> woodland to open forest on alluvium fringing streams	3.89	395.72	0.98
7.3.43 <i>Eucalyptus tereticornis</i> open forest to woodland on uplands on well-drained alluvium	4.50	284.77	1.58
7.8.10 <i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> (or <i>E. granitica</i> ), <i>E. portuensis</i> , <i>Corymbia intermedia</i> woodland to open forest, or <i>E. moluccana</i> woodland to open forest, of uplands and highlands on basalt	0.19	20.35	0.94
7.8.19 <i>Corymbia clarksoniana</i> open forest to woodland on basalt	0.47	11.71	4.03
7.12.27a <i>Eucalyptus reducta</i> medium open forest and woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone	190.72	2,933.54	6.50
7.12.27c <i>Eucalyptus resinifera</i> and <i>Syncarpia glomulifera</i> open woodland. Uplands and highlands on shallow granitic and rhyolitic soils, of the moist rainfall zone	76.12	1,833.92	4.15
7.12.29a <i>Corymbia intermedia</i> , <i>Eucalyptus tereticornis</i> , <i>E. drepanophylla</i> open forest to low open forest and woodland with <i>Allocasuarina torulosa</i> , <i>A. littoralis</i> , <i>Lophostemon suaveolens</i> ,	14.77	299.37	4.93



Regional Ecosystem	Clearing Area within Project Footprint (ha)	Area within Project Area (ha)	Clearing Area as % of Project Area
<i>Acacia cincinnata</i> , <i>A. flavescens</i> , <i>Banksia aquilonia</i> and <i>Xanthorrhoea johnsonii</i> . Uplands, on granite and rhyolite			
7.12.30a <i>Corymbia citriodora</i> , <i>Eucalyptus portuensis</i> , <i>C. intermedia</i> , <i>Syncarpia glomulifera</i> woodland to low woodland to open forest with <i>Callitris intratropica</i> , <i>Acacia calyculata</i> and <i>Xanthorrhoea johnsonii</i> . Uplands and highlands, of the moist and dry rainfall zones	65.72	1,222.39	5.38
7.12.34 <i>Eucalyptus portuensis</i> and/or <i>E. drepanophylla</i> +/- <i>C. intermedia</i> +/- <i>C. citriodora</i> , +/- <i>E. granitica</i> open woodland to open forest on uplands on granite	191.00	5,101.70	3.74
7.12.52 <i>Eucalyptus resinifera</i> , <i>Corymbia intermedia</i> , <i>Allocasuarina littoralis</i> , <i>Syncarpia glomulifera</i> , <i>E. drepanophylla</i> +/- <i>E. reducta</i> woodland on granite and rhyolite in the dry to moist rainfall zone	170.38	3,271.69	5.21
7.12.57 Shrubland and low woodland mosaic with <i>Syncarpia glomulifera</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>Allocasuarina littoralis</i> and <i>Xanthorrhoea johnsonii</i> on uplands and highlands on granite	9.29	177.52	5.23
7.12.57a Shrubland and low woodland mosaic with <i>Syncarpia glomulifera</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>Allocasuarina littoralis</i> and <i>Xanthorrhoea johnsonii</i> . Uplands and highlands on granite and rhyolite, of the moist and dry rainfall zones	28.92	359.89	8.04
7.12.65 Rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of <i>Acacia</i> spp. and/or <i>Lophostemon suaveolens</i> and/or <i>Allocasuarina littoralis</i> and/or <i>Eucalyptus lockyeri</i> subsp. <i>Exuta</i>	29.77	247.27	12.04
7.12.65k Granite and rhyolite rock outcrop, of dry western areas, associated with shrublands to closed forests of <i>Acacia</i> spp. and/or <i>Lophostemon</i> spp. and/or <i>Allocasuarina</i> spp. In the Mount Emerald area, shrubs may include <i>Acacia umbellata</i> , <i>Melaleuca borealis</i> , <i>Homoranthus porteri</i> , <i>Leptospermum neglectum</i> , <i>Melaleuca recurva</i> , <i>Melaleuca uxorum</i> , <i>Grevillea glossadenia</i> , <i>Corymbia abergiana</i> , <i>Eucalyptus lockyeri</i> , <i>Sannantha angusta</i> , <i>Pseudanthus ligulatus</i> subsp. <i>ligulatus</i> , <i>Acacia aulacocarpa</i> , <i>Leptospermum amboinense</i> , <i>Xanthorrhoea johnsonii</i> and <i>Jacksonia thesioides</i> . Ground-cover species may include <i>Borya septentrionalis</i> , <i>Lepidosperma laterale</i> , <i>Eriachne</i> spp., <i>Cleistochloa subjuncea</i> , <i>Boronia occidentalis</i> , <i>Cheilanthes</i> spp., <i>Coronidium newcastlianum</i> , <i>Schizachyrium</i> spp., <i>Tripogon</i>	5.82	1,294.63	0.45



Regional Ecosystem	Clearing Area within Project Footprint (ha)	Area within Project Area (ha)	Clearing Area as % of Project Area
<i>loliiformis</i> , <i>Gonocarpus acanthocarpus</i> and <i>Eragrostis</i> spp. Dry western areas. Granite and rhyolite			
7.12.66 <i>Lophostemon confertus</i> low shrubland or low closed forest on exposed rocky slopes on granite and rhyolite	25.82	236.41	10.92
9.3.15 <i>Eucalyptus tereticornis</i> +/- <i>Casuarina cunninghamiana</i> +/- <i>Melaleuca</i> spp. fringing woodland on channels and levees	1.03	629.92	0.16
9.3.16 <i>Eucalyptus tereticornis</i> and/or <i>E. platyphylla</i> and/or <i>Corymbia clarksoniana</i> woodland on alluvial flats, levees and plains	14.64	708.37	2.07
9.5.5a Mixed woodland to open forest of <i>Eucalyptus crebra</i> , <i>Corymbia clarksoniana</i> and <i>C. citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> with a generally open sub-canopy of canopy species +/- <i>Callitris intratropica</i> and <i>Acacia</i> spp. The open shrub layer often contains juvenile canopy species, <i>Petalostigma pubescens</i> , <i>Acacia flavescens</i> and other <i>Acacia</i> spp. <i>Themeda triandra</i> is the dominant species in a dense grassy ground layer. Occurs on Tertiary plateaus and remnants	12.96	1,996.97	0.65
9.8.4 <i>Eucalyptus crebra</i> and/or <i>E. tereticornis</i> open woodland on basalt plains	5.37	633.58	0.85
9.12.2 <i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> subsp. <i>citriodora</i> , <i>E. granitica</i> or <i>E. crebra</i> , <i>C. intermedia</i> or <i>C. clarksoniana</i> mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary	333.55	8,493.61	3.93
9.12.4 <i>Eucalyptus shirleyi</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia peltata</i> and/or <i>Callitris intratropica</i> low open woodland on igneous rocks	0.99	18.00	5.51
Non-remnant	60.88	1,168.07	5.21
<b>Total</b>	<b>1,250.26</b>	<b>31,936.35<sup>5</sup></b>	<b>3.91</b>

<sup>5</sup> Includes those REs not within the Project footprint



**Table 9.2 Estimated Clearing of Potential MNES habitat**

<b>MNES Species</b>	<b>Potential Habitat within Project Area (ha)</b>	<b>Proposed Clearing of Potential Habitat (ha)</b>	<b>Proportion of Critical Habitat within Study Area Impacted (%)</b>	<b>Critical Habitat within Project Area (ha)</b>	<b>Proposed Clearing of Critical Habitat</b>	<b>Proportion of Critical Habitat within Study Area Impacted (%)</b>
<i>Prostanthera clotteniana</i>	1,130.86	0	Nil	135.33	0	Nil
<i>Homoranthus porteri</i>	1,130.86	0	Nil	135.33	0	Nil
<i>Triplarina nitthaga</i>	1,130.86	0	Nil	135.33	0	Nil
Koala	25,100.8	573.03	2.28	0	0	Nil
Greater glider	14,045	563.27	4.01	3,723.4	56.59	1.5
Yellow-bellied glider	84.65	0	Nil	19.7	0	Nil
Northern quoll	8630.24	387.04	4.48	0	0	Nil
Spotted-tailed quoll	3,381.84	170.56	5.04	0	0	Nil
Ghost bat	17,768.7	730.02	4.11	424.42	2.62	0.6
Spectacled flying-fox	29,098.7	1,184.32	4.07	0	0	Nil
Southern cassowary	0	0	Nil	9.26	0	Nil
Red goshawk	25,550	1,024.86	4.01	5,297.28	165	3.1
White-throated needletail	30,198.45	1,142.87	3.78	0	0	Nil
Masked owl	29,693.7	1,185.54	3.99	1,025.64	4.93	0.5



<b>MNES Species</b>	<b>Potential Habitat within Project Area (ha)</b>	<b>Proposed Clearing of Potential Habitat (ha)</b>	<b>Proportion of Critical Habitat within Study Area Impacted (%)</b>	<b>Critical Habitat within Project Area (ha)</b>	<b>Proposed Clearing of Critical Habitat</b>	<b>Proportion of Critical Habitat within Study Area Impacted (%)</b>
Magnificent brood-frog	2,307.77	21.15	0.92	611.75	21.15	4.4
Fork-tailed swift	30,198.45	1,142.87	3.78	0	0	Nil
Black-faced monarch	2,436.46	84.49	3.47	0	0	Nil
Latham's snipe	364.48	4.54	1.25	0	0	Nil





## 9.2.2 Habitat Fragmentation

Terrestrial habitat connectivity may be reduced as a result of the Project due to linear clearing, which may reduce fauna movements between areas of retained remnant vegetation. This habitat fragmentation will be more prominent where clearing widths are larger and intersect intact areas of vegetation. Clearing linear widths through habitats also has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit, and to increase edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfire), thereby reducing the ecological functioning of those areas.

Some species are more prone to the impacts on fragmentation, such as greater gliders which are not able to traverse larger cleared areas. The maximum known gliding distance for a greater glider is 100 m (DELWP 2019) so clearings greater than 100 m wide are likely to act as a barrier to this species' movement at that location. Other species (such as masked owl) are less likely to be affected by clearings of this size and will disperse quite readily across access tracks and powerline easements.

Fragmentation impacts will be somewhat temporary as a substantial proportion of the clearing for the access roads is likely to be rehabilitated on completion of construction (subject to detailed design, this is estimated to be approximately 25% of the Project footprint). Further details on site rehabilitation are provided in **Section 10.0** and will be outlined in a Rehabilitation Management Plan.

## 9.2.3 Fauna Injury or Mortality

Direct fauna injury or mortality may occur as a result of the Project during vegetation clearing (e.g. through removal of mature trees containing hollows), vehicle collision or through entrapment in trenches.

Mortality from tree clearing is a greater risk for nocturnal arboreal mammals such as the greater glider, whereby mortality may occur from removal of hollow-bearing trees which provide daytime denning habitat for the species.

Excavations will be required to create trenches in which underground cables will be carried, and to allow construction of turbine pads and access roads. This will involve removal of ground vegetation, soil and rock which provide fauna habitat (e.g. denning sites in rocky areas). During trenching activities there is potential for fauna to fall into and become trapped in open trenches, where they may perish or become subject to increased predation risk. Particularly susceptible species groups include reptiles, frogs and small mammals.

Increased traffic around the Project area has the potential to kill or injure fauna on impact. Some ground-dwelling or slow-moving species may be particularly susceptible to these impacts.

## 9.2.4 Reduced Air Quality

Increased dust from vegetation clearing, earthworks and vehicle movements during construction has the potential to temporarily and locally impact flora and fauna values in the vicinity of the Project footprint. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity, resulting in reduced habitat quality for fauna. Increased dust can also impact on respiratory systems of fauna, alter soil properties impacting on plant species assemblages and reduce water quality in aquatic habitats.

Dust is expected to only be a potential issue during vegetation clearing and construction.

## 9.2.5 Noise and Vibration

Noise may adversely affect fauna by interfering with communication (e.g. territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Construction noise will be generated by the Project through the use of machinery, plant and vehicles, and will vary from short intermittent noise from plant



and equipment to more persistent noise from generators. The generation of construction noise may be in areas which have the potential to support threatened fauna species. Individuals that occur within the Project area may leave the area of impact. Project construction works and therefore potential noise impacts will be temporary.

Vibration from vehicles and equipment may cause temporary disturbance to fauna, and displacement or structural damage to boulder piles, rock fissures and caves which form habitat for fauna. Blasting may be required for construction of some pads and access roads depending on geological constraints, and obligate cave-dwelling bats would be particularly susceptible to vibration impacts from blasting.

### **9.2.6 Light Emissions**

Artificial lighting from infrastructure and machinery may impact fauna within the Project area during construction. Artificial lighting can have a range of impacts which vary between species. Artificial light can disrupt patterns of both nocturnal and diurnal species by eliciting responses. Some species may avoid brightly lit areas, potentially due to the perception of being increased risk of predation. Conversely, some species such as nocturnal reptiles, frogs and bats may congregate at artificial light sources to feed on insects attracted to light.

Other potential adverse impacts include disruption of breeding and migratory patterns, disorientation and potential collision with structures.

### **9.2.7 Erosion and Sedimentation**

The main construction activities that could impact on water quality are excavations and earthmoving for construction of turbine pads and access roads. This may lead to erosion and sedimentation, reduction in water quality and changes to water flows.

During construction activities, sediment may be mobilised and transported by surface water during rainfall events, ultimately discharging into watercourses and drainage lines and potentially reducing water quality in downstream aquatic habitats. Increased suspended sediments can reduce light penetration into the water column, reducing photosynthesis of aquatic macrophytes and decreasing dissolved oxygen levels. However, many creek lines in the Project area are ephemeral, which may reduce the magnitude of these impacts.

Changes in the hydrology of the Project area may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.

The accidental release of pollutants (including leaks and other uncontrolled releases) into the surrounding environment and waterways has the potential to degrade aquatic habitat quality in the Project area and impact vegetation communities and fauna utilising these areas. This includes direct toxic impacts on fauna from ingestion or inhalation. Without mitigation, contaminants may enter waterways including oily wastewater (from heavy equipment cleaning), contaminated runoff from chemical or fuel storage areas and general washdown water.

### **9.2.8 Hazardous Materials**

Project activities have the potential to result in accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to flora and fauna. The severity of the impact is dependent on the location and magnitude of the release.



### 9.2.9 Pests and Weeds

Project activities have the potential to increase the abundance of pest flora in the Project area and facilitate dispersal of species to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Project area is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the Project area which may introduce new species. Many weed species thrive on disturbed ground and will rapidly colonise disturbed areas in advance of native species recolonisation.

Increased pest flora abundance has adverse impacts on native vegetation and biodiversity, as well as potential negative economic effects on local land uses such as grazing activities.

Project-related activities may also increase pest fauna abundance in the Project area. This can lead to increased competition with, and predation of native fauna. In addition, habitat degradation may occur through vegetation trampling (e.g. feral pig wallowing). Creation of new access points into areas of intact vegetation may create pathways for feral fauna species to disperse. Uncontained waste sources may also attract feral fauna such as wild dogs.

### 9.2.10 Bushfire Risk

Fire is a natural part of the Australian landscape, and most vegetation communities are adapted to periodic fires. However, changes in the natural fire regime may result in changes in the species composition and / or structure of the vegetation. The increased presence of construction vehicles and personnel in the Project area may increase fire risk through use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.

## 9.3 Potential Operational Impacts

Throughout the operational phase, the Project has the potential to impact on MNES via the following:

- Fauna injury or mortality due to vehicle strike;
- Collision with turbines towers, blades and powerlines;
- Barotrauma;
- Wildlife disturbance due to noise and light emissions;
- Potential spills of hazardous materials;
- Increased pests and weeds due to increased vehicle movements; and
- Increased risk of bushfire due to potential ignition sources on site associated with increased activity.

These are discussed in more detail in the following sections.

### 9.3.1 Vehicle Strike

Increased traffic around the Project area has the potential to kill or injure fauna on impact although traffic levels will be greatly reduced from the construction phase and more geared towards light vehicles. Ground dwelling or slow-moving species may be particularly susceptible to traffic impacts.



### 9.3.2 Collision Risk

Potential impacts to threatened and migratory species, and other species groups of concern (e.g. microbats, raptors and waterfowl) may occur through direct collision with turbine towers and blades and associated powerlines, but also through flying through the “wake” behind the turbine. Many species will rarely, if ever, fly at rotor height while others will do so routinely. Different types of flight (e.g. soaring, direct flight, hovering) and different speeds of flight also will pose a different risk of collision.

Turbine siting will influence collision risk, with turbines located near wetlands likely to lead to greater risk of collision with birds and bats which congregate near wetland habitats. Turbines located on ridgelines and in valleys or other topographical features which may “funnel” birds and bats through a narrow pathway, are pose a greater risk of collision.

Other factors that attract birds and bats to the proximity of turbines include an increase in perching habitat (from powerlines or the turbine structure itself), increased lighting that increases insect abundance around turbines, and the presence of carcasses around the base of turbines (attracting raptors and corvids in particular).

Generally, species at higher risk of collision are likely to comprise:

- Raptors – this group take advantage of updrafts associated with ridgelines to move around. Raptor species were reasonably well represented in the diurnal bird surveys, with observations of collared sparrowhawk, brown goshawk, grey goshawk, wedge-tailed eagle, Pacific baza, whistling kite, brown falcon and peregrine falcon.
- Migratory swifts – both white-throated needletail and fork-tailed swift were recorded during the field surveys and will routinely fly at RSA height.
- Waterfowl (ducks, cormorants, terns, herons, etc.) – these species are generally prone to collision due to their often-direct nature of flight, flight height and lower manoeuvrability than other species. No significant wetlands are present within the Project area and this group was not well represented in the diurnal bird surveys, with a few observations of Australian wood duck, Pacific black duck, white-necked heron and white-faced heron.
- Migrating passerines and other species – migratory passerines routinely fly at RSA height. The Project area is not considered to be located in a significant corridor for passerine movement.
- High-flying or migratory/nomadic microbats – many species forage at or below canopy height, but some species forage well above canopy height (e.g. some of the freetail and sheathail species).

### 9.3.3 Barotrauma

Mortality from near-contact collision in the form of barotrauma is known to primarily affect microbat species. Barotrauma is associated with low air pressure produced in the wake of moving blade-tips in the form of vortices. These vortices increase in size and decompression gradients with increasing blade velocity. The sudden change in air pressure associated with the vortices is known to damage the internal air-containing tissues of microbats such as lungs when entering a fast-moving turbine wake, typically causing internal haemorrhaging resulting in death. This form of mortality may account for up to 50 % of all microbat deaths associated with wind farms in locations where microbats are common. Rapid air pressure changes are largely an undetectable hazard and it is thought that microbats are more susceptible to fatal barotrauma than other groups due to particular anatomical features such as large lungs to body ratios and specialised vascular system to power high-energy flight (Baerwald et al. 2008).



### 9.3.4 Noise and Light Emissions

The mechanisms for operational impacts from noise and lighting are as described in **Section 9.2.5** for construction, although the potential for significant noise generating activities is greatly reduced.

Artificial lighting from infrastructure may impact fauna within the Project area during operation of the Project. In particular, artificial light can disrupt patterns of both nocturnal and diurnal species by eliciting responses. Some species may avoid brightly lit areas, potentially due to the perception of an increased risk of predation. Increased lighting of turbines may increase the presence of insects and in turn lead to an increased risk of collision with turbines for bats and birds.

### 9.3.5 Hazardous Materials

As described in **Section 9.2.8** for construction activities, operational activities have the potential to cause harm to fauna species through accidental releases of hazardous materials. The volume of such substances being used and stored on site during operation will be significantly less than during construction, with a corresponding reduction in risk.

### 9.3.6 Pests and Weeds

As described in **Section 9.3.6** for construction activities, operational activities have the potential to increase the abundance of pest flora and fauna in the Project area and facilitate dispersal of species to previously unimpacted areas.

### 9.3.7 Bushfire Risk

During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.

## 9.4 Potential Decommissioning Impacts

At the end of the Project's operational life, infrastructure will be decommissioned at the site rehabilitated to facilitate continuation of the current land use (i.e. agriculture). Decommissioning involves the removal of all above-ground infrastructure such as turbines, overhead transmission lines, switch stations, etc. Removal of buried infrastructure is not normally undertaken as this typically causes additional disturbance and environmental impacts. Once above-ground infrastructure is removed, the land is rehabilitated in line with specific approval conditions and landholder agreements.

Impacts during decommissioning are likely to relate primarily to vehicle movements around the Project area, potential for spread of weeds and elevated risk of bushfire as described in the sections above. No additional vegetation clearing would be anticipated during decommissioning activities; however, this it would be subject to a separate assessment if required.



## 10.0 Impact Avoidance, Minimisation and Mitigation

### 10.1 Design Phase

Ecological surveys of the Project area commenced at an early stage during Project design, and as such the results of the surveys have been able to significantly inform the Project layout. Central to this process was ensuring that areas of higher ecological significance were avoided to the greatest practical extent, taking into consideration the challenging terrain and wind resource requirements.

Initial ecological surveys were designed to collect information about the characteristics of the broader Project area, such that the opportunities and constraints could inform the subsequent Project design activities.

The evolution of the Project design demonstrates informed and ecologically sensitive development, where observations in the field have resulted in tangible and significant changes to the Project. From Project inception, Epuron has been committed to achieving ecologically sustainable development through this Project, and this has formed a fundamental driver for the wider Project team.

Avoidance of MNES and associated habitat has been demonstrated during the design process as described in the subsections below.

#### 10.1.1 Avoidance of Wet Tropics WHA

The Wet Tropics WHA is located to the east of the Wooroora property, and also cuts across a portion of the north-eastern extent of the Project area (within Wooroora). It was considered critical by the Project team to ensure that the Project footprint did not extend into the Wet Tropics WHA. The Project footprint has been designed to achieve a separation distance of at least 500 m to the Wet Tropics WHA at its closest point (in the east of Wooroora). This not only avoids direct impacts to the Wet Tropics WHA, but also decreases the likelihood of any indirect impacts to the Wet Tropics WHA being associated with the Project.

#### 10.1.2 Avoidance of Rainforest Habitats

Since the inception of the Project, the rainforest habitats associated with the Wet Tropics WHA and various MNES were identified as some of the higher-value ecological aspects of the Project area. Consequently, the ecological surveys on site were partly designed to ground-truth the extent of these rainforest habitats such that they could be avoided by the Project footprint.

The Project area supports large areas of remnant vegetation dominated by open eucalypt woodland with small pockets of scattered rainforest communities close to the eastern boundary. The Project has been designed to avoid any clearing of rainforest vegetation therefore threatened species specifically associated with these communities are not expected to be impacted.

#### 10.1.3 Avoidance of Arthur's Seat

Desktop and site-based cultural heritage investigations of the Project area identified that the Arthur's Seat topographical feature was of high cultural significance for the Traditional Owners. This, coupled with the known presence of *T. nitchaga* and *H. porteri* at this location, contributed to Arthur's Seat being avoided by the Project footprint by at least 1,000 m.



#### **10.1.4 Avoidance of Habitat for MNES Plants Associated with Rocky Pavement**

The MNES flora species that are known to exist within the Project area (*P. clotteniana*, *H. porteri* and *T. nitchaga*) all share a common trait – their habitat requirements are highly niche. All recorded observations of these species during the field surveys were in association with the rocky pavement shrub complex habitat, corresponding with RE 7.12.65k. This vegetation community occurs on the granite and rhyolite outcrops favoured by all three listed plant species.

Through analysis of high-resolution aerial photography, these rocky pavement areas were identified and mapped throughout the Project area. These rocky pavement areas were then targeted for flora surveys in October 2020 and March 2021, and those found to contain MNES species were avoided entirely by the Project footprint through subsequent refinement by the Project team. This has resulted in the complete avoidance of impacts to these MNES flora species through appropriate and considerate Project design.

#### **10.1.5 Avoidance of Potential Red Goshawk Nest**

The location of the potential red goshawk nest within the Glen Gordon property and within riparian vegetation associated with Blunder Creek was identified as a high constraint for the purposes of Project design. The Project footprint has been designed to achieve a separation distance of more than 1,000 m between this nest and any proposed wind turbine. The Project footprint has also avoided this location through the appropriate placement of access tracks in areas removed from this potential red goshawk nest.

#### **10.1.6 Reduction in Number of Turbines**

In mid-2020, Epuron had designed approximately 200 wind turbines across the Project area for further investigation and refinement once specific constraints were identified. The Project has evolved to the point where less than half of the original number of wind turbines are proposed. Central to the process was the preparation of ecological constraints mapping that sought to bring together the collective implications associated with ecological findings throughout the Project area to inform the Project team. This ecological constraint mapping (and associated advice) was then overlaid with other considerations (e.g. wind mapping, topography, landholder considerations) to determine the current Project footprint.

#### **10.1.7 Additional Mitigation Measures**

Further to the measures described above, the following general measures have been implemented throughout the design phase to avoid and minimise environmental impacts to the greatest practical extent:

- Locating the substation, office, construction compound and temporary laydown areas on existing cleared land as far as practicable, and away from watercourses;
- Co-locating underground electric cabling with Project access roads and minimising the width of Project access roads as far as practicable; and
- Minimising the number and width of watercourse crossings – this has been a considerable driver to minimise potential impacts on greater glider, masked owl and red goshawk.



## 10.2 Construction Phase

### 10.2.1 Vegetation Clearing

The following measures will be employed during the construction phase of the Project to avoid and minimise impacts associated with vegetation clearing:

- Vegetation clearing will be limited to those areas required for earthworks and construction of the Project. Those areas which are not required for the ongoing operation of the Project will be rehabilitated to pre-disturbance land use as soon as practicable following construction.
- The approved disturbance area will be clearly demarcated prior to clearing to avoid unnecessary clearing of vegetation and to ensure personnel and vehicles stay within the approved footprint.
- Sequential clearing will occur to minimise impacts on native fauna, particularly arboreal fauna which may be using tree hollows.
- Measures to ensure clearing limits are adhered to will be documented in the CEMP and addressed in site inductions.
- Access will be limited to approved access routes and tracks.
- Turbine locations will be microsituated within the Project corridor, where conditions and wind resource allow, to take advantage of areas of lower ecological significance.
- Removal of protected plants will be avoided as much as practicable by locating infrastructure away from populations and individuals during micrositeing activities.
- Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal and loss of hollow-bearing trees, as well as to avoid additional disturbance through GBR wetland protection areas.
- Develop a Threatened Species Management Plan and Species Management Program (TSMP) to identify specific measures to be implemented that will mitigate impacts to threatened fauna species and breeding places during clearing, as well as operation of the Project.
- Pre-clearance surveys will be undertaken by a suitably qualified ecologist to:
  - identify GPS locations of any protected plants within the proposed disturbance areas noting details for each individual, including a health assessment;
  - identify and mark all hollow-bearing trees;
  - identify and mark any other active breeding places such as nests, burrows etc.;
  - identify suitable release sites; and
  - identify presence of weed species.
- A suitably qualified fauna spotter-catcher will be present during all clearing activities, working under an approved TSMP. The fauna spotter-catcher will be responsible to check an area immediately prior to any clearing for presence of any native fauna including searches of all potential habitats such as terrestrial microhabitats and hollows, etc. Any captured species (excluding koalas) will be relocated to an agreed release site. The fauna spotter-catcher will then advise the ground staff as to measures that need to be taken to avoid impacts on breeding places and fauna species. Specific threatened species pre-clearance activities within the Project footprint will include:





- canopy searches in suitable foraging tree species for koala; and
- inspections of suitably sized hollows for the presence of greater glider.
- Sequential clearing will occur. Key steps as part of sequential clearing are summarised below:
  - the first phase will consist of removing understorey vegetation and smaller juvenile trees only. Juvenile trees are under 4 m in height or trunk circumference of less than 31.5 cm at 1.3 m above the ground. No hollow-bearing trees will be cleared in Phase 1;
  - after 48hrs the second phase can commence which is to clear the remaining larger trees, including those with hollows. Trees with small hollows will be cleared using the “slow drop” technique. The tree will be brought down slowly by the machine and mulch put underneath to soften the fall. They will then be inspected by the fauna spotter-catcher to ensure no wildlife remain in the hollow. Where practicable, fauna will be caught, and released into suitable recipient sites once clearing has stopped.
  - if any native fauna are injured they will be taken to a local vet/wildlife carer for treatment.
  - it is important the clearing is done in such a way that arboreal fauna are given the opportunity to disperse from the area once clearing has commenced under their own volition. To encourage this to occur, no habitat trees will be isolated (either singly or in groups) and instead dispersal corridors will be left in place that link vegetation with clearing areas to adjacent areas of retained habitat. Such corridors could consist of a single row of trees no more than 30-40 m apart that will act as ‘stepping stones’.
  - any confirmed koalas will be identified by putting flagging tape and/or marking spray on the tree they are in, and any nearby trees with overlapping crowns or those trees that may impact the koala’s tree during felling will not be cleared until the koala has moved from the area under its own volition. In most situations the koala will move from the area overnight.
  - fell trees away from retained areas of vegetation where practicable. Where trees unavoidably fall into retained areas, leave in-situ to mimic natural tree fall and provide habitat for ground-dwelling fauna.
  - micro-habitats such as fallen logs and rocks will be moved into adjacent habitat.

### **10.2.2 Habitat Fragmentation**

The following measures will be implemented to mitigate and manage impacts of fragmentation as much as practicable during the construction phase:

- All fencing on site, including security fencing, will give consideration to the movement of fauna. Fencing design must consider allowing fauna to move through or over it and not using barbed wire on the top strand of fences.
- Installation of glider rope crossings and glider poles in areas of confirmed glider habitat with a clearance width of 50 m or greater to maintain habitat connectivity.
- Nest box installation to be undertaken where active dens are identified within the Project footprint to compensate for loss of denning resources.
- Minimise clearing widths and where feasible install measures to assist fauna safely move across these areas to adjacent habitats. This may be reducing vehicle speeds to minimise chance of vehicle strike, establish rope crossings at key fauna corridors (such as watercourse crossings).
- Install fauna exclusion fencing around some infrastructure such as the substation if there is a high risk of fauna species being impacted.



- Undertake staged clearing of native vegetation, and retain habitat trees where practicable, to minimise impacts to native fauna species.
- Implement weed and pest control across the Project area to reduce degradation of habitats and edge effects as a result of the Project.

### **10.2.3 Fauna Injury or Mortality**

The following measures will be implemented to prevent species mortality during the construction phase:

- All vehicles associated with construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks.
- A suitably qualified fauna spotter/catcher will be present during all clearing activities associated with the vegetation clearance, working under a Species Management Program. The spotter/catcher will be responsible to check an area prior to any slashing, minor vegetation removal, or ground disturbance occurring for; animal breeding places (such as hollow bearing trees, nests, dens and fallen logs) and presence of any fauna species (such as checking for reptiles under fallen logs, and koalas within eucalypt trees).
- All contractors will be educated on the presence of native fauna including threatened species and need to travel slowly and look out for fauna when driving. This training will form part of mandatory inductions.
- Vehicle traffic will be confined to designated roads and access tracks.
- All fauna encountered (e.g. vehicle strike or during clearing activities) will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the Species Management Program that will be in place for the Project.
- Appropriate procedures for managing injured wildlife should be developed and included in the CEMP.
- During trenching activities, open trenches will be monitored daily. If species are trapped in the trench they will be released by a fauna spotter-catcher. The amount of open trench will be minimised and trenches will preferably be backfilled prior to nightfall.
- Escape ramps or planks and/or shelter (e.g. sawdust filled bags) for trapped fauna will be installed in open trenches.

### **10.2.4 Dust Emissions**

The following measures will be implemented to mitigate and manage impacts from dust as much as practicable during the construction phase:

- Dust suppression techniques such as the use of water carts or application of soil binders will be implemented as required during construction.
- Dust generating activities will be minimised during dry, windy conditions.
- Low speed limits will be implemented on site to minimise dust generation.
- Areas of exposed soils will be stabilised / rehabilitated as soon as practicable, in line with best practice requirements.



- Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions and/or the use of vibration grids will be considered.
- Access roads will be designed to have a less erodible surface.
- Water spraying of nearby sensitive vegetation should be considered if visible dust sedimentation is observed.

### **10.2.5 Noise and Vibration**

The following measures will be implemented to mitigate and manage impacts from noise and vibration as much as practicable during the construction phase:

- Standard construction work hours for noise-generating activities will generally be between 6.30am and 6.30pm, reducing the risk of disturbance to nocturnal and crepuscular fauna.
- Equipment is to be fitted with noise reduction devices where practicable and switched off when not in use.
- Blasting will be minimised as far as practicable.
- Prior to construction, likely locations for blasting will be reviewed to determine the risk of damage or disturbance to caves that have the potential to support bat roosts and additional controls will be developed as necessary.

### **10.2.6 Light Emissions**

The following measures will be implemented to mitigate and manage impacts from lighting as much as practicable during the construction phase:

- Standard construction work hours (generally 6.30am to 6.30pm) predominantly coincide with daylight hours, minimising the need for lighting to facilitate night works. There may be some night work associated with the Project, subject to construction schedule and climatic conditions.
- Site lighting will be kept to the minimum required for safety.
- Where necessary, construction lighting will be directed to the required areas and designed to minimise light spill to surrounding areas through the use of shields or similar.

### **10.2.7 Erosion and Sedimentation**

The following measures will be implemented to mitigate and manage impacts of erosion and sediment as much as practicable during the construction phase:

- Erosion in active construction areas cannot be eliminated but can be controlled. As part of the construction planning a certified Erosion and Sediment Control Plan (ESCP) will be prepared prior to construction and implemented during on-site activities. Sediment and erosion control measures to prevent soil loss will be developed consistent with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control (BPESC) document. The ESCP will form part of the overall CEMP. Particular focus will be given to managing runoff in the vicinity of watercourses.
- As a minimum standard, access tracks will be constructed in accordance with EHP publication: "Erosion control on property roads and tracks—managing runoff".



- Creek crossing locations will seek to take advantage of existing gaps in the riparian corridors as far as practicable. Work in creek crossings will be carried out in periods of no flow where practicable.
- Design on site infrastructure to ensure water flows are not impounded or concentrated (e.g. culverts, diversion ditches, etc.).
- No equipment or materials will be stored across flow paths.
- The extent of the area required to carry out the permitted activity must be limited to the minimum area necessary to reasonably carry out the works.
- Waterway crossings will be designed in accordance with accepted development requirements for waterway barrier works wherever practicable to ensure fish passage is not impeded.
- Watercourse crossings must be designed to maintain flow and minimise the increase in flow volume or velocity.
- Constructed access tracks (e.g. culverts or splash-through crossings) must be provided with a scour apron and cut off wall on the downstream side sufficient to prevent bed erosion.

### **10.2.8 Hazardous Materials**

The following measures will be implemented to mitigate and manage impacts from accidental releases of hazardous substances:

- Hazardous chemicals will be stored within dedicated, bunded areas or within self-bunded containers away from watercourses and other sensitive receptors.
- Refuelling and the maintenance of machinery and equipment will be undertaken over hardstand areas with containment measures in place.
- Any accidental releases of hazardous materials will be reported within internal incident reporting systems so that these events can be reviewed, and corrective action taken as appropriate.
- Spill kits will be maintained onsite and located in proximity to chemical storage and handling areas; spill kit contents will be commensurate to the type and quantity of chemicals stored on-site.
- All recovered materials including affected soils, used absorbent pads and gravel, recovered liquids etc. are to be disposed of offsite at an appropriately licenced landfill facility.

### **10.2.9 Pests and Weeds**

The following measures will be implemented to mitigate and manage impacts from weeds and pest animals as much as practicable during the construction phase:

- A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures.
- Weed hygiene protocols will be implemented such as a dedicated vehicle and machinery cleaning bay at the main entrance to the site. This will not be placed near a watercourse.
- Restricted invasive plants present within the construction footprint will be treated prior to the commencement of works at that location.



- Onsite waste disposal (especially food waste) to discourage presence of pest fauna. Waste will be stored in covered bins/skips to prevent fauna access.
- Weeds will be identified during pre-clearing surveys, in particular, any large infestations within proposed disturbance areas. Clean and dirty zones should be demarcated on site to facilitate weed management.
- All vehicles, equipment and materials brought into site (such as gravel) will be certified as weed and disease free.
- Design weed washdown facilities at key access points and ensure that runoff is contained on site.
- Any herbicides used on site must be dispensed by an appropriately trained and qualified weed sprayer.

### **10.2.10 Bushfire Risk**

The following measures will be implemented to mitigate and manage impacts from bushfire risks as much as practicable during the construction phase:

- As part of the construction planning a certified Bushfire Management Plan will be prepared prior to construction and implemented during on-site activities. During the bushfire season, the fire danger status will be monitored daily through the Rural Fire Service website.
- For “hot-work” activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions.
- Vehicles may not idle or be parked in areas of long grass.
- Access tracks and fencelines will be used as firebreaks within the Project area and regularly maintained during construction and operation of the Project.
- Smoking will not be permitted on site.
- Fuel loads will be monitored and managed through activities such as controlled grazing, cool mosaic burns and weed management.

## **10.3 Operational Phase**

### **10.3.1 Vehicle Strike**

The following measures will be implemented to prevent species mortality through collision with vehicles during the operational phase:

- All vehicles associated with operational and maintenance activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks.
- All contractors will be educated on the presence of native fauna including threatened species and need to travel slowly and look out for fauna when driving. This training will form part of mandatory inductions.
- Vehicle traffic will be confined to designated roads and access tracks.
- All fauna encountered will be recorded in a central register by the Project Environment Manager. Any injured fauna will be reported as required in the Species Management Program that will be in place for the Project.



- Appropriate procedures for managing injured wildlife should be developed and included in the Project EMP.

### **10.3.2 Collision Risk**

The following measures will be implemented to mitigate and manage impacts from bird and bat collision risks as much as practicable during the operational phase:

- As part of the operational planning a certified Bird and Bat Management Plan (BBMP) will be prepared prior to the operation of the wind turbines. The BBMP will outline a monitoring program, identify if any threatened species are significantly impacted and define a strategy that manages and mitigates any significant impacts on these species.
- The availability of perches in the vicinity of turbines will be reduced.
- Lighting of turbines will be limited – it is the advice of a specialist aviation consultant that wind turbines associated with the Project do not require lighting.
- Use of onsite deterrents such as ultrasonic devices will be investigated.
- The presence of standing water in the vicinity of turbines will be minimised.
- Operational monitoring for the site utilisation of birds and bats will be undertaken and compared to baseline data. Triggers for adaptive management will be included. Annual bird and bat utilisation surveys will be undertaken in line with Project approval conditions as part of monitoring to assess whether the Project area continues to be used by species and assess any changes in abundance that may influence BBMP risk ratings.
- A regular carrion removal program will be implemented.

### **10.3.3 Noise and Light Emissions**

The following measures will be implemented to mitigate and manage impacts from noise and lighting as much as practicable during the operational phase:

- Night lighting will mainly be limited to that required for safety and security. Project lighting will be minimised (i.e. low luminance) as far as possible.
- Directional lighting should be away from environmentally sensitive areas.

### **10.3.4 Pests and Weeds**

The following measures will be implemented to mitigate and manage impacts from weeds and pest animals as much as practicable during the operational phase:

- All vehicles and plant will be washed and certified prior to arrival onsite.
- A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The pest management plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures.
- A pest animal monitoring program will be developed for the Project.
- Any herbicides used on site must be dispensed by an appropriately trained and qualified weed sprayer.



### 10.3.5 Bushfire Risk

The following measures will be implemented to mitigate and manage impacts from bushfire risks as much as practicable during the operational phase:

- A certified Bushfire Management Plan will be implemented during on-site activities. During the bushfire season, the fire danger status will be monitored daily through the Rural Fire Service website.
- For “hot-work” activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions.
- Vehicles may not idle or be parked in areas of long grass.
- Access tracks and fencelines will be used as firebreaks within the Project area and regularly maintained during construction and operation of the Project.
- Fuel loads will be monitored and managed through activities such as controlled grazing, cool mosaic burns and weed management.
- Smoking will not be permitted on site.

### 10.4 Rehabilitation

The following measures will be implemented to facilitate rehabilitation of the Project area:

- Areas required for construction which are no longer required for operation will be rehabilitated to pre-disturbance land use. This may include soil stabilisation, direct seeding, managing natural regeneration and weed management.
- It is anticipated that quite large areas required to be cleared for access tracks can be rehabilitated back down to a considerably narrower width for operational purposes. At any given location, the extent to which this might occur will depend on the nature of the earthworks.
- Hollow-bearing stags, woody debris, logs and rocks will be retained for use in rehabilitation.
- Where seeding and/or revegetation is required, plant species will be selected that are found in similar adjacent habitat on site. This may include use of an inert initial colonisation species to assist in groundcover and stabilisation.

### 10.5 Decommissioning

The following measures will be implemented to facilitate decommissioning of the Project area:

- Implement site planning and management requirements in accordance with a developed decommissioning and rehabilitation plan.
- Sequential rehabilitation will be practiced as soon as practicable following decommissioning activities.



## 11.0 Significant Impact Assessment

Significant impact assessments have been carried out for MNES that are known or considered likely to occur within the Project area and are (or could be) within the proposed Project footprint. A significant impact assessment has also been carried out for the WTWHA, given its proximity to the Project area and hence potential for indirect impacts on its features of outstanding universal value.

### 11.1 Wet Tropics World Heritage Area

An action is likely to have a significant impact on the World Heritage values of a declared World Heritage property if there is a real chance or possibility that it will cause:

- One or more of the World Heritage values to be lost;
- One or more of the World Heritage values to be degraded or damaged; or
- One or more of the World Heritage values to be notably altered, modified, obscured or diminished.

**Table 11.1 Significant Residual Impacts on the Wet Tropics World Heritage Area**

Significant Impact Criteria	Project Outcome
<i>Values associated with geology or landscape</i>	
Damage, modify, alter or obscure important geological formations in a World Heritage property	<b>Unlikely</b> The Project is located outside the Wet Tropics WHA and is not expected to damage, modify, alter or obscure geological formations within the WHA.
Damage, modify, alter or obscure landforms or landscape features, for example, by excavation or infilling of the land surface in a World Heritage property	<b>Unlikely</b> The Project is located outside the Wet Tropics WHA and will not involve any excavation or infilling within the WHA. The Project has undertaken a landscape and visual impact assessment which indicates that the Project is likely to be visible from the Misty Mountain hiking trail on Mount Major on a clear day. This is not considered likely to detract from the overall scenic amenity of the WHA.
Modify, alter or inhibit landscape processes, for example, by accelerating or increasing susceptibility to erosion, or stabilising mobile landforms such as sand dunes, in a World Heritage property	<b>Unlikely</b> The Project is located outside the Wet Tropics WHA and is not expected to modify, alter or inhibit landscape processes within the WHA
Divert, impound or channelise a river, wetland or other water body in a World Heritage property	<b>Unlikely</b> The Project is located outside the Wet Tropics WHA and will not involve the diversion, impoundment or channelising of any rivers, wetlands or water bodies.





