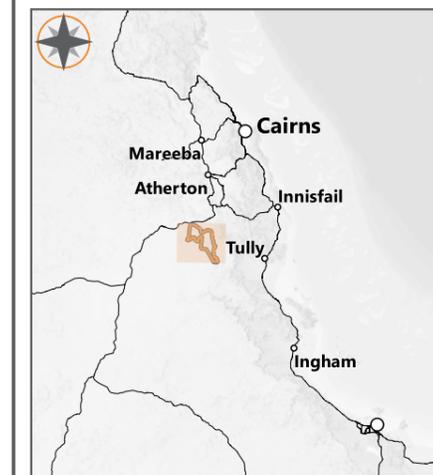


Chalumbin Wind Farm Threatened Fauna Observations

Figure 6.3

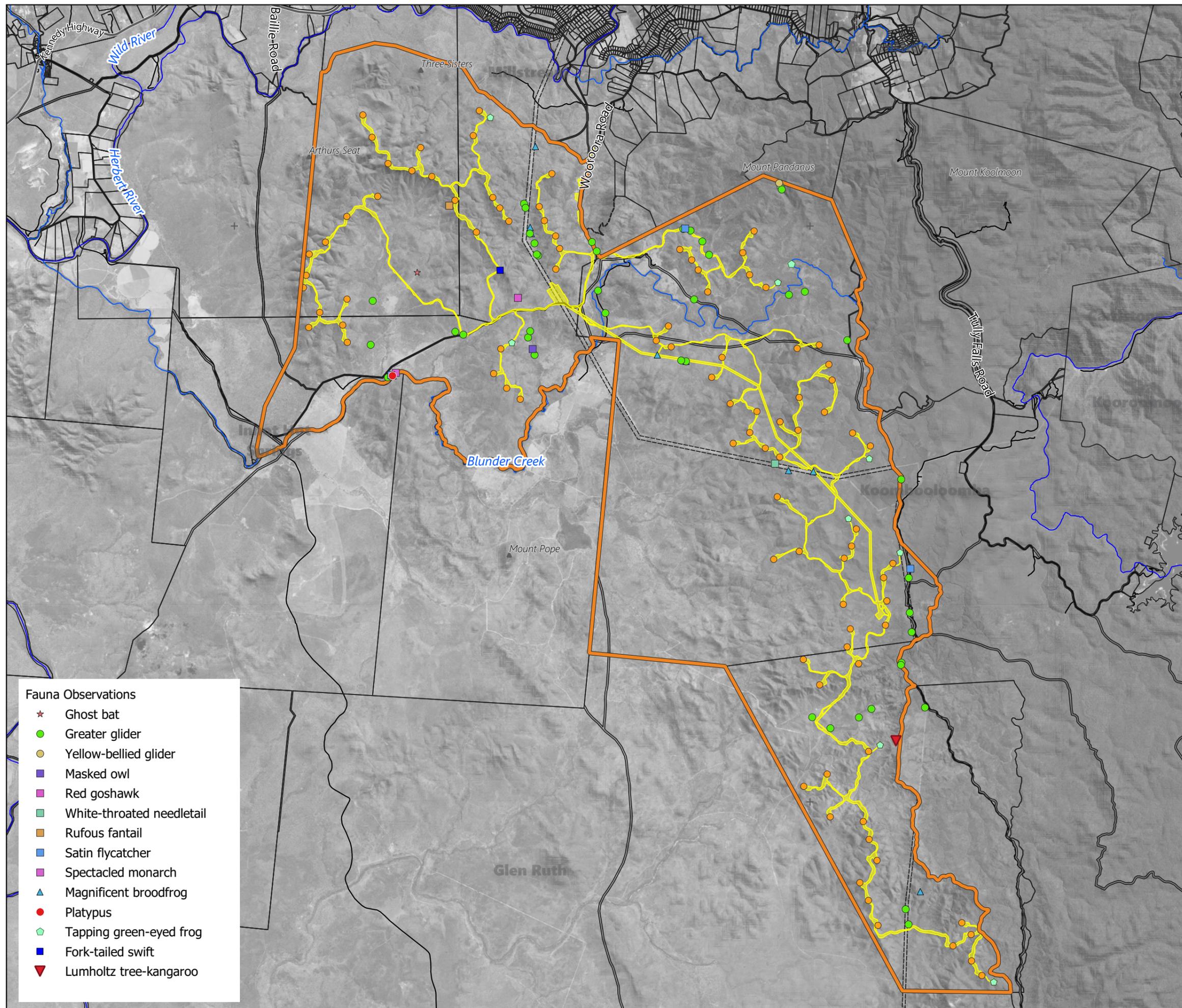
-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-12-12
 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