Significant Impact Criteria	Project Outcome
Substantially increase concentrations of suspended sediment, nutrients, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in a World Heritage property	<p><b>Unlikely</b></p> <p>Drainage within the Project area is from east to west, i.e. away from the Wet Tropics WHA so indirect impacts to water resources within the WHA (e.g. due to sedimentation or temporary changes to flows) are not anticipated.</p>
<i>Biological and ecological values</i>	
Reduce the diversity or modify the composition of plant and animal species in all or part of a World Heritage property	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA and there is a minimum separation distance of 500m between the boundary of the WHA and the nearest Project infrastructure. The project has been designed such that access for the turbines nearest the WHA will come from west, avoiding the need for Project vehicles to utilise existing roads within the WHA. Significant residual impact assessments have been undertaken for all flora and fauna species known or considered likely to occur within the Project area (<b>Section 11.0</b>), some of which also occur within the WHA, and the Project is not considered likely to reduce the diversity of change the composition of these species.</p>
Fragment, isolate or substantially damage habitat important for the conservation of biological diversity in a World Heritage property	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA and there is a minimum separation distance of 500m between the boundary of the WHA and the nearest Project infrastructure. The project has been designed such that access for the turbines nearest the WHA will come from west, avoiding the need for Project vehicles to utilise existing roads within the WHA. Habitats within the Project area are generally quite different in composition to those within the WHA; there are very few patches of rainforest vegetation within the Project area and the Project has avoided all direct impacts to these.</p>
Cause a long-term reduction in rare, endemic or unique plant or animal populations or species in a World Heritage property	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA and there is a minimum separation distance of 500m between the boundary of the WHA and the nearest Project infrastructure. The project has been designed such that access for the turbines nearest the WHA will come from west, avoiding the need for Project vehicles to utilise existing roads within the WHA. Significant residual impact assessments have been undertaken for all flora and fauna species known or considered likely to occur within the Project area (<b>Section 11.0</b>), some of</p>



Significant Impact Criteria	Project Outcome
	which also occur within the WHA, and the Project is not considered likely to reduce the diversity of change the composition of these species.
Fragment, isolate or substantially damage habitat for rare, endemic or unique animal populations or species in a World Heritage property	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA and there is a minimum separation distance of 500m between the boundary of the WHA and the nearest Project infrastructure. The project has been designed such that access for the turbines nearest the WHA will come from west, avoiding the need for Project vehicles to utilise existing roads within the WHA. Habitats within the Project area are generally quite different in composition to those within the WHA; there are very few patches of rainforest vegetation within the Project area and the Project has avoided all direct impacts to these.</p>
<i>Wilderness, natural beauty or rare or unique environmental values</i>	
Involve construction of buildings, roads, or other structures, vegetation clearance, or other actions with substantial, long-term or permanent impacts on relevant values	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA. The Project has undertaken a landscape and visual impact assessment which indicates that the Project is likely to be visible from the Misty Mountain hiking trail on Mount Major on a clear day. This is not considered likely to detract from the overall scenic amenity of the WHA.</p>
Introduce noise, odours, pollutants or other intrusive elements with substantial, long-term or permanent impacts on relevant values	<p><b>Unlikely</b></p> <p>The Project is located outside the Wet Tropics WHA and there is a minimum separation distance of 500m between the boundary of the WHA and the nearest Project infrastructure. The project has been designed such that access for the turbines nearest the WHA will come from west, avoiding the need for Project vehicles to utilise existing roads within the WHA. The Project is not anticipated to introduce noise, odours, pollutants or other intrusive elements with substantial, long-term or permanent impacts on relevant values.</p>

## 11.2 *Prostanthera clotteniana*

### 11.2.1 Ecology, Habitat and Distribution

*Prostanthera clotteniana* was thought to be extinct prior to its rediscovery in 1999. It is a small shrub that grows to about 1 m high. Its leaves are opposite or occur in three-leaved whorls, with white, hairy branchlets (Bean, 2000). Leaves are 12-35 mm long and 4-9 mm wide. Flowers are two-lipped, about 17 mm long, and range in colour from pale lilac to purplish-pink (Bean, 2000).



*Prostanthera clotteniana* is a perennial shrub with very slow recruitment and establishment (4-10 years) due to the species being an obligate seed regenerator that can be severely impacted by fire within known localities, therefore making it susceptible to extinction if fire regimes fall outside its range of tolerance (DoE, 2015b). The species prefers sandstone, rhyolite or other acidic rocks that weather to coarse sandy soils (DoE, 2015b), with all recorded sites on the rhyolite of the Glen Gordon and Walsh Bluff volcanics. It occurs on stony hills, rocky outcrops and cliff faces among low eucalypt woodland with a shrubby understorey.

*Prostanthera clotteniana* is known only from North Queensland, in the Herberton-Dinden-Ravenshoe-Atherton area, with known locations and habitats straddling the Wet Tropics and Einasleigh Uplands bioregions. The species is thought to be isolated to a few hilltops near Ravenshoe and Mount Baldy, typically at elevations of 700-800 m above sea level (Conn and Wilson, 2015).

### 11.2.2 Important Populations

The species is known from only a few isolated sites in the Herberton-Dinden-Ravenshoe-Atherton area; therefore, every population of *Prostanthera clotteniana* is considered important (DoE 2015b).

### 11.2.3 Threats to the Species

Current known threats to *Prostanthera clotteniana* include fire regimes that fall outside their range of tolerance, habitat loss, illegal collection and weed invasion (DoE 2015b).

### 11.2.4 Distribution within the Project Area

Nine records of *Prostanthera clotteniana* were noted within the Project area, all within the vegetation community RE 7.12.65 (rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of *Acacia* spp. and/or *Lophostemon suaveolens* and/or *Allocasuarina littoralis* and/or *Eucalyptus lockyeri* subsp. *Exuta*) (see **Figure 6.2**). The records included:

- Eight sites within an area of approximately 130 ha on the Wooroora property, to the south of the existing powerline. These observations were within an altitude range of 780 – 790 m asl. These sites are in the vicinity of the proposed turbine 59 and internal access track. These observations are consistent with WildNET records;
- One site was to the north of the existing powerline on the Wooroora property, at an altitude of 790 m.

Project infrastructure has been relocated to avoid any direct disturbance to this species.

Areas of RE 7.12.65 that do not contain the species are considered potential habitat, but these areas are not considered to be habitat critical to the survival of the species, as they are considered to lack the niche characteristics that the species obviously requires.



## 11.2.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.2 Potential Construction Impacts and Proposed Mitigation – *P. clotteniana***

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	<p>The Project has been designed to avoid any direct disturbance to this species. No known populations of this species are proposed within the Project footprint.</p> <p>The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; all areas of this habitat within the Project footprint have been surveyed for potential presence of this species.</p>	<p>The Project footprint has been specifically designed to avoid all confirmed populations of the species.</p> <p>Pre-clearance surveys in areas of associated habitat will be undertaken prior to construction to confirm absence from the Project footprint. In the unlikely event that individuals are observed within the Project footprint, micro-siting and redesign actions will be explored in preference to impacting the species.</p>
Indirect impacts from trampling	<p>Trampling may occur if project construction related plant and equipment venture off designated access tracks and disturbance areas.</p>	<p>Delineation of areas of recorded <i>Prostanthera clotteniana</i> adjacent to the disturbance areas (including WTG59) to avoid inadvertent trampling.</p> <p>The Project's Vegetation Management Plan will ensure construction activities are carried out in a manner that avoids indirect impacts on any known populations of this species.</p>
Weed and pest incursion	<p>Weeds may be brought to or translocated across the site on project construction related plant and equipment.</p>	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p> <p>A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures</p>
Erosion and sedimentation	<p>Construction activities may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>An Erosion and Sediment Control Plan (ESCP) will be prepared prior to construction and implemented during on-site activities, to prevent soil loss from the disturbance areas.</p>



Potential Impact	Assessment	Proposed Mitigation
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

## 11.2.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.3 Potential Operational Impacts and Proposed Mitigation – *P. clotteniana***

Potential Impact	Assessment	Proposed Mitigation
Indirect impacts from trampling	Trampling may occur if project operational plant and equipment venture off designated access tracks and disturbance areas.	<p>Delineation of areas of recorded <i>Prostanthera clotteniana</i> adjacent to the disturbance areas (including WTG59) to avoid inadvertent trampling.</p> <p>The Project's Vegetation Management Plan will ensure operational activities are carried out in a manner that avoids indirect impacts on any known populations of this species.</p> <p>Operational staff will be under instruction to remain only within disturbed areas for the operational phase of the Project.</p>
Weed and pest incursion	Weeds may be brought to or translocated across the site on operational plant and equipment.	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p> <p>A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures</p>
Erosion and sedimentation	The Project may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>An Erosion and Sediment Control Plan (ESCP) will be prepared prior to operation and implemented during on-site activities, to prevent soil loss from the disturbance areas.</p>



Potential Impact	Assessment	Proposed Mitigation
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan. This may include measures to manage fuel loads in proximity to known populations of this species.

### 11.2.7 Assessment of Significant Residual Impacts

The Project is unlikely to have a significant residual impact on *Prostanthera clotteniana*. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.4**.

**Table 11.4 Significant Residual Impact on *Prostanthera clotteniana***

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of a population	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>P. clotteniana</i> .
Reduce the area of occupancy of the species	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no reduction in the area of occupancy of <i>P. clotteniana</i> .
Fragment an existing population into two or more populations	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>P. clotteniana</i> .
Adversely affect habitat critical to the survival of a species	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>P. clotteniana</i> . The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas).
Disrupt the breeding cycle of a population	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore



Significant Impact Criteria	Assessment
	there will be disruption to the breeding cycle of a population of <i>P. clotteniana</i> .
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>P. clotteniana</i>.</p> <p>The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas).</p> <p>The Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that <i>P. clotteniana</i> is likely to decline.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and the risk of invasive species will be managed through a Project-specific Weed and Pest Management Plan. This will include measures to ensure that the known locations of <i>P. clotteniana</i> are protected from invasive species.</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Disease is not a known threat for the species. The Project is not anticipated to increase the risk of disease impacting <i>P. clotteniana</i>.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>P. clotteniana</i>.</p> <p>The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas).</p> <p>The Project is not expected to interfere with the recovery of <i>P. clotteniana</i>.</p>

## 11.3 *Triplarina nitchaga*

### 11.3.1 Ecology, Habitat and Distribution

*Triplarina nitchaga* is a shrub that grows to about 2.5 m tall. It has grey scaly bark, thin pointed leaves that are 3.8-5.5 mm long, 1-1.5 mm wide with the widest part near the tip. Flowers are white and occur in clumps of two to three at each leaf axil (DEWHA, 2008a). Only two small populations of *Triplarina nitchaga* are known, both of which are near Ravenshoe, Queensland. One of these populations occurs on granite outcrops near Nitchaga Creek, in open



forest dominated by *Syncarpia glomulifera*, *Eucalyptus resinifera*, and *Leptospermum brachyandrum* (Bean, 1995). The other is located near Arthurs Seat, where it grows on a rhyolite hillside in open forest dominated by *Eucalyptus citriodora*, *E. acmenoides*, *E. abergiana*, *Homoranthus porteri*, and *Labichea nitida* (Bean, 1995).

### 11.3.2 Important Populations

The species is known from only a couple of isolated sites near Ravenshoe; therefore, every population of *Triplarina nitchaga* is considered important (DEWHA, 2008a).

### 11.3.3 Threats to the Species

The main potential threats to the species include fire regimes that fall outside their range of tolerance, habitat clearing and localised extinction due to small population size (DEWHA 2008a).

### 11.3.4 Distribution within the Project Area

Eight records of *Triplarina nitchaga* were noted within the Project area, all within the vegetation community RE 7.12.65 (rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of *Acacia* spp. and/or *Lophostemon suaveolens* and/or *Allocasuarina littoralis* and/or *Eucalyptus lockyeri* subsp. *Exuta*) in the northwest of the Glen Gordon property, in the area known as Arthur's Seat (see **Figure 6.2**). Arthur's Seat is one of two previously documented populations of the species (DEWHA 2008a). The species was recorded within an altitude range of 840 – 875 m asl. These observations are consistent with WildNET records.

Project infrastructure has been relocated to avoid any direct disturbance to this species, with the Project footprint located at least 1,000 m from the recorded observations.

### 11.3.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.5 Potential Construction Impacts and Proposed Mitigation – *T. nitchaga***

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	<p>The Project has been designed to avoid any direct disturbance to this species. No known populations of this species are proposed within the Project footprint.</p> <p>The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; all areas of this habitat within the Project footprint have been surveyed for potential presence of this species.</p>	<p>The Project footprint has been specifically designed to avoid all confirmed populations of the species.</p> <p>Pre-clearance surveys in areas of associated habitat will be undertaken prior to construction to confirm absence from the Project footprint. In the unlikely event that individuals are observed within the Project footprint, micro-siting and redesign actions will be explored in preference to impacting the species.</p>
Indirect impacts from trampling	<p>Trampling may occur if project construction related plant and equipment venture off designated</p>	<p>The known populations of this species are entirely avoided by, and beyond any area of influence associated with, the Project.</p>





Potential Impact	Assessment	Proposed Mitigation
	access tracks and disturbance areas.	The Project's Vegetation Management Plan will ensure construction activities are carried out in a manner that avoids indirect impacts on any known populations of this species.
Weed and pest incursion	Weeds may be brought to or translocated across the site on project construction related plant and equipment.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures
Erosion and sedimentation	Construction activities may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. An Erosion and Sediment Control Plan (ESCP) will be prepared prior to construction and implemented during on-site activities, to prevent soil loss from the disturbance areas. The known populations of this species are entirely avoided by, and beyond any area of potential erosion and sedimentation influence associated with, the Project.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.3.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.6 Potential Operational Impacts and Proposed Mitigation – *T. nitchaga***

Potential Impact	Assessment	Proposed Mitigation
Indirect impacts from trampling	Trampling may occur if project operational plant and equipment venture off designated access tracks and disturbance areas.	The known populations of this species are entirely avoided by, and beyond any area of influence associated with, the Project. The Project's Vegetation Management Plan will ensure operational activities are carried out in a



Potential Impact	Assessment	Proposed Mitigation
		<p>manner that avoids indirect impacts on any known populations of this species.</p> <p>Operational staff will be under instruction to remain only within disturbed areas for the operational phase of the Project.</p>
Weed and pest incursion	Weeds may be brought to or translocated across the site on operational plant and equipment.	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p> <p>A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures</p>
Erosion and sedimentation	The Project may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>An Erosion and Sediment Control Plan (ESCP) will be prepared prior to operation and implemented during on-site activities, to prevent soil loss from the disturbance areas.</p> <p>The known populations of this species are entirely avoided by, and beyond any area of potential erosion and sedimentation influence associated with, the Project.</p>
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan. This may include measures to manage fuel loads in proximity to known populations of this species.</p>

### 11.3.7 Assessment of Significant Residual Impacts

The Project is unlikely to have a significant residual impact on *Triplarina nitchaga*. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.7**.

**Table 11.7 Significant Residual Impact Assessment - *Triplarina nitchaga***



Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>T. nitichaga</i>.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no reduction in the area of occupancy of <i>T. nitichaga</i>.</p>
Fragment an existing important population into two or more populations	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>T. nitichaga</i>.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>T. nitichaga</i>. The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas).</p>
Disrupt the breeding cycle of an important population	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be disruption to the breeding cycle of a population of <i>T. nitichaga</i>.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>T. nitichaga</i>. The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas). The Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that <i>T. nitichaga</i> is likely to decline.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and the risk of invasive species will be managed through a Project-specific Weed and Pest Management Plan. This will include measures to ensure that the known locations of <i>T. nitichaga</i> are protected from invasive species.</p>



Significant Impact Criteria	Assessment
Introduce disease that may cause the species to decline	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Disease is not a known threat for the species. The Project is not anticipated to increase the risk of disease impacting <i>T. nitchaga</i> .
Interfere substantially with the recovery of the species	<b>Unlikely</b> The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>T. nitchaga</i> . The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas). The Project is not expected to interfere with the recovery of <i>T. nitchaga</i> .

## 11.4 *Homoranthus porteri*

### 11.4.1 Ecology, Habitat and Distribution

*Homoranthus porteri* is an erect shrub which grows to about 2 m tall. Its leaves are opposite, linear, about 1 mm long and 1.5 mm wide, with a pointed tip and short stalk, and become crowded near the end of branchlets (DEWHA, 2008b). Flowers typically occur in pairs at the ends of branchlets. The flowers are surrounded by red or creamy white bracteoles (floral bracts) which are about 7 mm long and have a protruding style about 15 mm long (DEWHA, 2008b).

*Homoranthus porteri* occurs on shallow soils underlain by a variety of rock types, typically in woodland or heath. It has been recorded on scree slopes, sandstone pavement, rock outcrops, rocky hillsides, and the edge of rocky escarpments. More recent surveys have suggested that the species favours exposed ridge topography (RPS, 2011).

*Homoranthus porteri* is known from the Mareeba and Herberton districts of north Queensland and is assumed to be restricted to an area from Mareeba southwards to Ravenshoe (DEWHA, 2008b).

### 11.4.2 Important Populations

Although anecdotal evidence suggests that *Homoranthus porteri* is 'common' throughout the wet tropics, given this is its only known distribution, all populations are considered important (DEWHA, 2008b).

### 11.4.3 Threats to the Species

Threats to this species are likely to include habitat loss and weed infestation; however, further research is needed to identify the threats to *Homoranthus porteri* (DEWHA 2008b).

### 11.4.4 Distribution within the Project Area

*Homoranthus porteri* was recorded 30 times during the various vegetation surveys across the Project area (see **Figure 6.2**), all within the vegetation community RE 7.12.65 (rock pavement or areas of skeletal soil on granite and



rhyolite of dry western or southern areas +/- shrublands to closed forests of *Acacia* spp. and/or *Lophostemon suaveolens* and/or *Allocasuarina littoralis* and/or *Eucalyptus lockyeri* subsp. *Exuta*) in the following locations:

- In the northwest of the Glen Gordon property, in the vicinity and to the east of Arthur's Seat, within an altitude range of 830 – 860 m asl (corresponding to the same broad area where *Triplarina nitchaga* was also observed, see above);
- On an adjacent ridgeline to the east of the above site, at an altitude of approximately 920 m asl. Extensive protected plants surveys were conducted along the ridgelines in this part of the Project area, with individuals occurring in discrete pockets on the rocky pavements;
- An area to the south of the existing powerline in the Wooroora property, corresponding to the area where *Prostanthera clotteniana* was also observed (see above). These observations are consistent with WildNET records; and
- One site to the north of powerline easement in Wooroora, also corresponding to a *Prostanthera clotteniana* observation.

Project infrastructure has been relocated to avoid any direct disturbance to this species.

#### 11.4.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.8 Potential Construction Impacts and Proposed Mitigation – *H. porteri***

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project has been designed to avoid any direct disturbance to this species. No known populations of this species are proposed within the Project footprint. The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; all areas of this habitat within the Project footprint have been surveyed for potential presence of this species.	The Project footprint has been specifically designed to avoid all confirmed populations of the species. Pre-clearance surveys in areas of associated habitat will be undertaken prior to construction to confirm absence from the Project footprint. In the unlikely event that individuals are observed within the Project footprint, micro-siting and redesign actions will be explored in preference to impacting the species.
Indirect impacts from trampling	Trampling may occur if project construction related plant and equipment venture off designated access tracks and disturbance areas.	The known populations of this species are entirely avoided by, and beyond any area of influence associated with, the Project. The Project's Vegetation Management Plan will ensure construction activities are carried out in a manner that avoids indirect impacts on any known populations of this species.
Weed and pest incursion	Weeds may be brought to or translocated across the site on project construction related plant and equipment.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise



Potential Impact	Assessment	Proposed Mitigation
		<p>the risk of the Project further exacerbating the issue.</p> <p>A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures</p>
Erosion and sedimentation	Construction activities may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>An Erosion and Sediment Control Plan (ESCP) will be prepared prior to construction and implemented during on-site activities, to prevent soil loss from the disturbance areas.</p> <p>The known populations of this species are entirely avoided by, and beyond any area of potential erosion and sedimentation influence associated with, the Project.</p>
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.</p>

#### 11.4.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.9 Potential Operational Impacts and Proposed Mitigation – *H. porteri***

Potential Impact	Assessment	Proposed Mitigation
Indirect impacts from trampling	Trampling may occur if project operational plant and equipment venture off designated access tracks and disturbance areas.	<p>The known populations of this species are entirely avoided by, and beyond any area of influence associated with, the Project.</p> <p>The Project's Vegetation Management Plan will ensure operational activities are carried out in a manner that avoids indirect impacts on any known populations of this species.</p> <p>Operational staff will be under instruction to remain only within disturbed areas for the operational phase of the Project.</p>
Weed and pest incursion	Weeds may be brought to or translocated across the site on operational plant and equipment.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise



Potential Impact	Assessment	Proposed Mitigation
		<p>the risk of the Project further exacerbating the issue.</p> <p>A Weed and Pest Management Plan will be developed for the Project with specific advice for key identified species. The plan will include management of weed spread, management of pest infestations, and monitoring effectiveness of control measures</p>
Erosion and sedimentation	The Project may alter surface water overland flow, leading to increased erosion of suitable habitat for this species.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>An Erosion and Sediment Control Plan (ESCP) will be prepared prior to operation and implemented during on-site activities, to prevent soil loss from the disturbance areas.</p> <p>The known populations of this species are entirely avoided by, and beyond any area of potential erosion and sedimentation influence associated with, the Project.</p>
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan. This may include measures to manage fuel loads in proximity to known populations of this species.</p>

#### 11.4.7 Assessment of Significant Residual Impacts

The Project is unlikely to have a significant residual impact on *Homoranthus porteri*. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.10**.

**Table 11.10 Significant Residual Impact Assessment – *Homoranthus porteri***

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>H. porteri</i>.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no reduction in the area of occupancy of <i>H. porteri</i>.</p>



Significant Impact Criteria	Assessment
Fragment an existing important population into two or more populations	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no long-term decrease in the size of a population of <i>H. porteri</i>.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>H. porteri</i>. The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas).</p>
Disrupt the breeding cycle of an important population	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be disruption to the breeding cycle of a population of <i>H. porteri</i>.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>H. porteri</i>. The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas). The Project is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that <i>H. porteri</i> is likely to decline.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and the risk of invasive species will be managed through a Project-specific Weed and Pest Management Plan. This will include measures to ensure that the known locations of <i>H. porteri</i> are protected from invasive species.</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Disease is not a known threat for the species. The Project is not anticipated to increase the risk of disease impacting <i>H. porteri</i>.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project has been designed to avoid all populations of the species. Potential indirect impacts will be managed appropriately and therefore there will be no impacts to habitat critical to the survival of <i>H. porteri</i>.</p>





Significant Impact Criteria	Assessment
	The Project may lead to the removal of 29.77 ha of associated RE 7.12.65; but this is not considered habitat that is critical to the survival of the species (it is confirmed absent from these areas). The Project is not expected to interfere with the recovery of <i>H. porteri</i> .

## 11.5 Koala

### 11.5.1 Ecology, Habitat and Distribution

The koala inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the genus *Eucalyptus*. It is limited to < 800 m asl (DSEWPC 2012c). Its diet is restricted mainly to *Eucalyptus* species; however, it may also consume *Corymbia*, *Angophora* and *Lophostemon* and at times may supplement its diet with *Leptospermum* and *Melaleuca* (TSSC 2012b).

The Project area occurs within the koala's coastal distribution, as detailed within the *EPBC Act referral guidelines for the vulnerable koala* (DoE, 2014) (the koala referral guidelines). Within the coastal context, the koala referral guidelines identify koala habitat as forest and woodland mostly dominated by *Eucalyptus* species (or those of related genera) and also those dominated by *Melaleuca* or *Casuarina* species (with emergent food trees). The ground-truthed vegetation within the Project area has the potential to provide koala habitat as defined by the koala referral guidelines.

Home range sizes are variable, with those in poorer habitats being larger than in higher quality habitats. Home ranges overlap although the species is generally solitary. During the breeding season males will attempt to establish dominance over the home ranges of a number of females, and on average, male koalas usually have larger home ranges than females (SPRAT 2021). Koalas generally do not move large distances under most conditions; however, longer movements through dispersing individuals (mostly young males) are reported, including movements of several kilometres over land with little vegetation (SPRAT 2021).

### 11.5.2 Important Populations

The koala referral guidelines do not identify important populations of koala due to insufficient information throughout the full range of the species. It is anticipated that the national recovery plan for koala (currently being developed) may contain information on delineating important populations of koala.

In the absence of a definition for important populations of the koala, the koala referral guidelines contain a koala habitat assessment tool to assist in the determination of the sensitivity, value and quality of land potentially impacted by an action.

### 11.5.3 Threats to the Species

Primary threats to koalas in the coastal context include:

- Loss, fragmentation and degradation of habitat, including dispersal habitat;
- Mortality due to vehicle strike, dog attack and disease; and
- High-intensity fire.



#### 11.5.4 Distribution with the Project Area

There are two historical records for koala within the Study area, both are greater than 5 km from the Project area. The species has not been recorded within the Project area and no evidence was observed during the field surveys. Nevertheless, suitable habitat is present within the Project area.

The koala referral guidelines and the associated koala habitat assessment tool were used to identify whether the Project area contains habitat critical to the survival of the koala. Impact areas that score five or more using the habitat assessment tool for the koala contain habitat *critical to the survival* of the koala; habitat that is important for the long-term survival and recovery of the species. Impact areas that score four or less using the koala habitat assessment tool are unlikely to contain habitat critical to the survival of the koala (DoE, 2014).

The koala habitat assessment for the Project area is presented in **Table 11.11**.

**Table 11.11 Koala habitat assessment**

Attribute	Score	Coastal Criteria	Project Area Score
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 2 years.	<b>0</b> The species has not been observed directly or indirectly within the Project area. The nearest sighting within the last 5 years is greater than 6 km from the Project footprint.
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.	
	0 (low)	None of the above.	
Vegetation composition	+2 (high)	Has forest or woodland with 2 or more known koala food trees species, OR 1 food tree species that alone accounts for > 50% of the vegetation in the relevant strata.	<b>+2</b> The majority of vegetation communities in the Project area are dominated by <i>Eucalyptus</i> and <i>Corymbia</i> species that are food trees for the koala.
	+1 (medium)	Has forest or woodland with 1 species of known koala food tree present.	
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape $\geq$ 500 ha.	<b>+2</b> The Project area is part of a highly connected landscape. It is connective with protected area estates to the north and to the east.
	+1 (medium)	Area is part of a contiguous landscape < 500 ha but $\geq$ 300 ha.	
	0 (low)	None of the above.	
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	<b>0</b> The Project area scores 0 for koala occurrence and camera trapping evidence has demonstrated that there is a particularly large threat associated with dingo populations within the Project area.
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at	



Attribute	Score	Coastal Criteria	Project Area Score
		present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and are likely to have some degree of dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, OR Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context.	<b>0</b> The Project area is not known to have an existing koala population and therefore does not support a genetically robust population, one that is free of disease, or one that is breeding. Koalas are historically scarce in the broader landscape and the Project area is not identified as an important location for the long-term survival and recovery of the species.
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context.	
<b>Total 4</b>			The Project area is unlikely to comprise habitat critical to the survival of the koala.

Given that the Project area scores a 4 under the koala habitat assessment tool, it is considered to only provide *potential* habitat for the koala (i.e. habitat that is not critical to the long-term survival and recovery of the species).

Potential koala habitat in the Project area has been categorised according to the RE and presence of foraging trees within that vegetation community as follows:

- Preferred potential habitat involves any eucalypt dominated RE in Land Zone 3 and more diverse, densely structured Eucalypt communities on ridgelines;
- Marginal potential habitat includes all other areas of vegetation (remnant and regrowth) that contain eucalypt species; and
- Unlikely habitat: includes rainforest patches.

It is estimated that there is 25,101 ha of potential habitat for the koala within the Project area. This consists of:

- Preferred potential habitat RE in 7.3.16, 7.3.19, 7.3.19a, 7.3.26, 7.3.42b, 7.3.43, 9.3.15, and 9.3.16; and



- Marginal preferred habitat RE in 7.12.21, 7.12.27a, 7.12.27c, 7.12.29, 7.12.29a, 7.12.30a, 7.12.34, 7.12.52, 7.12.57, 7.12.57a, 7.12.61, 7.12.61a, 7.12.65, 7.12.65, 7.12.65k, 7.12.66, 7.3.8, 7.8.10, 7.8.15a, 7.8.19, 7.8.7, 7.8.7a, 9.11.10, 9.12.17, 9.12.2, 9.12.4, 9.3.4, 9.5.17, 9.5.5a, 9.5.5c, 9.8.4.

Of this habitat, approximately 579 ha (or 2.3% of the total habitat within the Project area) is within the Project footprint.

## 11.5.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.12 Potential Construction Impacts and Proposed Mitigation – Koala**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 579 ha of potential habitat for the species; habitat that is not considered to be critical to the long-term survival and recovery of the species.	<p>Large areas of potential koala habitat throughout the Project area will be retained.</p> <p>Vegetation clearing will be minimised as much as practicable through micrositing within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of potential koala habitat will occur sequentially.</p>
Fragmentation (of populations and habitat)	The Project may lead to the clearing of 579 ha of potential habitat for the species; habitat that is not considered to be critical to the long-term survival and recovery of the species.	<p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas.</p> <p>Given the broad and generally linear nature of the Project footprint (narrow in the context of the broader retained vegetation), the Project is unlikely to lead to fragmentation impacts.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p> <p>Wild dog control will be undertaken – this will assist to reduce predation on koalas.</p>



Potential Impact	Assessment	Proposed Mitigation
Species mortality (vehicle collision, vegetation clearance)	The species is susceptible to vehicle strike; this risk may increase during the construction phase of the Project. During vegetation clearing, there is potential for direct mortality if koalas are present in the vegetation to be cleared.	Mitigation measures outlined in <b>Section 10</b> will reduce risks associated with increased vehicle presence on site. Any clearing would take place in a way to allow koalas (if present) to move into adjacent areas of retained vegetation. This will include allowing escape paths to retained vegetation to be maintained. If koalas are encountered they are to be left in-situ, works are to stop in the area, and the Project personnel must wait for the animal to move to retained habitat. Sequential clearing methods will be followed.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the koala.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Bushfire risk		
Noise and lighting		
Reduced air quality		

## 11.5.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.13 Potential Operational Impacts and Proposed Mitigation – Koala**

Potential Impact	Assessment	Proposed Mitigation
Species mortality (vehicle collision)	Increased traffic around the Project area has the potential to kill or injure fauna on impact although traffic levels will be greatly reduced during operations compared to the construction phase and more geared towards light or medium vehicles.	Mitigation measures outlined in <b>Section 10</b> will reduce risks associated with increased vehicle presence on site.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.



Potential Impact	Assessment	Proposed Mitigation
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Wild dog control will be undertaken – this will assist to reduce predation on koalas.

### 11.5.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impact on the koala. The significance assessment is provided in **Table 11.14**, noting that no important populations of the species are defined by the koala referral guidelines.

**Table 11.14 Significant Residual Impact Assessment – Koala**

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>No koalas are known to be present within the Project area. Historic records occur more than 5 km from the Project footprint and are rare. The landowners of Glen Gordon and Wooroorra have not seen koalas on their properties. Koalas were also not recorded during Project field surveys, either directly or indirectly.</p> <p>The Project area is not considered to be habitat critical to the survival of the species. The Project may lead to the clearing of 579 ha of potential habitat for the species; habitat that is not considered to be critical to the long-term survival and recovery of the species.</p> <p>Therefore, the Project is unlikely to (a) lead to a long-term decrease in the size of an important population of the koala, (b) reduce the area of occupancy of an important population of the koala, or (c) fragment an existing important population into two or more populations.</p>
Reduce the area of occupancy of an important population	
Fragment an existing important population into two or more populations	
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>The Project area is not considered to be habitat critical to the survival of the species; it scores a 4 out of 10 within the koala referral guidelines' habitat assessment tool. The Project may lead to the clearing of 579 ha of potential habitat for the species; habitat that is not considered to be critical to the long-term survival and recovery of the species.</p>
Disrupt the breeding cycle of an important population	<p><b>Unlikely</b></p> <p>Female koalas have the potential to produce one offspring each year, with births occurring between October and May (McLean 2003). The Project activities are not expected to disrupt the breeding cycle of a population of koalas. Habitat areas and movement corridors will be retained in the Project area; these can be utilised for breeding by the species should it ever be present in the Project area.</p>



Significant Impact Criteria	Assessment
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>No koalas are known to be present within the Project area. Historic records occur more than 5 km from the Project footprint and are rare. The landowners of Glen Gordon and Wooroora have not seen koalas on their properties. Koalas were also not recorded during Project field surveys, either directly or indirectly.</p> <p>The Project area is not considered to be habitat critical to the survival of the species. The Project may lead to the clearing of 579 ha of potential habitat for the species; habitat that is not considered to be critical to the long-term survival and recovery of the species.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on observation of tracks and scats in the field, as well as numerous individuals recorded on remote cameras, wild dogs are abundant in the Project area. There is potential for the Project to increase the existing impact of wild dogs on the species, either through attracting more individual dogs or facilitating their ability to attack koalas through habitat clearance. Mitigation measures such as disposing of rubbish appropriately, controlling wild dog populations and monitoring clearing activities will reduce this risk.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the potential koala habitat.</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>The most well-known disease present in the koala population is associated with particular strains of Chlamydia. Koala Retrovirus was recently identified and is thought to be responsible for a range of conditions, including leukaemia and an immunodeficiency syndrome (DSEWPC, 2012). The Project is not likely to directly result in an increase in Chlamydia in koalas. This is a broader issue for the population.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>DSEWPC (2012) identifies a number of recovery and conservation objectives through the Approved Conservation Advice. The Project will not interfere substantially with any of these objectives.</p>



## 11.6 Greater Glider

### 11.6.1 Ecology, Habitat and Distribution

The northern greater glider (*Petauroides volans minor*) is an arboreal nocturnal marsupial that is largely restricted to eucalypt forests and woodlands. It is known to favour forests with a diversity of eucalypt species due to seasonal variation in its preferred tree species. It is primarily folivorous, with a diet mostly comprising eucalypt leaves and occasionally flowers. It is typically found in higher abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (TSSC 2016c). The species distribution may be patchy even in suitable habitat. Modelling has shown they require native forest patches of at least 160 km<sup>2</sup> to maintain viable populations (TSSC 2016c).

The species has an elevation range from sea level to 1200 m asl.

### 11.6.2 Important Populations

DAWE does not specify what constitutes an important population for northern greater glider. The Significant Impact Guidelines (DoE 2013) define an important population of a vulnerable species as populations that are:

- Key source populations either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.

The species occurs from Victoria north to the Atherton tableland. The north Queensland population, including that within the Project area, is considered a separate subspecies, *Petauroides volans minor*. As the population within the Project area is near the northern limit of the species' range and provides connectivity between the Yourka nature reserve to the south (a known greater glider site) and a number of protected areas to the east and north, it is likely to be considered an important population.

### 11.6.3 Threats to the Species

The main threats to northern greater glider are habitat loss and fragmentation (TSSC 2016c). The species has limited ability to disperse through cleared areas, with a maximum known gliding distance of approximately 100 m (DELWP 2019). It is also thought to be prone to intense or frequent bushfires, as these threaten the large hollow-bearing trees that the species relies on for denning.

There is no recovery or threat abatement plan in place for this species. The Commonwealth's Approved Conservation Advice for Greater Glider (TSSC 2016c) lists the following priority conservation actions:

- Reduce the frequency and intensity of prescribed burns;
- Identify appropriate levels of patch retention, habitat tree retention and logging rotation in hardwood production; and
- Protect and retain hollow-bearing trees, suitable habitat and habitat connectivity.





#### 11.6.4 Distribution within the Project Area

The Project area provides suitable foraging and nesting habitat in the lower-lying and riparian areas which support larger trees with abundant hollows. The vegetation communities on the ridgelines are largely the same as those mapped over the lower-lying areas, but in many cases the vegetation condition on the ridgelines is considered less favourable for greater gliders (thin soils, less water availability, shorter trees with fewer hollows) as demonstrated by LiDAR analysis. Riparian habitats are represented as narrow communities primarily consisting of eucalypt woodlands on alluvium (corresponding to REs 9.3.16, 9.3.15, 7.3.26 and 7.3.43). They typically consist of forest red gum (*E. tereticornis*) with sub-dominant river she-oak (*Casuarina cunninghamiana*) and/or poplar gum (*E. platyphylla*). These areas represent preferred habitats for species that nest or den in large hollows, such as greater glider.

Northern greater gliders were observed on both properties during the nocturnal spotlighting surveys. In January 2021, 25 adult gliders were observed over a duration of 28 person-hours of spotlighting (on foot and vehicle transects). In March 2021, a further 14 gliders were observed over a duration of 40 person-hours of spotlighting, primarily on foot. MacHunter *et al.* (2011) defined a large population as more than 10 individuals per km of spotlighting transect, or more than 2 per hectare or more than 15 per hour of spotlighting. Consequently, the population within the Project area (less than 1 per hour of spotlighting) would not be considered 'large'. Surveys to date have focused on lower-lying parts of the Project area as ridgelines were difficult to safely access at night during the wet season. These lower-lying areas support the tallest trees with the highest abundance of hollows and would be expected to have the highest abundance of greater gliders. Additional greater glider surveys proposed for June/July 2021 will focus on the ridgelines to confirm the findings of the LiDAR analysis.

#### 11.6.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.15 Potential Construction Impacts and Proposed Mitigation – Greater glider**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 56.59 ha of habitat critical to the survival of the species and 563.27 ha of potential habitat for the species.	Large areas of critical and potential greater glider habitat throughout the Project area will be retained. Design has sought to avoid and minimise clearing within the riparian locations and areas of larger trees (and likely more suitable hollows). If practical during construction, micro-siting of access tracks will seek to avoid large hollow-bearing trees. Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint. Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential habitat. Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.



Potential Impact	Assessment	Proposed Mitigation
		<p>Clearing of greater glider habitat will occur sequentially and in accordance with an approved Species Management Program. Impacts to critical habitat are generally restricted to access track and overhead transmission line crossings of riparian environments; the turbines and hardstands are located primarily on elevated ridgelines where there is less suitable habitat for the species. Unavoidable impacts to denning trees will be mitigated through installation of nest boxes within retained habitat on a 1:1 basis.</p>
<p>Fragmentation (of populations and habitat)</p>	<p>The Project may lead to the clearing of 56.59 ha of habitat critical to the survival of the species and 563.27 ha of potential habitat for the species. Whilst there are significant areas of critical and potential habitat retained within the Project area, it is noted that a 55 m wide road can act as a barrier movement for greater gliders between forest patches.</p>	<p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas. Project design has sought to minimise the width of access tracks in areas of potential and critical greater glider habitat. In locations where the width of linear infrastructure exceeds 50 m, crossing infrastructure such as rope bridges, poles, etc. will be installed. Crossing infrastructure design will consider the most appropriate locations for installation and will consider any relevant literature and experience on other projects. This measure will be important to deal with potential impacts associated with fragmentation of habitat. Targeted revegetation of parts of the Project footprint not required for operation will occur using species likely to form large hollows suitable for the greater glider.</p>
<p>Weed and pest incursion</p>	<p>The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.</p>	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Wild dog control will be undertaken – this will assist to reduce predation on greater gliders.</p>



Potential Impact	Assessment	Proposed Mitigation
Species mortality (vehicle collision, vegetation clearance)	During vegetation clearing, there is potential for direct mortality if greater gliders are present (i.e. denning in the hollow-bearing trees to be cleared). The risk of vehicle strike is negligible.	Clearing of habitat could potentially result in significant injury or death to individual greater gliders, however clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of habitat trees overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring greater gliders are detected providing procedures are followed and spotters are allowed ample opportunity to check trees before felling. Hollow-bearing trees will be marked and hollows inspected where possible for the presence of arboreal fauna prior to tree-felling. Clearing protocols will be developed including methods for clearing hollow-bearing trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured gliders will be taken to a vet for treatment.  Where practicable, dead standing timber and living, hollow-bearing trees should be retained. The use of barbed wire as the top strand of fences will be avoided if practical.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the greater glider.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and lighting		
Reduced air quality		
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.6.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.16 Potential Operational Impacts and Proposed Mitigation – Greater glider**

Potential Impact	Assessment	Proposed Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan



Potential Impact	Assessment	Proposed Mitigation
	maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Wild dog control will be undertaken – this will assist to reduce predation on greater gliders.

### 11.6.7 Assessment of Significant Residual Impacts

The Project is assessed as having a potential significant residual impact on the greater glider. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.17**.

**Table 11.17 Significant Residual Impact Assessment – Greater Glider**

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>As the Project area is located in proximity to the northern extent of the species' range, it is considered that any population of greater glider within the Project area is part of an important population. The Project area contains a mixture of potential and critical habitat for the species.</p> <p>Northern greater gliders were observed on both properties during the nocturnal spotlighting surveys. In January 2021, 25 adult gliders were observed over a duration of 28 person-hours of spotlighting (on foot and vehicle transects). In March 2021, a further 14 gliders were observed over a duration of 40 person-hours of spotlighting, primarily on foot. The existing population of the species within the Project area is not considered to be a "large" population (MacHunter <i>et al.</i> (2011)).</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area's greater glider population.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p>



Significant Impact Criteria	Assessment
	<p>The proposed habitat removal associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the greater glider population's area of occupancy.</p>
<p>Fragment an existing important population into two or more populations</p>	<p><b>Unlikely</b></p> <p>As the Project area is located in proximity to the northern extent of the species' range, it is considered that any population of greater glider within the Project area is part of an important population.</p> <p>The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area.</p> <p>Risks of fragmentation are likely to be highest where access roads and overhead transmission line infrastructure crosses areas of critical habitat. Although greater gliders have been observed gliding for lengths between 75-100 m, Taylor and Goldingay (2009) state that a 55 m wide road can act as a barrier to movement for greater gliders between forest patches. Conservatively, 50 m is therefore taken as a distance at which achievable gliding distance may be compromised by Project design.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing important population into two or more populations.</p> <p>Large tracts of greater glider habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors will support the species and provide connectivity.</p> <p>Rehabilitation activities will also aim to restore woodland habitats that will provide greater glider foraging habitats over short to medium term, and denning habitat in longer term. The Project is not expected to fragment an existing population into two or more populations.</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p><b>Likely</b></p> <p>The Project will involve the removal of 563.27ha of potential habitat and 56.59ha of critical habitat for the greater glider.</p> <p>Despite the extent of habitat remaining in the locality, coupled with the implementation of the proposed mitigation measures, the removal of approximately 56.59ha of critical habitat is considered likely to constitute a significant impact to the species.</p>
<p>Disrupt the breeding cycle of an important population</p>	<p><b>Unlikely</b></p> <p>Females give birth to a single young from March to June (TSSC 2016). Their relatively low reproductive rate may render isolated populations in small remnants prone to extinction (TSSC 2016). To avoid and minimise impacts on greater glider breeding habitat and young, fauna spotter catchers will be present prior to and during clearing to check for the presence of the species and hollow-bearing trees. When hollow-bearing trees are cleared procedures will be put in place to</p>



Significant Impact Criteria	Assessment
	<p>minimise impacts to the species. Procedures will then be put in place to ensure impacts are minimised through retaining the hollow-bearing trees for another 24-48 hours while adjacent trees are cleared to allow species to vacate the hollows overnight. These measures will be outlined in a SMP. All identified suitable greater glider hollows will be replaced on a 1:1 basis with suitable nest boxes for the species based on current best practice, or salvaged hollows from the cleared area. The Project is not expected to disrupt the breeding cycle of an important population.</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area. Nevertheless, the Project will involve the removal of 563.27ha of potential habitat and 56.59ha of critical habitat for the greater glider.</p> <p>Large tracts of greater glider habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors will support the species and provide connectivity. Rehabilitation activities will also aim to restore woodland habitats that will provide greater glider foraging habitats over short to medium term, and denning habitat in longer term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species. There may be a minor local impact to the species that is attributable to the Project, but this is not expected to result in a broader regional decline.</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the greater glider habitat.</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the greater glider. It is not expected that the Project will introduce disease that may cause the species to decline.</p>



Significant Impact Criteria	Assessment
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project is not expected to interfere substantially with the recovery of the species. Clearing of habitat will be undertaken sequentially, and large areas of potential and critical habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any greater glider within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and hollow-bearing trees protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors, will support the species and provide connectivity and maintain gene flow for the species.</p>

## 11.7 Yellow-bellied Glider

### 11.7.1 Ecology, Habitat and Distribution

The yellow-bellied glider (Wet Tropics) is a nocturnal gliding marsupial which is largely restricted to a narrow band of wet eucalypt open forest (also called wet sclerophyll forest) adjacent to rainforest on the western fringe of the Wet Tropics WHA. It is typically found at altitudes above 700 m altitude (SPRAT 2021). The species has known RE associations which include 7.8.15ab, 7.8.16ab, 7.12.21ab, 7.12.22abde and 7.12.27b. These wet eucalypt open forests are typically dominated by *Eucalyptus grandis* (a preferred den tree) and *E. resinifera* (a preferred feeding tree); the presence of these two trees is essential. The northern Queensland population of yellow-bellied glider is dependent on a single tree species for feeding, *E. resinifera* (Jessup et al, 2020).

The known distribution of the yellow-bellied glider (Wet Tropics) is from west of Cardwell to north of Cairns, in the Wet Tropics Bioregion of Queensland. There are three known major sub-populations:

- The Cardwell Range – Herberton Range subpopulation;
- The Mount Carbine Tablelands subpopulation; and
- The Mount Windsor Tableland subpopulation.

The Project site overlaps the Cardwell Range – Herberton Range subpopulation. This subpopulation has a narrow linear distribution 120 km long, rarely wider than 2 km, and is expected to be naturally fragmented due to habitat discontinuities e.g. the Mt Baldy population at the northern end and other breaks further south. In addition, habitat clearance has increased the fragmentation of this subpopulation through the creation of two major breaks around Ravenshoe, the 'Evelyn Gap' and the 'Butchers Creek Gap'. These gaps isolate gliders in the Tumoulin area from those in the Herberton Range to the north and those in the Cardwell Range to the south of Ravenshoe (TSSC 2020a).



## 11.7.2 Important Populations

There is currently no recovery plan for the yellow-bellied glider (Wet Tropics) and no important populations have been identified. In the absence of important populations being identified in a recovery plan, an important population may include:

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

Past studies (Goldingay & Possingham, 1995) suggest that for a population to remain viable, there must be a minimum of 150 family units. Given only one confirmed observation of a yellow-bellied glider during the field surveys (for a survey effort of 68 person hours), and the very limited extent of habitat within the Project area, it is considered highly unlikely that the Project area supports an important population of yellow-bellied glider.

## 11.7.3 Threats to the Species

Threats to the yellow-bellied glider (Wet Tropics) include habitat loss, inappropriate fire regimes, habitat change due to livestock, entanglement in barbed wire and feral cat predation (TSSC 2020a).

## 11.7.4 Distribution within the Project Area

One yellow-bellied glider (Wet Tropics) was heard during spotlighting in March 2021, in a small patch of simple notophyll vine forest (RE 7.12.16a) surrounded by *Eucalyptus grandis* open forest (RE 7.12.21) in the very north of the Woorooro property. This observation was within the Wet Tropics WHA and nearly 2 km from the nearest proposed Project infrastructure. This is consistent with previous records of yellow-bellied glider (Wet Tropics) from Wildnet. The other Wildnet records for this species were to the east of the Project area, within the Wet Tropics WHA.

## 11.7.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.18 Potential Construction Impacts and Proposed Mitigation – Yellow-bellied Glider**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project will not lead to the clearing of any critical or potential habitat for the species.	Only minimal areas of habitat critical to the survival of the yellow-bellied glider have been mapped within the Project area. Project infrastructure has been sited to avoid clearing any of this habitat.
Fragmentation (of populations and habitat)	The Project will not lead to the clearing of any critical or potential habitat for the species.	Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce





Potential Impact	Assessment	Proposed Mitigation
		disturbance to surrounding habitat and conservation areas.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Wild dog control will be undertaken – this will assist to reduce predation on yellow-bellied gliders.
Species mortality (vehicle collision, vegetation clearance)	The Project will not lead to the clearing of any critical or potential habitat for the species therefore direct mortality during clearing is not expected. The risk of vehicle strike is negligible.	Clearing of habitat could potentially result in significant injury or death to individual yellow-bellied gliders, however no clearing of critical habitat is proposed. Generally, clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of habitat trees overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring yellow-bellied gliders are detected providing procedures are followed and spotters are allowed ample opportunity to check trees before felling. Hollow-bearing trees will be marked and hollows inspected where possible for the presence of arboreal fauna prior to tree-felling. Clearing protocols will be developed including methods for clearing hollow-bearing trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured gliders will be taken to a vet for treatment. Where practicable, dead standing timber and living, hollow-bearing trees should be retained. The use of barbed wire as the top strand of fences will be avoided if practical.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the yellow-bellied glider.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and lighting		
Reduced air quality		
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



Potential Impact	Assessment	Proposed Mitigation
	risk of high intensity bushfires in the Project area.	Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.7.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.19 Potential Operational Impacts and Proposed Mitigation – Yellow-bellied Glider**

Potential Impact	Assessment	Proposed Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Wild dog control will be undertaken – this will assist to reduce predation on yellow-bellied gliders.

### 11.7.7 Assessment of Significant Residual Impacts

The Project is unlikely to have a significant residual impact on yellow-bellied glider. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.20**.

**Table 11.20 Significant Residual Impact – Yellow-bellied Glider**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of a population	<b>Unlikely</b> There is minimal critical habitat for yellow-bellied glider within the Project area and no clearing of this habitat is proposed. Only one observation of a yellow-bellied glider was recorded for a survey effort of 68 person-hours of spotlighting; this observation was



Significant Impact Criteria	Project Outcome
	<p>on the boundary between the Project area and the Wet Tropics WHA (which represents a stronghold for the species).</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area's yellow-bellied population.</p>
Reduce the area of occupancy of the species	<p><b>Unlikely</b></p> <p>Project infrastructure has been sited to avoid any clearing of habitat critical to the survival of the yellow-bellied glider.</p>
Fragment an existing population into two or more populations	<p><b>Unlikely</b></p> <p>Project infrastructure has been sited to avoid any clearing of habitat critical to the survival of the yellow-bellied glider, thereby avoiding fragmentation of the species' population.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Likely</b></p> <p>The Project will not involve the removal of any critical habitat for the yellow-bellied glider.</p>
Disrupt the breeding cycle of a population	<p><b>Unlikely</b></p> <p>Yellow-bellied gliders preferentially den in <i>Eucalyptus grandis</i>-dominated forests. The Project has been designed to avoid clearing any of this habitat. To further minimise the risk of impacts on yellow-bellied glider breeding habitat and young, fauna spotter catchers will be present prior to and during clearing to check for the presence of the species and hollow-bearing trees. When hollow-bearing trees are cleared procedures will be put in place to minimise impacts to the species. Procedures will then be put in place to ensure impacts are minimised through retaining the hollow-bearing trees for another 24-48 hours while adjacent trees are cleared to allow species to vacate the hollows overnight. These measures will be outlined in a SMP. All identified suitable yellow-bellied glider hollows will be replaced on a 1:1 basis with suitable nest boxes for the species based on current best practice, or salvaged hollows from the cleared area. The Project is not expected to disrupt the breeding cycle of an important population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project will not involve the removal of any critical habitat for the yellow-bellied glider.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the	<p><b>Unlikely</b></p>



Significant Impact Criteria	Project Outcome
critically endangered or endangered species' habitat	<p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>No clearing is proposed within critical habitat for yellow-bellied glider. Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the yellow-bellied glider habitat.</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the yellow-bellied glider. It is not expected that the Project will introduce disease that may cause the species to decline.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project is not expected to interfere substantially with the recovery of the species. No clearing of critical habitat is proposed, and any yellow-bellied glider within the Project area will continue to have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and hollow-bearing trees protected.</p>

## 11.8 Northern Quoll

### 11.8.1 Ecology, Habitat and Distribution

The northern quoll is a nocturnal, carnivorous marsupial. It is sedentary with a home range of approximately 35 ha. The northern quoll has been in gradual decline for the last 50 years, more recently exacerbated and accelerated by the introduction of cane toads (DoE 2016).

The northern quoll occurs in four regional populations across Queensland, the Northern Territory and Western Australia. In Queensland, the species' habitat occurs from the southeast to the Gulf of Carpentaria (DoE 2016); the Project area falls within this range.

The northern quoll occupies a variety of habitats including rocky areas, eucalypt forest and woodlands, dry rainforests and vine thickets, sandy lowlands and beaches, shrublands, grasslands and deserts. Habitat usually includes some form of rocky area or structurally diverse woodland or forest used for shelter purposes with surrounding vegetated habitats used for foraging and dispersal. Shelter habitat is important for breeding and refuge from fire / predation (DoE 2016). The National Recovery Plan for the Northern Quoll (Hill and Ward, 2010) identifies that shelter sites are non-specific, and can include rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings.

Little is known about the characteristics of foraging or dispersal habitat for the northern quoll. Based on current knowledge, foraging or dispersal habitat is considered to be any land comprising predominantly native vegetation



within 1 km of shelter habitat, quoll records or land comprising predominantly native vegetation that is connected to shelter habitat within the range of the species (DoE 2016).

The EPBC Act referral guideline for the endangered northern quoll (DoE 2016) notes that habitat critical to the survival of the northern quoll is habitat within the modelled distribution of the species which provides shelter for breeding, refuge from fire or predation and potential poisoning from cane toads. Habitat critical to the survival of the species usually occurs in the form of:

- Offshore islands where the northern quoll is known to exist;
- Rocky habitats such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines or treed creek lines; or
- Structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs.

Dispersal and foraging habitat associated with connecting populations important for the long-term survival of the northern quoll is also considered habitat critical to the survival of the species.

The National Recovery Plan for the Northern Quoll (Hill and Ward, 2010) confirms that rocky areas provide prime habitat for northern quolls. Declines in Queensland have mainly been in lowland and flatter (less rugged) areas. Rocky areas retain water and have a diversity of microhabitats, so support high floristic diversity and productivity, and thus greater prey density and/or diversity compared to non-rocky adjacent country. In addition, cats forage less effectively in rocky areas. Their topographic complexity may serve to ameliorate fire impacts and they are typically not used for livestock production. Recent surveys throughout Queensland have suggested the species is more likely to be present in high relief areas that have shallower soils, greater cover of boulders, less fire impact and are closer to permanent water (TSSC 2005, SPRAT 2021).

### **11.8.2 Important Populations**

The EPBC Act referral guideline for the endangered northern quoll (DoE 2016) defines populations important for the long-term survival of the northern quoll as:

- High density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present;
- Populations occurring in habitat that is free of cane toads and unlikely to support cane toads on arrival, e.g. populations surrounded by desert without permanent water; and
- Populations subject to ongoing conservation or research actions, i.e. populations being monitored by government agencies or universities or subject to reintroductions or translocation.

A high density population may be characterised by numerous camera triggers of multiple individuals across multiple cameras and/or traps on the site. A low density population may be characterised by infrequent captures of one or two individuals confined to one or two traps or where no trapping has identified a northern quoll but latrine evidence remains. Detailed population modelling is not needed to make this assessment.

### **11.8.3 Threats to the Species**

The National Recovery Plan for the Northern Quoll (Hill and Ward, 2010) identifies the spread of cane toads as the greatest current threat to northern quoll populations on a national scale, with declines in the absence of cane toads likely attributed to inappropriate fire regimes, habitat clearing, habitat degradation through over-grazing, and predation by feral and domestic animals. Predators include dingos, dogs, feral cats, owls, snakes and kites (DES 2021).



In relation to loss of habitat, quolls are considered likely to disappear from areas where less than 50-70% woodland remains within a 4 km radius (DES 2021, Hill and Ward 2010)

There is research that indicates that higher quoll numbers and high quality habitat may result in learned aversion traits which likely contribute to northern quoll persistence in cane toad affected areas (DoE 2016).

#### 11.8.4 Distribution within the Project Area

There are no known records of the species within the Project area. There are two records of the species dating from 2010 in the northwest of the Study area, near Mount Garnet (approximately 7.75 km from the Project area), as well as much older records from Ravenshoe (dating from 1921 and approximately 11.9 km to the north of the Project area) and Tully Falls National Park (dating from 1922 and approximately 2.6 km east of the Project area), also both within the Study area.

The presence of northern quoll within the Project area has not been confirmed. Extensive camera trapping effort (1,953 camera trap nights) failed to record a single image of the northern quoll and no latrines were observed during habitat assessments. Large boulder habitat is generally absent from the Project area, with rocky habitat typically comprising smaller rocks on scree slopes or flat areas of exposed bedrock. However, there are open eucalypt woodlands which provide potential foraging and dispersal habitat.

In the absence of a confirmed population of northern quoll, no habitat critical to the survival of the species has been mapped within the Project area. *Potential* habitat has been mapped as follows:

- Potential shelter habitat – areas of rocky relief as identified through the analysis of LiDAR (see Section 4.4); and
- Potential foraging and dispersal habitat – eucalypt woodland within 1 km of potential shelter habitat and gullies connecting potential shelter habitat.

#### 11.8.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.21 Potential Construction Impacts and Proposed Mitigation – Northern Quoll**

Potential Impact	Assessment	Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 2.62 ha of potential shelter habitat and 384.42 ha of potential foraging and dispersal habitat for the species.	Large areas of potential quoll habitat throughout the Project area will be retained. Design has sought to avoid and minimise clearing within mapped areas of rocky relief which are more likely to support dens in the preferred form of boulder piles as well as adjacent foraging and dispersal habitat. If practical during construction, micrositing of access tracks will seek to avoid boulder piles and large hollow-bearing trees that could support dens. Vegetation clearing will be minimised as much as practicable through micrositing within the proposed Project footprint. Project infrastructure including laydown areas, construction compounds and substation have been



Potential Impact	Assessment	Mitigation
		<p>sited in cleared areas where practicable to avoid clearing of potential quoll habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of potential quoll habitat will occur sequentially and in accordance with an approved Species Management Program.</p> <p>Impacts to potential shelter habitat are generally restricted to the turbines and associated hardstands; the overhead transmission line and other support infrastructure are located where there is less suitable habitat for the species.</p> <p>Unavoidable impacts to potential den sites will be mitigated through relocation of the den sites (particularly hollow logs and stags) into adjacent undisturbed habitat where practicable under the supervision of an appropriately trained fauna spotter catcher.</p>
Fragmentation (of populations and habitat)	The Project may lead to the clearing of 2.62 ha of potential shelter habitat and 384.42 ha of potential foraging and dispersal habitat for the species.	<p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas.</p> <p>Project design has sought to minimise the width of access tracks in areas of potential northern quoll habitat.</p> <p>Construction personnel will be educated on the potential presence of northern quoll. Off-track driving will not be permitted and reduced speed limits will be enforced in areas of potential quoll habitat, with appropriate signage on site.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	<p>The Project area is currently subjected to existing weed and pest impacts, with cane toads and feral cats both prevalent on site. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue (as described in <b>Section 10.0</b>).</p> <p>Feral cat control will be undertaken – this will assist to reduce predation on northern quoll.</p>



Potential Impact	Assessment	Mitigation
Species mortality (vehicle collision, vegetation clearance)	During vegetation clearing, there is potential for direct mortality if northern quolls are present (i.e. denning in the hollow-bearing trees to be cleared). There is also a risk of vehicle strike during construction.	<p>Clearing of habitat could potentially result in significant injury or death to individual northern quoll; however, clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of potential denning habitat overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring northern quoll are detected providing procedures are followed and spotters are allowed ample opportunity to check areas prior to construction. Boulder piles, hollow-bearing trees and hollow logs will be marked and inspected where possible for the presence of fauna prior to clearing. Clearing protocols will be developed including methods for clearing hollow-bearing trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured quolls will be taken to a vet for treatment.</p> <p>Standard construction hours (6.30am to 6.30pm) will reduce the likelihood of construction vehicles driving within northern quoll habitat when this nocturnal species is active. Construction personnel will be educated on the potential presence of northern quoll. Off-track driving will not be permitted and reduced speed limits will be enforced in areas of potential quoll habitat, with appropriate signage on site.</p>
Erosion and sedimentation Reduced air quality	These potential impacts are considered to be negligible risks for the northern quoll.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and vibration	Vibration from construction activities has the potential to damage or destroy northern quoll den sites within boulder piles. Noise emissions may cause general disturbance to northern quoll.	<p>The need for rock blasting has not yet been confirmed. Should it be required, an assessment will be undertaken of the blast pressure zone to consider whether any potential northern quoll den sites are at risk of being damaged or destroyed, and additional abatement measures will be developed as required. Blasting will be avoided within potential northern quoll habitat between May and November as far as practicable, when quolls are breeding.</p> <p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage risks associated with potential noise disturbance.</p>





Potential Impact	Assessment	Mitigation
Light emissions	The northern quoll is a nocturnal species and therefore may be disturbed by light emissions associated with the Project.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.8.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.22 Potential Operational Impacts and Proposed Mitigation – Northern Quoll**

Potential Impact	Assessment	Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts, with feral cats and cane toads prevalent across the site. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Feral cat control will be undertaken – this will assist to reduce predation on northern quolls.

### 11.8.7 Assessment of Significant Residual Impacts

The Project is not expected to have a potential significant residual impact on the northern quoll. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.23**.



**Table 11.23 Significant Residual Impact – Northern Quoll**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of a population	<p><b>Unlikely</b></p> <p>Desktop assessment and extensive field surveys have not confirmed the presence of northern quoll within the Project area. Only potential habitat has been mapped within the Project area on a precautionary basis and additional surveys targeting these areas are continuing.</p> <p>The EPBC Act referral guideline for the endangered northern quoll (DoE 2016) defines three types of population that would be important for the long-term survival of the northern quoll, and the Project area does not meet the definition of any of these (high-density population, habitat free of cane toads, or population currently subject to research).</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area’s northern quoll population.</p>
Reduce the area of occupancy of the species	<p><b>Unlikely</b></p> <p>The proposed removal of potential habitat associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the northern quoll’s area of occupancy.</p>
Fragment an existing population into two or more populations	<p><b>Unlikely</b></p> <p>The Project area contains potential habitat for the species. The vast majority of this habitat will be retained within the Project area. Risks of fragmentation are likely to be highest where access roads cross areas of potential habitat. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing population into two or more populations.</p> <p>Large tracts of northern quoll habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide northern quoll foraging habitats over short to medium term, and denning habitat in longer term. The Project is not expected to fragment an existing population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>The Project will not involve the removal of habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population	<p><b>Unlikely</b></p> <p>Northern quolls breed between May and November, and the majority of the adult males in a population die after the breeding season.</p>



Significant Impact Criteria	Project Outcome
	<p>Females typically only live for three years. This may render isolated populations prone to extinction. To avoid and minimise impacts on northern quoll breeding habitat and young, fauna spotter catchers will be present prior to and during clearing to check for the presence of the species and potential dens. When potential dens are cleared procedures will be put in place to minimise impacts to the species. Procedures will then be put in place to ensure impacts are minimised through retaining the hollow-bearing trees for another 24-48 hours while adjacent trees are cleared to allow species to vacate the hollows overnight. These measures will be outlined in a SMP. All identified suitable dens will be replaced on a 1:1 basis with suitable nest boxes for the species based on current best practice, or salvaged hollows from the cleared area. The Project is not expected to disrupt the breeding cycle of an important population</p>
<p>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The Project area contains potential habitat for the species. The vast majority of this habitat will be retained within the Project area. Nevertheless, the Project will involve the removal of 387.04ha of potential habitat for the northern quoll.</p> <p>Large tracts of northern quoll habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide northern quoll foraging habitats over short to medium term, and denning habitat in longer term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat</p>	<p><b>Unlikely</b></p> <p>Feral cats and cane toads are both prevalent within the Project area. Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the northern quoll habitat</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p>



Significant Impact Criteria	Project Outcome
	No specific disease is applicable to the northern quoll. It is not expected that the Project will introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>In Queensland, regional mitigation objectives for the northern quoll include:</p> <ul style="list-style-type: none"> <li>• Protection of persisting populations and reduction of impacts on breeding habitats; and</li> <li>• Minimisation of risk of high intensity fire to these populations (DoE 2016).</li> </ul> <p>The Project is not expected to interfere substantially with the recovery of the species, the presence of which has not been confirmed. Clearing of habitat will be undertaken sequentially, and large areas of potential habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any northern quoll within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and potential den sites protected.</p> <p>Large tracts of potential habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity and maintain gene flow for the species.</p>

## 11.9 Spotted-Tailed Quoll

### 11.9.1 Ecology, Habitat and Distribution

Historically, the spotted-tailed quoll (North Queensland subspecies) occurred from the Paluma Range near Townsville north to near Cooktown, in north-eastern Queensland. The southern-most population in the Paluma Range (Mt Spec region) is possibly extinct, with no records since the early 1940s, despite high levels of visitation and human occupancy of that region. There are no recent records from the Big Tableland and Evelyn Tableland. The northern taxon is now thought to be confined to two extant populations: one centred on the Windsor and Carbine Tablelands, Thornton Peak, Mount Finnegan and associated smaller ranges; and the other centred on the Atherton Tablelands and associated mountain ranges (SPRAT 2021).

The subspecies is mostly confined to the relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers draining east and west of the Eastern Escarpment in the Wet Tropics bioregion of north-eastern Queensland (SPRAT 2021). It has also been suggested that the species occurs in lower altitude notophyll, mesophyll and wet sclerophyll forests in lesser numbers. Vegetation types typical of this habitat are simple and complex notophyll vine forest, simple microphyll vine-fern forest and simple microphyll vine-fern thicket (SPRAT 2021).

The subspecies utilises dens for resting and for raising young. Dens have been found in tree hollows, logs, rock crevasses and even among building materials.



### 11.9.2 Important Populations

The species occurs in six small and disjunct populations in tropical northern Queensland with high rainfall and plenty of prey species (SPRAT 2021). All populations of this subspecies are important for the long-term survival of the subspecies. However, Long & Nelson (2010a, as cited in SPRAT 2021) identified the following four populations as important due to the range contraction that would occur if they were lost:

- Daintree region;
- Atherton region;
- Great Basalt Wall; and
- Mount Spec region.

### 11.9.3 Threats to the Species

The National Recovery Plan for the Spotted-Tailed Quoll (DELWP 2016) identifies the following threatening processes for the species:

- Habitat loss and modification;
- Fragmentation;
- Timber harvesting;
- Poison baiting;
- Competition and predation from introduced predators;
- Deliberate killing;
- Road mortality;
- Bushfire and prescription burning;
- Poisoning by cane toads; and
- Climate change.

### 11.9.4 Distribution within the Project Area

Habitat that is critical to the survival of the species includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey. However, the threshold densities of these critical components required to support quoll populations are unknown. As a result, it is not currently possible to define or map habitat critical to the survival of the spotted-tailed quoll. Given the threat status of the spotted-tailed quoll, all habitats within its current distribution that are known to be occupied are considered important (DELWP 2016).

No habitat critical to the survival of the species has been mapped within the Project area, as there are no known records of the species within the Project area and it was not recorded during field surveys. There is limited *potential* habitat for the spotted-tailed quoll within the Project area and this has been mapped in

**Figure 8-6.**



## 11.9.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.24 Potential Construction Impacts and Relevant Mitigation – Spotted-tailed Quoll**

Potential Impact	Assessment	Mitigation
Vegetation and habitat clearance	The Project will not lead to the clearing of any habitat critical to the survival of the species but could result in clearing of 170.56 ha of potential habitat for the species.	<p>There is no mapped critical habitat within the Project area. Large areas of potential spotted-tailed quoll habitat throughout the Project area will be retained.</p> <p>Design has sought to avoid and minimise clearing within mapped areas of potential spotted-tailed quoll habitat.</p> <p>If practical during construction, micro-siting of access tracks will seek to avoid boulder piles and large hollow-bearing trees that could support dens.</p> <p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential quoll habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of quoll habitat will occur sequentially and in accordance with an approved Species Management Program.</p> <p>Unavoidable impacts to potential den sites will be mitigated through relocation of the den sites (particularly hollow logs and stags) into adjacent undisturbed habitat where practicable under the supervision of an appropriately trained fauna spotter catcher.</p>
Fragmentation (of populations and habitat)	The Project could result in fragmentation through clearing of 170.56 ha of potential habitat for the species.	<p>It is likely that the protected area estate adjacent to the Project area provides critical habitat for the spotted-tailed quoll. Project infrastructure has been designed to avoid fragmenting potential spotted-tailed habitat on site from these larger areas of habitat to the east, with Project access roads approaching from the west instead.</p> <p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire,</p>



Potential Impact	Assessment	Mitigation
		<p>pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas.</p> <p>Project design has sought to minimise the width of access tracks in areas of potential spotted-tailed quoll habitat.</p> <p>Construction personnel will be educated on the potential presence of spotted-tailed quoll. Off-track driving will not be permitted and reduced speed limits will be enforced in areas of potential quoll habitat, with appropriate signage on site.</p> <p>Targeted revegetation of parts of the Project footprint not required for operation will occur using species likely to form large hollows suitable for the spotted-tailed quoll.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	<p>The Project area is currently subjected to existing weed and pest impacts, with cane toads and feral cats both prevalent on site. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue (as described in <b>Section 10.0</b>).</p> <p>Feral cat control will be undertaken – this will assist to reduce predation on spotted-tailed quoll.</p>
Species mortality (vehicle collision, vegetation clearance)	During vegetation clearing, there is potential for direct mortality if spotted-tailed quoll are present (i.e. denning in the hollow-bearing trees to be cleared). There is also a risk of vehicle strike during construction.	<p>Clearing of habitat could potentially result in significant injury or death to individual spotted-tailed quoll, however clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of potential denning habitat overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring spotted-tailed quoll are detected providing procedures are followed and spotters are allowed ample opportunity to check areas prior to construction. Boulder piles, hollow-bearing trees and hollow logs will be marked and inspected where possible for the presence of fauna prior to clearing. Clearing protocols will be developed including</p>



Potential Impact	Assessment	Mitigation
		<p>methods for clearing hollow-bearing trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured quolls will be taken to a vet for treatment.</p> <p>Standard construction hours (6.30am to 6.30pm) will reduce the likelihood of construction vehicles driving within spotted-tailed quoll habitat when this nocturnal species is active. Construction personnel will be educated on the potential presence of spotted-tailed quoll. Off-track driving will not be permitted and reduced speed limits will be enforced in areas of potential quoll habitat, with appropriate signage on site.</p>
Erosion and sedimentation Reduced air quality	These potential impacts are considered to be negligible risks for the spotted-tailed quoll.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and vibration	Vibration from construction activities has the potential to damage or destroy spotted-tailed quoll den sites within boulder piles. Noise emissions may cause general disturbance to spotted-tailed quoll.	<p>The need for rock blasting has not yet been confirmed. Should it be required, an assessment will be undertaken of the blast pressure zone to consider whether any potential spotted-tailed quoll den sites are at risk of being damaged or destroyed, and additional abatement measures will be developed as required. Blasting will be avoided within potential spotted-tailed habitat between June and September as far as practicable, when quolls are breeding.</p> <p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage risks associated with potential noise disturbance.</p>
Light emissions	The spotted-tailed quoll is a nocturnal species and therefore may be disturbed by light emissions associated with the Project.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p> <p>Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.</p>





## 11.9.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.25 Potential Operational Impacts and Relevant Mitigation – Spotted-tailed Quoll**

Potential Impact	Assessment	Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts, with feral cats and cane toads prevalent across the site. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Feral cat control will be undertaken – this will assist to reduce predation on spotted-tailed quolls.

## 11.9.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impacts on the spotted-tailed quoll. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.26**.

**Table 11.26 Significant Residual Impact – Spotted-tailed Quoll**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of a population	<b>Unlikely</b> Desktop assessment and extensive field surveys have not confirmed the presence of spotted-tailed quoll within the Project area. Potential habitat has been mapped within the Project area on a precautionary basis and additional surveys targeting these areas are continuing. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area's spotted-tailed quoll population.
Reduce the area of occupancy of the species	<b>Unlikely</b>



Significant Impact Criteria	Project Outcome
	<p>The proposed habitat removal associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the spotted-tailed quoll's area of occupancy.</p>
<p>Fragment an existing population into two or more populations</p>	<p><b>Unlikely</b></p> <p>The Project area contains potential habitat for the species. The vast majority of this habitat will be retained within the Project area. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing population into two or more populations.</p> <p>Large tracts of potential spotted-tailed quoll habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent protected area estates to the east. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide spotted-tailed quoll foraging habitats over short to medium term, and denning habitat in longer term. The Project is not expected to fragment an existing population into two or more populations.</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p><b>Unlikely</b></p> <p>The Project will not impact on habitat critical to the survival of the spotted-tailed quoll. The Project will involve the removal of 170.56ha of <i>potential</i> habitat for the spotted-tailed quoll. This is not considered likely to constitute a significant impact to the species, the presence of which has not been confirmed within the Project area.</p>
<p>Disrupt the breeding cycle of a population</p>	<p><b>Unlikely</b></p> <p>Spotted-tailed quolls breed between June and September. To avoid and minimise impacts on spotted-tailed quoll breeding habitat and young, fauna spotter catchers will be present prior to and during clearing to check for the presence of the species and potential dens. When potential dens are cleared procedures will be put in place to minimise impacts to the species. Procedures will then be put in place to ensure impacts are minimised through retaining the hollow-bearing trees for another 24-48 hours while adjacent trees are cleared to allow species to vacate the hollows overnight. These measures will be outlined in a SMP. All identified suitable spotted-tailed quoll hollows will be replaced on a 1:1 basis with suitable nest boxes for the species based on current best practice, or salvaged hollows from the cleared area. The Project is not expected to disrupt the breeding cycle of the species.</p>
<p>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The Project area contains potential for the species. The vast majority of this habitat will be retained within the Project area. Nevertheless, the Project will involve the removal of 170.56ha of potential habitat for the spotted-tailed quoll.</p>



Significant Impact Criteria	Project Outcome
	<p>Large tracts of spotted-tailed quoll habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide spotted-tailed quoll foraging habitats over short to medium term, and denning habitat in longer term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat</p>	<p><b>Unlikely</b></p> <p>Feral cats and cane toads are both prevalent within the Project area. Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the spotted-tailed quoll habitat</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the spotted-tailed quoll. It is not expected that the Project will introduce disease that may cause the species to decline.</p>
<p>Interfere substantially with the recovery of the species</p>	<p><b>Unlikely</b></p> <p>The strategy of recovery for the spotted-tailed quoll is to focus on reducing the impact of threatening processes throughout the species' range and subsequently halt the current decline in its distribution and abundance.</p> <p>The Project is not expected to interfere substantially with the recovery of the species, the presence of which has not been confirmed. Clearing of habitat will be undertaken sequentially, and large areas of potential habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any spotted-tailed quoll within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and potential den sites protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity and maintain gene flow for the species.</p>



## 11.10 Ghost Bat

### 11.10.1 Ecology, Habitat and Distribution

The ghost bat is Australia's largest microchiropteran bat, and Australia's only carnivorous bat. Fossil data shows that the ghost bat was once distributed widely over much of Australia, except Victoria and Tasmania, but contracted north during the Holocene period likely in response to increasing aridity. The species' current range is discontinuous, occurring in disjunct colonies in the Pilbara, the Kimberley, northern Northern Territory, the Gulf of Carpentaria, coastal and near-coastal eastern Queensland from Cape York to near Rockhampton and western Queensland. Only 14 breeding sites are currently known within this range (TSSC 2016a).

Ghost bats roost in natural caves commonly in deeper limestone caves, tower karst and sinkholes, sandstone formations, granite boulder piles and ironstone rocky landscapes preferring multiple entrance points (TSSC 2016a) and require a range of these preferred cave sites for dispersal. Foraging sites are an average distance of 1.9 km from roosts (TSSC 2016a) and 64 ha in area though they are capable of expanding this range during nocturnal foraging. Females have high fidelity to natal roosts whilst males disperse, hence loss of roosts can be critical for population size and distribution (TSSC 2016a).

### 11.10.2 Important Populations

There is currently no recovery plan for the ghost bat and no important populations have been identified. In the absence of important populations being identified in a recovery plan, an important population may include:

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

Based on the above, the Project area is not thought to support an important population of ghost bat as the species' presence has not been definitively confirmed with the Project area and it is not near the limit of the species range. It is unlikely that, if present, the population within the Project area is a key source population for breeding or dispersal, nor necessary for maintaining genetic diversity.

### 11.10.3 Threats to the Species

The Conservation Advice (TSSC 2016a) identifies that the key threat to ghost bat is habitat loss and degradation due to mining activities. Other threats include disturbance of breeding sites, modification to foraging habitat, collision with fences (particularly those with barbed wire), collapse or reworking of old mine adits, contamination by mining residue at roost sites, disease, poisoning by cane toads and competition for prey with foxes and feral cats.

### 11.10.4 Distribution within the Project Area

There is an undated record of ghost bat at Mount Garnet to the west of, and outside, the Study area. An echolocation call potentially belonging to the ghost bat was recorded by Anabat adjacent to a dam within the Project area during the January 2021 surveys. It is difficult to definitively identify the ghost bat based on call alone, as it is similar to insect noise. A precautionary approach has been taken, and the ghost bat is assumed to be present within the Project area.

The ghost bat is an obligate cave dweller. As outlined in **Section 4.4**, analysis of LiDAR data has been undertaken to identify areas of rocky relief within the Project area that have the potential to support caves suitable for ghost bat



roosting. These areas have been as habitat critical to the survival of the species, with woodland habitats within 2 km of potential roost sites mapped as potential habitat (

Figure 8-7). These habitats are likely to be suitable for foraging in the event that ghost bat are roosting within the Project area.

### 11.10.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.27 Potential Construction Impacts and Relevant Mitigation – Ghost Bat**

Potential Impact	Assessment	Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 2.62 ha of habitat critical to the survival of the species and 730.02 ha of potential foraging habitat for the species.	<p>Large areas of critical and potential ghost bat habitat throughout the Project area will be retained.</p> <p>Design has sought to avoid and minimise clearing within mapped areas of rocky relief which are more likely to support caves for roosting as well as adjacent foraging habitat. Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential ghost bat foraging habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of ghost bat habitat will occur sequentially and in accordance with an approved Species Management Program.</p> <p>Impacts to critical habitat are generally restricted to the turbines and associated hardstands; the overhead transmission line and other support infrastructure are located where there is less suitable habitat for the species.</p> <p>Further studies into the presence of ghost bat and the location of potential roost sites are ongoing.</p>
Fragmentation (of populations and habitat)	The Project may lead to the clearing of 2.62 ha of habitat critical to the survival of the species and 730.02 ha of potential habitat for the species.	Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will



Potential Impact	Assessment	Mitigation
		<p>reduce disturbance to surrounding habitat and conservation areas.</p> <p>Project design has sought to minimise the width of access tracks in areas of potential and critical ghost bat habitat.</p> <p>Priority for revegetation will be given to parts of the Project footprint not required for operation.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	<p>The Project area is currently subjected to existing weed and pest impacts, with feral cats recorded across the site. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue (as described in <b>Section 10.0</b>).</p> <p>Feral cat control will be undertaken – this will assist to reduce competition for prey with the ghost bat.</p>
Species mortality (vehicle collision, vegetation clearance)	The risk of species mortality during construction is negligible, as ghost bat does not roost in trees and is unlikely to be struck by construction vehicles.	Standard construction hours (6.30am to 6.30pm) will reduce the likelihood of construction vehicles driving within ghost bat habitat when this nocturnal species is active.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the ghost bat.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Reduced air quality		
Noise and vibration	Vibration from construction activities has the potential to damage or destroy ghost bat roosts within caves. Noise emissions may cause general disturbance to ghost bat.	<p>The need for rock blasting has not yet been confirmed. Should it be required, an assessment will be undertaken of the blast pressure zone to consider whether any potential ghost bat roosts are at risk of being damaged or destroyed, and additional abatement measures will be developed as required. Blasting will be avoided within critical ghost bat habitat between July and November as far as practicable, when the bats are breeding.</p> <p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage risks associated with potential noise disturbance.</p>
Light emissions	The ghost bat is a nocturnal species and therefore may be disturbed by light emissions associated with the Project.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



Potential Impact	Assessment	Mitigation
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.10.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.28 Potential Operation Impacts and Relevant Mitigation – Ghost Bat**

Potential Impact	Assessment	Mitigation
Collision risk	The risk of ghost bats colliding with wind turbines during Project operation is considered negligible as the species does not fly within the RSA.	None required.
Barotrauma	As the ghost bat does not fly within the RSA, the risk of barotrauma is considered negligible.	None required.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts, with feral cats prevalent across the site. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Feral cat control will be undertaken – this will assist to reduce competition for prey with the ghost bat.

### 11.10.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impact on the ghost bat. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.29**.



**Table 11.29 Significant Residual Impact – Ghost Bat**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>The presence of ghost bat has not been definitely confirmed within the Project area, and the Project area is unlikely to support an important population of the species. Critical and potential habitat has been mapped within the Project area on a precautionary basis and additional surveys targeting these areas are continuing.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area’s ghost bat population.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p> <p>The proposed habitat removal associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the ghost bat’s area of occupancy.</p>
Fragment an existing important population into two or more populations	<p><b>Unlikely</b></p> <p>The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area.</p> <p>Risks of fragmentation are likely to be highest where access roads cross areas of critical habitat. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing population into two or more populations.</p> <p>Large tracts of ghost bat habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide ghost bat foraging habitats over short to medium term.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>The Project will involve the removal of 2.62ha of critical habitat for the ghost bat, representing approximately 0.6% of critical habitat within the Project area. Given the species’ presence has not been confirmed on site and the extent of habitat remaining in the locality, coupled with the implementation of the proposed mitigation measures, the removal of approximately 2.62ha of critical habitat is not considered likely to constitute a significant impact to the species.</p>
Disrupt the breeding cycle of an important population	<p><b>Unlikely</b></p> <p>Ghost bats breed between July and November and maternity roosts as sensitive to disturbance during this time. Further studies are ongoing</p>





Significant Impact Criteria	Project Outcome
	<p>to confirm whether there are any caves that could provide potential ghost bat roosts within the areas determined as potentially suitable through the analysis of LiDAR (currently mapped as critical habitat). Should suitable caves be identified, blasting activities that could disturb or damage roosts will be avoided within these areas of critical habitat during the breeding period. The Project is not expected to disrupt the breeding cycle of an important population</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area. Nevertheless, the Project will involve the removal of 730.02ha of potential habitat and 2.62ha of critical habitat for the ghost bat.</p> <p>Large tracts of ghost bat habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide ghost bat foraging habitats over short to medium term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>Feral cats are prevalent within the Project area. Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the ghost bat habitat</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the ghost bat. It is not expected that the Project will introduce disease that may cause the species to decline.</p>
<p>Interfere substantially with the recovery of the species</p>	<p><b>Unlikely</b></p> <p>There is no recovery plan currently in place for the ghost bat. The Project is not expected to interfere substantially with the recovery of the species, the presence of which has not been confirmed. Clearing of habitat will be undertaken sequentially, and large areas of potential</p>



Significant Impact Criteria	Project Outcome
	<p>and critical habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any ghost bats within the Project area will have available foraging resources. Fire will also be managed on site to ensure hot wildfires are minimised and potential den sites protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity and maintain gene flow for the species.</p>

## 11.11 Spectacled Flying-fox

### 11.11.1 Ecology, Habitat and Distribution

The spectacled flying-fox occurs in north-eastern Queensland, north of Cardwell with past records from Brisbane and Chillagoe. It is restricted to tropical rainforest areas, most specifically, the species occurs between Ingham and Cooktown, and between the McIlwraith and Iron Ranges of Cape York. The species also occurs on Torres Strait islands. The largest population in Australia is known from the Wet Tropics of Queensland World Heritage Area between Townsville and Cooktown (SPRAT 2021).

One study showed that the spectacled flying-fox roosts within 6.5 km of rainforest, although a roost 16 km from rainforest has also been observed. The species was long assumed to feed primarily on rainforest species but individuals regularly feed on a wide variety of non-rainforest species, including eucalypts (*Eucalyptus* spp., *Corymbia* spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems. It will forage within 50 km of a camp and the Mabi Forest TEC is considered a key habitat for the spectacled flying-fox (SPRAT 2021).

### 11.11.2 Important Populations

There is a recovery plan in place for the spectacled flying-fox but it does not identify important populations of the species. In the absence of important populations being identified in the recovery plan, an important population may include:

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

The species has not been previously recorded within the Project area and none of its key foraging habitat, the Mabi Forest TEC, has been ground-truthed within the Project area. The Project area is therefore not considered to support an important population of spectacled flying-fox.

### 11.11.3 Threats to the Species

The Conservation Advice (TSSC 2019c) identifies the following key threats for the spectacled flying-fox:



- Degradation of habitat from cyclones;
- Habitat loss and fragmentation;
- Persecution at orchards;
- Persecution at camps;
- Tick paralysis;
- Birth deformities such as cleft palate syndrome;
- Mortality associated with barbed wire, powerlines, fruit nets, etc.;

#### 11.11.4 Distribution within the Project Area

The National Flying Fox Monitoring programme (DAWE 2021b) reports a spectacled flying-fox camp at Malaan, east of Ravenshoe and just outside the Study area. The desktop assessment also indicates the species' presence in the Ravenshoe Forest Reserve 1 which is within the Study Area, and abuts the Project area immediately to the north. There is limited rainforest habitat within the Project area to support a camp, and none of its key foraging habitat (Mabi Forest TEC) has been ground-truthed within the Project area. Therefore, no habitat critical to the survival of the species has been mapped within the Project area. Potential foraging habitat has been mapped as eucalypt forest within 50km of the known camp at Malaan (

Figure 8-8).