- Fauna Observations**
-  Ghost bat
 -  Greater glider
 -  Yellow-bellied glider
 -  Masked owl
 -  Red goshawk
 -  White-throated needletail
 -  Rufous fantail
 -  Satin flycatcher
 -  Spectacled monarch
 -  Magnificent broodfrog
 -  Platypus
 -  Tapping green-eyed frog
 -  Fork-tailed swift
 -  Lumholtz tree-kangaroo

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 km² 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 and in June a further 25 gliders were observed over a duration of 35 person-hours of spotlighting. 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. Using this as a benchmark, the population within the Project area (< 1 per hour of spotlighting) would not be considered 'large'. Observations of the species are shown in **Figure 6-3**, and one individual is shown in **Plate 6-6**.



Plate 6-6 Northern Greater Glider Photographed during Project Surveys

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 (see **Figure 6-3**).

6.2.1.3 Lumholtz Tree-kangaroo (*Dendrolagus lumholtzi*)

Lumholtz tree-kangaroo is listed as Near Threatened under the NC Act. It occurs mostly at high altitudes along the western edge of the Atherton Tablelands. It is mostly restricted to rainforest habitats but also extends along riparian vegetation through primarily open forest habitats and, less abundantly, wet sclerophyll forests. It is mainly nocturnal and predominantly arboreal. The species shows strong site fidelity, with individuals remaining within their home range even when this is threatened by clearing or disturbance; as such, it has been known to occupy forest fragments of less than 20 ha. Populations in such fragments may have limited long-term viability (Woinarski & Burbridge 2016b).

One adult and one juvenile were recorded on camera within a small patch of rainforest vegetation within the Project area (see **Plate 6-7**). This vegetation is not intersected by any Project infrastructure.



Plate 6-7 Lumholtz Tree-kangaroo

6.2.1.4 Short-beaked Echidna (*Tachyglossus aculeatus*)

The short-beaked echidna is listed as Special Least Concern under the NC Act. It is found in various open woodland types, savannah and rainforest as well as agricultural areas.

Short-beaked echidnas were recorded by camera trap at four locations within the Project area (see **Plate 6-8**).



Plate 6-8 Short-beaked Echidna

6.2.1.5 Platypus (*Ornithorhynchus anatinus*)

The platypus is listed as Special Least Concern under the NC Act. It is restricted to streams and suitable freshwater bodies, including lakes and ponds. It is water dependent as it feeds almost exclusively on benthic macroinvertebrates. When not foraging it rests in burrows on earth banks or beneath low dense vegetation.

Platypus were observed in Blunder Creek on the Glen Gordon property during the wet season surveys.

6.2.1.6 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. The potential call was recorded adjacent to a farm dam within the Glen Gordon property, although the ghost bat is an obligate cave-dweller. The potential recording of this species 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 was undertaken to better delineate areas of rocky relief that may provide suitable cave roosts and these areas were targeted with additional bat surveys in June 2021. No further potential ghost bat calls were recorded and no individuals were observed entangled in barbed wire within the Project area (which is common for this species). As such, the presence of ghost bat within the Project area is considered unlikely.



6.2.1.7 Tube-nosed Insectivorous Bat (*Murina florium*)

The tube-nosed insectivorous bat has been recorded from a range of tropical moist forest types, including rainforest, and from dry and wet sclerophyll woodland. It roosts as solitary animals or in small groups, amongst dead leaves and other foliage, in caves or in disused buildings.

One call file from the Anabat deployment in January 2021 potentially corresponds with this species; however, the species is difficult to accurately identify based on call alone. There is limited suitable habitat for the tube-nosed insectivorous bat within the Project area and these areas were targeted with harp traps in June 2021. The species was not recorded. As such, the presence of this species within the Project area is considered unlikely.

6.2.1.8 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 (see **Figure 6-3**).

6.2.1.9 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 (see **Figure 6-3**).

6.2.1.10 Spectacled Monarch (*Monarcha trivirgatus* syn. *Symposiachrus trivirgatus*)

The spectacled monarch inhabits dense rainforests and moist eucalypt forests of eastern and north-eastern Australia, including waterside vegetation and mangroves (BirdLife International 2017a).

One spectacled monarch was observed as an incidental record (i.e. travelling between survey sites) in October 2021.