#### 11.11.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.30 Potential Construction Impacts and Relevant Mitigation – Spectacled Flying-fox**

Potential Impact	Assessment	Mitigation
Vegetation and habitat clearance	There is no habitat critical to the survival of the spectacled flying-fox within the Project area. The Project may lead to the clearing of 1,184.32 ha of potential foraging habitat for the species.	<p>Large areas of spectacled flying-fox foraging habitat throughout the Project area will be retained.</p> <p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of spectacled flying-fox foraging habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of spectacled flying-fox foraging habitat will occur sequentially and in accordance with an approved Species Management Program.</p>



Potential Impact	Assessment	Mitigation
Fragmentation (of populations and habitat)	The Project may lead to the clearing of 1,184.32 ha of potential foraging habitat for the species.	Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas. Project design has sought to minimise the width of access tracks in areas of potential spectacled flying-fox foraging habitat. Priority for revegetation will be given to parts of the Project footprint not required for operation.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue (as described in <b>Section 10.0</b> ).
Species mortality (vehicle collision, vegetation clearance)	The risk of species mortality during construction is negligible, as there are no known camps within the Project area and the species is unlikely to be struck by construction vehicles.	Standard construction hours (6.30am to 6.30pm) will reduce the likelihood of construction vehicles driving within spectacled flying-fox foraging habitat when this nocturnal species is active.
Erosion and sedimentation Reduced air quality	These potential impacts are considered to be negligible risks for the spectacled flying-fox.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and vibration	Noise emissions may cause general disturbance to spectacled flying-fox.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage risks associated with potential noise disturbance.
Light emissions	The spectacled flying-fox is a nocturnal species and therefore may be disturbed by light emissions associated with the Project.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.11.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.31 Potential Operational Impacts and Relevant Mitigation – Spectacled Flying-fox**



Potential Impact	Assessment	Mitigation
Collision risk	There is a risk of spectacled flying-fox colliding with wind turbines during Project operation as the species does fly within the RSA height.	<p>The following measures will be implemented to mitigate and manage impacts from spectacled flying-fox collision risks as much as practicable during the operational phase:</p> <ul style="list-style-type: none"> <li>• A certified Bird and Bat Management Plan (BBMP) will be prepared prior to the operation of the wind turbines. The BBMP will outline a monitoring program, identify if any threatened species are significantly impacted and define a strategy that manages and mitigates any significant impacts on these species.</li> <li>• The availability of perches in the vicinity of turbines will be reduced.</li> <li>• Lighting of turbines will be limited.</li> <li>• Use of onsite deterrents such as ultrasonic devices will be investigated.</li> <li>• The presence of standing water in the vicinity of turbines will be minimised.</li> <li>• Operational monitoring for bats will be undertaken and compared to baseline data. Triggers for adaptive management will be included. Annual bat surveys will be undertaken in line with Project approval conditions as part of monitoring to assess whether the Project area continues to be used by species and assess any changes in abundance that may influence BBMP risk ratings.</li> </ul>
Barotrauma	The risk of barotrauma to the spectacled flying-fox is considered negligible as it is known to primarily affect microbat species due to their specific physiology.	None required.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and	The Project area is currently subjected to existing weed and pest impacts. During operation of the



Potential Impact	Assessment	Mitigation
	pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.

### 11.11.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impacts on the spectacled flying-fox. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.32**.

**Table 11.32 Significant Residual Impacts on Spectacled Flying-fox**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of a population	<p><b>Unlikely</b></p> <p>The presence of spectacled flying-fox has not been definitely confirmed within the Project area, and there is no habitat critical to the survival of the species within the Project area. Potential foraging habitat is widespread across the Project area as there is a known camp within approximately 18km of the site.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area's spectacled flying-fox population.</p>
Reduce the area of occupancy of the species	<p><b>Unlikely</b></p> <p>The proposed habitat removal associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the spectacled flying-fox's area of occupancy.</p>
Fragment an existing population into two or more populations	<p><b>Unlikely</b></p> <p>The Project area contains a large area of potential habitat for the species, the majority of which will be retained within the Project area. Risks of fragmentation are considered negligible as the species is readily able to cross the maximum clearing widths associated with the Project. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing population into two or more populations.</p> <p>Large tracts of spectacled flying-fox habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide spectacled flying-fox foraging habitats over short to medium term.</p>



Significant Impact Criteria	Project Outcome
Adversely affect habitat critical to the survival of a species	<p><b>Unlikely</b></p> <p>There is no habitat critical to the survival of the spectacled flying-fox within the Project area. The Project may lead to the clearing of 1,184.32 ha of potential foraging habitat for the species.</p>
Disrupt the breeding cycle of a population	<p><b>Unlikely</b></p> <p>Spectacled flying-foxes give birth to one pup a year, between October and December. Camps would be most sensitive to disturbance during this time. There are no known camps within the Project area, with the nearest being located approximately 18km to the northeast. The Project is not expected to disrupt the breeding cycle of a population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project area contains extensive potential foraging habitat for the species, the majority of which will be retained within the Project area. The Project will involve the removal of 1,184.32ha of potential habitat for the spectacled flying-fox.</p> <p>Large tracts of spectacled flying-fox habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity. Rehabilitation activities will also aim to restore habitats that will provide spectacled flying-fox foraging habitats over short to medium term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the spectacled flying-fox habitat</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the spectacled flying-fox. It is not expected that the Project will introduce disease that may cause the species to decline.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p>



Significant Impact Criteria	Project Outcome
	<p>The overall objectives of the National Recovery Plan for Spectacled Flying-Fox (DERM 2010) are to secure the long-term protection of the species through a reduction in the impact of threats to species' survival and to improve the standard of information available to guide recovery. Specific recovery objectives are to:</p> <ul style="list-style-type: none"><li>• Research practicable and cost effective flying-fox deterrent systems for commercial fruit growers;</li><li>• Identify and protect native foraging habitat critical to the survival of the spectacled flying-fox;</li><li>• Accurately assess the short and long term population size and population trends of the spectacled flying-fox;</li><li>• Improve the public perception of the spectacled flying-fox and the standard of information available to guide recovery;</li><li>• Increase knowledge of spectacled flying-fox roosting requirements and protect important camps;</li><li>• Improve understanding of incidence of tick paralysis and actions to minimise paralysis mortality in flying-foxes;</li><li>• Implement strategies to reduce incidence of electrocution and entanglement of spectacled flying-fox; and</li><li>• Investigate the causes of birth abnormalities such as cleft palate syndrome.</li></ul> <p>The Project is not expected to interfere substantially with the recovery of the species. Clearing of habitat will be undertaken sequentially, and large areas of potential foraging habitat will be retained across the Project area. This availability and connectivity of foraging habitat will ensure any spectacled flying-fox within the Project area will have available foraging resources. Fire will also be managed on site to ensure hot wildfires are minimised.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats will support the species and provide connectivity and maintain gene flow for the species.</p>

## 11.12 Southern Cassowary

### 11.12.1 Ecology, Habitat and Distribution

The southern cassowary is a flightless bird and the largest native animal in Australian rainforests. Cassowaries are very territorial and mostly solitary. Cassowaries eat fleshy fruits of over 200 species of plants, dispersing seeds long distances in the process. This makes them a keystone species in the World Heritage listed rainforests of tropical Queensland (SRAT 2021).

Although primarily occurring in rainforest and associated vegetation, the southern cassowary also uses woodland, swamp and disturbed habitats for a year-round supply of fleshy fruits.





### 11.12.2 Important Populations

The Recovery Plan identifies important populations of southern cassowary around Mission Beach, Coquette Point (Moresby Range), Graham Range, Woopen/Badgery Creeks (upper Russell and North Johnstone River valleys), and the Wallaman Falls/Mt Fox areas. It also suggests that the Black Mountain corridor (Macalister Range), the Lamb Range to Davies Creek, and the slopes on the north and east shores of Lake Tinaroo appear to be important for cassowary populations. Six priority Regional Cassowary Management Areas are identified as having extreme current/potential threats to their cassowary populations: the Daintree lowlands, Kuranda and Black Mountain Road, sections of the Cairns foothills, Innisfail, Mission Beach and Paluma/Mt Spec.

The Project area does not align with any of the above areas and therefore is not considered to constitute an important population.

### 11.12.3 Threats to the Species

The Wet Tropics cassowary population is threatened by eight main threats:

- Habitat loss from clearing;
- Habitat fragmentation;
- Habitat degradation;
- Roads and traffic;
- Dog attacks;
- Hand feeding;
- Diseases; and
- Natural catastrophic events such as cyclones.

### 11.12.4 Distribution within the Project Area

The Recovery Plan for the Southern Cassowary (Latch 2007) identifies three categories of habitat for the southern cassowary (essential habitat, general habitat and rehabilitating habitat); the category of Essential Habitat is the best estimate of habitat that is critical to the survival of the species (Latch 2007). The Recovery Plan lists 91 REs that comprise Essential Habitat for the southern cassowary, of which three have been ground-truthed within the Project area, REs 7.12.7, 7.3.8, 7.8.7. These have been mapped as habitat critical to the survival of the species in

Figure 8-9.

### 11.12.5 Potential Construction Impacts from the Project and Relevant Mitigation

#### Table 11.33 Potential Construction Impacts and Relevant Mitigation – Southern Cassowary



Potential Impact	Assessment	Mitigation
Vegetation and habitat clearance	The Project will not clear critical habitat for the species.	The Project footprint has been specifically designed to avoid all critical habitat for this species.
Fragmentation (of populations and habitat)	The Project will not clear critical habitat for the species.	<p>The Project footprint has been specifically designed to avoid all critical habitat for this species.</p> <p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue (as described in <b>Section 10.0</b> ).
Species mortality (vehicle collision, vegetation clearance)	There is also a risk of vehicle strike on southern cassowary during construction, including vegetation clearing and general vehicle movements.	<p>Clearing of vegetation could potentially result in significant injury or death to individual southern cassowary, however clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of potential nesting habitat overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring southern cassowary are detected providing procedures are followed and spotters are allowed ample opportunity to check areas prior to construction. Potential nest sites will be marked and inspected where possible for the presence of fauna prior to clearing. Clearing protocols will be developed including checks for any injured species. Capture and release those healthy individuals. Any injured southern cassowary will be taken to a vet for treatment.</p> <p>Construction personnel will be educated on the potential presence of southern cassowary. Off-track driving will not be permitted and reduced speed limits will be enforced in areas of</p>



Potential Impact	Assessment	Mitigation
		southern cassowary habitat, with appropriate signage on site.
Erosion and sedimentation Reduced air quality	These potential impacts are considered to be negligible risks for the southern cassowary.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and vibration	Noise emissions may cause general disturbance to southern cassowary.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage risks associated with potential noise disturbance.
Light emissions	The southern cassowary is mostly active during the day and requires a quiet, dark place to rest at night. There is a risk that the southern cassowary may be disturbed by light emissions associated with the Project.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.

### 11.12.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.34 Potential Operational Impacts and Relevant Mitigation – Southern Cassowary**

Potential Impact	Assessment	Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts, with wild dogs prevalent across the site. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.



Potential Impact	Assessment	Mitigation
		Wild dog control will be undertaken – this will assist to reduce predation on southern cassowary.

### 11.12.7 Assessment of Significant Residual Impacts

The Project is assessed as unlikely to have a significant residual impact on the southern cassowary. A full significance assessment following the Significant Impact Guidelines for the endangered southern cassowary (*Casuarius casuarius johnsonii*) Wet Tropics Population (DEWHA 2010a) is presented in **Table 11.35**.

**Table 11.35 Significant Residual Impact – Southern Cassowary**

Threat	For actions within potential cassowary habitat, plus a 100 m buffer	Watercourses within, adjacent to or linking areas of potential cassowary habitat, plus a 50 m buffer from the bank
Habitat removal	Clearing > 1500 m <sup>2</sup> for any purpose other than a single dwelling on an existing lot Forestry operations (including selecting logging) that open the canopy by > 10% or remove cassowary food trees Subdivision of land that results in clearing and/or intensification of use	Any clearing
<i>Project outcome</i>	<i>The Project will not result in the removal of critical habitat for the cassowary</i>	<i>The Project will not result in the removal of watercourse habitat adjacent to or linking areas of cassowary habitat</i>
Habitat degradation caused by exotic plants or animals; increased accessibility; fire behaviour change; microclimate change	Any action that reduces habitat quality	Any action that changes water quality or flow
<i>Project outcome</i>	<i>Mitigation measures outlined in Section 10 are considered appropriate to manage this risk.</i>	<i>The Project will not result in any impacts to watercourse habitat adjacent to or linking areas of cassowary habitat.</i>
Fragmentation and isolation of habitat and populations caused by roads; fencing; drainage channels; powerlines; service infrastructure and subdivision of land	Any action that reduces patch area to < 5 ha; separates patches by > 100 m; reduces patch quality; or separates or perforates existing patches	Any action that reduces access to water (for example fencing that reduces connectivity within or between riparian corridors, and roads that reduce connectivity between or within riparian corridors);



Threat	For actions within potential cassowary habitat, plus a 100 m buffer	Watercourses within, adjacent to or linking areas of potential cassowary habitat, plus a 50 m buffer from the bank
		or any action that reduces movement along waterways
<i>Project outcome</i>	<i>The Project will not result in the removal of critical habitat for the cassowary</i>	<i>The Project will not result in any impacts to watercourse habitat adjacent to or linking areas of cassowary habitat.</i>
Roads and traffic: Traffic conflict points Traffic volume such as road upgrades or traffic-producing development Any increase in vehicle speed limits Proliferation of roadside weeds Any road or vehicle track developments with proposed speeds > 60 km/hr (without adequate and proven traffic calming measures) in places where cassowary road deaths have occurred; through known cassowary crossing points; within local or regional movement corridors; in the eight key areas where the cassowary is seriously threatened; or through National Parks or conservation areas.	Any action that increases traffic conflict; traffic volume; or traffic speed to > 60 km/hr	Any road, trail or other access point, construction or upgrade
<i>Project outcome</i>	<i>The Project will not result in the removal of critical habitat for the cassowary</i>	<i>The Project will not result in any impacts to watercourse habitat adjacent to or linking areas of cassowary habitat</i>

## 11.13 Red Goshawk

### 11.13.1 Ecology, Habitat and Distribution

The red goshawk is endemic to Australia. It is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division to northeastern NSW, and occasionally on continental islands. The red goshawk is suspected to have always had a very large distributional range and extent of occurrence within which it was very sparsely distributed. The distribution of the red goshawk is not severely fragmented (SPRAT 2021).

The red goshawk prefers extensive, multi-species mosaics of mostly Eucalypt-dominated open forests and woodlands in or with proximity to permanent water (Czechura et al. 2010). Most likely occurrence is associated with open forests



and woodlands that contain a mix of tall (>20m) ironbark, other eucalypt and bloodwood species where streams and wetlands are present (Czechura et al. 2010). The same nesting habitat is occupied and revisited yearly and is restricted to trees that are taller than 20 metres (DERM 2012) and within 1 km of a watercourse or wetland (TSSC 2015a). Nesting territory for female red goshawks range up to 120 km<sup>2</sup> whilst males can expand to 200 km<sup>2</sup> (TSSC 2015a; SPRAT 2021).

### 11.13.2 Important Populations

The National Recovery Plan for Red Goshawk (DERM 2021) does not identify important populations for the red goshawk. The Significant Impact Guidelines (DoE 2013) define an important population of a vulnerable species as populations that are:

- Key source populations either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.

The identification of a potential red goshawk nest within the Project area during the January 2021 surveys indicates the Project area could support a breeding pair, which would likely be considered an important population. The Project area is not near the limit of the species' range.

### 11.13.3 Threats to the Species

The National Recovery Plan for Red Goshawk (DERM 2021) identifies the following key threats to the red goshawk:

- Habitat loss;
- Fragmentation;
- Threats to nest sites;
- Threats to the prey base;
- Threats to prey availability

### 11.13.4 Distribution within the Project Area

Habitat critical to the survival of the red goshawk includes all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal, buffer areas and sites required for the future recovery of the species (DERM 2012). The following red goshawk habitat has been mapped across the Project area (**Figure 8-10**):

- Habitat critical for the survival of the species: trees > 20 m within 1 km of a watercourse and Eucalypt-dominated open forests and woodlands in or within 1 km to permanent water; and
- Potential habitat: remainder of open forests within the Project area.

### 11.13.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.36 Potential Construction Impacts and Relevant Mitigation – Red Goshawk**



Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 165 ha of habitat critical to the survival of the species and 1,024.86 ha of potential habitat for the species.	<p>Large areas of critical and potential red goshawk habitat throughout the Project area will be retained.</p> <p>Design has sought to avoid and minimise clearing within the riparian locations and areas of larger trees which are more likely to be suitable for nesting.</p> <p>If practical during construction, micro-siting of access tracks will seek to avoid large nesting trees.</p> <p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential habitat.</p> <p>Clearing of red goshawk habitat will occur sequentially and in accordance with an approved Species Management Program.</p> <p>Impacts to critical habitat are generally restricted to access track and overhead transmission line crossings of riparian environments; the turbines and hardstands are located primarily on elevated ridgelines where there is less suitable habitat for the species.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.
Species mortality (vehicle collision, vegetation clearance)	During vegetation clearing, there is potential for direct mortality if red goshawk are present (i.e. nesting in a trees to be cleared). The risk of vehicle strike is negligible.	Clearing of habitat could potentially result in significant injury or death to individual red goshawks. A pre-construction survey will confirm whether there are any red goshawk nests within the clearing footprint prior to construction. If potential nests are identified, clearing of the nest tree and a 300m buffer around it will be postponed until after the nesting season when any chicks have fledged. In the absence of any potential nests within the clearing footprint, clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and



Potential Impact	Assessment	Proposed Mitigation
		retention of potential nest trees overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring red goshawk are detected providing procedures are followed and spotters are allowed ample opportunity to check trees before felling. Clearing protocols will be developed including methods for clearing potential nest trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured individuals will be taken to a vet for treatment.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the red goshawk.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Bushfire risk		
Noise and lighting		
Reduced air quality		

### 11.13.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.37 Potential Operational Impacts and Relevant Mitigation - Red Goshawk**

Potential Impact	Assessment	Mitigation
Species mortality (collision with turbines)	The species hunts primarily under the canopy, taking small to medium-sized birds. This flight behaviour makes it unlikely it flies at RSA for the majority of time, but it is known to soar, particularly during breeding displays.	A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data). Protocols for carcass searches to enable detection of any mortality will be included within the Bird and Bat Management Plan. Triggers for adaptive management will also be included.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.





Potential Impact	Assessment	Mitigation
	being present in areas of ground vegetation.	
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.

### 11.13.7 Assessment of Significant Residual Impacts

The Project will potentially have a significant residual impact on the red goshawk. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.38**.

**Table 11.38 Significant Residual Impacts – Red Goshawk**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>Given the Project area's potential to support a breeding pair of red goshawks, it may be considered to support an important population. The Project will involve the clearing of up to 165ha of critical habitat for the species and 1,024.86ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of trees that could support a red goshawk nest. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable clearing of potential nest trees will be undertaken outside the nesting season and after any chicks have fledged.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is considered unlikely that the Project will lead to a long-term decrease in the size of an important population of the red goshawk.</p> <p>Furthermore, operational impacts on the species associated with the Project are expected to be unlikely. The red goshawk is known to forage primarily under the canopy and is only likely to soar to within the RSA of the operational wind turbines during breeding displays.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p> <p>Given the Project area's potential to support a breeding pair of red goshawks, it may be considered to support an important population.</p>



Significant Impact Criteria	Project Outcome
	<p>The Project will involve the clearing of up to 165ha of critical habitat for the species and 1,024.86ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of trees that could support a red goshawk nest. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>The Project is unlikely to cause a permanent disappearance of the species from a 4 km<sup>2</sup> area such that there would be a decrease in the area of occupancy of the species.</p>
Fragment an existing important population into two or more populations	<p><b>Unlikely</b></p> <p>Given the Project area's potential to support a breeding pair of red goshawks, it may be considered to support an important population. The Project will involve the clearing of up to 165ha of critical habitat for the species and 1,024.86ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of trees that could support a red goshawk nest. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable clearing of potential nest trees will be undertaken outside the nesting season and after any chicks have fledged.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is considered unlikely that the Project will fragment an existing important population of the red goshawk into two or more populations.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Likely</b></p> <p>The Project will involve the clearing of up to 165ha of critical habitat for the species; given the species' home range and the size of the Project area, this would potentially affect one breeding pair. Red goshawks show site fidelity to nesting territories but not necessarily specific nest trees, as nests typically do not remain intact through the FNQ cyclone season. The potential clearing represents 3.1% of available critical habitat within the Project area. Despite the extent of habitat remaining in the locality, coupled with the implementation of the proposed mitigation measures, the removal of this proportion of critical habitat is considered likely to constitute a significant impact to the species.</p>
Disrupt the breeding cycle of an important population	<p><b>Unlikely</b></p> <p>Given the Project area's potential to support a breeding pair of red goshawks, it may be considered to support an important population.</p>



Significant Impact Criteria	Project Outcome
	<p>The species has a large home range, with nests 7-8 km apart (SPRAT 2021). Breeding generally occurs in spring and chicks have typically fully fledged by the end of the year (SPRAT 2021). Works within critical habitat will be undertaken outside these months where the Project's schedule allows this to occur.</p> <p>Should a pre-clearance survey identify that a red goshawk is nesting within the Project footprint, all efforts will be made to microsite the infrastructure to avoid the impact.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, it is not considered likely that the Project will disrupt the breeding cycle of an important population of the red goshawk.</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>Given the Project area's potential to support a breeding pair of red goshawks, it may be considered to support an important population. The Project will involve the clearing of up to 165ha of critical habitat for the species and 1,024.86ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of trees that could support a red goshawk nest. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP. Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the red goshawk is likely to decline.</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the red goshawk habitat.</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p>



Significant Impact Criteria	Project Outcome
	No specific disease is applicable to the red goshawk. It is not expected that the Project will introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project is not expected to interfere substantially with the recovery of the species. Clearing of habitat will be undertaken sequentially, and large areas of potential and critical habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any red goshawk within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and hollow-bearing trees protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors, will support the species into the future.</p> <p>From an operational perspective, the Project poses minimal overall risk to the red goshawk due to its tendency to forage below the canopy.</p>

## 11.14 White-throated Needle-tail

### 11.14.1 Ecology, Habitat and Distribution

The white-throated needle-tail is widespread in eastern and south-eastern Australia. It is recorded in all coastal regions of Queensland, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (SPRAT 2021). The species breeds in northern Asia and spends the non-breeding season (typically October – March inclusive) in Australia where it is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1,000 m above the ground.

The white-throated needle-tail occurs over most types of habitat, including cleared areas, but is most often recorded above wooded areas (SPRAT 2021).

### 11.14.2 Important Populations

DAWE does not identify what constitutes an important population for the species. Consequently, it is relevant to refer to the EPBC Act Significant Impact Guidelines 1.1 (DoE 2013) which define an important population of a vulnerable species as being populations that are:

- Key source populations either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.



The species occurs widely throughout eastern Australia and does not breed in the country. The Project area is not located near the edge of the species' range. It is unlikely that any population of the species in the area is a key population for breeding, dispersal or maintaining genetic diversity in the species.

Consequently, any presence of the species within the Project area is not likely to be part of an important population.

### 11.14.3 Threats to the Species

There are no significant threats to swifts in Australia. Deforestation may contribute to a decline in roosting habitat and/or food availability (Tarburton 2014). Individuals occasionally collide with overhead wires, windows and lighthouses (SPRAT 2021), as evidenced by the dead individual observed under existing transmission lines within the Project area. No recovery or threat abatement plans are in place for this species.

### 11.14.4 Distribution within the Project Area

One white-throated needletail was observed during the March 2021 field surveys. The specimen was found deceased within the existing transmission line corridor.

The white-throated needletail is a non-breeding visitor to Australia arriving in October and departing by April. Numbers fluctuate on an annual basis and the species is widespread across the eastern coast, moving in response to foraging and weather conditions. The species is likely to occur on a sporadic basis over the summer months within the Project area. Within the core range of the species, numbers can vary from 0 on one day to over 1,000 the next day with seemingly little pattern, presumably driven by weather and foraging conditions. Therefore it is impossible to predict on a long-term basis any patterns of utilisation of a given site.

### 11.14.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.39 Potential Construction Impacts and Proposed Mitigation – White-throated Needletail**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The species is almost exclusively aerial and direct impacts from clearance of habitat is not expected to occur as a result of the Project. The species forages frequently over all landscapes and the vegetation clearance associated with the Project is not expected to impact foraging resources.	The general mitigation measures presented in <b>Section 10</b> are considered sufficient.
Fragmentation (of populations and habitat)		
Weed and pest incursion	These potential impacts are considered to be negligible risks for the white-throated needletail.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Species mortality (vehicle collision, vegetation clearance)		
Erosion and sedimentation		



Potential Impact	Assessment	Proposed Mitigation
Bushfire risk		
Noise and lighting		
Reduced air quality		

### 11.14.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.40 Potential Operational Impacts and Proposed Mitigation – White-throated Needletail**

Potential Impact	Assessment	Proposed Mitigation
Species mortality (turbine collision)	<p>During Project operation there is potential for the species to collide with wind turbines and tower structures during the summer months when the species is likely to be present sporadically within the Project area.</p> <p>The impact is expected to be minor as this species uses a range of habitats and is widespread across eastern Australia.</p> <p>Operational monitoring data from 15 wind farms in Victoria between 2003-2018 only recorded five white-throated needletail deaths as a result of turbine strike. This species is not considered to be particularly prone to turbine strike; it is a relatively mobile species and often flies at heights well above RSA.</p> <p>The Conservation Advice for the species (TSSC, 2019) acknowledges collision with wind turbines as a threat, although of low severity and affecting a small number of birds (Hull, 2013).</p> <p>Prior to its recent listing as threatened under the EPBC Act, and following the draft referral guidelines for migratory species under the EPBC Act (DoE, 2015) an ecologically significant proportion of the population of White-throated Needletail was estimated to be 10 birds (0.1% of the total population using the lower population estimate of 10,000 birds).</p> <p>A review of this significant impact threshold will be made under an adaptive management framework following further information on the species being available in subsequent bird utilisation survey monitoring, and the potential</p>	<p>A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data).</p> <p>Protocols for carcass searches to enable detection of any mortality will be included within the Bird and Bat Management Plan. Triggers for adaptive management will also be included.</p>



Potential Impact	Assessment	Proposed Mitigation
	impact from other wind farms becomes available.	
Species mortality (vehicle collision)	During operational activities, there is negligible risk of the species colliding with Project vehicles, as the species is almost exclusively aerial.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this negligible risk.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.
Noise and lighting	Lighting of turbines during operation may result in an increase in insect numbers within the vicinity of wind turbines. This in turn may attract insectivorous species such as the white-throated needletail, thereby increasing collision risk. As the species is diurnal, and wind turbine lighting is not likely to be required for aviation safety purposes, this risk is considered negligible.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this negligible risk.

### 11.14.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impact on the white-throated needletail. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.41**.

**Table 11.41 Significant Residual Impact Assessment – White-throated needletail**

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<b>Unlikely</b> Important populations of the white-throated needletail have not been specifically nominated. Given the species' capacity for large-scale migration, the species is unlikely to have localised important



Significant Impact Criteria	Assessment
	<p>populations. As the Project area is not near the edges of the species' known range it is unlikely to be an important population. The white-throated needletail is exclusively aerial and does not have typical associations with habitat. As such, clearing for the Project is unlikely to have a significant impact on the species' local abundance. The white-throated needletail has a low risk of collision with wind turbines. Collision mortality of white-throated needletails has been occasionally reported from Australian wind farms where the species occurs. The species typically occurs singly and flies at heights of up to 1,000 m elevation. While individuals can occasionally fly at RSA height, the risks of collision are considered low. While a small number of individuals may collide with wind turbines during the operation phase, the level of mortality is not expected to have any impact at a population level.</p>
<p>Reduce the area of occupancy of an important population</p>	<p><b>Unlikely</b></p> <p>The Project will result in no loss of habitat for the white-throated needletail. While the species could experience some injury and mortality due to collision with wind turbines, this is unlikely to cause a permanent disappearance of the species from a 4 km<sup>2</sup> area such that there would be a decrease in the area of occupancy of the species.</p>
<p>Fragment an existing important population into two or more populations</p>	<p><b>Unlikely</b></p> <p>The terrestrial habitats within the Project area are not critical for the white-throated needletail. The species has the capacity to overfly cleared and fragmented areas; it is almost exclusively aerial. Consequently, the Project will not fragment a population of the species into two or more populations.</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p><b>Unlikely</b></p> <p>The Project area does not contain habitat critical to the survival of the white-throated needletail, as the species does not have conventional habitat requirements.</p>
<p>Disrupt the breeding cycle of an important population</p>	<p><b>Unlikely</b></p> <p>The white-throated needletail does not breed in Australia. It spends its breeding season in Asia. Consequently, the Project will not disrupt the breeding cycle of an important population of the species.</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The species is almost entirely aerial and does not have conventional habitat requirements. The Project therefore will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>There are no invasive species identified as threats to the white-throated needletail. The Project is not expected to result in an increase in invasive species that might threaten the local abundance of the white-throated needletail.</p>





Significant Impact Criteria	Assessment
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>Disease is not identified as a key threat to the species. The predominantly aerial nature of the species is such that it is unlikely to have many opportunities to contract diseases that could threaten any local populations. Furthermore, the Project is not expected to increase the prevalence of any diseases.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>Through collision risk, the Project has the potential to cause periodic injury and mortality of white-throated needle-tails. Based on the sporadic nature of the species' presence within the Project area and based on empirical evidence from operational wind farms in Australia, this is likely to affect small numbers of individuals under normal circumstances. An ecologically significant proportion of the population of the species is estimated to be 10 birds (0.1% of the total population using the lower population estimate of 10,000 birds). The risk of collision mortality is unlikely to be of a sufficient magnitude to interfere with the recovery of the species.</p>
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	<p><b>Unlikely</b></p> <p>The species is almost entirely aerial and does not have conventional habitat requirements. The Project therefore will not modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p><b>Unlikely</b></p> <p>There are no invasive species identified as threats to the white-throated needle-tail. The Project is not expected to result in an increase in invasive species that might threaten the local abundance of the white-throated needle-tail.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	<p><b>Unlikely</b></p> <p>The white-throated needle-tail does not breed in Australia. It spends its breeding season in Asia. Consequently, the Project will not disrupt the breeding cycle of an important population of the species.</p> <p>Through collision risk, the Project has the potential to cause periodic injury and mortality of white-throated needle-tails. Based on the sporadic nature of the species' presence within the Project area and based on empirical evidence from operational wind farms in Australia, this is likely to affect small numbers of individuals under normal circumstances. An ecologically significant proportion of the population of the species is estimated to be 10 birds (0.1% of the total population using the lower population estimate of 10,000 birds). The risk of collision mortality is unlikely to be of a sufficient magnitude to interfere with the recovery of the species.</p>



## 11.15 Masked Owl

### 11.15.1 Ecology, Habitat and Distribution

The species is native to Australia, Indonesia and Papua New Guinea (BirdLife International 2018). The distribution of the masked owl (northern) within Australia is poorly known, and three subpopulations have been suggested: Kimberley, Northern Territory and Cape York (SPRAT 2021). In Queensland it occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide (SPRAT 2021).

The extent of occurrence of the masked owl (northern) is estimated with medium reliability at 1,800,000 km<sup>2</sup> while the area of occupancy is estimated at 18,000 km<sup>2</sup>. Both of these are thought to be declining (SPRAT 2021).

The masked owl is known to use a range of habitat types in Queensland including riparian forest, rainforest, open forests, Melaleuca swamps and mangrove edges, as well as along the margins of sugar cane fields (SPRAT 2021).

It requires large old-growth trees with large hollows for nesting (SPRAT 2021). It usually nests in patches of closed forest and feeds largely on small to medium sized terrestrial mammals. The subspecies probably breeds in March-October and nests are 7-8 km apart (SPRAT 2021).

The majority of the Project area, with the exception of cleared areas and rainforest patches, comprises potential habitat for the masked owl. The riparian environments of the higher stream order waterways within the Project area comprise high value foraging, breeding and roosting habitat for the species. These areas are considered to constitute critical habitat for the masked owl.

### 11.15.2 Important Populations

The DAWE listing advice does not specify what constitutes an important population for the masked owl. Therefore, the definition of an important population is taken from the EPBC Act significant impact guidelines, which states that important populations are necessary for a species' long-term survival and recovery, and include:

- 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.

The Project area coincides with the western extent of the known distribution of the wet tropics sub-population of the species. Consequently, the population within the Project area is considered to be an important population.

### 11.15.3 Threats to the Species

Reasons for the relatively low population density of the masked owl (northern) are not well understood (Garnett & Crowley 2000). It is suspected that the species has been affected by broadscale alterations to the environment of northern Australia including altered fire regimes, agriculture, feral animals and pasture grasses (Woinarski 2004). It is generally accepted that a large decline in numbers of small and medium-sized native mammals across northern Australia over the past century has reduced the availability of food for the masked owl (SPRAT 2021).

There is conjecture within the literature about other threatening process for the species, with conflicting hypotheses around competition with other large owls and/or limited availability of large trees with suitable hollows for nesting (SPRAT 2021).



#### 11.15.4 Distribution within the Project Area

During field surveys, the species was observed (through calls) at two locations along Blunder Creek within the Glen Gordon property (see **Figure 6.3**).

The majority of the Project area, with the exception of cleared areas and rainforest patches, comprises potential habitat for the masked owl. The riparian environments of the higher stream order waterways within the Project area comprise high value foraging, breeding and roosting habitat for the species, as they typically comprise larger *Eucalypt* trees with potential for hollows of a suitable size. These areas are considered to constitute critical habitat for the masked owl.

#### 11.15.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.42 Potential Construction Impacts and Proposed Mitigation – Masked owl**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 4.93 ha of habitat critical to the survival of the species and 1,185.54 ha of potential habitat for the species.	<p>Large areas of critical and potential masked owl habitat throughout the Project area will be retained.</p> <p>Design has sought to avoid and minimise clearing within the riparian locations and areas of larger trees (and likely more suitable hollows). If practical during construction, micro-siting of access tracks will seek to avoid large hollow-bearing trees.</p> <p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential habitat.</p> <p>Clearing of masked owl habitat will occur sequentially and in accordance with an approved Species Management Program.</p> <p>Impacts to critical habitat are generally restricted to access track and overhead transmission line crossings of riparian environments; the turbines and hardstands are located primarily on elevated ridgelines where there is less suitable habitat for the species.</p> <p>Unavoidable impacts to denning trees will be mitigated through installation of nest boxes within retained habitat on a 1:1 basis.</p>
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery,	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest



Potential Impact	Assessment	Proposed Mitigation
	vehicles and materials brought to site from outside the Project area.	control measures will be established to minimise the risk of the Project further exacerbating the issue.
Species mortality (vehicle collision, vegetation clearance)	During vegetation clearing, there is potential for direct mortality if masked owls are present (i.e. denning in the hollow-bearing trees to be cleared). The risk of vehicle strike is negligible.	Clearing of habitat could potentially result in significant injury or death to individual masked owls, however clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher and retention of habitat trees overnight. The process will significantly mitigate any potential impacts associated with clearing operations ensuring masked owls are detected providing procedures are followed and spotters are allowed ample opportunity to check trees before felling. Hollow-bearing trees will be marked and hollows inspected where possible for the presence of arboreal fauna prior to tree-felling. Clearing protocols will be developed including methods for clearing hollow-bearing trees (e.g. remove surrounding trees on previous day) and check for any injured species. Capture and release those healthy individuals. Any injured individuals will be taken to a vet for treatment. Where practicable, dead standing timber and living, hollow-bearing trees should be retained.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the masked owl.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Bushfire risk		
Noise and lighting		
Reduced air quality		

### 11.15.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.43 Potential Operational Impacts and Proposed Mitigation – Masked owl**

Potential Impact	Assessment	Proposed Mitigation
Species mortality (collision with turbines)	The species hunts primarily on the ground or within the canopy, taking small mammals – typically gliding from perches in trees to prey. This flight behaviour makes it unlikely it flies at RSA.	A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data).



Potential Impact	Assessment	Proposed Mitigation
		Protocols for carcass searches to enable detection of any mortality will be included within the Bird and Bat Management Plan. Triggers for adaptive management will also be included.
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.

### 11.15.7 Assessment of Significant Residual Impacts

The Project is not considered likely to have a significant residual impact on the masked owl (northern). A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.44**.

**Table 11.44 Significant Residual Impact Assessment – Masked owl**

Significant Impact Criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>Given the Project area's location on the edge of the known distribution of the wet tropics subpopulation of this species, the population within and around the Project area is likely to be considered an important population.</p> <p>The Project will involve the clearing of up to 4.93ha of critical habitat for the species and 1,185.54ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of hollows that are a suitable size for the masked owl. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p>



Significant Impact Criteria	Assessment
	<p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable impacts on hollow-bearing trees will mitigated through replacement of hollows/nest boxes on a 1:1 basis.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is considered unlikely that the Project will lead to a long-term decrease in the size of an important population of the masked owl.</p> <p>Furthermore, operational impacts on the species associated with the Project are expected to be unlikely. The masked owl is highly unlikely to fly within the RSA of the operational wind turbines.</p>
<p>Reduce the area of occupancy of an important population</p>	<p><b>Unlikely</b></p> <p>Given the Project area's location on the edge of the known distribution of the wet tropics subpopulation of this species, the population within and around the Project area is likely to be considered an important population.</p> <p>The Project will involve the clearing of up to 4.93ha of critical habitat for the species and 1185.54ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of hollows that are a suitable size for the masked owl. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>The Project is unlikely to cause a permanent disappearance of the species from a 4 km<sup>2</sup> area such that there would be a decrease in the area of occupancy of the species.</p>
<p>Fragment an existing important population into two or more populations</p>	<p><b>Unlikely</b></p> <p>Given the Project area's location on the edge of the known distribution of the wet tropics subpopulation of this species, the population within and around the Project area is likely to be considered an important population.</p> <p>The Project will involve the clearing of up to 4.93ha of critical habitat for the species and 1185.54ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of hollows that are a suitable size for the masked owl. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable impacts on hollow-bearing trees will mitigated through replacement of hollows/nest boxes on a 1:1 basis.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is</p>



Significant Impact Criteria	Assessment
	<p>considered unlikely that the Project will fragment an existing important population of the masked owl into two or more populations.</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p><b>Unlikely</b></p> <p>The Project will involve the removal of 1,185.54ha of potential habitat and 4.93ha of critical habitat for the masked owl. This clearing represents approximately 0.5% of the critical habitat for the species mapped within the Project area.</p> <p>Given the extent of habitat remaining in the locality, coupled with the implementation of the proposed mitigation measures, the removal of approximately 4.93ha of critical habitat is not considered likely to constitute a significant impact to the species.</p>
<p>Disrupt the breeding cycle of an important population</p>	<p><b>Unlikely</b></p> <p>Given the Project area's location on the edge of the known distribution of the wet tropics subpopulation of this species, the population within and around the Project area is likely to be considered an important population.</p> <p>The species has a large home range, with nests 7-8 km apart (SPRAT 2021). Females usually lay 2-3 eggs, with the breeding season likely to be between March and October (DAWE 2021). Works within critical habitat will be undertaken outside these months where the Project's schedule allows this to occur.</p> <p>Should a pre-clearance survey identify that a masked owl is nesting within the Project footprint, all efforts will be made to microsite the infrastructure to avoid the impact.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable impacts on hollow-bearing trees will mitigated through replacement of hollows/nest boxes on a 1:1 basis.</p> <p>Taking into account the avoidance, minimisation and mitigation measures proposed, it is not considered likely that the Project will disrupt the breeding cycle of an important population of the masked owl.</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The Project will involve the clearing of up to 4.93 ha of critical habitat for the species and 1,185.54 ha of potential habitat for the species. Critical habitat corresponds with more mature vegetation communities in riparian areas, where there is a greater likelihood of hollows that are a suitable size for the masked owl. The Project design has sought to avoid and minimise impacts within these areas to the greatest extent practicable.</p> <p>Vegetation clearing will be undertaken in accordance with an approved SMP and any unavoidable impacts on hollow-bearing trees will mitigated through replacement of hollows/nest boxes on a 1:1 basis.</p>



Significant Impact Criteria	Assessment
	<p>Taking into account the avoidance, minimisation and mitigation measures proposed, and the fact that extensive areas of critical and potential habitat will be retained throughout the Project area, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the masked owl is likely to decline.</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the masked owl habitat.</p>
<p>Introduce disease that may cause the species to decline</p>	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the masked owl. It is not expected that the Project will introduce disease that may cause the species to decline.</p>
<p>Interfere substantially with the recovery of the species</p>	<p><b>Unlikely</b></p> <p>The Project is not expected to interfere substantially with the recovery of the species. Clearing of habitat will be undertaken sequentially, and large areas of potential and critical habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any masked owls within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and hollow-bearing trees protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors, will support the species into the future.</p> <p>From an operational perspective, the Project poses minimal overall risk to the masked owl.</p>

## 11.16 Magnificent Brood-frog

### 11.16.1 Ecology, Habitat and Distribution

The magnificent brood-frog is range-restricted and is only known to occur on rhyolites of the Glen Gordon volcanics at altitudes greater than 800 m. The species was known only from the Ravenshoe and Herberton areas (including the





Ravenshoe State Forest immediately to the north of the Project area) until 2013 when it was found approximately 160 km to the southeast.

The magnificent brood-frog is known to breed in and around seepage areas in open eucalypt forests with an understorey comprising kangaroo grass, grass trees, sedges, swamp box and she-oaks.

### 11.16.2 Important Populations

The Recovery Plan for the Magnificent Broodfrog (McDonald et al, 2000) does not identify important populations of magnificent brood-frog. The Significant Impact Guidelines (DoE 2013) define an important population of a vulnerable species as populations that are:

- Key source populations either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.

Given the species' highly restrictive range, it could be argued that any known population of magnificent brood-frog is an important population.

### 11.16.3 Threats to the Species

Habitat loss and degradation (due to grazing, logging, road works and other development) appear to be the greatest threats to the magnificent brood-frog (McDonald et al, 2000).

### 11.16.4 Distribution within the Project Area

During field surveys, the species was observed in six locations (out of 21 survey locations), with two locations recording large groups of male frogs (15-20 individuals). Only two of the six recorded observations were above the 800 m contour, which forms the lower limit of the species' range according to published literature.

The following habitat was mapped for magnificent brood-frog across the Project area (**Figure 8-12**):

- Habitat critical to the survival of the species is open eucalypt forest within 50 m of a stream order 1 watercourse on rhyolites of the Glen Gordon volcanics, above 800 m; and
- Potential habitat is open eucalypt forest within 50 m of a stream order 1 watercourse on rhyolites of the Glen Gordon volcanics, below 800 m.

### 11.16.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.45 Potential Construction Impacts and Relevant Mitigation – Magnificent Brood-frog**

Potential Impact	Assessment	Proposed Mitigation
Vegetation and habitat clearance	The Project may lead to the clearing of 27.03 ha of habitat critical to the survival of the	Large areas of critical and potential magnificent brood-frog habitat throughout the Project area will be retained.



Potential Impact	Assessment	Proposed Mitigation
	<p>species and 21.15 ha of potential habitat for the species.</p>	<p>Design has sought to avoid and minimise clearing within its preferred habitat.</p> <p>If practical during construction, micro-siting of access tracks will seek to avoid seepage areas.</p> <p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint.</p> <p>Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of potential habitat.</p> <p>Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities.</p> <p>Clearing of magnificent brood-frog habitat will occur sequentially and in accordance with an approved Species Management Program.</p>
<p>Fragmentation (of populations and habitat)</p>	<p>The Project may lead to the clearing of 27.03 ha of habitat critical to the survival of the species and 21.15 ha of potential habitat for the species.</p>	<p>Retained vegetation will be maintained through implementation of a Vegetation Management Plan to reduce hazards from fire, pest species, degradation and other potential impacts. This will assist in maintaining the integrity of the vegetation as habitat and will reduce disturbance to surrounding habitat and conservation areas.</p> <p>Project design has sought to minimise the width of access tracks in areas of potential and critical magnificent brood-frog habitat.</p> <p>Targeted revegetation of parts of the Project footprint not required for operation will occur.</p>
<p>Weed and pest incursion</p>	<p>The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.</p>	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p>
<p>Species mortality (vehicle collision, vegetation clearance)</p>	<p>During vegetation clearing, there is potential for direct mortality if magnificent brood-frogs are present. The risk of vehicle strike is negligible.</p>	<p>Clearing of habitat could potentially result in significant injury or death to individual magnificent brood-frogs, however, clearing operations will be conducted in accordance with the provisions outlined in a sequential clearing procedure including the use of a fauna spotter catcher. The process will significantly mitigate any potential impacts associated with clearing</p>



Potential Impact	Assessment	Proposed Mitigation
		operations ensuring magnificent brood-frogs are detected providing procedures are followed and spotters are allowed ample opportunity to check seepage areas before site clearing.
Erosion and sedimentation	These potential impacts are considered to be negligible risks for the magnificent brood-frog.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage these negligible risks.
Noise and lighting		
Reduced air quality		
Bushfire risk		

### 11.16.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.46 Potential Operational Impacts and Relevant Mitigation – Magnificent Brood-frog**

Potential Impact	Assessment	Mitigation
Bushfire risk	During operational activities, there is potential for heightened fire risk due to the increased presence of maintenance and monitoring vehicles and personnel in the Project area. This is through the use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Weed and pest incursion	The Project has the potential to facilitate the spread of weeds and pest fauna through machinery, vehicles and materials brought to site from outside the Project area.	The Project area is currently subjected to existing weed and pest impacts. During operation of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.

### 11.16.7 Assessment of Significant Residual Impacts

The Project could potentially have a significant residual impact on the magnificent brood-frog. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.47**.



**Table 11.47 Significant Residual Impact Assessment – Magnificent Brood frog**

Significant Impact Criteria	Project Outcome
Lead to a long-term decrease in the size of an important population of a species	<p><b>Unlikely</b></p> <p>As the species has a highly restricted range, it is considered that any population of magnificent brood-frog within the Project area is part of an important population.</p> <p>The Project area contains a mixture of potential and critical habitat for the species.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a long-term decrease in the size of the Project area’s magnificent brood-frog.</p>
Reduce the area of occupancy of an important population	<p><b>Unlikely</b></p> <p>The proposed habitat removal associated with the Project is not concentrated in a manner that will remove one or more 4km<sup>2</sup> grid squares from the magnificent brood-frog population’s area of occupancy.</p>
Fragment an existing important population into two or more populations	<p><b>Unlikely</b></p> <p>As the species has a highly restricted range, it is considered that any population of magnificent brood-frog within the Project area is part of an important population. The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area.</p> <p>Risks of fragmentation are likely to be highest where access roads and overhead transmission line infrastructure crosses areas of critical habitat.</p> <p>Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to fragmentation of an existing important population into two or more populations.</p> <p>Large area of magnificent brood-frog habitat will remain within the Project area post clearing. These retained and adjacent habitats, particularly along riparian corridors will support the species, and provide connectivity. The Project is not expected to fragment an existing population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species	<p><b>Likely</b></p> <p>The Project will involve the removal of 21.15ha of potential habitat and 27.03ha of critical habitat for the magnificent brood-frog (representing approximately 4.4% of the critical habitat mapped within the Project area).</p> <p>Despite the extent of habitat remaining in the locality, coupled with the implementation of the proposed mitigation measures, the removal</p>



Significant Impact Criteria	Project Outcome
	of approximately 27.03ha of critical habitat is considered likely to constitute a significant impact to the species.
Disrupt the breeding cycle of an important population	<p><b>Likely</b></p> <p>Very little is known about the life cycle of the magnificent brood-frog. It is considered likely that eggs are laid on moist soil in or near a seepage and that after hatching, the tadpoles make their way down the seepage or are washed into first order streams where development continues in small pools (McDonald et al, 2000). Construction activities have the potential to degrade and destroy seepage areas, which are dependent on climate factors and difficult to map year-on-year. The Project could potentially disrupt the breeding cycle of an important population.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project area contains a mixture of potential and critical habitat for the species. The vast majority of this habitat will be retained within the Project area. Nevertheless, the Project will involve the removal of 21.15ha of potential habitat and 27.03ha of critical habitat for the magnificent brood-frog.</p> <p>Large tracts of magnificent brood-frog habitat will remain within the Project area post clearing which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors will support the species and provide connectivity. Rehabilitation activities will also aim to restore woodland habitats that will provide magnificent brood-frog habitats over short to medium term. Aside from the sensitive design measures already employed for the Project, the measures proposed to manage vegetation clearing and fragmentation are expected to be effective in ensuring that the Project does not lead to a decline in the species.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p><b>Unlikely</b></p> <p>Clearing activities associated with the Project have the potential to open up areas that may be subject to weed incursion and increased prevalence of pest fauna.</p> <p>Areas of retained vegetation will be managed, including weed and pest animal control to maintain the retained areas in good condition and reduce threats. Hygiene protocols in the operational areas will also be implemented to reduce any weeds or disease being introduced to the Project area or spread from the Project area.</p> <p>Based on implementing the proposed mitigation measures it is not expected the Project will result in an increase of invasive species in the magnificent brood-frog habitat.</p>
Introduce disease that may cause the species to decline	<p><b>Unlikely</b></p> <p>No specific disease is applicable to the magnificent brood-frog. It is not expected that the Project will introduce disease that may cause the species to decline.</p>



Significant Impact Criteria	Project Outcome
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project is not expected to interfere substantially with the recovery of the species. Clearing of habitat will be undertaken sequentially, and large areas of potential and critical habitat will be retained across the Project area. This availability and connectivity of foraging and breeding habitat will ensure any magnificent brood-frogs within the Project area will have available foraging and breeding resources. Fire will also be managed on site to ensure hot wildfires are minimised and hollow-bearing trees protected.</p> <p>Large tracts of habitat will remain within the Project area which are connected to larger habitats in adjacent areas. These retained and adjacent habitats, particularly along riparian corridors, will support the species and provide connectivity and maintain gene flow for the species.</p>

## 11.17 Fork-tailed Swift

### 11.17.1 Ecology, Habitat and Distribution

The fork-tailed swift is a non-breeding visitor to all states and territories of Australia. There are scattered records of the fork-tailed swift in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread but scattered in coastal areas from 20° S, south to Brisbane and in much of the south south-eastern region. They are more widespread west of the Great Divide, and are commonly found west of the line joining Chinchilla and Hughenden. They are found to the west between Richmond and Winton, Longreach, Gowan Range, Maraila National Park and Dirranbandi. They are rarely found further west to Windorah and Thargomindah (SPRAT 2021).

The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. They probably roost aerially, but are occasionally observed to land (SPRAT 2021).

### 11.17.2 Ecologically Significant Proportion of the Population

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species and each circumstance will need to be evaluated. Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

The global population of fork-tailed swift is currently unknown but thought to be stable (BirdLife International 2019). One individual fork-tailed swift was observed within the Project area during the January 2021 surveys. Given the



survey effort (75 person hours at 56 sites across the Project area), it is considered unlikely that the Project area supports an ecologically significant proportion of the population of fork-tailed swift.

### 11.17.3 Threats to the Species

There are no significant threats to the fork-tailed swift in Australia. Potential threats include habitat destruction and predation by feral animals (SPRAT 2021).

### 11.17.4 Distribution within the Project Area

An area of important habitat for a migratory species is:

- Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- Habitat utilised by a migratory species which is at the limit of the species' range; and/or
- Habitat within an area where the species is declining.

Based on the above, the Project area is not considered to provide important habitat for the fork-tailed swift as:

- The Project area does not appear to support an ecologically significant proportion of the population of the species;
- There is no habitat of critical importance to the species within the Project area;
- The species is not at the limit of its range; and
- The species is not in decline.

### 11.17.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.48 Potential Construction Impact and Relevant Mitigation – Fork-tailed Swift**

Potential Impact	Assessment	Mitigation
Vegetation/habitat clearance	As swifts are almost exclusively aerial, direct impacts from clearance of their habitat are not expected to occur as a result of Project construction. Fork-tailed swift frequently forage over cleared or urban landscapes and the Project is unlikely to impact on their foraging resources during construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Fragmentation	As swifts are almost exclusively aerial, direct impacts from fragmentation of their habitat are	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



Potential Impact	Assessment	Mitigation
	not expected to occur as a result of Project construction.	
Erosion and water quality	Fork-tailed swift is unlikely to be directly impacted by impacts from erosion and reduced water quality resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	There is limited scope for indirect impacts such as increased bushfire risk on this species resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Noise and lighting	There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Reduced air quality	There is limited scope for indirect impacts from reduced air quality on this species resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Weeds and pests	There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project construction. Although there is the possibility of roosting individuals being taken by cats, the frequency of such events is likely to be low.  The potential for weeds to impact on the quality of foraging habitat is low.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.

### 11.17.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.49 Potential Operational Impacts and Relevant Mitigation – Fork-tailed Swift**

Potential Impact	Assessment	Mitigation
Collision risk	During Project operation there is potential for fork-tailed swift to collide with wind turbines during the summer months when the species may be present within the Project area. The impact is expected to be minor as this species uses a range of	A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data). Additionally, protocols for carcass





Potential Impact	Assessment	Mitigation
	<p>habitats and is widespread across Australia.</p> <p>Fork-tailed Swift is not considered to be particularly prone to turbine strike, being a relatively mobile species and often flying at heights well above RSA.</p>	<p>searches to enable detection of any mortality will be included.</p> <p>Triggers for adaptive management will be included.</p>
Bushfire risk	<p>The increased presence of construction personnel, vehicles and machinery in the Project area during operational activities will lead to elevated bushfire risk unless adequately mitigated.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.</p>
Noise and lighting	<p>There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project operation. Lighting of turbines during operation may lead to increased insect numbers in the vicinity of turbine structures. This may attract insectivorous species such as fork-tailed swift to the area around structures, increasing collision risk. However, it is exclusively a diurnal species, and therefore the mechanism for increased impacts from lighting impacts is negligible.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>
Weeds and pests	<p>There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project operation. Although there is the possibility of roosting individuals being taken by cats, the frequency of such events is likely to be low.</p> <p>The potential for weeds to impact on the quality of foraging habitat is low.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>
Vehicle strike	<p>The potential for species mortality during operation of the Project is low (beyond that already assessed for collision with turbine structures). Fork-tailed swift is a high-flying species and unlikely to interact with Project vehicles.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>



### 11.17.7 Assessment of Significant Residual Impacts

The Project is unlikely to have a significant residual impact on the fork-tailed swift. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.50**.

**Table 11.50 Significant Residual Impact Assessment – Fork-tailed Swift**

Significant Impact Criteria	Project Outcome
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The fork-tailed swift is almost exclusively aerial. The Project area is not considered to provide important habitat for the fork-tailed swift, which has a vast range and very broad habitat preferences.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p>The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue.</p> <p>Feral cat control will be undertaken – this will assist to reduce potential predation on fork-tailed swift should the species alight within the Project area.</p> <p>The Project area is not considered to provide important habitat for the fork-tailed swift.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	<p>The species does not breed in Australia, therefore the Project will not disrupt the breeding cycle of the fork-tailed swift.</p> <p>The global population of fork-tailed swift is currently unknown but thought to be stable (BirdLife International 2019). One individual fork-tailed swift was observed within the Project area during the January 2021 surveys. Given the survey effort (75 person hours at 56 sites across the Project area), it is considered unlikely that the Project area supports an ecologically significant proportion of the population of fork-tailed swift.</p> <p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>

## 11.18 Black-faced Monarch

### 11.18.1 Ecology, Habitat and Distribution

The black-faced monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border (SPRAT 2021).

The black-faced monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf)



thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. It breeds in rainforest habitat and feeds mostly in rainforest but also in open eucalypt forest (SPRAT 2021).

Its migration has been described as an "Intercontinental Whole Coast" pattern. Species exhibiting this pattern move north along the east coast of Australia from as far south as Victoria. They move directly along the coast as well as taking the shortest route inland, and a large proportion of the population leaves Australia during winter (SPRAT 2021).

### 11.18.2 Ecologically Significant Proportion of the Population

The Referral guideline for 14 birds listed as migratory species (DoE 2015a) identifies that an ecologically significant proportion of the black-faced monarch population would equate to 4,600 individuals in relation to the global population, or 460 individuals for the national population.

One individual black-faced monarch was observed within the Project area during the January 2021 field surveys. The desktop assessment indicates multiple observations of the species within the protected area estate to the east of the Project area (as indicated in **Figure 8-13**), with these all being of individual or very small groups of birds (maximum of three) (ALA 2021). On this basis, it does not seem likely that the Project area would support an ecologically significant proportion of black-faced monarch.

### 11.18.3 Threats to the Species

The Referral guideline for 14 birds listed as migratory species (DoE 2015a) the black rat and invasive vines of riparian habitat such as rubber vine as being key threats to the species.

### 11.18.4 Distribution within the Project Area

One individual black-faced monarch was recorded within the Project area during field surveys, and there are multiple records of the species within the protected area estate to the east. The most recent of these records is of two individuals dating from 2018.

The following habitats have been across the Project area:

- Important habitat – rainforest communities (including wet sclerophyll forests) which occur in small, isolated patches along the boundary between the Project area and the Wet Tropics WHA; and
- Potential habitat – open eucalypt forest within 1km of the above rainforest habitats.

### 11.18.5 Potential Construction Impacts from the Project and Relevant Mitigation

**Table 11.51 Potential Construction Impacts and Relevant Mitigation – Black-faced Monarch**

Potential Impact	Assessment	Mitigation
Vegetation/habitat clearance	There is minimal important habitat for the black-faced monarch within the Project area and none of this is proposed to be cleared. The Project	The majority of potential black-faced monarch foraging habitat throughout the Project area will be retained.



Potential Impact	Assessment	Mitigation
	<p>may lead to the clearing of 84.49 ha of potential foraging habitat for the species.</p>	<p>Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint. Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of black-faced monarch foraging habitat. Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities. Clearing of black-faced monarch foraging habitat will occur sequentially and in accordance with an approved Species Management Program.</p>
Fragmentation	<p>The Project may lead to the clearing of 84.49 ha of potential foraging habitat for the species.</p>	<p>Potential foraging habitat is located in discrete patches along the eastern boundary of the Project area. The Project has been designed to minimise fragmentation of these habitats with access tracks approaching from the west. Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>
Erosion and water quality	<p>The black-faced monarch is unlikely to be directly impacted by impacts from erosion and reduced water quality resulting from Project construction.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>
Bushfire risk	<p>Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.</p>
Noise and lighting	<p>There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project construction.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>
Reduced air quality	<p>There is limited scope for indirect impacts from reduced air quality on this species resulting from Project construction.</p>	<p>Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.</p>



Potential Impact	Assessment	Mitigation
Weeds and pests	<p>There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project construction. Although there is the possibility of roosting individuals being taken by feral cats, the frequency of such events is likely to be low.</p> <p>The potential for weeds to impact on the quality of foraging habitat is low.</p>	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.

### 11.18.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.52 Potential Operational Impacts and Relevant Mitigation – Black-faced Monarch**

Potential Impact	Assessment	Mitigation
Collision risk	The black-faced monarch typically forages within 6m of the ground (SPRAT 2021), well below RSA. The risk of collision with the wind turbines is therefore considered negligible.	<p>A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data). Additionally, protocols for carcass searches to enable detection of any mortality will be included.</p> <p>Triggers for adaptive management will be included.</p>
Bushfire risk	The increased presence of construction personnel, vehicles and machinery in the Project area during operational activities will lead to elevated bushfire risk unless adequately mitigated.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Noise and lighting	There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project operation. Lighting of turbines during operation may lead to increased insect numbers in the vicinity of turbine structures. This may attract insectivorous species such as the black-faced monarch to the area around structures, increasing collision risk. However, it is exclusively a diurnal species, and therefore the mechanism for increased impacts from lighting impacts is negligible.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



Potential Impact	Assessment	Mitigation
Weeds and pests	There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project operation. Although there is the possibility of roosting individuals being taken by cats, the frequency of such events is likely to be low. The potential for weeds to impact on the quality of foraging habitat is low.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Vehicle strike	The potential for species mortality during operation of the Project is low (beyond that already assessed for collision with turbine structures).	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.

### 11.18.7 Assessment of Significant Residual Impacts

The Project is not expected to have a significant residual impact on the black-faced monarch. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.53**.

**Table 11.53 Significant Residual Impact Assessment – Black-faced Monarch**

Significant Impact Criteria	Project Outcome
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Referral guideline for 14 birds listed as migratory species (DoE 2015a) identifies that an area of impact on important habitat that is likely to result in a significant impacts is 2,600 ha (in relation to the global population) or 260 ha (in relation to the national population). The Project will not result in any direct or indirect impacts to important habitat for the black-faced monarch.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Feral cat control will be undertaken – this will assist to reduce potential predation on black-faced monarch. The Project contains minimal important habitat for the black-faced monarch.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	The Project area does not support an ecologically significant proportion of the population of black-faced monarch and there will be no direct or indirect impacts to important habitat for the species. Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



## 11.19 Latham's Snipe

### 11.19.1 Ecology, Habitat and Distribution

Latham's snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia (i.e. it travels through northern Australia to reach non-breeding areas located further south). The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. Most birds spend the non-breeding period at sites located south of the Richmond River in New South Wales (SPRAT 2021).

Latham's snipe is dispersive during its stay in Australia. The species is highly mobile, will readily move between locations as conditions become more or less favourable, has a widespread distribution and, in wet years (when potentially many wetland areas are available), can have a widely dispersed population. Latham's snipe probably moves in response to rainfall and the availability of food (SPRAT 2021).

In Australia, Latham's snipe occurs in a wide variety of permanent and ephemeral wetlands. They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (SPRAT 2021). The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat. As such, snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest (SPRAT 2021).

### 11.19.2 Ecologically Significant Proportion of the Population

The global population is estimated to number c.25,000-100,000 individuals (Wetlands International 2006). No Latham's snipe were observed within the Project area during the January 2021 surveys although lone individuals and small groups (up to three birds) have been previously recorded within the Project area (ALA 2021). Given the survey effort (75 person hours at 56 sites across the Project area), it is considered unlikely that the Project area supports an ecologically significant proportion of the population of Latham's snipe, which would equate to between 250 and 1,000 individuals.

### 11.19.3 Threats to the Species

Historical threats to Latham's snipe have been identified as:

- Loss of habitat caused by drainage and modification of wetlands – this is ongoing; and
- Excessive mortality due to hunting – this is now banned (SPRAT 2021).

### 11.19.4 Distribution within the Project Area

There is no important habitat mapped within the Project area for Latham's snipe. Wetlands within the Project area have been mapped as potential habitat (

Figure 8-14).



## 11.19.5 Potential Construction Impact from the Project and Relevant Mitigation

**Table 11.54 Potential Construction Impacts and Relevant Mitigation – Latham’s Snipe**

Potential Impact	Assessment	Mitigation
Vegetation/habitat clearance	There is no important habitat for Latham’s snipe within the Project area. The Project may lead to the clearing of 4.54 ha of potential habitat for the species.	The majority of Latham’s snipe habitat throughout the Project area will be retained. Vegetation clearing will be minimised as much as practicable through micro-siting within the proposed Project footprint. Project infrastructure including laydown areas, construction compounds and substation have been sited in cleared areas where practicable to avoid clearing of Latham’s snipe habitat. Existing access tracks within the Project area are prioritised as part of the design to minimise any further clearing and fragmentation of vegetation communities. Clearing of Latham’s snipe habitat will occur sequentially and in accordance with an approved Species Management Program.
Fragmentation	The Project may lead to the clearing of 4.54 ha of potential habitat for the species.	The Project has been designed to minimise fragmentation of Latham’s snipe habitat by aligning with existing access tracks across wetland areas as far as practicable. Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Erosion and water quality	The Latham’s snipe is unlikely to be directly impacted by impacts from erosion and reduced water quality resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Bushfire risk	Inappropriate fire regimes are a threat to this species. The Project is not expected to increase the risk of high intensity bushfires in the Project area.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and construction activities will be undertaken in accordance with this plan.
Noise and lighting	There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.





Potential Impact	Assessment	Mitigation
Reduced air quality	There is limited scope for indirect impacts from reduced air quality on this species resulting from Project construction.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Weeds and pests	There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project construction. Although there is the possibility of roosting individuals being taken by feral cats, the frequency of such events is likely to be low. The potential for weeds to impact on the quality of foraging habitat is low.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.

### 11.19.6 Potential Operational Impacts from the Project and Relevant Mitigation

**Table 11.55 Potential Operational Impacts and Relevant Mitigation – Latham’s Snipe**

Potential Impact	Assessment	Mitigation
Collision risk	There is a risk of collision with the wind turbines during migratory flight.	A Bird and Bat Management Plan will be developed during the detailed design stage (post-approval) including operational monitoring for the site utilisation of birds and bats (compared to baseline data). Additionally, protocols for carcass searches to enable detection of any mortality will be included.  Triggers for adaptive management will be included.
Bushfire risk	The increased presence of construction personnel, vehicles and machinery in the Project area during operational activities will lead to elevated bushfire risk unless adequately mitigated.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk. Specifically, a Project Bushfire Management Plan will be prepared and operational activities will be undertaken in accordance with this plan.
Noise and lighting	There is limited scope for indirect impacts such as noise and lighting on this species resulting from Project operation. Latham’s snipe habitat coincides with low-lying wetland areas rather than the turbine locations on ridgelines.	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Weeds and pests	There is limited scope for indirect impacts such as weed and pest interaction with this species resulting from Project operation. Although there is the possibility of individuals being	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



Potential Impact	Assessment	Mitigation
	taken by cats, the frequency of such events is likely to be low. The potential for weeds to impact on the quality of foraging habitat is low.	
Vehicle strike	The potential for species mortality during operation of the Project is low (beyond that already assessed for collision with turbine structures).	Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.

### 11.19.7 Assessment of Significant Residual Impact

The Project is not expected to have a significant residual impact on Latham's snipe. A full significance assessment following the Significant Impact Guidelines (DoE 2013) is presented in **Table 11.56**.

**Table 11.56 Significant Residual Impact Assessment – Latham's Snipe**

Significant Impact Criteria	Project Outcome
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Project area does not support important habitat for Latham's snipe. Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	The Project area is currently subjected to existing weed and pest impacts. During construction of the Project, weed and pest control measures will be established to minimise the risk of the Project further exacerbating the issue. Feral cat control will be undertaken – this will assist to reduce potential predation on Latham's snipe. The Project does not contain important habitat for the Latham's snipe.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	The Project area does not support an ecologically significant proportion of the population of Latham's snipe and there will be no direct or indirect impacts to important habitat for the species. Mitigation measures outlined in <b>Section 10</b> are considered appropriate to manage this risk.



## 12.0 Environmental Offset Availability

Where the Project is likely to have a significant residual impact on MNES values these values will be offset in accordance with the requirements set out in the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (Commonwealth of Australia 2012). While the approach to environmental offsets is yet to be determined, a preliminary assessment of the availability of potential offset sites has been undertaken (see below).

Spatial analysis was conducted to assess the availability of potentially suitable offsets to address significant residual impacts to MNES associated with the action. The proposed action straddles two sub-regions, Kirrama – Hinchinbrook (subregion 7.6) located within the Wet Tropics Bioregion and Herberton – Wairuna (subregion 9.6) located within the Einasleigh Uplands Bioregion. Both sub-regions were found to be predominantly (greater than 90%) zoned “Regional Landscape and Rural Production Area” and therefore there are few regional or local planning constraints preventing the establishment of offsets in these two subregions.

Within the Kirrama – Hinchinbrook sub-region there is >14,500 ha of non-remnant rural lands mapped as Category X (non-remnant) and there is 200 ha of regrowth vegetation mapped as Category C. Both these types of areas are potentially suitable for the establishment of offsets. Of the total area some 2,832 ha occur within State Level Bioregional Corridors with proximity to the protected area estate.

Within the Herberton – Wairuna subregion there is 103,289 ha of non-remnant areas mapped as Category X (non-remnant) and there is 400 ha of mapped regrowth vegetation, Category C. Of those non-remnant areas 83,782 ha occur within State Level Bioregional Corridors, whilst some 65,891 ha of that area occurs in close proximity to the protected area estate.

As outlined above, the spatial assessment of the availability of potential offset sites has identified that there are large areas of unconstrained non-remnant and regrowth vegetation with suitable landscape connectivity available within the relevant sub-regions of each of the bioregions.



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## Appendix A

# Desktop Searches



# 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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 03/05/21 10:42:10

## [Summary](#)

## [Details](#)

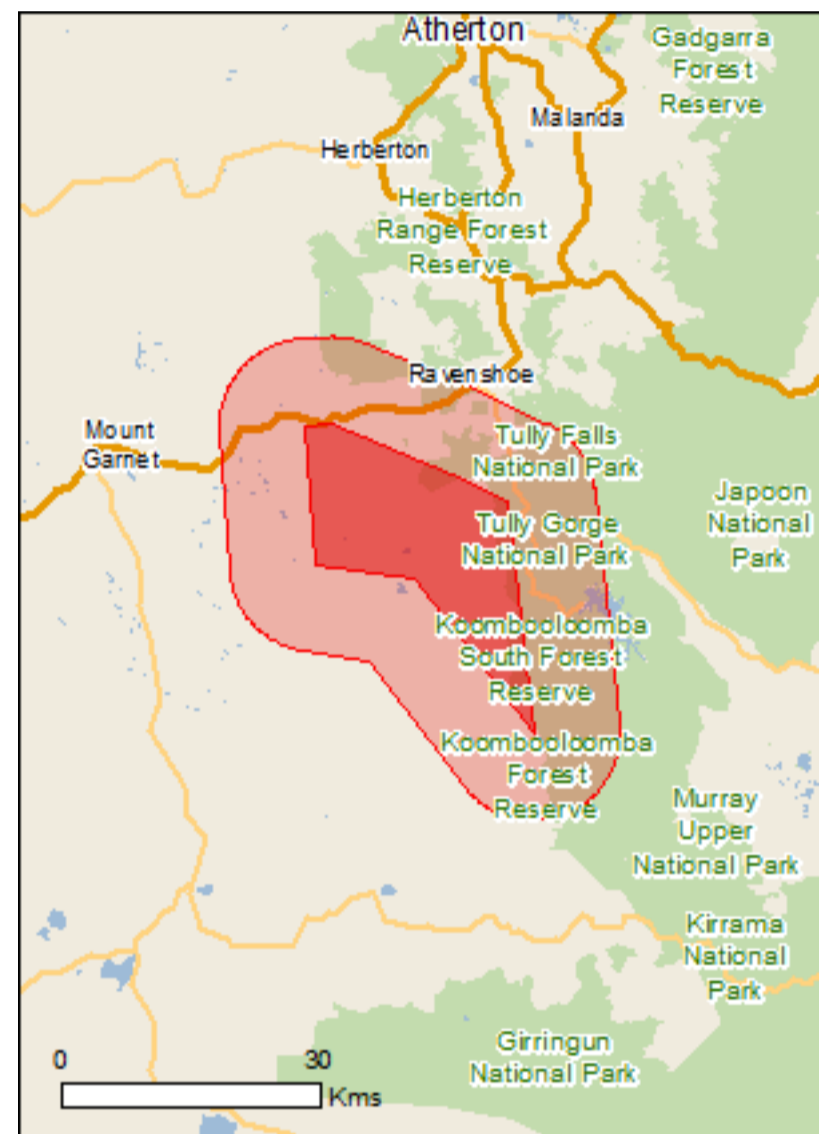
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

## [Caveat](#)

## [Acknowledgements](#)



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[Buffer: 10.0Km](#)



# Summary

## Matters of National Environmental 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](#).

<a href="#">World Heritage Properties:</a>	1
<a href="#">National Heritage Places:</a>	2
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	53
<a href="#">Listed Migratory Species:</a>	19

## 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 <http://www.environment.gov.au/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.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	24
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	11
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	28
<a href="#">Nationally Important Wetlands:</a>	1
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

### World Heritage Properties [\[ Resource Information \]](#)

Name	State	Status
<a href="#">Wet Tropics of Queensland</a>	QLD	Declared property

### National Heritage Properties [\[ Resource Information \]](#)

Name	State	Status
Natural		
<a href="#">Wet Tropics of Queensland</a>	QLD	Listed place
Indigenous		
<a href="#">Wet Tropics World Heritage Area (Indigenous Values)</a>	QLD	Within listed place

### 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.

Name	Status	Type of Presence
<a href="#">Broad leaf tea-tree (<i>Melaleuca viridiflora</i>) woodlands in high rainfall coastal north Queensland</a>	Endangered	Community likely to occur within area
<a href="#">Mabi Forest (Complex Notophyll Vine Forest 5b)</a>	Critically Endangered	Community likely to occur within area

### Listed Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
Birds		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Casuarius casuarius johnsonii</a> Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986]	Endangered	Species or species habitat known to occur within area
<a href="#">Erythrorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Turnix olivii</a> Buff-breasted Button-quail [59293]	Endangered	Species or species habitat likely to occur within area



Name	Status	Type of Presence
<a href="#">Tyto novaehollandiae kimberli</a> Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area
<b>Frogs</b>		
<a href="#">Litoria dayi</a> Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog [86707]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Litoria nyakalensis</a> Mountain Mistfrog, Nyakala Frog [1820]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Pseudophryne covacevichae</a> Magnificent Brood Frog [64385]	Vulnerable	Species or species habitat known to occur within area
<b>Mammals</b>		
<a href="#">Bettongia tropica</a> Northern Bettong [214]	Endangered	Species or species habitat may occur within area
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
<a href="#">Dasyurus maculatus gracilis</a> Spotted-tailed Quoll (North Queensland), Yarri [64475]	Endangered	Species or species habitat known to occur within area
<a href="#">Hipposideros semoni</a> Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Breeding likely to occur within area
<a href="#">Mesembriomys gouldii rattoides</a> Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Petauroides volans</a> Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Petaurus australis Wet Tropics subspecies</a> Yellow-bellied Glider (Wet Tropics), Fluffy Glider [88022]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pteropus conspicillatus</a> Spectacled Flying-fox [185]	Endangered	Species or species habitat known to occur within area
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
<a href="#">Rhinolophus robertsi</a> Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Saccolaimus saccolaimus nudicluniatus</a> Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
<b>Plants</b>		
<a href="#">Acacia purpureopetala</a> Purple-flowered Wattle [61156]	Critically Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
<a href="#">Alloxylon flammeum</a> Red Silky Oak, Queensland Waratah, Tree Waratah [56400]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Aponogeton bullosus</a> [8299]	Endangered	Species or species habitat likely to occur within area
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Canarium acutifolium</a> [23956]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Carronia pedicellata</a> [24178]	Endangered	Species or species habitat likely to occur within area
<a href="#">Chingia australis</a> [24603]	Endangered	Species or species habitat likely to occur within area
<a href="#">Corymbia rhodops</a> [64015]	Vulnerable	Species or species habitat may occur within area
<a href="#">Cycas platyphylla</a> a cycad [55796]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diplazium cordifolium</a> [15585]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Euphorbia carissoides</a> [12431]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Grevillea glossadenia</a> [7979]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Homoranthus porteri</a> [55196]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Lastreopsis walleri</a> a fern [18229]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Macropteranthes montana</a> [9003]	Vulnerable	Species or species habitat may occur within area
<a href="#">Phaius australis</a> Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
<a href="#">Phaius pictus</a> [22564]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phlegmariurus marsupiiformis</a> Water Tassel-fern [86553]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<a href="#">Polyphlebium endlicherianum</a> Middle Filmy Fern [87494]	Endangered	Species or species habitat likely to occur within area
<a href="#">Prostanthera clotteniana</a> [76165]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Tephrosia leveillei</a> [16946]	Vulnerable	Species or species habitat may occur within area
<a href="#">Triplarina nitchaga</a> [64593]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tropilis callitrophilis</a> Thin Feather Orchid [82771]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Vappodes lithocola</a> Dwarf Butterfly Orchid, Cooktown Orchid [78893]	Endangered	Species or species habitat likely to occur within area
<a href="#">Zeuxine polygonoides</a> Velvet Jewel Orchid [46794]	Vulnerable	Species or species habitat may occur within area

#### Reptiles

<a href="#">Delma mitella</a> Atherton Delma, Legless Lizard [25931]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area

#### Listed Migratory Species

[ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Marine Species</b>		
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat likely to occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat likely to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[ <a href="#">Resource Information</a> ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat may occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat likely to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

## Reptiles

<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Alcock	QLD
Kirrama	QLD
Koombooloomba	QLD
Koombooloomba	QLD
Koombooloomba South	QLD
Millstream Falls	QLD
Ravenshoe 1	QLD
Tully Falls	QLD
Tully Gorge	QLD
Yourka	QLD
Yourka Reserve	QLD

### Invasive Species [\[ Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Lonchura punctulata</i> Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
<i>Sturnus vulgaris</i> Common Starling [389]		habitat likely to occur within area  Species or species habitat likely to occur within area
<b>Frogs</b>		
<i>Rhinella marina</i> Cane Toad [83218]		Species or species habitat known to occur within area
<b>Mammals</b>		
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Sus scrofa</i> Pig [6]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
<i>Acacia nilotica</i> subsp. <i>indica</i> Prickly Acacia [6196]		Species or species habitat may occur within area
<i>Annona glabra</i> Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311]		Species or species habitat likely to occur within area
<i>Cabomba caroliniana</i> Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
<i>Cenchrus ciliaris</i> Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
<i>Cryptostegia grandiflora</i> Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
<i>Hymenachne amplexicaulis</i> Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

### Reptiles

Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
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### Nationally Important Wetlands

[ [Resource Information](#) ]

Name	State
<a href="#">Innot Hot Springs</a>	QLD



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

# Coordinates

-17.959564 145.546847,-17.959564 145.546847,-17.807632 145.424968,-17.793249 145.321971,-17.655899 145.311671,-17.653936 145.338107,-17.70431 145.463763,-17.730474 145.521785,-17.959564 145.546847

# 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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# Queensland Government

## Wildlife Online Extract

Search Criteria: Species List for a Defined Area  
Species: All  
Type: All  
Status: All  
Records: All  
Date: Since 1980  
Latitude: 17.655 to 17.966  
Longitude: 145.3 to 145.563  
Email: [nikki.odonnell@attexo.com.au](mailto:nikki.odonnell@attexo.com.au)  
Date submitted: Monday 03 May 2021 10:34:29  
Date extracted: Monday 03 May 2021 10:40:02

The number of records retrieved = 894

### **Disclaimer**

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			34
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		24
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		19
animals	amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog		C		6
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria jungguy</i>	northern stony creek frog		C		2
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		19
animals	amphibians	Hylidae	<i>Litoria serrata</i>	tapping green eyed frog	V			29/7
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		7
animals	amphibians	Hylidae	<i>Litoria gracilentia</i>	graceful treefrog		C		29
animals	amphibians	Hylidae	<i>Litoria xanthomera</i>	orange thighed treefrog		C		14
animals	amphibians	Hylidae	<i>Litoria lesueuri sensu lato</i>	stony creek frog		C		15
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		37
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		1
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		13
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		20
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		42
animals	amphibians	Microhylidae	<i>Cophixalus infacetus</i>	creaking nurseryfrog		C		1
animals	amphibians	Microhylidae	<i>Cophixalus australis</i>	southern ornate nursery-frog		C		125/19
animals	amphibians	Microhylidae	<i>Austrochaperina pluvialis</i>	white browed whistletfrog		C		3
animals	amphibians	Microhylidae	<i>Austrochaperina robusta</i>	robust whistletfrog		C		9/2
animals	amphibians	Myobatrachidae	<i>Mixophyes schevilli sensu lato</i>	northern barred frog		C		6
animals	amphibians	Myobatrachidae	<i>Pseudophryne covacevichae</i>	magnificent broodfrog		V	V	39
animals	amphibians	Myobatrachidae	<i>Taudactylus acutirostris</i>	sharp snouted dayfrog		PE	EX	2
animals	amphibians	Myobatrachidae	<i>Mixophyes schevilli</i>	northern barred frog		C		10/3
animals	amphibians	Myobatrachidae	<i>Mixophyes coggeri</i>	mottled barred frog		C		1
animals	amphibians	Myobatrachidae	<i>Uperoleia altissima</i>	tableland gungan		C		53/1
animals	birds	Acanthizidae	<i>Acanthiza katherina</i>	mountain thornbill		C		30
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		1
animals	birds	Acanthizidae	<i>Sericornis keri</i>	Atherton scrubwren		C		12
animals	birds	Acanthizidae	<i>Gerygone mouki</i>	brown gerygone		C		24
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		2
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		1
animals	birds	Acanthizidae	<i>Oreoscopus gutturalis</i>	fernwren		C		14
animals	birds	Acanthizidae	<i>Sericornis magnirostra</i>	large-billed scrubwren		C		47
animals	birds	Acanthizidae	<i>Smicromnis brevirostris</i>	weebill		C		4
animals	birds	Acanthizidae	<i>Sericornis citreogularis</i>	yellow-throated scrubwren		C		42
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		2
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		2
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		3
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		1/1
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk		E	V	2
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		1
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		15

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		3
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		1
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		1
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		4
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		1
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		1
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		3
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		1
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		1
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		1
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		4
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		6
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		8
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		29
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		10
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		6
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii banksii</i>	red-tailed black-cockatoo (Cape York & Eastern Aust)		C		2
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		39
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		7
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		13
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cicadabird		C		12
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		7
animals	birds	Campephagidae	<i>Coracina lineata</i>	barred cuckoo-shrike		C		10
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		2
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		4
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		4
animals	birds	Casuariidae	<i>Casuaris casuarius johnsonii (southern population)</i>	southern cassowary (southern population)		E	E	15
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		2
animals	birds	Climacteridae	<i>Cormobates leucophaea minor</i>	white-throated treecreeper (northern)		C		23
animals	birds	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper		C		27
animals	birds	Columbidae	<i>Geophaps scripta peninsulae</i>	squatter pigeon (northern subspecies)		C		8
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		4
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		37/1
animals	birds	Columbidae	<i>Ptilinopus magnificus</i>	wompoo fruit-dove		C		25
animals	birds	Columbidae	<i>Ptilinopus superbus</i>	superb fruit-dove		C		37
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		11

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		6
animals	birds	Columbidae	<i>Columba leucomela</i>	white-headed pigeon		C		2
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		3
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		15
animals	birds	Columbidae	<i>Chalcophaps indica</i>	emerald dove		C		10
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		5
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		13
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		1
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		6
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		10
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		11
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		7
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		5
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		3
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		17
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		14
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		1
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		1
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		9/1
animals	birds	Halcyonidae	<i>Tanysiptera sylvia</i>	buff-breasted paradise-kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		5
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		3
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		23
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		12
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		1
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		5
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl		C		22
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		10
animals	birds	Meliphagidae	<i>Phylidonyris niger</i>	white-cheeked honeyeater		C		1
animals	birds	Meliphagidae	<i>Bolemoreus frenatus</i>	bridled honeyeater		C		34
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		1
animals	birds	Meliphagidae	<i>Cissomela pectoralis</i>	banded honeyeater		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		10
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		3
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		17
animals	birds	Meliphagidae	<i>Xanthotis flaviventer</i>	tawny-breasted honeyeater		C		1
animals	birds	Meliphagidae	<i>Xanthotis macleayanus</i>	Macleay's honeyeater		C		9
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		12
animals	birds	Meliphagidae	<i>Microptilotis gracilis</i>	graceful honeyeater		C		2
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		11
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		10
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		4
animals	birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	eastern spinebill		C		9
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		2
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		35
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		12
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		5
animals	birds	Monarchidae	<i>Arses kaupi</i>	pieb monarch		C		2
animals	birds	Monarchidae	<i>Machaerirhynchus flaviventer</i>	yellow-breasted boatbill		C		6
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		16
animals	birds	Monarchidae	<i>Carterornis leucotis</i>	white-eared monarch		C		1
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		24
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		5
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		6
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		10
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		6
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		2
animals	birds	Oriolidae	<i>Oriolus flavocinctus</i>	yellow oriole		C		1
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		9
animals	birds	Orthonychidae	<i>Orthonyx spaldingii</i>	chowchilla		C		21
animals	birds	Pachycephalidae	<i>Colluricincla boweri</i>	Bower's shrike-thrush		C		35
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		10
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		36
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		10
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		18
animals	birds	Pachycephalidae	<i>Pachycephala simplex peninsulae</i>	grey whistler		C		1
animals	birds	Paradisaeidae	<i>Ptiloris victoriae</i>	Victoria's riflebird		C		27
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		6
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		6
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		2
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		6
animals	birds	Petroicidae	<i>Heteromyias cinereifrons</i>	grey-headed robin		C		58
animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		4
animals	birds	Petroicidae	<i>Tregellasia capito</i>	pale-yellow robin		C		16
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		2
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		2
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		4
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		2
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		8
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		4
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		33
animals	birds	Psittacidae	<i>Cyclopsitta diophthalma macleayana</i>	Macleay's fig-parrot		V		4
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		24
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		4
animals	birds	Psittacidae	<i>Platycercus elegans</i>	crimson rosella		C		12
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		11
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		8
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		22
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird		C		30