6.2.1.11 Satin Flycatcher (*Myiagra cyanoleuca*)

The satin flycatcher 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 International 2017c). The species is mostly absent from rainforest (SPRAT 2021).

One satin flycatcher was observed as an incidental record (i.e. travelling between survey sites) in October 2021.



6.2.1.12 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 and the young remaining dependent on the parents until they leave the natal territory by the end of December (DERM 2012). The estimated home range is 120 km² for a breeding female and 200 km² for a male (TSSC 2015c; SPRAT 2021).

The red goshawk's diet is 95% birds (SPRAT 2021), especially those in the 100-250 g 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 goshawks were observed during the diurnal bird surveys in January 2021. A nest considered possibly belonging to red goshawk was observed in the Glen Gordon property, in riparian vegetation to the north of the main property access road (see **Plate 6-9** and **Figure 6-3**). 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 likely belonging to the red goshawk while two others considered it was 'possibly' belonging to the red goshawk.

All potential nesting habitat for red goshawk was mapped as described in **Section 4.4**, and a combination of walked and driven transects were undertaken in October 2021 to search for nests. Bird utilisation surveys were undertaken as part of the same survey, which would have identified any soaring red goshawks if present. No red goshawks were observed during the survey. No new potential red goshawk nests were identified during the survey. The previously-identified potential red goshawk nest was revisited and appeared to be disused. There was no evidence of bones, food or faeces under the nest. Call playback was undertaken in proximity to the nest for 30 minutes and the only species to respond was a pied currawong. There is no evidence of any breeding pairs nesting within the Project area in the current nesting season and no evidence of any red goshawks currently using any part of the Project area for foraging. The potential for juvenile red goshawks to use the Project area for foraging whilst undertaking the vast migrations for which they are known could not be discounted but seems unlikely based on current evidence.

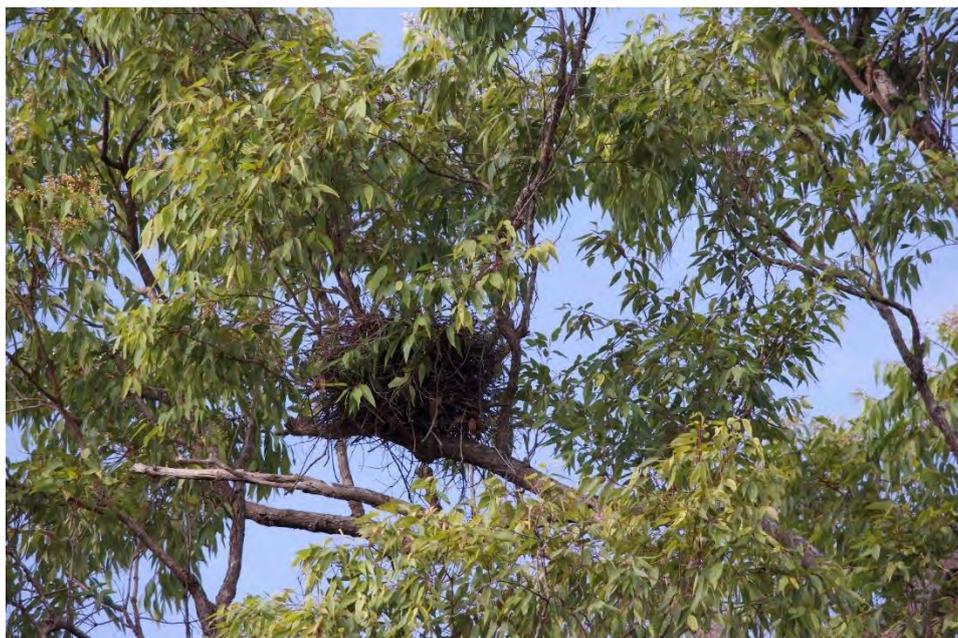


Plate 6-9 Potential Red Goshawk Nest

6.2.1.13 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 6-10**) as shown on **Figure 6-3**.



Plate 6-10 White-throated Needletail

6.2.1.14 Rufous Fantail (*Rhipidura rufifrons*)

The rufous fantail occurs in coastal and near coastal districts of northern and eastern Australia. It has breeding populations in Australia and also occurs in PNG, the Solomon Islands and Micronesia (SPRAT 2021). Some populations in east Australia are migratory, although its movement patterns are not fully understood. In the Atherton region populations possibly move altitudinally, with reporting rates above 500 m asl in the region of 37 % in summer and 0 % in winter (SPRAT 2021). The species prefers moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey (DoE 2015a). When on passage a wider range of habitats are used, including dry eucalypt forests and woodlands, and Brigalow shrublands (DoE 2015).