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ptilonorhynchidae	<i>Scenopoeetes dentirostris</i>	tooth-billed bowerbird		C		36
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus violaceus</i>	satin bowerbird		C		4
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		3
animals	birds	Ptilonorhynchidae	<i>Ailuroedus maculosus</i>	spotted catbird		C		26
animals	birds	Ptilonorhynchidae	<i>Amblyornis newtonianus</i>	golden bowerbird		C		12
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		3
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		47
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		20
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		8
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		17
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		5
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		4
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		1
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		7
animals	birds	Turdidae	<i>Zoothera lunulata</i>	Bassian thrush		C		5
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		3
animals	birds	Tytonidae	<i>Tyto tenebricosa multipunctata</i>	lesser sooty owl		C		3
animals	insects	Papilionidae	<i>Ornithoptera priamus</i>	New Guinea birdwing		C		1
animals	mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider		C		1
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			2
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				10
animals	mammals	Canidae	<i>Canis sp.</i>		Y			1
animals	mammals	Dasyuridae	<i>Antechinus flavipes rubeculus</i>	yellow-footed antechinus (north-east Queensland)		C		4
animals	mammals	Dasyuridae	<i>Dasyurus maculatus gracilis</i>	spotted-tailed quoll (northern subspecies)		E	E	1
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart		C		3
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		6
animals	mammals	Dasyuridae	<i>Antechinus adustus</i>	rusty antechinus		C		1
animals	mammals	Dasyuridae	<i>Sminthopsis sp.</i>			C		1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			2
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			5
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		7
animals	mammals	Macropodidae	<i>Dendrolagus lumholtzi</i>	Lumholtz's tree-kangaroo		NT		2
animals	mammals	Macropodidae	<i>Macropus sp.</i>			C		1
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		3
animals	mammals	Macropodidae	<i>Petrogale mareeba</i>	Mareeba rock-wallaby		C		1
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		28
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby		C		36
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo		C		8
animals	mammals	Macropodidae	<i>Thylogale stigmatica</i>	red-legged pademelon		C		7
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		8
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		3
animals	mammals	Muridae	<i>Uromys caudimaculatus</i>	giant white-tailed rat		C		6



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animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		2
animals	mammals	Muridae	<i>Rattus sp.</i>			C		5/1
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			5
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		13
animals	mammals	Muridae	<i>Pseudomys patrius</i>	eastern pebble-mound mouse		C		2
animals	mammals	Muridae	<i>Rattus lutreolus</i>	swamp rat		C		3/1
animals	mammals	Muridae	<i>Rattus fuscipes</i>	bush rat		C		6
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		12
animals	mammals	Muridae	<i>Rattus rattus</i>	black rat	Y			2
animals	mammals	Muridae	<i>Pogonomys sp.</i>	tree mouse		C		1
animals	mammals	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	platypus		SL		4
animals	mammals	Peramelidae	<i>Perameles pallescens</i>	northern long-nosed bandicoot		C		10
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		6
animals	mammals	Petauridae	<i>Petaurus sp.</i>			C		5
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider		C		8
animals	mammals	Petauridae	<i>Dactylopsila trivirgata</i>	striped possum		C		1
animals	mammals	Petauridae	<i>Petaurus australis unnamed subsp.</i>	yellow-bellied glider (northern subspecies)		E	V	1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		43
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		12
animals	mammals	Pseudocheiridae	<i>Petauroides minor</i>	northern greater glider		V	V	28
animals	mammals	Pseudocheiridae	<i>Hemibelideus lemuroides</i>	lemuroid ringtail possum		C		113
animals	mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	common ringtail possum		C		1
animals	mammals	Pseudocheiridae	<i>Pseudochirulus herbertensis</i>	Herbert River ringtail possum		C		46
animals	mammals	Pseudocheiridae	<i>Pseudochirops archeri</i>	green ringtail possum		C		21
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		8
animals	mammals	Pteropodidae	<i>Nyctimene robinsoni</i>	eastern tube-nosed bat		C		5
animals	mammals	Pteropodidae	<i>Pteropus conspicillatus</i>	spectacled flying-fox		E	E	6
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			6
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		2
animals	mammals	Vespertilionidae	<i>Nyctophilus bifax</i>	northern long-eared bat		C		6
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		3
animals	mammals	Vespertilionidae	<i>Vespadelus pumilus</i>	eastern forest bat		C		4
animals	mammals	Vespertilionidae	<i>Murina florium</i>	tube-nosed insectivorous bat		V		2
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		1
animals	mammals	Vespertilionidae	<i>Kerivoula papuensis</i>	golden-tipped bat		C		3
animals	mammals	Vespertilionidae	<i>Scoteanax rueppellii</i>	greater broad-nosed bat		C		5
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				2
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				4
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					2
animals	ray-finned fishes	Plotosidae	<i>Tandanus tropicanus</i>					2

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animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				2
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				2
animals	reptiles	Agamidae	<i>Lophosaurus boydii</i>	Boyd's forest dragon		C		1/1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		19
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon		C		3
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		1
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi		C		1
animals	reptiles	Boidae	<i>Simalia kinghorni</i>	amethystine python (Australian form)		C		1/1
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		3
animals	reptiles	Carphodactylidae	<i>Carphodactylus laevis</i>	chameleon gecko		C		5
animals	reptiles	Carphodactylidae	<i>Saltuarius cornutus</i>	northern leaf-tailed gecko		C		27
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle		C		2
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		1
animals	reptiles	Colubridae	<i>Stegonotus australis</i>	slaty-grey snake		C		1
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		2
animals	reptiles	Diplodactylidae	<i>Amalosia rhombifer</i>	zig-zag gecko		C		3
animals	reptiles	Diplodactylidae	<i>Oedura monilis sensu lato</i>	ocellated velvet gecko		C		1
animals	reptiles	Elapidae	<i>Cacophis churchilli</i>	northern dwarf crowned snake		C		1
animals	reptiles	Elapidae	<i>Pseudechis porphyriacus</i>	red-bellied black snake		C		2
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		4
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		2
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		1
animals	reptiles	Scincidae	<i>Carlia rostralis</i>	black-throated rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		9
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		4
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		12
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		5
animals	reptiles	Scincidae	<i>Lampropholis bellendenkerensis</i>			C		2
animals	reptiles	Scincidae	<i>Gnypetoscincus queenslandiae</i>	prickly forest skink		C		1
animals	reptiles	Scincidae	<i>Glaphyromorphus mjobergi</i>	Atherton Tableland mulch-skink		C		1
animals	reptiles	Scincidae	<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus</i>	striped snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Coeranoscincus frontalis</i>	limbless snake-tooth skink		C		1
animals	reptiles	Scincidae	<i>Saproscincus basiliscus</i>	basilisk shadeskink		C		17
animals	reptiles	Scincidae	<i>Glaphyromorphus cracens</i>	slender mulch-skink		C		1
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		7
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		9/2
animals	reptiles	Scincidae	<i>Carlia rubrigularis</i>	red-throated rainbow-skink		C		8
animals	reptiles	Scincidae	<i>Ctenotus strauchii</i>	eastern barred wedgesnout ctenotus		C		2
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		2
animals	reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink		C		1

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animals	reptiles	Scincidae	<i>Lygisaurus laevis</i>	rainforest edge litter-skink		C		1
animals	reptiles	Scincidae	<i>Concinnia tigrina</i>	yellow-blotched forest-skink		C		1
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		1
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Ctenotus sp.</i>			C		1
animals	reptiles	Typhlopidae	<i>Anilius torresianus</i>	north-eastern blind snake		C		2
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		5
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		1
fungi	Agaricomycetes	Agaricaceae	<i>Lepiota</i>					1/1
fungi	Agaricomycetes	Agaricaceae	<i>Macrolepiota clelandii</i>			C		1/1
fungi	Agaricomycetes	Amanitaceae	<i>Amanita</i>					5/5
fungi	Agaricomycetes	Atheliaceae	<i>Dictyonema irpicinum</i>			C		1/1
fungi	Agaricomycetes	Boletaceae	<i>Boletellus emodensis</i>			C		1/1
fungi	Agaricomycetes	Boletaceae	<i>Austroboletus</i>					2/2
fungi	Agaricomycetes	Boletaceae	<i>Tylopilus</i>					2/2
fungi	Agaricomycetes	Boletaceae	<i>Boletus</i>					2/2
fungi	Agaricomycetes	Boletaceae	<i>Strobilomyces</i>					1/1
fungi	Agaricomycetes	Cantharellaceae	<i>Cantharellus</i>					1/1
fungi	Agaricomycetes	Clavariaceae	<i>Clavicornia</i>					1/1
fungi	Agaricomycetes	Cortinariaceae	<i>Gymnopilus</i>					4/4
fungi	Agaricomycetes	Cortinariaceae	<i>Cortinarius</i>					1/1
fungi	Agaricomycetes	Crepidotaceae	<i>Crepidotus</i>					2/2
fungi	Agaricomycetes	Entolomataceae	<i>Entoloma</i>					1/1
fungi	Agaricomycetes	Fomitopsidaceae	<i>Fomitopsis</i>					1/1
fungi	Agaricomycetes	Ganodermataceae	<i>Amauroderma rude</i>			C		1/1
fungi	Agaricomycetes	Ganodermataceae	<i>Ganoderma</i>					2/2
fungi	Agaricomycetes	Geastraceae	<i>Geastrum</i>			C		1/1
fungi	Agaricomycetes	Gomphaceae	<i>Ramaria</i>			C		1/1
fungi	Agaricomycetes	Hyaloriaceae	<i>Pseudohydnum gelatinosum</i>			C		1/1
fungi	Agaricomycetes	Hydnangiaceae	<i>Laccaria</i>					6/6
fungi	Agaricomycetes	Hygrophoraceae	<i>Hygrocybe cantharellus</i>			C		1/1
fungi	Agaricomycetes	Hygrophoraceae	<i>Humidicutis mavis</i>			C		1/1
fungi	Agaricomycetes	Hygrophoraceae	<i>Hygrocybe</i>					1/1
fungi	Agaricomycetes	Inocybaceae	<i>Inocybe nobilissima</i>			C		1/1
fungi	Agaricomycetes	Inocybaceae	<i>Inocybe gracilissima</i>			C		1/1
fungi	Agaricomycetes	Inocybaceae	<i>Inocybe</i>			C		7/7
fungi	Agaricomycetes	Mycenaceae	<i>Xeromphalina</i>					1/1
fungi	Agaricomycetes	Mycenaceae	<i>Mycena</i>					10/10
fungi	Agaricomycetes	Pleurotaceae	<i>Hohenbuehelia</i>					1/1
fungi	Agaricomycetes	Podoscyphaceae	<i>Cymatoderma elegans</i>			C		1/1
fungi	Agaricomycetes	Polyporaceae	<i>Laetiporus sulphureus</i>			C		1/1
fungi	Agaricomycetes	Polyporaceae	<i>Microporus</i>					1/1
fungi	Agaricomycetes	Polyporaceae	<i>Polyporus</i>					2/2
fungi	Agaricomycetes	Polyporaceae	<i>Trametes</i>					5/5
fungi	Agaricomycetes	Polyporaceae	<i>Poria</i>					1/1
fungi	Agaricomycetes	Polyporaceae	<i>Microporus xanthopus</i>			C		2/2

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fungi	Agaricomycetes	Psathyrellaceae	<i>Psathyrella candolleana</i>			C		1/1
fungi	Agaricomycetes	Psathyrellaceae	<i>Psathyrella</i>					2/2
fungi	Agaricomycetes	Pterulaceae	<i>Pterula</i>					1/1
fungi	Agaricomycetes	Russulaceae	<i>Russula lenkunya</i>			C		1/1
fungi	Agaricomycetes	Russulaceae	<i>Russula foetens</i>			C		1/1
fungi	Agaricomycetes	Russulaceae	<i>Russula</i>			C		5/5
fungi	Agaricomycetes	Russulaceae	<i>Russula cyanoxantha</i>			C		1/1
fungi	Agaricomycetes	Sclerodermataceae	<i>Scleroderma polyrhizum</i>			C		1/1
fungi	Agaricomycetes	Sclerodermataceae	<i>Scleroderma</i>					4/4
fungi	Agaricomycetes	Stereaceae	<i>Stereum illudens</i>			C		1/1
fungi	Agaricomycetes	Stereaceae	<i>Stereum ostrea</i>			C		3/3
fungi	Agaricomycetes	Strophariaceae	<i>Galerina</i>					1/1
fungi	Agaricomycetes	Strophariaceae	<i>Hypholoma</i>					1/1
fungi	Agaricomycetes	Strophariaceae	<i>Hypholoma fasciculare</i>			C		1/1
fungi	Agaricomycetes	Tricholomataceae	<i>Collybia</i>					1/1
fungi	Agaricomycetes	Tricholomataceae	<i>Tricholoma eucalypticum</i>			C		1/1
fungi	Agaricomycetes	Tricholomataceae	<i>Filoboletus manipularis</i>			C		2/2
fungi	Agaricomycetes	Tricholomataceae	<i>Gymnopus</i>					1/1
fungi	lecanoromycetes	Cladoniaceae	<i>Cladia muelleri</i>			C		2/2
fungi	lecanoromycetes	Collemataceae	<i>Leptogium cyanescens</i>			C		1/1
fungi	lecanoromycetes	Collemataceae	<i>Leptogium bullatulum</i>			C		1/1
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora sulfurescens</i>			C		1/1
fungi	lecanoromycetes	Lobariaceae	<i>Sticta myrioloba</i>			C		1/1
fungi	lecanoromycetes	Lobariaceae	<i>Pseudocyphellaria beccarii</i>			C		1/1
fungi	lecanoromycetes	Lobariaceae	<i>Pseudocyphellaria pickeringii</i>			C		1/1
fungi	lecanoromycetes	Pannariaceae	<i>Physma byrsaeum</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea pectinata</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea rubicunda</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea rubrotincta</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea alboverrucata</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea bismolliuscula</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea molliuscula subsp. queenslandica</i>			C		4/4
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea cornuta</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea baileyi</i>			C		8/8
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea elixii</i>			C		7/7
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea effusa</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea dasaea</i>			C		2/2
fungi	lecanoromycetes	Physciaceae	<i>Rinodina moziana var. moziana</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Heterodermia koyana</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Rinodina confragosula</i>			C		1/1
fungi	lecanoromycetes	Ramalinaceae	<i>Physcidia australasica</i>			C		1/1
fungi	sordariomycetes	Xylariaceae	<i>Xylaria longipes</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes phyllostachya</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens subsp. adscendens</i>			C		1/1
plants	land plants	Amaryllidaceae	<i>Proiphys amboinensis</i>			C		1/1

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plants	land plants	Annonaceae	<i>Polyalthia submontana</i> subsp. <i>sessiliflora</i>			C		4/4
plants	land plants	Annonaceae	<i>Desmos goezeanus</i>			C		2/2
plants	land plants	Apocynaceae	<i>Marsdenia jensenii</i>			C		1/1
plants	land plants	Apocynaceae	<i>Parsonsia latifolia</i>	green-leaved silkpod		C		1/1
plants	land plants	Apocynaceae	<i>Alyxia ruscifolia</i>			C		1/1
plants	land plants	Apocynaceae	<i>Alyxia orophila</i>	mountain alyxia		C		1/1
plants	land plants	Apocynaceae	<i>Alyxia grandis</i>			C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum</i>					1/1
plants	land plants	Apocynaceae	<i>Parsonsia straminea</i>	monkey rope		C		3/3
plants	land plants	Apocynaceae	<i>Melodinus baccellianus</i>			C		1/1
plants	land plants	Apocynaceae	<i>Hoya australis</i> subsp. <i>tenuipes</i>			C		1/1
plants	land plants	Apocynaceae	<i>Parsonsia grayana</i>			C		3/3
plants	land plants	Apocynaceae	<i>Neisosperma poweri</i>			C		2/2
plants	land plants	Aponogetonaceae	<i>Aponogeton bullosus</i>			E	E	1/1
plants	land plants	Araceae	<i>Alocasia brisbanensis</i>			C		1/1
plants	land plants	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		1/1
plants	land plants	Araliaceae	<i>Hydrocotyle miranda</i>			C		1/1
plants	land plants	Araliaceae	<i>Cephalalaria cephalobotrys</i>	climbing panax		C		1/1
plants	land plants	Araliaceae	<i>Polyscias australiana</i>	ivory basswood		C		1/1
plants	land plants	Araliaceae	<i>Motherwellia haplosciadea</i>			C		1/1
plants	land plants	Argophyllaceae	<i>Argophyllum ferrugineum</i>			C		3/3
plants	land plants	Aristolochiaceae	<i>Pararistolochia australopithecus</i>			C		1/1
plants	land plants	Asteraceae	<i>Erechtites valerianifolius</i> forma <i>valerianifolius</i>		Y			1/1
plants	land plants	Asteraceae	<i>Picris angustifolia</i> subsp. <i>carolorum-henricorum</i>			C		1/1
plants	land plants	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1/1
plants	land plants	Asteraceae	<i>Centipeda minima</i> subsp. <i>minima</i>			C		1/1
plants	land plants	Asteraceae	<i>Crassocephalum crepidioides</i>	thickhead	Y			1/1
plants	land plants	Asteraceae	<i>Dichrocephala integrifolia</i>		Y			3/3
plants	land plants	Asteraceae	<i>Phacellothrix cladochaeta</i>			C		1/1
plants	land plants	Asteraceae	<i>Adenostemma macrophyllum</i>			C		1/1
plants	land plants	Asteraceae	<i>Eschenbachia leucantha</i>			C		2/2
plants	land plants	Asteraceae	<i>Erigeron bonariensis</i>		Y			1/1
plants	land plants	Asteraceae	<i>Praxelis clematidea</i>		Y			5/5
plants	land plants	Asteraceae	<i>Coronidium rupicola</i>			C		2/2
plants	land plants	Asteraceae	<i>Chromolaena odorata</i>	Siam weed	Y			3/3
plants	land plants	Asteraceae	<i>Ageratum conyzoides</i>	billygoat weed	Y			1/1
plants	land plants	Asteraceae	<i>Euchiton japonicus</i>			C		1/1
plants	land plants	Asteraceae	<i>Erigeron pusillus</i>		Y			1/1
plants	land plants	Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y			1/1
plants	land plants	Asteraceae	<i>Bidens pilosa</i>		Y			1/1
plants	land plants	Asteraceae	<i>Stevia ovata</i>		Y			7/7
plants	land plants	Asteraceae	<i>Apowollastonia spilantheidoides</i>			C		2/2
plants	land plants	Athyriaceae	<i>Diplazium dilatatum</i>			C		1/1
plants	land plants	Austrobaileyaceae	<i>Austrobaileya scandens</i>			C		1/1
plants	land plants	Aytoniaceae	<i>Plagiochasma rupestre</i>			C		1/1
plants	land plants	Aytoniaceae	<i>Reboulia hemisphaerica</i>			C		1/1

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plants	land plants	Aytoniaceae	<i>Asterella whiteleggeana</i>			C		1/1
plants	land plants	Aytoniaceae	<i>Asterella drummondii</i>			C		1/1
plants	land plants	Balanopaceae	<i>Balanops australiana</i>			C		5/5
plants	land plants	Balsaminaceae	<i>Impatiens walleriana</i>	balsam	Y			2/2
plants	land plants	Bignoniaceae	<i>Pandorea nervosa</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandra unguis-cati</i>	cat's claw creeper	Y			1/1
plants	land plants	Blechnaceae	<i>Pteridoblechnum neglectum</i>			C		1/1
plants	land plants	Blechnaceae	<i>Doodia linearis</i>			C		1/1
plants	land plants	Blechnaceae	<i>Blechnum patersonii subsp. queenslandicum</i>			C		1/1
plants	land plants	Boryaceae	<i>Borya septentrionalis</i>			C		1/1
plants	land plants	Burseraceae	<i>Canarium australasicum</i>	mango bark		C		3/3
plants	land plants	Byblidaceae	<i>Byblis liniflora</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Seringia hookeriana</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Seringia lanceolata</i>			C		3/3
plants	land plants	Byttneriaceae	<i>Commersonia dasyphylla</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Senna septemtrionalis</i>		Y			3/3
plants	land plants	Caesalpiniaceae	<i>Chamaecrista rotundifolia var. rotundifolia</i>		Y			1/1
plants	land plants	Caesalpiniaceae	<i>Senna aciphylla</i>	Australian senna		C		1/1
plants	land plants	Caesalpiniaceae	<i>Caesalpinia robusta</i>	giant mother-in-law vine		C		2/2
plants	land plants	Campanulaceae	<i>Wahlenbergia</i>					1/1
plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			C		1/1
plants	land plants	Celastraceae	<i>Hippocratea barbata</i>	knotvine		C		1/1
plants	land plants	Celastraceae	<i>Siphonodon membranaceus</i>			C		3/3
plants	land plants	Centrolepidaceae	<i>Centrolepis exserta</i>			C		1/1
plants	land plants	Centrolepidaceae	<i>Centrolepis banksii</i>			C		1/1
plants	land plants	Clusiaceae	<i>Garcinia zichii</i>			C		9/9
plants	land plants	Clusiaceae	<i>Garcinia</i>					1/1
plants	land plants	Colchicaceae	<i>Schelhammera multiflora</i>			C		2/2
plants	land plants	Commelinaceae	<i>Cartonema brachyantherum</i>			C		2/2
plants	land plants	Commelinaceae	<i>Pollia crispata</i>	pollia		C		1/1
plants	land plants	Commelinaceae	<i>Aneilema</i>					1/1
plants	land plants	Cornaceae	<i>Alangium polyosmoides subsp. polyosmoides</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Trichosanthes pilosa</i>			C		1/1
plants	land plants	Cunoniaceae	<i>Davidsonia pruriens</i>			C		1/1
plants	land plants	Cunoniaceae	<i>Pullea stutzeri</i>	hard alder		C		3/3
plants	land plants	Cyatheaceae	<i>Cyathea baileyana</i>	wig tree fern		C		1/1
plants	land plants	Cyatheaceae	<i>Cyathea rebecca</i>	black tree fern		C		2/2
plants	land plants	Cyatheaceae	<i>Cyathea celebica</i>			NT		1/1
plants	land plants	Cyatheaceae	<i>Cyathea woollsiana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Machaerina rubiginosa</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus melanostachys</i>			C		2/2
plants	land plants	Cyperaceae	<i>Fimbristylis acicularis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis cinnamometorum</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus haspan subsp. juncooides</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus polystachyos var. polystachyos</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus laevis</i>			C		1/1

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plants	land plants	Cyperaceae	<i>Carex maculata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Rhynchospora brownii</i>	beak rush		C		1/1
plants	land plants	Cyperaceae	<i>Lepironia articulata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus tetraphyllus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Chorizandra cymbaria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Tetraria capillaris</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis furva</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus cyperoides</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus sparteus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Rhynchospora leae</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus kennyi</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus procerus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus prolifer</i>	dwarf papyrus	Y			1/1
plants	land plants	Dennstaedtiaceae	<i>Hypolepis glandulifera</i>	sticky ground fern		C		1/1
plants	land plants	Dennstaedtiaceae	<i>Microlepia speluncaea</i>	cave fern		C		1/1
plants	land plants	Dichapetalaceae	<i>Dichapetalum papuanum</i>			C		2/2
plants	land plants	Dicksoniaceae	<i>Calochlaena villosa</i>			NT		1/1
plants	land plants	Dilleniaceae	<i>Hibbertia aspera</i> subsp. <i>pilosifolia</i>			C		1/1
plants	land plants	Dilleniaceae	<i>Hibbertia bicarpellata</i>			C		2/2
plants	land plants	Dipentodontaceae	<i>Perrottetia arborescens</i>			C		1/1
plants	land plants	Droseraceae	<i>Drosera lanata</i>			C		1/1
plants	land plants	Droseraceae	<i>Drosera lunata</i>			C		1/1
plants	land plants	Dryopteridaceae	<i>Lastreopsis wurunuran</i>			C		1/1
plants	land plants	Dryopteridaceae	<i>Bolbitis taylorii</i>			C		1/1
plants	land plants	Dryopteridaceae	<i>Lastreopsis rufescens</i>			C		2/2
plants	land plants	Ebenaceae	<i>Diospyros hemicycloides</i>			C		3/3
plants	land plants	Elaeagnaceae	<i>Elaeagnus triflora</i> var. <i>triflora</i>			C		1/1
plants	land plants	Elaeocarpaceae	<i>Sloanea australis</i> subsp. <i>parviflora</i>			C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus eumundi</i>	Eumundi quandong		C		2/2
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus foveolatus</i>			C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus ruminatus</i>			C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus carolinae</i>			C		2/2
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus elliffii</i>			C		4/4
plants	land plants	Elaeocarpaceae	<i>Sloanea macbrydei</i>	northern yellow carabeen		C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus obovatus</i> subsp. <i>umbratilis</i>			C		2/2
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus largiflorens</i> subsp. <i>largiflorens</i>			C		2/2
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus sericopetalus</i>			C		2/2
plants	land plants	Ericaceae	<i>Acrothamnus spathaceus</i>			C		1/1
plants	land plants	Eriocaulaceae	<i>Eriocaulon fistulosum</i>			C		1/1
plants	land plants	Eriocaulaceae	<i>Eriocaulon depressum</i>			C		1/1
plants	land plants	Escalloniaceae	<i>Polyosma hirsuta</i>			C		2/2
plants	land plants	Escalloniaceae	<i>Polyosma alangiacea</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Croton triacros</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium</i> subsp. <i>boreale</i>			C		1/1

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plants	land plants	Euphorbiaceae	<i>Bertya polystigma</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus polyadenos</i>			C		1/1
plants	land plants	Fabaceae	<i>Mirbelia pungens</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria brevis</i>			C		1/1
plants	land plants	Fabaceae	<i>Hovea densivellosa</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera linnaei</i>	Birdsville indigo		C		1/1
plants	land plants	Fabaceae	<i>Desmodium nemorosum</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene villosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Desmodium gangeticum</i>			C		1/1
plants	land plants	Fabaceae	<i>Gompholobium nitidum</i>			C		1/1
plants	land plants	Fabaceae	<i>Chorizema parviflorum</i>	eastern flame pea		C		1/1
plants	land plants	Fabaceae	<i>Indigofera trifoliata</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna vexillata var. angustifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Zornia muriculata subsp. muriculata</i>			C		1/1
plants	land plants	Fabaceae	<i>Desmodium heterocarpon var. heterocarpon</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia sp. (Miriam Vale E.J.Thompson+ MIR33)</i>			C		1/1
plants	land plants	Flagellariaceae	<i>Flagellaria indica</i>	whip vine		C		1/1
plants	land plants	Gentianaceae	<i>Fagraea fagraeacea</i>			C		1/1
plants	land plants	Geocalycaceae	<i>Chiloscyphus</i>					4/4
plants	land plants	Geocalycaceae	<i>Heteroscyphus argutus</i>			C		1/1
plants	land plants	Gleicheniaceae	<i>Sticherus flabellatus var. flabellatus</i>			C		1/1
plants	land plants	Gleicheniaceae	<i>Gleichenia dicarpa</i>	pouched coral fern		C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia grandiflora</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Velleia pubescens</i>			C		3/3
plants	land plants	Haloragaceae	<i>Gonocarpus humilis</i>			C		1/1
plants	land plants	Haloragaceae	<i>Gonocarpus chinensis subsp. verrucosus</i>			C		1/1
plants	land plants	Himantandraceae	<i>Galbulimima baccata</i>			C		3/3
plants	land plants	Hymenophyllaceae	<i>Hymenophyllum walleri</i>			C		1/1
plants	land plants	Hymenophyllaceae	<i>Crepidomanes bipunctatum</i>			C		1/1
plants	land plants	Hymenophyllaceae	<i>Vandenboschia johnstonensis</i>			C		1/1
plants	land plants	Jungermanniaceae	<i>Jungermannia</i>					1/1
plants	land plants	Lamiaceae	<i>Prostanthera clotteniana</i>			E	CE	2/2
plants	land plants	Lamiaceae	<i>Platostoma longicorne</i>			C		1/1
plants	land plants	Lamiaceae	<i>Pityrodia salviifolia</i>	pityrodia		C		1/1
plants	land plants	Lamiaceae	<i>Mentha satureioides</i>	native pennyroyal		C		1/1
plants	land plants	Lamiaceae	<i>Coleus glabriflorus</i>			C		1/1
plants	land plants	Lamiaceae	<i>Coleus</i>					1/1
plants	land plants	Lamiaceae	<i>Teucrium argutum</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas zeylanica</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Coleus australis</i>			C		4/3
plants	land plants	Lamiaceae	<i>Coleus amicornum</i>			C		8/8
plants	land plants	Lamiaceae	<i>Coleus amoenus</i>			V		4/4
plants	land plants	Lamiaceae	<i>Anisomeles moschata</i>			C		1/1
plants	land plants	Lauraceae	<i>Beilschmiedia brunnea</i>			C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya lividula</i>			C		9/9
plants	land plants	Lauraceae	<i>Cryptocarya angulata</i>	ivory laurel		C		4/4



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plants	land plants	Lauraceae	<i>Beilschmiedia tooram</i>			C		2/2
plants	land plants	Lauraceae	<i>Endiandra sankeyana</i>	Sankey's walnut		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya grandis</i>			C		2/2
plants	land plants	Lauraceae	<i>Endiandra discolor</i>	domatia tree		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya putida</i>			C		13/13
plants	land plants	Lauraceae	<i>Cryptocarya oblata</i>			C		1/1
plants	land plants	Lauraceae	<i>Endiandra montana</i>			C		5/5
plants	land plants	Lauraceae	<i>Litsea connorsii</i>			C		3/3
plants	land plants	Lauraceae	<i>Endiandra wolfei</i>			C		1/1
plants	land plants	Lauraceae	<i>Beilschmiedia collina</i>			C		2/2
plants	land plants	Lauraceae	<i>Cryptocarya mackinnoniana</i>			C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya melanocarpa</i>			C		11/11
plants	land plants	Lauraceae	<i>Cryptocarya leucophylla</i>			C		1/1
plants	land plants	Lauraceae	<i>Endiandra palmerstonii</i>	Queensland walnut		C		2/2
plants	land plants	Lauraceae	<i>Endiandra dichrophylla</i>	coach walnut		C		10/10
plants	land plants	Lauraceae	<i>Cryptocarya smaragdina</i>			C		3/3
plants	land plants	Lauraceae	<i>Cryptocarya saccharata</i>			C		2/2
plants	land plants	Lauraceae	<i>Cryptocarya densiflora</i>			C		3/3
plants	land plants	Lauraceae	<i>Cryptocarya cocosoides</i>			C		5/5
plants	land plants	Lauraceae	<i>Endiandra sideroxylon</i>			C		3/3
plants	land plants	Lauraceae	<i>Cryptocarya corrugata</i>			C		3/3
plants	land plants	Lauraceae	<i>Beilschmiedia recurva</i>			C		2/2
plants	land plants	Lejeuneaceae	<i>Lejeuneaceae</i>					1/1
plants	land plants	Lejeuneaceae	<i>Lejeunea</i>					1/1
plants	land plants	Lejeuneaceae	<i>Leptolejeunea</i>					1/1
plants	land plants	Lentibulariaceae	<i>Utricularia caerulea</i>	blue bladderwort			C	2/2
plants	land plants	Lepidoziaceae	<i>Lepidozia</i>					1/1
plants	land plants	Leucobryaceae	<i>Leucobryum</i>					3/3
plants	land plants	Linderniaceae	<i>Artanema fimbriatum</i>				C	1/1
plants	land plants	Linderniaceae	<i>Lindernia sp. (Sudley A.Gunness 1886)</i>				C	1/1
plants	land plants	Lindsaeaceae	<i>Lindsaea terrae-reginae</i>				E	1/1
plants	land plants	Loganiaceae	<i>Mitrasacme phascoides</i>				C	1/1
plants	land plants	Loganiaceae	<i>Mitrasacme oasena</i>				C	2/2
plants	land plants	Lythraceae	<i>Rotala tripartita</i>				C	2/2
plants	land plants	Lythraceae	<i>Rotala mexicana</i>				C	1/1
plants	land plants	Maesaceae	<i>Maesa dependens var. dependens</i>				C	1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			2/2
plants	land plants	Malvaceae	<i>Sida rhombifolia</i>		Y			1/1
plants	land plants	Marattiaceae	<i>Ptisana oreades</i>				C	1/1
plants	land plants	Meliaceae	<i>Synoum glandulosum subsp. paniculosum</i>				C	1/1
plants	land plants	Meliaceae	<i>Synoum glandulosum subsp. glandulosum</i>				C	1/1
plants	land plants	Menispermaceae	<i>Stephania japonica var. timoriensis</i>				C	1/1
plants	land plants	Menispermaceae	<i>Hypserpa decumbens</i>				C	1/1
plants	land plants	Menispermaceae	<i>Parapachygone longifolia</i>				C	1/1
plants	land plants	Menispermaceae	<i>Hypserpa smilacifolia</i>				C	2/2
plants	land plants	Meteoriaceae	<i>Papillaria crocea</i>				C	1/1

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plants	land plants	Meteoriaceae	<i>Papillaria flexicaulis</i>			C		2/2
plants	land plants	Meteoriaceae	<i>Aerobryopsis longissima</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia humifusa</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia calyculata</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia crassicarpa</i>			C		1/1
plants	land plants	Mimosaceae	<i>Archidendron vaillantii</i>	salmon bean		C		1/1
plants	land plants	Mimosaceae	<i>Acacia</i>					1/1
plants	land plants	Mimosaceae	<i>Acacia burrana</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia celsa</i>			C		1/1
plants	land plants	Monimiaceae	<i>Hedycarya loxocarya</i>			C		1/1
plants	land plants	Monimiaceae	<i>Pendressia wardellii</i>			C		1/1
plants	land plants	Monimiaceae	<i>Wilkiea angustifolia</i>			C		4/4
plants	land plants	Monimiaceae	<i>Austromatthaea elegans</i>			C		2/2
plants	land plants	Monimiaceae	<i>Stegánthera laxiflora subsp. laxiflora</i>			C		1/1
plants	land plants	Monimiaceae	<i>Levieria acuminata</i>			C		3/3
plants	land plants	Moraceae	<i>Ficus copiosa</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus henneana</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine ireneae subsp. ireneae</i>			C		2/2
plants	land plants	Myrsinaceae	<i>Myrsine subsessilis subsp. cryptostemon</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Tapeinosperma pallidum</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine achradifolia</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine maculata</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine smithii</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine porosa</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium endophloium</i>			C		2/2
plants	land plants	Myrtaceae	<i>Gossia myrsinocarpa</i>			C		1/1
plants	land plants	Myrtaceae	<i>Rhodomyrtus pervagata</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium apodophyllum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Leptospermum anfractum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Pilidiostigma tropicum</i>	apricot myrtle		C		2/2
plants	land plants	Myrtaceae	<i>Rhodomyrtus macrocarpa</i>	finger cherry		C		1/1
plants	land plants	Myrtaceae	<i>Syzygium trachyphloium</i>			C		2/2
plants	land plants	Myrtaceae	<i>Syzygium cryptophlebium</i>			C		1/1
plants	land plants	Myrtaceae	<i>Pilidiostigma tetramerum</i>			C		2/2
plants	land plants	Myrtaceae	<i>Leptospermum brachyandrum</i>	weeping tea-tree		C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus lockyeri subsp. exuta</i>			C		3/3
plants	land plants	Myrtaceae	<i>Eucalyptus pachycalyx subsp. pachycalyx</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus shirleyi</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium johnsonii</i>	Johnson's satinash		C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		1/1
plants	land plants	Myrtaceae	<i>Uromyrtus tenella</i>			C		2/2
plants	land plants	Myrtaceae	<i>Sannantha angusta</i>			C		4/4
plants	land plants	Myrtaceae	<i>Rhodamnia costata</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca sylvana</i>			E		3/3
plants	land plants	Myrtaceae	<i>Melaleuca recurva</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium kuranda</i>	Kuranda satinash		C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Myrtaceae	<i>Acmena smithii</i>	lillypilly satinash		C		2/2
plants	land plants	Myrtaceae	<i>Syzygium wesa</i>			C		2/2
plants	land plants	Myrtaceae	<i>Gossia grayi</i>			C		2/2
plants	land plants	Myrtaceae	<i>Syzygium</i>					1/1
plants	land plants	Myrtaceae	<i>Lenwebbia lasioclada</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus granitica</i>	granite ironbark		C		1/1
plants	land plants	Myrtaceae	<i>Triplarina nitchaga</i>			V	V	7/7
plants	land plants	Myrtaceae	<i>Rhodamnia blairiana</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca viminalis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Homoranthus porteri</i>			V	V	2/2
plants	land plants	Myrtaceae	<i>Rhodomyrtus canescens</i>			C		1/1
plants	land plants	Ochnaceae	<i>Brackenridgea australiana</i>			C		7/7
plants	land plants	Oleaceae	<i>Notelaea sp. (Barakula A.R.Bean 7553)</i>			C		1/1
plants	land plants	Oleaceae	<i>Chionanthus acuminiger</i>			C		1/1
plants	land plants	Oleaceae	<i>Jasminum dallachii</i>	soft jasmine		C		1/1
plants	land plants	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		1/1
plants	land plants	Orchidaceae	<i>Dendrobium carrii</i>			C		1/1
plants	land plants	Orchidaceae	<i>Caladenia carnea</i>			C		1/1
plants	land plants	Orchidaceae	<i>Cadetia taylori</i>			C		1/1
plants	land plants	Orchidaceae	<i>Diuris oporina</i>	northern white donkeys tails		NT		2/2
plants	land plants	Orchidaceae	<i>Corybas abellianus</i>	nodding helmet orchid		NT		1/1
plants	land plants	Orchidaceae	<i>Mobilabium hamatum</i>			C		1/1
plants	land plants	Orchidaceae	<i>Octarrhena pusilla</i>			C		2/2
plants	land plants	Orchidaceae	<i>Dipodium ensifolium</i>	leafy hyacinth orchid		C		2/2
plants	land plants	Orchidaceae	<i>Dockrillia nugentii</i>			C		1/1
plants	land plants	Orchidaceae	<i>Microtis parviflora</i>	slender onion orchid		C		1/1
plants	land plants	Orchidaceae	<i>Bulbophyllum lilianae</i>			C		1/1
plants	land plants	Orchidaceae	<i>Arthrochilus dockrillii</i>			C		2/2
plants	land plants	Orchidaceae	<i>Dendrobium canaliculatum</i>			C		1/1
plants	land plants	Orchidaceae	<i>Thelymitra queenslandica</i>			C		1/1
plants	land plants	Oxalidaceae	<i>Oxalis chnoodes</i>			C		1/1
plants	land plants	Pallaviciniaceae	<i>Symphyogyna</i>					1/1
plants	land plants	Pennantiaceae	<i>Pennantia cunninghamii</i>	brown beech		C		2/2
plants	land plants	Phyllanthaceae	<i>Antidesma erostre</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Glochidion hylandii</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus dallachyanus subsp. (Irvinebank P.I.Forster PIF14675)</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion harveyanum var. harveyanum</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion sessiliflorum var. pedicellatum</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus tenellus</i>		Y			1/1
plants	land plants	Piperaceae	<i>Peperomia enervis</i>			C		1/1
plants	land plants	Pittosporaceae	<i>Pittosporum rubiginosum</i>			C		1/1
plants	land plants	Pittosporaceae	<i>Pittosporum trilobum</i>			C		1/1
plants	land plants	Plantaginaceae	<i>Plantago major</i>	greater plantain	Y			1/1
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Veronica plebeia</i>	trailing speedwell		C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			2/2
plants	land plants	Poaceae	<i>Panicum simile</i>			C		1/1
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis sp. (Lakefield NP J.R.Clarkson+ 7010)</i>			C		1/1
plants	land plants	Poaceae	<i>Dimeria sp. (Mosquito Point J.R.Clarkson+ 9994)</i>			C		1/1
plants	land plants	Poaceae	<i>Microlaena stipoides var. stipoides</i>			C		2/2
plants	land plants	Poaceae	<i>Setaria pumila subsp. subtesselata</i>		Y			1/1
plants	land plants	Poaceae	<i>Hyparrhenia rufa subsp. altissima</i>		Y			1/1
plants	land plants	Poaceae	<i>Phyllostachys bambusoides</i>		Y			1/1
plants	land plants	Poaceae	<i>Hyparrhenia filipendula</i>	tambookie grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus pyramidalis</i>		Y			1/1
plants	land plants	Poaceae	<i>Schizachyrium fragile</i>	firegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		1/1
plants	land plants	Poaceae	<i>Ottochloa nodosa</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalum urvillei</i>	vasey grass	Y			1/1
plants	land plants	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis sororia</i>			C		1/1
plants	land plants	Poaceae	<i>Oplismenus aemulus</i>	creeping shade grass		C		1/1
plants	land plants	Poaceae	<i>Panicum mitchellii</i>			C		1/1
plants	land plants	Poaceae	<i>Urochloa decumbens</i>		Y			1/1
plants	land plants	Poaceae	<i>Axonopus compressus</i>		Y			1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis mexicana</i>	Mexican lovegrass	Y			1/1
plants	land plants	Poaceae	<i>Paspalidium distans</i>	shotgrass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus fertilis</i>	giant Parramatta grass	Y			2/2
plants	land plants	Poaceae	<i>Axonopus fissifolius</i>		Y			1/1
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		1/1
plants	land plants	Poaceae	<i>Ectrosia agrostoides</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalum paniculatum</i>	Russell River grass	Y			1/1
plants	land plants	Podocarpaceae	<i>Prumnopitys amara</i>			C		1/1
plants	land plants	Polygalaceae	<i>Xanthophyllum octandrum</i>			C		3/3
plants	land plants	Polygalaceae	<i>Comesperma rhyoliticum</i>			C		1/1
plants	land plants	Polygalaceae	<i>Salomonina ciliata</i>			C		1/1
plants	land plants	Polypodiaceae	<i>Belvisia mucronata var. mucronata</i>			C		1/1
plants	land plants	Polypodiaceae	<i>Pyrrosia confluens var. dielsii</i>			C		1/1
plants	land plants	Polypodiaceae	<i>Dictymia brownii</i>	strap fern		C		2/2
plants	land plants	Polypodiaceae	<i>Crypsinus simplicissimus</i>			C		1/1
plants	land plants	Polypodiaceae	<i>Grammitis stenophylla</i>			C		1/1
plants	land plants	Polytrichaceae	<i>Dawsonia polytrichoides</i>			C		1/1
plants	land plants	Porellaceae	<i>Porella crawfordii</i>			C		1/1
plants	land plants	Proteaceae	<i>Lomatia milnerae</i>			C		1/1
plants	land plants	Proteaceae	<i>Banksia aquilonia</i>			C		2/2
plants	land plants	Proteaceae	<i>Persoonia tropica</i>			C		7/7
plants	land plants	Proteaceae	<i>Alloxylon flammeum</i>			V	V	1/1
plants	land plants	Proteaceae	<i>Helicia nortoniana</i>			C		1/1
plants	land plants	Proteaceae	<i>Cardwellia sublimis</i>			C		1/1

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plants	land plants	Proteaceae	<i>Carnarvonia araliifolia</i> var. <i>montana</i>			C		1/1
plants	land plants	Proteaceae	<i>Bleasdalea bleasdalei</i>			C		6/6
plants	land plants	Proteaceae	<i>Darlingia darlingiana</i>			C		4/4
plants	land plants	Proteaceae	<i>Helicia lamingtoniana</i>			C		1/1
plants	land plants	Proteaceae	<i>Buckinghamia celsissima</i>	spotted silky oak		C		1/1
plants	land plants	Proteaceae	<i>Stenocarpus reticulatus</i>			C		3/3
plants	land plants	Proteaceae	<i>Darlingia ferruginea</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes</i>					1/1
plants	land plants	Pteridaceae	<i>Pteris umbrosa</i>	jungle bracken		C		1/1
plants	land plants	Pteridaceae	<i>Adiantum silvaticum</i>			C		1/1
plants	land plants	Pteridaceae	<i>Monogramma acrocarpa</i>			C		1/1
plants	land plants	Pterobryaceae	<i>Calyptothecium</i>					1/1
plants	land plants	Pterobryaceae	<i>Pterobryidium australe</i>			C		1/1
plants	land plants	Pterobryaceae	<i>Muellerobryum whiteleggei</i>			C		1/1
plants	land plants	Ptychomniaceae	<i>Garovaglia elegans</i> subsp. <i>dietrichiae</i>			C		1/1
plants	land plants	Ptychomniaceae	<i>Garovaglia</i>					1/1
plants	land plants	Putranjivaceae	<i>Drypetes acuminata</i>			C		2/2
plants	land plants	Pylaisiadelphaceae	<i>Isopterygium albescens</i>			C		1/1
plants	land plants	Radulaceae	<i>Radula ocellata</i>			C		1/1
plants	land plants	Restionaceae	<i>Dapsilanthus ramosus</i>			C		1/1
plants	land plants	Rhamnaceae	<i>Cryptandra debilis</i>			C		1/1
plants	land plants	Rhizogoniaceae	<i>Pyrrhobryum spiniforme</i>			C		1/1
plants	land plants	Ripogonaceae	<i>Ripogonum danesii</i>			C		1/1
plants	land plants	Rosaceae	<i>Rubus moluccanus</i> var. <i>trilobus</i>			C		1/1
plants	land plants	Rubiaceae	<i>Gynochthodes oresbia</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria</i> sp. (Utchee Creek H.Flecker NQNC5313)			C		1/1
plants	land plants	Rubiaceae	<i>Spermacoce</i> sp. (Lorim Point A.Morton AM1237)			C		2/2
plants	land plants	Rubiaceae	<i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i>			C		1/1
plants	land plants	Rubiaceae	<i>Atractocarpus fitzalanii</i> subsp. <i>tenuipes</i>			C		2/2
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i> var. <i>pubigera</i>			C		1/1
plants	land plants	Rubiaceae	<i>Scleromitron polycladum</i>				NT	1/1
plants	land plants	Rubiaceae	<i>Gynochthodes jasminoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Cyclophyllum multiflorum</i>			C		1/1
plants	land plants	Rubiaceae	<i>Amaracarpus nematopodus</i>			C		2/2
plants	land plants	Rubiaceae	<i>Richardia brasiliensis</i>	white eye		Y		1/1
plants	land plants	Rubiaceae	<i>Gynochthodes umbellata</i>			C		2/2
plants	land plants	Rubiaceae	<i>Gynochthodes retropila</i>			C		4/4
plants	land plants	Rubiaceae	<i>Antirhea</i>					1/1
plants	land plants	Rubiaceae	<i>Ixora oreogena</i>			C		1/1
plants	land plants	Rubiaceae	<i>Bobea myrtoides</i>			C		3/3
plants	land plants	Rubiaceae	<i>Antirhea tenuiflora</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax laxiflorens</i>			C		2/2
plants	land plants	Rubiaceae	<i>Opercularia diphylla</i>			C		1/1
plants	land plants	Rubiaceae	<i>Atractocarpus merikin</i>			C		1/1
plants	land plants	Rutaceae	<i>Clausena brevistyla</i>	clausena		C		1/1
plants	land plants	Rutaceae	<i>Boronia occidentalis</i>			C		2/2

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plants	land plants	Rutaceae	<i>Halfordia kendack</i>	saffron heart		C		2/2
plants	land plants	Rutaceae	<i>Acronychia vestita</i>			C		3/3
plants	land plants	Rutaceae	<i>Flindersia acuminata</i>	silver silkwood		C		1/1
plants	land plants	Rutaceae	<i>Acronychia acronychioides</i>			C		1/1
plants	land plants	Rutaceae	<i>Acronychia parviflora</i>			C		2/2
plants	land plants	Rutaceae	<i>Flindersia pimenteliana</i>	maple silkwood		C		8/8
plants	land plants	Rutaceae	<i>Acronychia crassipetala</i>			C		3/3
plants	land plants	Rutaceae	<i>Melicope broadbentiana</i>			C		1/1
plants	land plants	Rutaceae	<i>Flindersia bourjotiana</i>			C		8/8
plants	land plants	Rutaceae	<i>Zanthoxylum veneficum</i>			C		1/1
plants	land plants	Rutaceae	<i>Melicope xanthoxyloides</i>			C		2/2
plants	land plants	Salicaceae	<i>Casearia grayi</i>			C		2/2
plants	land plants	Salicaceae	<i>Casearia costulata</i>			C		1/1
plants	land plants	Salicaceae	<i>Casearia dallachii</i>			C		1/1
plants	land plants	Sapindaceae	<i>Synima cordierorum</i>			C		1/1
plants	land plants	Sapindaceae	<i>Mischocarpus lachnocarpus</i>			C		1/1
plants	land plants	Sapindaceae	<i>Mischarytera lautereriana</i>	corduroy tamarind		C		2/2
plants	land plants	Sapindaceae	<i>Mischocarpus macrocarpus</i>			C		1/1
plants	land plants	Sapindaceae	<i>Sarcotoechia lanceolata</i>			C		4/4
plants	land plants	Sapindaceae	<i>Rhysotoechia mortoniana</i>			C		2/2
plants	land plants	Sapindaceae	<i>Toechima erythrocarpum</i>			C		1/1
plants	land plants	Sapindaceae	<i>Sarcotoechia protracta</i>			C		4/4
plants	land plants	Sapindaceae	<i>Cnesmocarpon dasyantha</i>			C		2/2
plants	land plants	Sapindaceae	<i>Castanospora alphandii</i>	brown tamarind		C		2/2
plants	land plants	Sapindaceae	<i>Alectryon semicinereus</i>			C		1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis papillosa</i>			C		2/2
plants	land plants	Sapindaceae	<i>Sarcotoechia cuneata</i>			C		3/3
plants	land plants	Sapindaceae	<i>Sarcopteryx martyana</i>			C		2/2
plants	land plants	Sapindaceae	<i>Lepiderema ixiocarpa</i>			C		4/4
plants	land plants	Sapindaceae	<i>Harpullia rhyticarpa</i>			C		1/1
plants	land plants	Sapindaceae	<i>Synima reynoldsiae</i>			C		2/2
plants	land plants	Sapindaceae	<i>Arytera pauciflora</i>			C		2/2
plants	land plants	Sapindaceae	<i>Dodonaea uncinata</i>				NT	2/2
plants	land plants	Sapindaceae	<i>Guioa lasioneura</i>			C		1/1
plants	land plants	Sapindaceae	<i>Guioa acutifolia</i>	northern guioa		C		1/1
plants	land plants	Sapindaceae	<i>Mischocarpus pyriformis subsp. pyriformis</i>			C		1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis flagelliformis var. flagelliformis</i>			C		1/1
plants	land plants	Sapindaceae	<i>Guioa montana</i>			C		2/2
plants	land plants	Sapotaceae	<i>Pleioluma brownlessiana</i>			C		2/2
plants	land plants	Sapotaceae	<i>Planchonella asterocarpon</i>			C		2/2
plants	land plants	Sapotaceae	<i>Planchonella euphlebia</i>			C		4/4
plants	land plants	Smilacaceae	<i>Smilax aculeatissima</i>			C		1/1
plants	land plants	Solanaceae	<i>Solanum viridifolium</i>			C		1/1
plants	land plants	Solanaceae	<i>Cestrum elegans</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum macoorai</i>			C		1/1
plants	land plants	Solanaceae	<i>Solanum hamulosum</i>			E		1/1

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plants	land plants	Solanaceae	<i>Solanum americanum</i>		Y			2/2
plants	land plants	Solanaceae	<i>Solanum lasiocarpum</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum mauritianum</i>	wild tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Solanum parvifolium</i>				C	1/1
plants	land plants	Solanaceae	<i>Solanum parvifolium subsp. tropicum</i>				C	1/1
plants	land plants	Sphenostemonaceae	<i>Sphenostemon lobosporus</i>				C	1/1
plants	land plants	Stemonuraceae	<i>Irvingbaileya australis</i>				C	2/2
plants	land plants	Sterculiaceae	<i>Firmiana papuana</i>	lacewood			V	1/1
plants	land plants	Sterculiaceae	<i>Franciscodendron laurifolium</i>				C	3/3
plants	land plants	Stylidiaceae	<i>Stylidium eriorhizum</i>				C	2/2
plants	land plants	Symplocaceae	<i>Symplocos stawellii</i>				C	1/1
plants	land plants	Symplocaceae	<i>Symplocos hayesii</i>				C	2/2
plants	land plants	Symplocaceae	<i>Symplocos glabra</i>				C	2/2
plants	land plants	Thelypteridaceae	<i>Pneumatopteris sogerensis</i>				C	1/1
plants	land plants	Thuidiaceae	<i>Thuidium</i>					2/2
plants	land plants	Thymelaeaceae	<i>Pimelea linifolia subsp. linifolia</i>				C	1/1
plants	land plants	Thymelaeaceae	<i>Pimelea linifolia</i>				C	1/1
plants	land plants	Thymelaeaceae	<i>Pimelea plurinervia</i>				C	3/3
plants	land plants	Urticaceae	<i>Elatostema reticulatum</i>	rainforest spinach			C	2/2
plants	land plants	Verbenaceae	<i>Verbena incompta</i>		Y			1/1
plants	land plants	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			1/1
plants	land plants	Verbenaceae	<i>Lantana camara</i>	lantana	Y			1/1
plants	land plants	Violaceae	<i>Viola hederacea subsp. hederacea</i>				C	1/1
plants	land plants	Viscaceae	<i>Viscum whitei subsp. whitei</i>				C	2/2
plants	land plants	Vitaceae	<i>Cissus vinosa</i>				C	2/2
plants	land plants	Xyridaceae	<i>Xyris complanata</i>	yellow-eye			C	1/1

#### CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



## Appendix B

# Consolidated Species List



Class	Family	Scientific name	Common name	NC Act	EPBC Act	October 2020	Jan-21	Mar-21
mammals	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	platypus	SL			1	
mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna	SL		1	1	
mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider	C			1	
mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider	C			1	
mammals	Pseudocheiridae	<i>Petauroides volans minor</i>	northern greater glider	V	V		1	x
mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider	C			1	
mammals	Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	E	E			x
mammals	Petauridae	<i>Petaurus breviceps</i>	Sugar Glider	C				x
mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	common ringtail possum	C			1	
mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum	C			1	
mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong	C			1	
mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo	C		1	1	
mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby	C			1	
mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby	C			1	
mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo	C		1	1	
mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby	C			1	
mammals	Macropodidae	<i>Petrogale mareeba</i>	Mareeba rock wallaby	C			1	
mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox	C		1	1	
mammals	Muridae	<i>Mus musculus</i>	house mouse				1	
mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				1	
mammals	Felidae	<i>Felis catus</i>	cat				1	
mammals	Suidae	<i>Sus scrofa</i>	pig				1	
mammals	Bovidae	<i>Bos taurus</i>	domestic cattle					
mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat	C			1	
mammals	Peramelidae	<i>Perameles nasuta</i>	long-nosed bandicoot	C			1	
mammals	Dasyuridae	<i>Antechinus godmani</i>	Atherton antechinus	C				
mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot	C			1	
mammals	Molossidae	<i>Austronomus australis</i>	White-striped Mastiff Bat	C			167	
mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	C			2	
mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	C			2095	
mammals	Megadermatidae	<i>Macroderma gigas*</i>	Ghost Bat	E	V		1	
mammals	Miniopteridae	<i>Miniopterus australis</i>	Little Bentwing Bat	C			4	
mammals	Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Eastern Bentwing Bat	C			42	
mammals	Vespertilionidae	<i>Murina florium</i>	Tube-nosed Bat	V			72	
mammals	Vespertilionidae	<i>Nyctophilus sp</i>	Long-eared Bat species				2	
mammals	Molossidae	<i>Ozimops ridei</i>	Eastern Freetail Bat	C			3519	
mammals	Molossidae	<i>Ozimops lumsdenae</i>	Northern Freetail Bat	C			x	
mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat	C			4	
mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	C			280	
mammals	Vespertilionidae	<i>Scotorepens / Scoteanax</i>	Broad-nosed Bats				24	
mammals	Vespertilionidae	<i>Vespadelus pumilus</i>	Eastern Forest Bat	C			2	
birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu	C			1	
birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		1	1	
birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C			1	
birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	C		1		
birds	Columbidae	<i>Geopelia striata</i>	peaceful dove	C		1	1	
birds	Columbidae	<i>Geophaps scripta peninsulae</i>	squatter pigeon (northern subspecies)	C		1	1	
birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon	C			1	
birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove	C			1	
birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon	C		1	1	
birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing	C			1	
birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth	C			1	
birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar	C			1	
birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar	C			1	
birds	Aegothelidae	<i>Aegothales cristatus</i>	Australian owl-nightjar	C			1	
birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet	C			1	
birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift	SL	M	1	1	
birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron	C		1		
birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		1		
birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis	C		1		
birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk	C			1	
birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk	C			1	
birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk	C			1	
birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle	C		1	1	
birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza	C			1	
birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk	E	V		1	
birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite	C			1	
birds	Falconidae	<i>Falco berigora</i>	brown falcon	C		1	1	
birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon	C			1	
birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew	C			1	
birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing	C			1	
birds	Turnicidae	<i>Turnix varius</i>	painted button-quail	C		1		
birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo	C		1	1	
birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo	C		1	1	
birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot	C		1	1	
birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet	C		1	1	

Class	Family	Scientific name	Common name	NC Act	EPBC Act	October 2020	Jan-21	Mar-21
birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella	C		1	1	
birds	Psittacidae	<i>Platycercus elegans</i>	crimson rosella	C		1		
birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet	C		1	1	
birds	Psittacidae	<i>Trichoglossus haematodus</i>	rainbow lorikeet	C		1	1	
birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo	C			1	
birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal	C		1	1	
birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo	C		1		
birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel	C			1	
birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo	C			1	
birds	Strigidae	<i>Ninox connivens</i>	barking owl	C			1	
birds	Tytonidae	<i>Tyto novaehollandiae kimberli</i>	masked owl (northern subspecies)	V	V		1	
birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher	C			1	
birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra	C		1	1	
birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra	C		1	1	
birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher	C		1	1	
birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher	C			1	
birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater	C			1	
birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird	C		1	1	
birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren	C			1	
birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill	C			1	
birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	C			1	
birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone	C			1	
birds	Acanthizidae	<i>Sericornis magnirostra</i>	large-billed scrubwren	C		1		
birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill	C		1	1	
birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote	C		1	1	
birds	Meliphagidae	<i>Bolemoreus frenatus</i>	bridled honeyeater	C			1	
birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater	C		1	1	
birds	Meliphagidae	<i>Cissomela pectoralis</i>	banded honeyeater	C			1	
birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater	C			1	
birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	C		1	1	
birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	C			1	
birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater	C		1	1	
birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater	C		1	1	
birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater	C			1	
birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater	C			1	
birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater	C		1	1	
birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird	C		1	1	
birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	C		1	1	
birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater	C			1	
birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler	C			1	
birds	Orthonychidae	<i>Orthonyx spaldingii</i>	chowchilla	C		1		
birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird	C		1	1	
birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella	C			1	
birds	Campephagidae	<i>Coracina lineata</i>	barred cuckoo-shrike	C		1		
birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	C		1	1	
birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike	C			1	
birds	Campephagidae	<i>Coracina tenuirostris</i>	cicadabird	C		1	1	
birds	Campephagidae	<i>Lalage leucomela</i>	varied triller	C			1	
birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush	C		1	1	
birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush	C		1		
birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler	C		1		
birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	C		1	1	
birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole	C		1	1	
birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird	C			1	
birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow	C		1	1	
birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird	C			1	
birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird	C		1	1	
birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C		1	1	
birds	Artamidae	<i>Strepera graculina</i>	piebald currawong	C		1	1	
birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo	C		1	1	
birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail	C			1	
birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	C		1	1	
birds	Corvidae	<i>Corvus orru</i>	Torresian crow	C		1	1	
birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark	C		1	1	
birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch	SL	M		1	
birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher	C		1	1	
birds	Paradisaeidae	<i>Ptiloris victoriae</i>	Victoria's riflebird	C		1		
birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin	C		1	1	
birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin	C			1	
birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye	C			1	
birds	Sturnidae	<i>Acridotheres tristis</i>	common myna			1	1	
birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird	C		1	1	
birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch	C			1	
birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	C		1	1	
birds	Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V			x
birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	C				x

Class	Family	Scientific name	Common name	NC Act	EPBC Act	October 2020	Jan-21	Mar-21
birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush turkey	C				
birds	Turdidae	<i>Zoothera lunulata</i>	Bassian thrush	C				
birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen	C				
birds	Pachycephalidae	<i>Colluricincla boweri</i>	Bower's shrike-thrush	C				
birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl	C				
reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella	C			1	
reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko	C			1	
reptiles	Diplodactylidae	<i>Amalosa rhombifer</i>	zig-zag gecko	C			1	
reptiles	Diplodactylidae	<i>Oedura coggeri</i>	northern spotted velvet gecko	C			1	
reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead	C		1	1	
reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi	C			1	
reptiles	Agamidae	<i>Hypsilurus boydii</i>	Boyd's Forest Dragon	C				x
reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon	C			1	
reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon	C			1	
reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor	C			1	
reptiles	Varanidae	<i>Varanus varius</i>	lace monitor	C			1	
reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink	C			1	
reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink	C			1	
reptiles	Scincidae	<i>Carlia rostralis</i>	black-throated rainbow-skink	C			1	
reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink	C			1	
reptiles	Scincidae	<i>Cryptoblepharus virgatus</i>	striped snake-eyed skink	C			1	
reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink	C			1	
reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider	C			1	
reptiles	Scincidae	<i>Menetia greyii</i>	common dwarf skink	C			1	
reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink	C		1		
reptiles	Scincidae	<i>Eulamprus quoyii</i>	Eastern water skink	C				
reptiles	Boidae	<i>Morelia spilota</i>	carpet python	C			1	
reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake	C			1	
reptiles	Colubridae	<i>Stegonotus australis</i>	slaty-grey snake	C			1	x
reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake	C			1	
reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake	C			1	
reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake	C			1	
reptiles	Scincidae	<i>Saproscincus basiliscus</i>	Basilisk shadeskink	C				x
reptiles	Carphodactylidae	<i>Carphodactylus laevis</i>	Chameleon Gecko	C				x
reptiles	Carphodactylidae	<i>Saltuarius cornutus</i>	Northern Leaf-tailed Gecko	C				x
amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog	C			1	x
amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog	C			1	
amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk	C			1	
amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog	C			1	x
amphibians	Myobatrachidae	<i>Uperoleia mimula</i>	mimicking gungan	C			1	x
amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog	C			1	
amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog	C			1	
amphibians	Hylidae	<i>Litoria gracilentata</i>	graceful treefrog	C			1	
amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog	C			1	
amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog	C			1	x
amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog	C			1	x
amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog	C			1	
amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog	C			1	x
amphibians	Microhylidae	<i>Cophixalus australis</i>	southern ornate nursery-frog	C			1	
amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad				1	x
amphibians	Hylidae	<i>Litoria serrata</i>	Tapping green-eyed Tree Frog	V				x
amphibians	Myobatrachidae	<i>Uperoleia altissima</i>	Montane Gungan	C				x
amphibians	Myobatrachidae	<i>Pseudophryne covacevichae</i>	Magnificent Broodfrog	V	V			x
amphibians	Microhylidae	<i>Cophixalus australis</i>	Southern Ornate Nursery-frog	C				x

Scientific Name	Common Name	Order	Family	EPBC	QLD	Invasive
<i>Acacia leptostachya</i>	Townsville wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia aulacocarpa</i>	Golden flowered salwood	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia calyculata</i>		Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia crassicaarpa</i>	northern wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia disparrima</i>	southern salwood	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia flavescens</i>	Yellow Wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia implexa</i>	hickory wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia melanoxylon</i>	Australian blackwood	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia simsii</i>	Sims' Wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia sp.</i>		Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia umbellata</i>		Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acacia whitei</i>	White's Wattle	Fabales	Leguminosae (Mimosaceae)	-	-	-
<i>Acmena smithii</i>	Lilly Pilly	Myrtales	Myrtaceae	-	-	-
<i>Allocasuarina inophloia</i>	woolly oak	Fagales	Casuarinaceae	-	-	-
<i>Allocasuarina littoralis</i>	black sheoak	Fagales	Casuarinaceae	-	-	-
<i>Allocasuarina torulosa</i>	Rose she-oak	Fagales	Casuarinaceae	-	-	-
<i>Alloteropsis semialata</i>	Cockatoo Grass	Poales	Poaceae	-	-	-
<i>Alphitonia excelsa</i>	Red Ash	Rosales	Rhamnaceae	-	-	-
<i>Ancistrachne uncinulata</i>	Hooky Grass	Poales	Poaceae	-	-	-
<i>Angophora floribunda</i>	Rough-barked apple	Myrtales	Myrtaceae	-	-	-
<i>Aristida Calycina</i>	dark wiregrass	Poales	Poaceae	-	-	-
<i>Arundinella nepalensis</i>	Reed Grass	Poales	Poaceae	-	-	-
<i>Banksia aquilonia</i>	northern banksia	Proteales	Proteaceae	-	-	-
<i>Brachychiton populneus</i>	Kurrajong	Malvales	Sterculiaceae	-	-	-
<i>Breynia oblongifolia</i>	coffee bush	Malpighiales	Phyllanthaceae	-	-	-
<i>Brunoniella australis</i>	Blue Trumpet	Lamiales	Acanthaceae	-	-	-
<i>Bursaria incana</i>	Prickly pine	Apiales	Pittosporaceae	-	-	-
<i>Callitris intratropica</i>	Blue Cypress	Pinales	Cupressaceae	-	-	-
<i>Capillipedium spicigerum</i>	Scented-top Grass	Poales	Poaceae	-	-	-
<i>Capparis canescens</i>	Wild Orange	Brassicales	Capparaceae	-	-	-
<i>Casuarina cunninghamiana</i>	River she-oak	Fagales	Casuarinaceae	-	-	-
<i>Centella asiatica</i>	Gotu Kola	Apiales	Apiaceae	-	-	-
<i>Chamaecrista rotundifolia</i>	roundleaf sensitive pea	Fabales	Leguminosae (Caesalpiniaceae)	-	-	-
<i>Cheilanthes sieberi</i>	poison rock fern	Polypodiales	Pteridaceae	-	-	-
<i>Coleus amoenus</i>		Lamiales	Lamiaceae	N/A	Vulnerable	-
<i>Corymbia abergiana</i>	range bloodwood	Myrtales	Myrtaceae	-	-	-
<i>Corymbia citriodora</i>	Lemon Scented Gum	Myrtales	Myrtaceae	-	-	-
<i>Corymbia clarksoniana</i>	Clarksons Bloodwood	Myrtales	Myrtaceae	-	-	-
<i>Corymbia intermedia</i>	Pink Bloodwood	Myrtales	Myrtaceae	-	-	-
<i>Corymbia sp.</i>		Myrtales	Myrtaceae	-	-	-
<i>Corymbia tessellaris</i>	Moreton Bay Ash	Myrtales	Myrtaceae	-	-	-
<i>Corymbia trachyphloia</i>	Brown Bloodwood	Myrtales	Myrtaceae	-	-	-
<i>Cymbopogon sp.</i>		Poales	Poaceae	-	-	-
<i>Cyperus sp.</i>		Poales	Cyperaceae	-	-	-
<i>Denhamia sp.</i>		Celastrales	Celastraceae	-	-	-
<i>Desmodium rhytidophyllum</i>	Rusty tick-trefoil	Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Desmodium sp.</i>		Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Dianella caerulea</i>	blue flax-lily	Asparagales	Hemerocallidaceae	-	-	-
<i>Dianella longifolia</i>	Pale Flax-lily	Asparagales	Hemerocallidaceae	-	-	-
<i>Dianella revoluta</i>	black anther flax-lily	Asparagales	Hemerocallidaceae	-	-	-
<i>Dianella sp.</i>		Asparagales	Hemerocallidaceae	-	-	-
<i>Dioscorea transversa</i>	Dioscoreaceae	Dioscoreales		-	-	-
<i>Dipodium sp.</i>		Asparagales	Orchidaceae	-	-	-
<i>Dodonaea lanceolata</i>		Sapindales	Sapindaceae	-	-	-
<i>Dodonaea uncinata</i>		Sapindales	Sapindaceae	N/A	Near Threatened	-
<i>Enneapogon sp.</i>		Poales	Poaceae	-	-	-
<i>Entolasia stricta</i>	wiry panic	Poales	Poaceae	-	-	-
<i>Eremophila sp.</i>		Lamiales	Scrophulariaceae	-	-	-
<i>Eucalyptus shirleyi</i>	Shirley's silver leafed ironbark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus crebra</i>	Narrow-leaved ironbark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus exserta</i>	Queensland peppermint	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus granitica</i>	Granite ironbark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus lockyeri</i>	Lockyer's box	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus melanophloia</i>	Silver-leaved ironbark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus platyphylla</i>	White gum	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus portuensis</i>	White mahogany	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus reducta</i>	Tindal's stringybark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus resinifera</i>	Red mahogany	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus shirleyi</i>	Shirley's silver leafed ironbark	Myrtales	Myrtaceae	-	-	-
<i>Eucalyptus tereticornis</i>	Blue gum	Myrtales	Myrtaceae	-	-	-
<i>Euclptus portuensis</i>	White mahogany	Myrtales	Myrtaceae	-	-	-
<i>Euroschinus falcata</i>	Maiden's blush	Sapindales	Anacardiaceae	-	-	-
<i>Eustrephus latifolius</i>	Wombat Berry	Asparagales	Laxmanniaceae	-	-	-
<i>Gahnia aspera</i>	Round sawsedge	Poales	Cyperaceae	-	-	-
<i>Gastrolobium grandiflorum</i>	Wallflower poison	Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Glycine clandestina</i>	Twining glycine	Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Glycine tabacina</i>	variable glycine	Fabales	Leguminosae (Fabaceae)	-	-	-

Scientific Name	Common Name	Order	Family	EPBC	QLD	Invasive
<i>Grevillea glauca</i>	Cobblers peg tree	Proteales	Proteaceae	-	-	-
<i>Grevillea parallela</i>	White grevillea	Proteales	Proteaceae	-	-	-
<i>Grevillea pteridifolia</i>	Honeysuckle	Proteales	Proteaceae	-	-	-
<i>Grewia latifolia</i>	Dogs balls	Malvales	Sparrmanniaceae	-	-	-
<i>Hakea benthamii</i>	Broad leaved hakea	Proteales	Proteaceae	-	-	-
<i>Heteropogon contortus</i>	Black Speargrass	Poales	Poaceae	-	-	-
<i>Hibbertia aspera</i>	Rough guinea flower	Dilleniales	Dilleniaceae	-	-	-
<i>Hibbertia bicarpellata</i>		Dilleniales	Dilleniaceae	-	-	-
<i>Hibbertia stricta</i>	Erect guinea-flower	Dilleniales	Dilleniaceae	-	-	-
<i>Homoranthus porteri</i>		Myrtales	Myrtaceae	Vulnerable	Vulnerable	-
<i>Hovea sp.</i>		Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Imperata cylindrica</i>	Cogon grass	Poales	Poaceae	-	-	-
<i>Ischaemum australe</i>	Large Bluegrass	Poales	Poaceae	-	-	-
<i>Jacksonia thesioides</i>		Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Jasminum simplicifolium</i>	Stiff jasmine	Lamiales	Oleaceae	-	-	-
<i>Lantana camara</i>	Lantana	Lamiales	Verbenaceae			Yes
<i>Laxmannia gracilis</i>	Slender wire lily	Asparagales	Laxmanniaceae	-	-	-
<i>Lepidosperma laterale</i>	variable swordsege	Poales	Cyperaceae	-	-	-
<i>Leptosema oxylobioides</i>		Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Leptospermum sp.</i>		Myrtales	Myrtaceae	-	-	-
<i>Leucopogon sp.</i>		Myrtales	Myrtaceae	-	-	-
<i>Lomandra hystrix</i>	Mat Rush	Asparagales	Laxmanniaceae	-	-	-
<i>Lomandra longifolia</i>	spiky-headed mat-rush	Asparagales	Laxmanniaceae	-	-	-
<i>Lomandra multiflora</i>	Many-flowered Mat-rush	Asparagales	Laxmanniaceae	-	-	-
<i>Lophostemon confertus</i>	Brush Box	Myrtales	Myrtaceae	-	-	-
<i>Lophostemon suaveolens</i>	Swamp mahogany	Myrtales	Myrtaceae	-	-	-
<i>Melaleuca bracteata</i>	Rver tea-tree	Myrtales	Myrtaceae	-	-	-
<i>Melaleuca sp.</i>		Myrtales	Myrtaceae	-	-	-
<i>Melaleuca viminalis</i>	Weeping bottlebrush	Myrtales	Myrtaceae	-	-	-
<i>Melaleuca viridiflora</i>	broad-leaved paperbark	Myrtales	Myrtaceae	-	-	-
<i>Melastoma sp.</i>		Myrtales	Melastomataceae	-	-	-
<i>Melichrus adpressus</i>		Ericales	Ericaceae	-	-	-
<i>Melichrus urceolatus</i>	Urn heath	Ericales	Ericaceae	-	-	-
<i>Melinis repens</i>	Red Natal grass	Poales	Poaceae	-	-	-
<i>Neolitsea dealbata</i>	hairy-leaved bolly gum	Laurales	Lauraceae	-	-	-
<i>Notelaea microcarpa</i>	Mock-olive	Lamiales	Oleaceae	-	-	-
<i>Oplismenus aemulus</i>	Basketgrass	Poales	Poaceae	-	-	-
<i>Pandanus sp.</i>		Pandanales	Pandanaceae	-	-	-
<i>Panicum effusum</i>	hairy panic	Poales	Poaceae	-	-	-
<i>Persoonia falcata</i>	Milky Plum	Proteales	Proteaceae	-	-	-
<i>Persoonia tropica</i>		Proteales	Proteaceae	-	-	-
<i>Petalostigma pubescens</i>		Malpighiales		-	-	-
<i>Pimelea linifolia</i>	slender rice flower	Malvales	Thymelaeaceae	-	-	-
<i>Pittosporum sp.</i>		Apiales	Pittosporaceae	-	-	-
<i>Platysace valida</i>		Apiales	Apiaceae	-	-	-
<i>Polyscias australiana</i>	Ivory Basswood	Apiales	Araliaceae	-	-	-
<i>Pomaderris alphonoides</i>	Yellow ash	Rosales	Rhamnaceae	-	-	-
<i>Pomaderris argyrophylla</i>	Silver Pomaderris	Rosales	Rhamnaceae	-	-	-
<i>Pomaderris sp.</i>		Rosales	Rhamnaceae	-	-	-
<i>Praxelis clematidea</i>	Praxelis	Asterales	Asteraceae	-	-	-
<i>Prostanthera clotteniana</i>		Lamiales	Lamiaceae	Critically Endangered	Critical	-
<i>Prostanthera sp.</i>		Lamiales	Lamiaceae	-	-	-
<i>Pteridium esculentum</i>	Bracken fern	Polypodiales	Dennstaedtiaceae	-	-	-
<i>Rapanea variabilis</i>	Muttonwood	Polypodiales	Primulaceae	-	-	-
<i>Rubus sp.</i>		Rosales	Rosaceae	-	-	-
<i>Sida hackettiana</i>	Spiked Sida	Malvales	Malvaceae	-	-	-
<i>Sida sp</i>		Malvales	Malvaceae	-	-	-
<i>Smilax australis</i>	Smilax	Liliales	Smilacaceae	-	-	-
<i>Stylosanthes humilis</i>	Townsville stylo	Fabales	Leguminosae (Fabaceae)	-	-	-
<i>Syncarpia glomulifera</i>	Turpentine tree	Myrtales	Myrtaceae	-	-	-
<i>Themeda quadrivalvis</i>	Grader grass	Poales	Poaceae	-	-	-
<i>Themeda triandra</i>	Kangaroo grass	Poales	Poaceae	-	-	-
<i>Thysanotus tuberosus</i>	Common fringe-lily	Asparagales	Laxmanniaceae	-	-	-
<i>Trema aspera</i>	Peach leaf poison bush	Rosales	Ulmaceae	-	-	-
<i>Triplarina nitchaga</i>		Myrtales	Myrtaceae	Vulnerable	Vulnerable	-
<i>Xanthorrhoea johnsonii</i>	Grass Tree	Asparagales	Xanthorrhoeaceae	-	-	-



## Appendix C

# Likelihood of Occurrence



## TECs

TEC	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
<p>Broad leaf tea-tree (<i>Melaleuca viridiflora</i>) woodlands in high rainfall north coast Queensland</p>	<p>Likely to occur</p>	<p>E</p>	<p>RE 7.3.8a <i>Melaleuca viridiflora</i> open forest to open woodland, on poorly drained alluvial plains            RE 7.3.8b <i>Melaleuca viridiflora</i> open forest to open woodland with eucalypt emergent or sparse eucalypt overstorey            RE 7.3.8c <i>Melaleuca viridiflora</i> and <i>Lophostemon suaveolens</i> open forest to woodland on poorly drained alluvial plains            RE 7.3.8d <i>Melaleuca viridiflora</i>, <i>Lophostemon suaveolens</i> and <i>Allocasuarina littoralis</i> open shrubland on poorly drained alluvial plains            RE 7.5.4g <i>Melaleuca viridiflora</i> woodland on laterite            RE 8.3.2 <i>Melaleuca viridiflora</i> woodland on</p>	<p>This ecological community is restricted to the Wet Tropics and Central Mackay Coast bioregions where it occurs in high rainfall floodplain areas. While most occurrences are found within 20 km of the east coast, some patches of the community lie further inland. It occurs on poorly drained floodplains with a land form that is sloping to flat, and it occurs on landzones 3 (Quaternary alluvial systems) and 5 (plains and plateaus on Tertiary land surfaces). Soils are duplex with an impeded layer several centimetres below the surface which causes surface water to be present during the wet season. Inundation can persist for up to a few months (TSSC 2012a).</p> <p>It is typically a woodland (but can have a forest structure in some areas) where <i>M. viridiflora</i> is dominant in the canopy and a diversity of grasses, sedges and forbs occupy the ground layer (DSEWPC 2012b). The structure and floristics of this community vary in response to different soil types, extent of inundation in the wet season and successional responses to fire and grazing (DSEWPC 2012b).</p>	<p><b>Potential to Occur</b></p> <p>Two patches of RE 7.3.8a dominated by <i>M. viridiflora</i> in the canopy were recorded within the Project area, outside of the Project footprint. This RE is known to be associated with the TEC; however, it is not confirmed whether they are reflective of the TEC through the listing advice for this ecological community (TSSC 2012a). No other REs associated with this TEC were ground-truthed within the Project area.</p>



TEC	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
			seasonally inundated alluvial plains with impeded drainage RE 8.5.2a <i>Melaleuca viridiflora</i> +/- <i>Allocasuarina littoralis</i> woodland on Tertiary sand plains RE 8.5.2c <i>Melaleuca viridiflora</i> and <i>M. nervosa</i> woodland on Tertiary sand plains RE 8.5.6 <i>Melaleuca viridiflora</i> +/- <i>Allocasuarina littoralis</i> woodland on Tertiary sand plains (TSSC 2012)		
Mabi Forest (Complex Notophyll Vine Forest 5b)	Likely to occur	CR	RE 7.8.3 (Endangered): complex semi-evergreen notophyll vine forest of uplands on basalt RE 7.3.37 (Endangered): complex semi-evergreen notophyll vine forest of uplands on alluvium	This ecological community occurs on moist lowlands, foothills and uplands, on highly fertile basalt-derived soils. It is restricted to those mapped areas of RE 7.8.3 and other patches identified as Complex Notophyll Vine Forest 5b in the Wet Tropics bioregion (TSSC 2002).	<b>Unlikely to occur</b> Based on the DoR RE mapping, approximately 232 ha of RE 7.8.3 occur within the Study area, however this RE type was not mapped within the Project area and has not been ground-truthed within the Project area. The Mabi Forest TEC is therefore not considered likely to occur within the Project area.