Known threats including predation by black rats and habitat degradation caused by invasive vines such as rubber vine (DoE 2015a).

A rufous fantail was recorded by camera trap in April 2021 (**Plate 6-11**) within a small rainforest patch on a rocky drainage line (**Figure 6-3**), dominated by brush box (*Lophostemon confertus*).



Plate 6-11 Rufous Fantail

6.2.1.15 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* (see **Figure 6-3**).

6.2.1.16 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 south-east. 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.

Magnificent brood frogs were also observed during spotlighting surveys at a further three locations on the Wooroora property in June 2021, and all of these sites were also below 800 m. One of the recorded individuals is shown in **Plate 6-12**.



Plate 6-12 Magnificent Brood frog

6.2.1.17 Tapping Green-eyed Frog (*Litoria serrata*)

Tapping green-eyed frog is listed as Vulnerable under the NC Act. It is a medium to large treefrog, originally described from Malanda but believed to be widespread across the Wet Tropics. It occupies rainforest and adjacent wet sclerophyll forest, and is usually found near creeks or seepages.

Tapping green-eyed frogs were observed near creeks during spotlighting surveys in March 2021 at two locations within the Wooroora property, towards the boundary with the Wet Tropics and more than 1 km from proposed Project infrastructure (see **Figure 6-3**).

6.2.2 All Fauna Observations

All observations of non-listed native fauna species were also recorded during the fauna field surveys. A total of 258 native vertebrate species were recorded during the surveys, including 18 amphibians, 163 birds, 14 bats, 24 non-volant mammals and 39 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 84 % of the Project area supports moist to dry open forests to woodlands (corresponding to REs 9.5.5, 9.8.4, 9.12.2, 9.12.4, 7.8.19, 7.8.10, 7.12.27, 7.12.29, 7.12.30, 7.12.34, 7.12.52 and 7.12.57), with a third of the Project area dominated by white mahogany (*Eucalyptus portuensis*), Queensland stringybark (*E. reducta*), red mahogany (*E. resinifera*) and/or pink bloodwood (*Corymbia intermedia*) on igneous hills and/or granite or rhyolite uplands (REs 9.12.2, 7.12.34 and 7.12.27). The understorey typically comprises shrubs and grasses including *Xanthorrhoea johnsonii*, *Grevillea* spp., *Acacia* spp. and kangaroo grass (*Themeda triandra*) whilst trees range in heights from 2 m to 30 m and canopy cover is generally 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

Approximately 5.6 % of the Project area comprises rocky pavements characteristic of granite and rhyolite rock outcrops and corresponding with RE 7.12.65 and 7.12.66. 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* and/or *Lophostemon* and/or *Allocasuarina* and/or *Eucalyptus* species. 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 nitichaga* 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 make up approximately 6.4 % of the Project area and 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 m tall and shrubs 1 m-4 m. 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, and forming less than 1 % of the Project area. 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 cm-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*) were recorded extensively by camera trap across the entire Project area;
- Domestic cat (*Felis catus*) were recorded by camera trap on both properties;
- Domestic cattle (*Bos taurus*) are widespread as both properties are cattle stations;
- Feral pig (*Sus scrofa*) were recorded on camera trap across both properties;
- House mouse (*Mus musculus*);
- Common myna (*Acridotheres tristis*); and
- Cane toad (*Rhinella marina*) were recorded extensively by camera trap on both properties.



Plate 6-13 Pest Fauna Species



7.0 Candidate Species

Following the results of the desktop review and completed field surveys, a refined likelihood of occurrence for the potential MSES 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.

7.1 Candidate Flora Species

A refined likelihood of occurrence assessment was completed for the NC Act-listed threatened flora species based on desktop analysis (see **Appendix C**) and the field survey results. As a result, this assessment determined that five 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>Coleus amoenus</i>	n/a	Vulnerable	Known to occur Recorded in numerous locations within the Project area. One population is likely to be impacted by clearing for Project infrastructure.
<i>Dodonia uncinata</i>	n/a	Near Threatened	Known to occur Recorded in a single broad location within the Project area. Project infrastructure has been relocated to avoid any direct disturbance to this species.
<i>Homoranthus porteri</i>	Vulnerable	Vulnerable	Known to occur 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	Known to occur 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 nitchaga</i>	Vulnerable	Vulnerable	Known to occur 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 NC Act-listed threatened fauna species based on desktop analysis (see **Appendix C**) and the field survey results. As a result, this assessment determined that nine