TEC	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
			(SPRAT 2021)		

## Flora

Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Acacia purpureopetala</i> , purple-flowered wattle	PMST	CE	V	The species is confined to the Herberton district in the Einasleigh Uplands biogeographic region of north-eastern Queensland. It grows on steep, granite or metamorphic rocky slopes, at altitudes of 780–880 m in eucalypt woodland. Associated vegetation includes (Mount Emerald) <i>Eucalyptus tindaliae</i> , <i>E. pachycalyx</i> , <i>E. abergiana</i> , <i>Homoranthus porteri</i> , and <i>Leptospermum amboinense</i> , (Herberton) <i>E. rhodops</i> and <i>E. medicris</i> , (Irvinebank) <i>E. cloeziana</i> , <i>E. crebra</i> , <i>Corymbia trachyphloia</i> , <i>Acacia calyculata</i> , <i>A. humifusa</i> and <i>A. leptoloba</i> . Its distribution is not known to overlap with any EPBC listed TECs (DoE 2014b).	<b>Unlikely to occur</b> The Project area is outside the species' distribution (SPRAT 2021) and, with the exception of <i>Homoranthus porteri</i> and <i>Eucalyptus crebra</i> , the associated vegetation (DoE 2014b) has not been recorded within the Project area. In areas where <i>Homoranthus porteri</i> has been recorded, detailed protected plants surveys have been undertaken in accordance with the Flora Survey Guidelines – Protected Plants (DES, 2020) and no individuals of <i>Acacia purpureopetala</i> have been observed. Similarly, no individuals of <i>Acacia purpureopetala</i> have been observed within <i>E. crebra</i> woodland within the Project area.
<i>Alloxylon flammeum</i> , red silky oak	PMST Wildlife Online	V	V	The species occurs in the Atherton Tablelands, from Danbulla to Upper Barron River. The species grows in rainforest on basalt and complex notophyll vine forests on metamorphics, and on humus-rich gravelly loam from granite, at altitudes of 700–820m above sea level. This distribution of this species overlaps with the EPBC listed	<b>Unlikely to occur</b> There is one record of <i>Alloxylon flammeum</i> from 2004 in a patch of Mabi Forest TEC within the Study area, approximately 1.2 km from the Project area boundary. No Mabi Forest TEC has been mapped or ground-truthed within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008c)	
<i>Aponogeton bullosus</i>	PMST Wildlife Online	E	E	The species occurs between Tully and Cairns, and west of Ravenshoe. This species grows in cool, rapid-flowing freshwater rivers and streams in both sunny and shady areas. The species occurs in Wooroonooran and Tully Falls National Park. This distribution of this species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008d).	<p><b>Unlikely to occur</b></p> <p>There are ALA records of <i>Aponogeton bullosus</i> in the Millstream, Ravenshoe State Forest and Tully Falls National Park, all of which overlap with the Study area but not the Project area. No Mabi Forest TEC has been mapped or ground-truthed within the Project area.</p>
<i>Arthraxon hispidus</i> , hairy-joint grass	PMST	V	V	<p>In Queensland, the species is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps and has been recorded in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests, as well as with bog mosses in mound springs. The distribution of the species overlaps with the following EPBC listed TECs:</p> <ul style="list-style-type: none"> <li>• Semi-evergreen vine thicket of the Brigalow Belt and Nandewar Bioregions</li> <li>• The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin</li> <li>• Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)</li> <li>• White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</li> </ul>	<p><b>Unlikely to occur</b></p> <p>There have been no records of <i>Arthraxon hispidus</i> within the Study area. There are no mapped or ground-truthed occurrences of the concurrent EPBC listed TECs within the Study area.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				(DEWHA 2008e)	
<i>Canarium acutifolium</i>	PMST	V	V	The species occurs between Mossman and Tully in north Queensland and has been recorded in mesophyll vine forest along rivers and creeks at altitudes of 5-200m above sea level. The distribution of the species is not known to overlap with EPBC listed TECs (DEWHA 2008f).	<p><b>Unlikely to occur</b></p> <p>All known records of the species are from the coastal region to the east of the Tablelands (ALA). The lowest point of the Project area is 670 m asl and no mesophyll vine forest has been mapped or ground-truthed within the Study area.</p>
<i>Carronia pedicellata</i>	PMST	E	E	The species occurs from Bellenden Ker to Mission Beach with disjunct populations in the Noah and Cooper Creek catchments near Cape Tribulation. It has been recorded in Wooroonooran and Clump Mountain National Parks. The species grows in complex mesophyll or notophyll vine forest of deep soils derived from basalt, granite or metamorphic substrates at altitudes from near sea level to 520m. The distribution of the species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008g).	<p><b>Unlikely to occur</b></p> <p>All known records of the species are from the eastern side of the Tablelands (ALA). The lowest point of the Project area is 670 m asl and there are no mapped or ground-truthed occurrences of the Mabi Forest TEC within the Project area.</p>
<i>Chingia australis</i>	PMST	E	E	The species occurs between Wooroonooran National Park and Daintree National Park, north Queensland. The species occurs in rainforest on steep creek banks and ridge slopes often inhabiting well-lit sites such as swampy ground in lowland forest or creek banks. Preferred habitats include mesophyll vine forest and upland simple notophyll vine forest, on clay soil (basalt and mudstone), metamorphic and granite substrates. Reliant on moisture,	<p><b>Potential to occur</b></p> <p>The species has not been recorded within the Study area as part of the desktop assessments (Wildnet or ALA) and it was not observed during the field surveys. Nevertheless, the Project area is within the known range of the species and suitable habitat is available.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				this species grows in proximity to water courses and requires disturbance such as road cuttings, treefalls, landslips or flood scouring for establishment on exposed mineral soil (Herbert 2006).	
<i>Corymbia rhodops</i> , red-throated bloodwood	PMST	V	V	The species is known from the Herberton-Irvinebank area southwest of Cairns and on the slopes of the Windsor Tableland near Mount Carbine. It grows in dry sclerophyll forest with numerous other eucalypt species, preferring ridges or hill slopes with coarse sandy soils. All known populations occur in remnant vegetation. The distribution of the species is not known to overlap with any listed TECs (DEWHA 2008h)	<b>Potential to occur</b> The Project area is outside the species' distribution (as documented in SPRAT 2021) and it has not previously been recorded within the Study area (Wildnet or ALA). Vegetation communities within the Project area are primarily wet forest rather than dry, nevertheless some marginal habitat for the species is present.
<i>Cycas platyphylla</i>	PMST	V	V	The species occurs from the Petford district, west of the Atherton Tableland with three disjunct populations recorded from Taravale, Wandovale and the White Mountains. The species occurs in sparse <i>Eucalyptus sideroxylon</i> woodland with a grassy understorey, often on rocky slopes in shallow red stony loams. Its distribution is not known to overlap with any EPBC listed TECs (DEWHA 2008i).	<b>Unlikely to occur</b> There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during field surveys. Its preferred habitat has not been mapped or ground-truthed within the Project area.
<i>Dichanthium setosum</i> , bluegrass	PMST	V	LC	The species occurs from the Leichhardt, Morton, North Kennedy and Port Curtis regions. The species is associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil and is found in moderately disturbed areas including cleared woodland, grassy roadsides, grazed land and highly disturbed pastures. In	<b>Unlikely to occur</b> There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during field surveys. There are no mapped or ground-



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				<p>grassy woodlands, the species can be found where the habitat has been variously grazed, nutrient-enriched and water-enriched, an indication that disturbance benefits the species. Its distribution overlaps with the following EPBC listed TECs:</p> <ul style="list-style-type: none"> <li>• Semi-evergreen vine thicket of the Brigalow Belt and Nandewar Bioregions</li> <li>• The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin</li> <li>• Bluegrass (<i>Dichanthium spp.</i>) dominant grasslands of the Brigalow Belt Bioregion</li> <li>• Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)</li> <li>• White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</li> <li>• Upland Wetlands of the New England Tablelands and the Monaro Plateau (DEWHA 2008j)</li> </ul>	<p>truthed occurrences of the concurrent EPBC listed TECs within the Study area.</p>
<i>Diplazium cordifolium</i>	PMST	V	V	<p>This species is found around Cairns, Herberton, and Wooroonooran. Occurrence includes in rainforest along creek banks, usually below 80-100m altitude although one population grows at 475m altitude in Palmerston Valley, north Queensland. Its distribution is not known to overlap with any EPBC listed TECs (DEWHA 2008k).</p>	<p><b>Unlikely to occur</b></p> <p>There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during field surveys. The lowest point of the Project area is 670 m asl and there are limited rainforest communities within the Project area.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Euphorbia carissoides</i>	PMST	V	V	Confined to areas between Georgetown and east to Stannary Hills, with a disjunct occurrence near Hopevale, north Queensland. Habitat includes cliff lines, among rocky outcrops and hillsides in shrubland and eucalypt low open woodland communities in generally shallow soils derived from sandstone, granite and rhyolite substrates (DEWHA 2008l).	<p><b>Potential to occur</b></p> <p>There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during the field surveys. Nevertheless, the Project area is within the known range of the species and suitable habitat is available.</p>
<i>Grevillea glossadenia</i>	PMST	V	V	Found west of Atherton Tablelands between Walkamin, Irvinebank, Herberton and Watsonville, north Queensland. Localities include Mt Emerald, Mt Misery, Cooloomon Ck, Little Cooloomon Ck, Emu Ck, Granite Ck and Barkerville. The species occurs in eucalypt woodland or low open forest, in shallow to skeletal granitic soils on rolling hills, gravel terraces near stream beds and may favour disturbed sites including along roadsides and mining tracks. It occurs in areas of 1000-1300mm rainfall and can tolerate forests as low as -8°C. Associated vegetation includes <i>Eucalyptus cloeziana</i> , <i>E. pachycalyx</i> , <i>E. reducta</i> , <i>E. cullenii</i> , <i>E. atrata</i> , <i>Corymbia abergiana</i> , <i>C. leichhardtii</i> , <i>C. trachyphloia</i> , <i>C. watsoniana</i> , <i>C. citriodora</i> , <i>Callitris intratropica</i> , <i>Alphitonia excelsa</i> , <i>Acacia purpureapetala</i> , <i>Homoranthus porteri</i> , <i>Leptospermum amboinense</i> , and <i>Xanthorrhoea johnsonii</i> . The distribution of the species is not known to overlap with EPBC listed TECs (DEWHA 2008m).	<p><b>Potential to occur</b></p> <p>The Project area is outside the species' distribution (as documented in SPRAT 2021) and there are no known records of the species within the Study area (Wildnet or ALA). It was not recorded during the field surveys. Nevertheless, the Project area does provide suitable habitat for the species.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Homoranthus porteri</i>	PMST Wildlife Online	V	V	Occurs from Mount Mulligan, west of Mareeba, southward near Ravenshoe and 80km north-west of Townsville, north Queensland. Grows on sandstone pavement, rocky outcrops (including rhyolite), hillsides and scree slopes in open eucalypt woodland. Its distribution is not known to overlap with any EPBC listed TECs (DEWHA 2008b). RPS (2011) described the species as favouring the edges of rock pavements, entirely restricted to exposed ridge topography and forming almost monospecific thickets.	<b>Known to occur</b> Recorded in four discrete locations within the Project area. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Lastreopsis walleri</i>	PMST Wildlife Online	V	V	This species is endemic to a few scattered locations on the Atherton Tablelands. It grows in rainforest and shaded places in open forest. The distribution of the species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008n).	<b>Unlikely to occur</b> The species has been historically recorded within the Study area where this overlaps with the Wet Tropics WHA, with the last record dating from 2006. It was not observed during the field surveys. There are no mapped or ground-truthed areas of Mabi Forest TEC within the Project area.
<i>Macropteranthes montana</i>	PMST	V	V	This species is known from a small area just south of Cape York peninsula with collections made from localities near Mount Mulligan, Chillagoe, Dimbulah, Petford, Irvinebank, Elizabeth Creek Gorge, Bulleringa National Park and south west as far as the northern Newcastle Range. The species occurs in shallow soil in low woodland or vine thicket and occurs within the Northern Gulf and Wet Tropics natural resource management regions. The distribution of this species is not known to overlap with any listed TECs (DEWHA 2008o).	<b>Potential to occur</b> This species has not been recorded in the desktop assessment (Wildnet or ALA) or during field surveys. There is limited potential habitat (vine thicket) within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Phaius australis</i> , lesser swamp-orchid	PMST	E	E	The species is endemic to Australia and occurs in southern Queensland and northern New South Wales. Its distribution has tentatively been described as north from Lake Cathie (near Port Macquarie) but mainly north of the Evans Head area to the Barron River in northeast Queensland, but it is rare in the latter region and these populations are now thought to be destroyed. It is commonly associated with coastal wet heath / sedgeland wetlands, swampy grassland or swampy forest and often where broad-leaved paperbark or swamp mahogany are found. Typically restricted to swamp forest margins and often associated with rainforest elements such as Bangalow palm and cabbage tree palm. The distribution of this species is not known to overlap with any listed TECs (DoE 2014b).	<b>Unlikely to occur</b> This species has not been recorded in the desktop assessment (Wildnet or ALA) or during field surveys. There is no suitable habitat for the species (as described in DoE 2014b) within the Project area.
<i>Phaius pictus</i>	PMST	V	V	The species occurs sporadically from Mcllwraith Range, Bloomfield River to Kirrama Range, north Queensland. Highly localised, the species is restricted to rainforests from 0-600m altitude and usually occurs in sheltered humid sites in proximity to streams and seepage among forest litter on boulders. The distribution of the species is not known to overlap with any EPBC listed TECs (DEWHA 2008p).	<b>Unlikely to occur</b> There is one record of the species dating from 1973 at the eastern-most extent of the Study area, to the north of Koombooloomba Dam within the National Park. There are no known records of the species within the Project area and it was not recorded during field surveys. The lowest point of the Project area is 670 m asl and there are limited rainforest communities within the Project area.
<i>Phlegmariurus marsupiiiformis</i> , water tassel-fern	PMST	V	V	The species is an epiphyte on rocks or rainforest trees, growing at altitudes >800m above sea level (Chinnock 1998) and occurs from the Windsor Tableland to south of	<b>Unlikely to occur</b> There is one record of the species dating from 1985 at the southeastern-most extent of the Study area, south of





Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				Tully River (Jones and Gray 1985; Chinnock 1998). The distribution of the species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008q).	Koombooloomba Dam. There are no known records of the species within the Project area and it was not recorded during field surveys. There are no mapped or ground-truthed areas of Mabi Forest TEC within the Project area.
<i>Polyphlebium endlicherianum</i> , middle filmy fern	PMST	E	V	The species is epiphytic and lithophytic, growing on damp rocks and tree trunks in tropical rainforest, often near streams or waterfalls (SPRAT 2021).	<b>Unlikely to occur</b> There is one undated record of the species at the northeastern-most extent of the Study area, within Tully Falls National Park. There are no known records of the species within the Project area and it was not recorded during field surveys. There are limited rainforest communities within the Project area.
<i>Prostanthera clotteniana</i>	PMST Wildlife Online	CE	E	This species occurs in very rocky areas, with shallow acidic soil. It is confined to rocky rhyolite areas in drier woodlands on steep hills west of the Atherton-Ravenshoe area. It was thought to be extinct prior to its rediscovery in 1999. All recorded sites are on the rhyolite of the Glen Gordon and Walsh Bluff volcanics. Known locations and habitats straddle the Wet Tropics and Einasleigh Uplands bioregions. Recruitment and establishment are very slow (4-10 years) due to the species being an obligate seed generator and being severely impacted by frequent fires within known localities (DoE 2015b).	<b>Known to occur</b> Recorded in one broad location within the Project area. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Tephrosia leveillei</i> (syn. <i>Tephrosia flagellaris</i> )	PMST	V	LC	This species is currently known from the area between Chillagoe and Forty Mile Scrub (five collections) with one collection further south, near Ravenswood. It has been recorded growing on alluvial plains in <i>Eucalyptus cullenii</i>	<b>Unlikely to occur</b> There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				woodland with <i>Corymbia erythrophloia</i> , <i>Erythrophleum chlorostachys</i> and <i>Grevillea glauca</i> , and in tall open forest of Eucalyptus and Corymbia species over dense <i>Heteropogon contortus</i> on red sand (DEWHA 2008). At the Ravenswood site it is recorded growing along the railway track (DEWHA 2008r).	during field surveys. No habitat similar to that where the species has been previously recorded has been mapped or ground-truthed within the Project area.
<i>Triplarina nitchaga</i>	PMST Wildlife Online	V	V	The species occurs in two small populations near Ravenshoe, north Queensland. It grows at Nitchaga Creek amongst granite outcrops near the stream, in open forest dominated by <i>Syncarpia glomulifera</i> , <i>Eucalyptus resinifera</i> , and <i>Leptospermum brachyandrum</i> . Whilst at Arthurs Seat, it grows on rhyolite hillside and dry gully, in open forest dominated by <i>Eucalyptus citriodora</i> , <i>E. acmenoides</i> , <i>E. abergiana</i> , <i>Homoranthus porteri</i> , and <i>Labichea nitida</i> . Its distribution is not known to overlap with any EPBC listed TECs (DEWHA 2008a).	<b>Known to occur</b> Recorded in one distinct location within the Project area, at Arthur's Seat, which is a known population. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Tropilis callitrophilis</i> (syn <i>Dendrobium callitrophilum</i> ), thin feather orchid	PMST	V		The species occurs on the Evelyn, Mount Windsor, Atherton and Carbine Tablelands and some of the higher mountains between the Daintree and Bloomfield Rivers. It grows at altitudes of 760-1500 m above sea level in or close to rainforest. It is epiphytic or lithophytic and favours stringybark cypress pine, <i>Callitris macleayana</i> , but also grows on various shrubby myrtles such as <i>Austromyrtus</i> . The distribution of the species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008s)	<b>Unlikely to occur</b> There is one undated record of the species at the eastern-most extent of the Study area, just north of Koombuloomba Dam. There are no known records of the species within the Project area and it was not recorded during field surveys. None of its preferred host species have been recorded within the Project area, and there are no mapped or ground-truthed areas of Mabi Forest TEC within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Vappodes lithocola</i> (syn. <i>Dendrobium lithocola</i> ), dwarf butterfly orchid	PMST	E	V	<p>This species is lithophytic (rock-growing) orchid. It is highly localised, occurring in the coastal ranges between Daintree and Cairns. It is confined to Macalister Range between the Barron and Mossman rivers.</p> <p>This species grows in rainforest areas on rocks, boulders, cliff faces on ridges and slopes at altitudes of 300-800 m asl. It occurs in open eucalypt forests and woodlands in exposed, often harsh situations on rocks, boulders and cliff faces. The distribution of the species is not known to overlap with any listed TECs (DEWHA 2008t).</p>	<p><b>Potential to occur</b></p> <p>There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during field surveys. Nevertheless, suitable habitat for the species does occur within the Project area.</p>
<i>Zeuxine polygonoides</i> (syn. <i>Rhomboda polygonoides</i> ), velvet jewel orchid	PMST	V	V	<p>The species is found in three locations between the Paluma Range and the Daintree River, north Queensland, at altitudes of 450-820m above sea level and usually growing on rainforest floor in moist shady sites. It has also been found in mesophyll vine forests and simple notophyll vine forest, growing on tops of granite boulders adjacent to streams, on flat rocks and among leaf litter on metamorphic substrates, granite, or rhyolite.</p> <p>It has been previously recorded in the following REs:</p> <ul style="list-style-type: none"> <li>• 7.11.1a – Mesophyll vine forest in very high rainfall lowlands and foothills on metamorphics</li> <li>• 7.12.16a – Simple notophyll vine forest (often with Bull Kauri, <i>Agathis microstachya</i>, in cloudy wet to moist uplands on granite and rhyolite</li> </ul>	<p><b>Potential to occur</b></p> <p>There are no known records of the species within the Study area (Wildnet or ALA) and it was not recorded during field surveys. There are no mapped or ground-truthed areas of Mabi Forest within the Project area but there are patches of RE 7.12 16a.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				The distribution of the species overlaps with the EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) (DEWHA 2008u).	

## Threatened Fauna

Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<b>Amphibians</b>					
<i>Litoria dayi</i> , Australian lace-lid	PMST Wildlife Online	V	V	The species is endemic to the Wet Tropics and is found at altitudes between sea level and 1200 m asl. It has disappeared from many upland sites throughout the Wet Tropics but persists in the lowlands and foothills. It is a rainforest specialist, inhabiting complex, densely vegetated habitats. It prefers fast-flowing rocky streams and has been found in habitats up to 50 m from streams (TSSC 2019a).	<b>Potential to occur</b> The species has never been recorded in the Project area and has not been recorded (Wildnet and ALA) in the Study area since 1974. It was not observed during targeted wet season surveys despite other amphibians being recorded from areas of suitable habitat. There is minimal preferred habitat within the Project area
<i>Litoria nyakalensis</i> , mountain mistfrog	PMST	CE	CR	The species is a rainforest specialist, with an obligate associated with streams. It is found in upland rainforest and wet sclerophyll forest alongside fast-flowing streams where there is white water from riffles and cascades. It has not recorded in the Wet	<b>Potential to occur</b> The species has been historically recorded (via Wildlife Online and ALA) within the Project area, within the Wet Tropics WHA. The last recorded



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				Tropics since 1990 and is possibly now extinct but may still persist in remote areas (TSSC 2019b).	observation is dated 1981. It was not observed during targeted wet season surveys despite other amphibians being recorded from areas of suitable habitat. There is minimal preferred habitat within the Project area, in the very north of Wooroora station within the Wet Tropics WHA.
<i>Pseudophryne covacevichae</i> , magnificent brood frog	PMST Wildlife Online	V	V	Until 2013 this species was known only from the Ravenshoe and Herberton areas; it was then found 160 km to the southeast. It is restricted to specific habitats, breeding in and around seepage areas in open eucalypt forests. All previous records of the species have been on rhyolites of Glen Gordon volcanics at altitudes >800 m. (TSSC 2017).	<b>Known to occur</b> Magnificent brood frog were recorded at multiple locations within the Project area during the March 2021 wet season surveys.
<b>Birds</b>					
<i>Calidris ferruginea</i> , curlew sandpiper	PMST	CE, migratory, marine	CR	The curlew sandpiper is a visiting migrant during Australian summer, congregating at sheltered intertidal mudflats and at the muddy margins of terrestrial wetlands. It mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. It may also be recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (SPRAT).	<b>Potential to occur</b> The species has not been recorded within the Study area (Wildnet or ALA) and it was not observed on site. There is minimal, marginal habitat within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Casuarius casuarius johnsonii</i> , southern cassowary – southern population	Wildlife Online PMST	E	E	<p>The southern cassowary primarily occurs in rainforests associated vegetation but also uses woodlands, melaleuca swamps, mangroves and beaches for intermittent foraging. It requires a high diversity of fruiting trees to provide year-round supply of fleshy fruit and access to freshwater multiple times a day. Its core habitat is the coastal lowlands between Ingham and Mossman, as well as uplands in the southern Atherton tablelands (Latch 2007).</p> <p>Appendix 2 of the Recovery Plan lists REs that are considered Essential Habitat for the species (Latch 2007).</p>	<p><b>Known to occur</b></p> <p>There are recent records of southern cassowary within the Study area (Wildnet). The species was not observed during the field surveys. There are small isolated patches of three vegetation communities listed as Essential Habitat for the southern cassowary within the Project area.</p>
<i>Erythroriorchis radiatus</i> , red goshawk	PMST Wildlife Online	V	E	<p>The red goshawk is endemic to Australia. It occurs in a patchy, widespread distribution across coastal and sub-coastal regions of northern and eastern Australia. The species inhabits biodiverse, extensive, multi-species mosaics of mostly Eucalypt-dominated open forests and woodlands, in permanently watered, varied terrain. Its present association with rugged terrain may be an artefact of past patterns of habitat clearance, an interpretation supported by the pattern of early records (Czechura et al. 2010).</p> <p>Nests are restricted to trees that are taller than 20 m (mean height = 31 m, DERM 2012) and within 1 km of a watercourse or wetland (TSSC 2015c). Pairs are believed to remain within the nesting territory all</p>	<p><b>Known to occur</b></p> <p>The species was known to nest historically on the Bush Heritage property 'Yourka' immediately to the south of the Project area, with the last recorded sighting in ALA dating from 2007. The Project area supports foraging and breeding habitat for the species. A potential nest (unoccupied) was recorded during the wet season surveys, after the end of the nesting season. Adopting the precautionary principle, this nest has been assumed to belong to a breeding pair of red goshawk.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				year but may expand their home range when not breeding (SPRAT 2021; TSSC 2015c).	
<i>Falco hypoleucos</i> , grey falcon	PMST	V	V	The grey falcon occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses (TSSC 2020b)	<b>Unlikely to occur</b> There are no known historical records of the species within the Study area and it was not recorded during field surveys. The Project area receives far in excess of 500 mm / annum and does not provide suitable habitat for this species.
<i>Hirundapus caudacutus</i> , white-throated needletail	PSMT	V, marine	V	The white-throated needletail is widespread in eastern and south-eastern Australia. It is recorded in all coastal regions of Queensland, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (SPRAT 2021). The species breeds in northern Asia and spends the non-breeding season (typically October – March inclusive) in Australia where it is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1,000 m above the ground. The white-throated needletail occurs over most types of habitat, including cleared areas, but is most often recorded above wooded areas (SPRAT 2021).	<b>Known to occur</b> There are a number of historical records of white-throated needletail within the Study area, to the north, south and east of the Project area. One white-throated needletail was observed during the March 2021 field surveys, deceased apparently due to collision with the existing transmission line.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Numenius madagascariensis</i> , Eastern curlew	PMST	CE, migratory, marine	E	Within Australia, the eastern curlew has a primarily coastal distribution. It is rarely recorded inland but may flyover during migration. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. (DoE 2015c)	<b>Unlikely to occur</b> There are no known historical records within the Study area and the species was not observed during field surveys. There is no potential habitat for the species within the Project area.
<i>Rostratula australis</i> , Australian painted snipe	PMST	E, marine	E	The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (SPRAT 2021)	<b>Unlikely to occur</b> There are no known historical records within the Study area and the species was not observed during field surveys. There is only limited potential habitat available within the Project area.
<i>Turnix olivii</i> , buff-breasted button-quail	PMST	E	E	The buff-breasted button-quail occurs in north-eastern Queensland. It is one of the least known birds in Australia. It occurs in patches of short and sparse grassland, on a terrain of small stones (often on the lower slopes of hills and ridges), and sometimes in open glades amongst <i>Melaleuca</i> , <i>Acacia</i> , <i>Alphitonia</i> or <i>Tristania</i> , in rainforest or open Eucalyptus woodland. It is possible that fires that occur early in the wet season might help to maintain a suitable open habitat structure for the breeding	<b>Unlikely to occur</b> There are no known historical records within the Study area and the species was not observed during field surveys. There is only limited potential habitat available within the Project area.





Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				<p>season, although observations suggest that the rapid and dense regrowth of grasses in burnt areas following the onset of the wet season quickly renders such habitats unsuitable (SPRAT 2021)</p> <p>The species inhabits tropical eucalypt woodland with very sparse understorey of shrubs and grasses. It is usually seen on lower, thinly grassed slopes of hills with small <i>M. viridiflora</i> (DEWHA 2010c)</p>	
<i>Tyto novaehollandiae</i> <i>Kimberli</i> , masked owl	PMST	V	V	<p>The masked owl is native to Australia, Indonesia and Papua New Guinea (BirdLife International 2018). The distribution of the masked owl (northern) within Australia is poorly known, and three subpopulations have been suggested: Kimberley, Northern Territory and Cape York (SPRAT 2021). In Queensland it occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide (SPRAT 2021).</p> <p>The masked owl (northern) has been recorded from riparian forest, open forest, <i>Melaleuca</i> swamps and the edges of mangroves, as well as the edges of sugar cane fields (SPRAT 2021). It requires large old-growth trees with large hollows for nesting (SPRAT 2021). It usually nests in patches of closed forest and feeds largely on small to medium sized terrestrial mammals. The subspecies probably breeds in March-October and nests are 7-8 km apart (SPRAT 2021). It is sedentary and territorial (SPRAT 2021).</p>	<p><b>Known to occur</b></p> <p>There are a number of historical records of masked owl within the Study area, to the north and south of the Project area. During the January 2021 surveys masked owl was recorded vocalising at two locations on the Glen Gordon property; on multiple occasions alongside Blunder Creek (within riparian vegetation dominated by <i>Eucalyptus tereticornis</i> and <i>Casuarina cunninghamiana</i>) and once within mixed Eucalypt woodland dominated by <i>Corymbia intermedia</i>, <i>E. resinifera</i> and <i>E. portuensis</i>.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<b>Mammals</b>					
<i>Bettongia tropica</i> , northern bettong	PMST Wildlife Online	E	E	<p>The species is endemic to northern Queensland. It has a small, fragmented distribution and only occurs within a thin strip of sclerophyll forest along the western margin of the rainforest, in the ecotone between rainforest and savannah woodland. The species has undergone a large contraction in its range and no longer occurs in the Dawson Valley or greater Ravenshoe area (TSSC 2016b).</p> <p>Extant populations of northern bettongs occur in a range of eucalypt forest types associated with the western edge of the rainforests in the Wet Tropics bioregion and the eastern edge of the open eucalypt woodlands in the Einasleigh Upland bioregion. This narrow band of habitats consists of a cline of eucalypt forest types from very tall and wet <i>Eucalyptus grandis</i> dominated forests through tall <i>E. resinifera</i>-<i>Syncarpia glomulifera</i> dominated forests to medium height and drier <i>E. citriodora</i> or <i>E. platyphylla</i> dominated forests (Dennis 2001).</p>	<p><b>Potential to occur</b></p> <p>The only known record of the species within the Study area dates from 1922 (ALA) and it is reported to no longer occur in the Ravenshoe area. The species was not recorded during field surveys, nevertheless suitable habitat is present within the Project area.</p>
<i>Dasyurus hallucatus</i> , northern quoll	PMST Wildlife Online	E	LC	<p>Habitat occupied by the species usually includes some form of rocky area or structurally diverse woodland or forest used for shelter purposes with surrounding vegetated habitats used for foraging and dispersal. Shelter habitat is important for breeding and refuge from fire / predation. Recent surveys throughout Queensland have suggested the</p>	<p><b>Likely to occur</b></p> <p>There is record of the species dating from 2010 in the northwest of the Study area, near Mount Garnet, as well as much older records from Ravenshoe (to the north) and Tully Falls National Park (to the east), also both within the Study area. There is suitable habitat distributed across the Project area.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				species is more likely to be present in high relief areas that have shallower soils, greater cover of boulders, less fire impact and were closer to permanent water (TSSC 2005, SPRAT 2021).	
<i>Dasyurus maculatus gracilis</i> , spotted-tailed quoll – northern subspecies	PMST Wildlife Online	E	E	This is a forest-dependent species that occupies a wide range of habitat types, all characterised by relatively high and predictable seasonal rainfall (> 600 mm/yr). The northern subspecies is confined to upland closed forests (mostly > 900 m altitude) in the upper catchments of rivers draining east and west of the eastern escarpment in the Wet Tropics bioregion. Preferred vegetation comprises simple and complex notophyll vine forest, simple microphyll vine-fern forest and simple microphyll vine-fern thicket. Denning occurs in tree hollows, logs and rock crevasses (SPRAT 2021).	<b>Likely to occur</b> The species has not been recorded within the Project area but there are a number of historic records within the broader Study area, from Tully Falls National Park to the east (the most recent of these dating from 1994). There is limited preferred habitat for the species within the Project area, mostly along the eastern boundary.
<i>Hipposideros semoni</i> , Semon's leaf-nosed bat	PMST	V	E	This species is distributed in coastal Queensland from Cape York to just south of Cooktown. It is known to roost in caves, rock fissures, mines, boulder piles and tree hollows. It forages in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland; they appear to prefer rainforest.	<b>Potential to occur</b> There are no known records of the species from the Study area (Wildnet or ALA) and it was not recorded during field surveys. Nevertheless, there is some potential habitat within the Project area.
<i>Macroderma gigas</i> , ghost bat	PMST	V	E	The species range is discontinuous and only 14 breeding sites are currently known. It roosts in caves, rock crevices and old mines. It is carnivorous, feeding	<b>Known to occur</b> There is an undated record of the species outside of the Study area to the west, at Mount Garnet. A call signal potentially belonging to ghost bat was



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				on small mammals (including other bats), birds, reptiles, frogs and large insects (TSSC 2016a).	recorded on an anabat during the wet season surveys. There is potential roosting habitat within the Project area.
<i>Mesembriomys gouldii rattoides</i> , black-footed tree-rat	PMST	V	LC	<p>This is a nocturnal mammal whose distribution is poorly known. It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba. There are also records sparsely scattered across the Cape York region and there are recent records from AWC's Picaninny Plains and Brooklyn wildlife sanctuaries. It dens in tree hollows and forages on the ground and in trees, foraging at least 500 m from a roost site. It has a home range of 60-70 ha. Its diet comprises mostly fruits and seeds but also includes some invertebrates, flowers and grass (TSSC 2015a).</p> <p>The species has an upper elevation limit of 700 m (Woinarski and Burbidge, 2016). It forages on the fruits of <i>Pandanus spiralis</i>, and uses the dense foliage of this vegetation as daytime roost sites (Rankmore and Friend 2008).</p>	<p><b>Potential to occur</b></p> <p>There is one undated record of the species outside the Study area to the west, at Mount Garnet. It was not observed during field surveys but potential habitat occurs on site.</p>
<i>Petauroides volans minor</i> , northern greater glider	PMST Wildlife Online	V	V	<p>The species has an elevation range from sea level to 1200 m asl. It is largely restricted to eucalypt forests and woodlands, and is typically in higher abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Distribution may be patchy, even in suitable habitat. It favours forests with a diversity of eucalypt species</p>	<p><b>Known to occur</b></p> <p>Recorded at multiple locations across the Project area during wet season fauna surveys.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				and has low persistence in small forest fragments, due to low dispersal ability; native forest patches of at least 160km <sup>2</sup> are required to maintain viable populations (TSSC 2016c).	
<i>Petaurus australis</i> unnamed subsp., yellow-bellied glider – Wet Tropics subspecies	PMST Wildlife Online	E	E	This species is found in tall open wet eucalypt forest adjacent to rainforest on the western fringe of the Wet Tropics WHA. It is found at altitudes above 700 m altitude (SPRAT 2021). Known RE associations include 7.8.15ab, 7.8.16ab, 7.12.21ab, 7.12.22abde and 7.12.27b. These forests are typically dominated by <i>E. grandis</i> and <i>E. resinifera</i> , often with <i>B. integrifolia</i> and <i>Syncarpia glomulifera</i> . YBG habitat is associated with other species of conservation interest: northern bettong, magnificent brood frog, <i>Dodonea uncinata</i> and <i>Prostanthera clotteniana</i> (TSSC 2020a).	<b>Known to occur</b> Recorded during wet season surveys in the north-eastern most part of the Project area, within the Wet Tropics QHA.
<i>Phascolarctus cinereus</i> , koala (combined populations of Queensland, New South Walkes and the Australian Capital Territory)	PMST Wildlife Online	V	V	The koala inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the genus <i>Eucalyptus</i> . It is limited to < 800 m asl (DSEWPC 2012c). Its diet is restricted mainly to Eucalyptus species, it may also consume <i>Corymbia</i> , <i>Angophora</i> and <i>Lophostemon</i> and at time supplement its diet with <i>Leptospermum</i> and <i>Melaleuca</i> (TSSC 2012b).	<b>Potential to occur</b> There are two historical records for koala within the Study area, both are > 5 km from the Project area. The species has not been recorded within the Project area and no evidence was observed during the field surveys. Nevertheless, suitable habitat is present within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Pteropus conspicillatus</i> , spectacled flying-fox	PMST Wildlife Online	E	E	The species is restricted to tropical rainforest areas for camps, although it will feed on eucalypts in tall open forests adjoining rainforest communities. It will forage up to 50 km from the camp in a night. The EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) is considered a key habitat for the species. (SPRAT 2021, TSSC 2019c).	<p><b>Likely to occur</b></p> <p>The National Flying Fox Monitoring programme (DAWE 2021b) reports a spectacled flying-fox camp at Malaan, east of Ravenshoe and just outside the Study area. The desktop assessment also indicates the species' presence in the Ravenshoe Forest Reserve 1 which is within the Study Area, and abuts the Project area immediately to the north. There is limited rainforest habitat within the Project area to support a camp, but potential foraging habitat is widespread.</p>
<i>Pteropus poliocephalus</i> , grey-headed flying-fox	PMST	V	-	<p>The grey-headed flying-fox is distributed in a coastal belt from southern QLD, NSW, eastern Victoria and rarely into South Australia, and is found infrequently in inland areas elsewhere. It is a highly colonial species, forming camps in tall closed forest near streams, rivers or estuaries. Its primary food source is blossom from <i>Eucalyptus</i> and related genera but in some areas it will also use a variety of rainforest fruits. None of the vegetation communities it uses for foraging produce continuous food resources throughout the year, so the species has adopted complex migration traits in response to ephemeral and patchy resources (TSSC 2001).</p> <p>The species is usually found on coastal lowlands and slopes below altitudes of 200 m. They will forage within 40 km of a camp (DAWE 2021a).</p>	<p><b>Unlikely to occur</b></p> <p>There are no known grey-headed flying-fox camps recorded in the Atherton Tablelands in the National Flying Fox Monitoring programme (DAWE 2021b) and no known records of the species in Wildnet or ALA. The lowest part of the Part area is approximately 670 m.</p>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Rhinolophus robertsi</i> , large-eared horseshoe bat	PMST	V	E	The species occurs in north-eastern QLD, within the Wet Tropics and Einasleigh Uplands bioregions. It forages within dense stands of vegetation: rainforests, riparian forests, eucalypt open forests and woodlands. It is insectivorous. It is thought to roost mainly in tree hollows and vegetation, or open habitats such as under creek banks, rock piles and relatively shallow caves (TSSC 2016e).	<b>Potential to occur</b> There are no known records of the species within the Study area (Wildnet and ALA), and it was not recorded during field surveys whereas other species within the <i>Rhinolophus</i> genera were. Nevertheless, suitable habitat is present within the Project area.
<i>Saccolaimus saccolaimus nudicluniatus</i> , bare-rumped sheath-tailed bat	PMST	V	E	The species is distributed in north-eastern QLD and the top end of the Northern Territory, and it mostly inhabits lowland areas. It is considered to be an obligate hollow-roosting species, with roosts occurring in <i>E. platyphylla</i> and <i>E. tetradonta</i> . Known habitats include poplar gum woodland and Darwin stringybark woodland. It is presumed to feed on aerial insects well above the tree canopy (SPRAT 2021, TSSC 2016f).	<b>Potential to occur</b> There are no known records of the species within the Study area, with ALA indicating all records within FNQ from the coastal plain only. Notwithstanding the above, potential roosting ( <i>E. platyphylla</i> dominated woodland) and foraging habitat is present.
<b>Reptiles</b>					
<i>Delma mitella</i> , Atherton delma, legless lizard	PMST	V	NT	The species is known from the eastern side of the Atherton Tablelands in north-eastern QLD. It is known only from tall open forests and rainforest interfaces, within the Wet Tropics bioregion. The distribution of the species is not known to overlap with any EPBC-listed TECs (DEWHA 2008v).	<b>Unlikely to occur</b> There is one historic record of the species at the very eastern edge of the broader Study area, dating from 1967. The Project area is on the western side of the Atherton Tablelands and there are no records of the species within the Project area.
<i>Egernia rugosa</i> , yakka skink	PMST	V	V	This species is endemic to QLD where its distribution is patchy. Populations have been recorded	<b>Unlikely to occur</b>



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				<p>throughout the Einsaleigh Uplands bioregion. It is found in open dry sclerophyll forest or woodland, often taking refuge among dense ground vegetation, large hollow logs, cavities in soil-bound roots of fallen trees and beneath rocks. They seldom venture far from shelter sites and are extremely secretive. Core habitat for the species is within the Mulga Lands and Brigalow Belt South Bioregions. It is generally not found in rocky habitats (DoE 2014c).</p>	<p>Only the southern-most part of the Project area is within the range of the species (as documented by SPRAT). There are no historic records of the species within either the Project area or the broader Study area. The vast majority of the Project area comprises rocky habitats which are not suitable for the species.</p>





## Migratory Species

Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Actitis hypoleucos</i> , common sandpiper	PMST	Wetlands migratory, marine	SLC	The species utilises coastal and inland wetlands and is found amongst muddy margins or rocky shores associated with mangroves, estuaries and deltas of streams, and upstream banks including lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally jetties and piers (Geering et al. 2007; Higgins and Davies 1996). Roosting and foraging occur mostly amongst mangroves; however, the species has been found to roost and feed in adjoining grasslands (Higgins and Davies 1996).	<b>Unlikely to occur</b> The species has not previously been recorded within the Study area and was not observed during field surveys. There is limited potential habitat for the species within the Project area.
<i>Apus pacificus</i> , fork-tailed swift	PMST	Marine migratory, marine	SLC	The species is a non-breeding visitor to all states and territories in Australia (Higgins 1999) with records in north-east Queensland from near Cooktown to Townsville. The species mostly occurs over inland plains but sometimes above foothills, settled areas, treeless grasslands, above rainforests, wet sclerophyll forest, open forest or plantations of pines (Higgins 1999), or in coastal areas over cliffs and beaches. The species exhibits foraging and movement that is completely aerial, with heights from 1-300m above ground (SPRAT 2021).	<b>Known to occur</b> The species was recorded within the Project area during the diurnal bird surveys in January 2021.
<i>Calidris acuminata</i> , sharp-tailed sandpiper	PMST	Migratory, marine	SLC	The species utilises muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, and mangroves. These include lagoons, swamps, lakes and pools near the coast, dams, waterholes, soaks, bore drains and swamps,	<b>Potential to occur</b> The species was not observed in field surveys and has been historically recorded within 5 km of the



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				salt pans and hypersaline salt-lakes inland, intertidal mudflats in sheltered bays, inlets, estuaries or seashores (SPRAT 2021). The species forages amongst inundated vegetation within wetlands or intertidal mudflats, whilst roosting occurs in mangroves (Minton and Whitelaw 2000), in vegetation at the edges of wetlands, sandy beaches and stony shores (Higgins and Davies 1996).	Project area (ALA 2021). Suitable habitat for this species may be present in the Project area.
<i>Calidris melanotos</i> , pectoral sandpiper	PMST	Wetlands migratory, marine	SLC	The species prefers shallow, fresh to saline wetlands that have open fringing mudflats and low, emergent or fringing vegetation and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (SPRAT 2021).	<b>Potential to occur</b> The species has not previously been recorded within the Study area and was not observed during field surveys. There is limited suitable habitat for the species.
<i>Crocodylus porosus</i> , salt-water crocodile	PMST	Marine migratory, marine	V	In Queensland, the species inhabits reef, coastal floodplains, tidal rivers, billabongs, and swamps (Webb et al. 1987) up to 150km inland (Webb et al. 1983).	<b>Unlikely to occur</b> The species has not previously been recorded within the Study area and was not observed during field surveys. There is no suitable habitat for the species in the Project area.
<i>Cuculus optatus</i> , Oriental cuckoo	PMST	Migratory	SLC	The species has been recorded in conifer and mixed forests, riparian shrub thickets, forest bogs, burned-out and clear-cut areas at the final stages of overgrowing (Meshcheryagina et al. 2019).	<b>Unlikely to occur</b> The species has not previously been recorded within the Study area (Wildnet or ALA) and was not observed during field surveys.
<i>Gallinago hardwickii</i> , Latham's snipe	PMST	Migratory, marine	SLC	The species occurs in permanent and ephemeral wetlands at altitudes up to 2000m above sea level. The species preferred habitat includes open,	<b>Known to occur</b> The species has been historically recorded within the Project area (ALA 2021).



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				freshwater wetlands with low, dense vegetation (swamps, flooded grasslands or heathlands, bogs) or habitat with saline or brackish water during migration and have been found in modified or artificial habitats close to human activity. Foraging and roosting habitat are characterised by areas of mud exposed or beneath shallow water with low, dense vegetation. The species is highly dispersive, moving in response to rainfall and availability of food (SPRAT 2021).	
<i>Hirundo rustica</i> , barn swallow	PMST	Migratory, marine	SLC	The species occurs from sea level up to 3000 m above sea level and has been recorded in open country in coastal lowlands, near water, towns and cities, and also in or over freshwater wetlands, paperbark <i>Melaleuca</i> woodland, mesophyll shrub thickets and tussock grasslands (Schodde and Mason 1999). The species prefers areas with accessible artificial structures such as barns, sheds and bridges for nesting and overhead wires or bare branches and twigs for perching, sunning and preening (Cramp 1988; Turner and Rose 1989).	<b>Potential to occur</b> The species has not previously been recorded within the Study area (Wildnet or ALA) and was not observed during field surveys. However, there is suitable habitat for the species.
<i>Monarcha melanopsis</i> , black-faced monarch	PMST Wildlife Online	Migratory, marine	SLC	The species is restricted to far northern Queensland, being a summer breeding migrant from New Guinea. The species is predominantly found in rainforests, eucalypt woodlands, coastal scrub and damp gullies, but may be found in more open woodland when migrating (BirdLife International 2016).	<b>Known to occur</b> Recorded within the Project area during the diurnal bird surveys in January 2021.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
<i>Monarcha trivirgatus</i> , syn <i>Symposiachrus trivirgatus</i> , spectacled monarch	PMST	Migratory, marine	SLC	The species inhabits dense rainforests and moist eucalypt forests of eastern and north-eastern Australia, including waterside vegetation and mangroves (BirdLife International 2017).	<b>Potential to occur</b> The species has been previously recorded within the Project area in 1995 (ALA) and more recently (2012) within the broader Study area. It was not observed during field surveys but there is potentially suitable habitat within the Project area.
<i>Motacilla cinerea</i> , grey wagtail	PMST	Migratory, marine	SLC	The species inhabits fast-flowing mountain streams and rivers with exposed rocks and shoals, often in forested areas, but is also found in lowland watercourses and canals where artificial waterfalls, weirs, millraces or lock gates are present. Species preferred habitat during non-breeding season includes farmyards, sewage farms, forest tracks, tea estates and town centres. Breeding habitat includes rock ledges, crevices in riverbanks, ledges in walls, under bridges or in drainpipes (BirdLife International 2017).	<b>Potential to occur</b> The species has not previously been recorded within the Study area (Wildnet or ALA) and was not observed during field surveys. However, there is suitable habitat for the species.
<i>Motacilla flava</i> , yellow wagtail	PMST	Migratory, marine	SLC	The species occurs in damp or wet habitats with low vegetation including damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra (BirdLife International 2019).	<b>Potential to occur</b> The species has not previously been recorded within the Study area (Wildnet or ALA) and was not observed during field surveys. However, there is suitable habitat for the species.
<i>Myiagra cyanoleuca</i> , satin flycatcher	PMST	Migratory, marine	SLC	The species inhabits heavily vegetated gullies in eucalypt-dominated forests and taller woodlands near wetlands or watercourses, and coastal forests, woodlands, mangroves, dry open woodland with grassy ground cover during migration (BirdLife	<b>Potential to occur</b> There is one historical record dating from 1981 of the species in the north-eastern corner of the



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				International 2017). The species is mostly absent from rainforests (SPRAT 2021).	broader Study area. It was not observed in field surveys.
<i>Pandion haliaetus</i> , osprey	PMST	Migratory, marine	SLC	The species inhabits a wide range of habitats that are within 3-5km of water bodies including salt marsh, mangrove swamp, cypress swamp, lake, bog, reservoirs or rivers that are abundant with fish (del Hoyo et al. 1994; BirdLife International 2019). Nesting habitat includes large dead trees on cliffs but also include artificial platforms such as power poles, communication towers and buildings which have been found to have more successful fledging during breeding (del Hoyo et al. 1994; BirdLife International 2019).	<b>Potential to occur</b> There is a single record of the species dating from 2004 at the north-eastern extent of the Study area (ALA). It was not observed in field surveys and there is limited potential habitat within the Project area.
<i>Rhipidura rufifrons</i> , rufous fantail	PMST	Migratory, marine	SLC	The species inhabits dense, shady undergrowth of gullies in moist eucalypt forests and rainforests. The species prefers habitat with deep shading and is often seen close to the ground. The species may be found in more open habitats during migration.	<b>Potential to occur</b> The species has not previously been recorded within the Study area (Wildnet or ALA) and was not observed during field surveys. However, there is suitable habitat for the species.
<i>Tringa nebularia</i> , common greenshank	PMST	Migratory, marine	SLC	The species occurs in sheltered coastal habitats typically with large mudflats, saltmarshes, mangroves, or seagrass with fringing or emergent vegetation. These include embayments, harbours, river estuaries, deltas and lagoons, ephemeral and permanent wetlands such as swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. The species have	<b>Potential to occur</b> There is a single record of the species within the Project area, dating from 2015 (ALA). It was not observed during field surveys and there is minimal potential habitat within the Project area.



Species Name	Data Source	EPBC Act Status	NC Act Status	Habitat and Ecology	Likelihood of Occurrence
				also been found in artificial wetlands (BirdLife International 2016).	