listed threatened fauna species are known to occur and four 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 Commonwealth and State Governments' 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
Mammals			
<i>Phascolarctus cinereus</i> , koala	Vulnerable	Vulnerable	Potential to occur 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	Known to occur 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	Known to occur Recorded during wet season surveys in the north-eastern most part of the Project area, within the Wet Tropics WHA.
<i>Dasyurus maculatus gracilis</i> , spotted-tailed quoll – northern subspecies	Endangered	Endangered	Likely to occur 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>Dendrolagus lumholtzi</i> , Lumholtz tree-kangaroo	n/a	Near Threatened	Known to occur The species was recorded on camera trap within a small patch of rainforest vegetation.
<i>Pteropus conspicillatus</i> , spectacled flying-fox	Endangered	Endangered	Likely to occur 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 the north. There is limited rainforest habitat within the Project area to support a camp, but potential foraging habitat is widespread.



Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
<i>Tachyglossus aculeatus</i> , short-beaked echidna	n/a	Special Least Concern	Known to occur The species was recorded by camera trap at four locations and suitable habitat is widespread across the Project area.
<i>Ornithorhynchus anatinus</i> , platypus	n/a	Special Least Concern	Known to occur Platypus were observed in Blunder Creek on the Glen Gordon property during the wet season surveys.
Birds			
<i>Casuarius casuarius johnsonii</i> , Southern cassowary – southern population	Endangered	Endangered	Likely to occur There are recent (2020) records of southern cassowary within the Study area (ALA). 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	Likely to occur 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. Targeted surveys in October 2021 did not find evidence of the species nesting within the Project area.
<i>Hirundapus caudacutus</i> , white-throated needletail	Vulnerable, migratory	Vulnerable	Known to occur 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	Known to occur 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> .
Amphibians			



Species Name	EPBC Act Status	NC Act Status	Likelihood of Occurrence & Rationale
<i>Litoria serrata</i> , tapping green-eyed frog	n/a	Vulnerable	Known to occur This species was observed at two locations within the Project area during spotlighting surveys.
<i>Pseudophryne covacevichae</i> , magnificent brood frog	Vulnerable	Vulnerable	Known to occur Magnificent brood frogs 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 five migratory species are known to occur within the Project area. The remaining 17 species were assessed as having potential to occur or being unlikely to occur. 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	Known to occur 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	Known to occur Recorded within the Project area during the diurnal bird surveys in January 2021.
<i>Monarcha trivirgatus</i> , spectacled monarch	Migratory, marine	Special Least Concern	Known to occur Recorded within the Project area as an incidental observation (i.e. whilst travelling between survey sites) during the October 2021 BUS.
<i>Myiagra cyanoleuca</i> , satin flycatcher	Migratory, marine	Special Least Concern	Known to occur Recorded within the Project area as an incidental observation (i.e. whilst travelling between survey sites) during the October 2021 BUS.
<i>Rhipidura rufifrons</i> , rufous fantail	Migratory, marine	Special Least Concern	Known to occur Recorded on camera trap within the Project area.



8.0 Threatened Species Habitat Mapping

Habitat constraints mapping has been prepared for those NC Act-listed species 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.

8.1 *Prostanthera clotteniana*, *Homoranthus porteri* and *Triplarina nitchaga*

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 for *Prostanthera clotteniana*, *Homoranthus porteri* and *Triplarina nitchaga*, is illustrated in **Figure 8-1**.

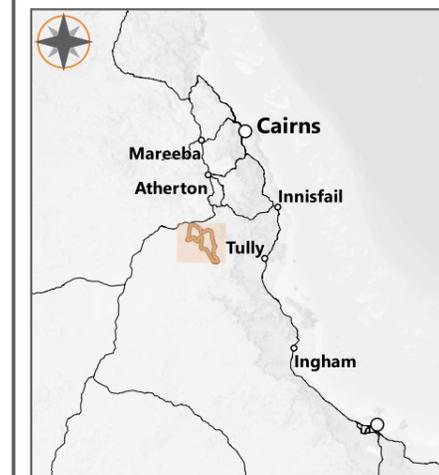
Chalumbin Wind Farm

Prostanthera clotteniana,
Homoranthus porteri and
Triplarina nitchaga

Figure 8.1

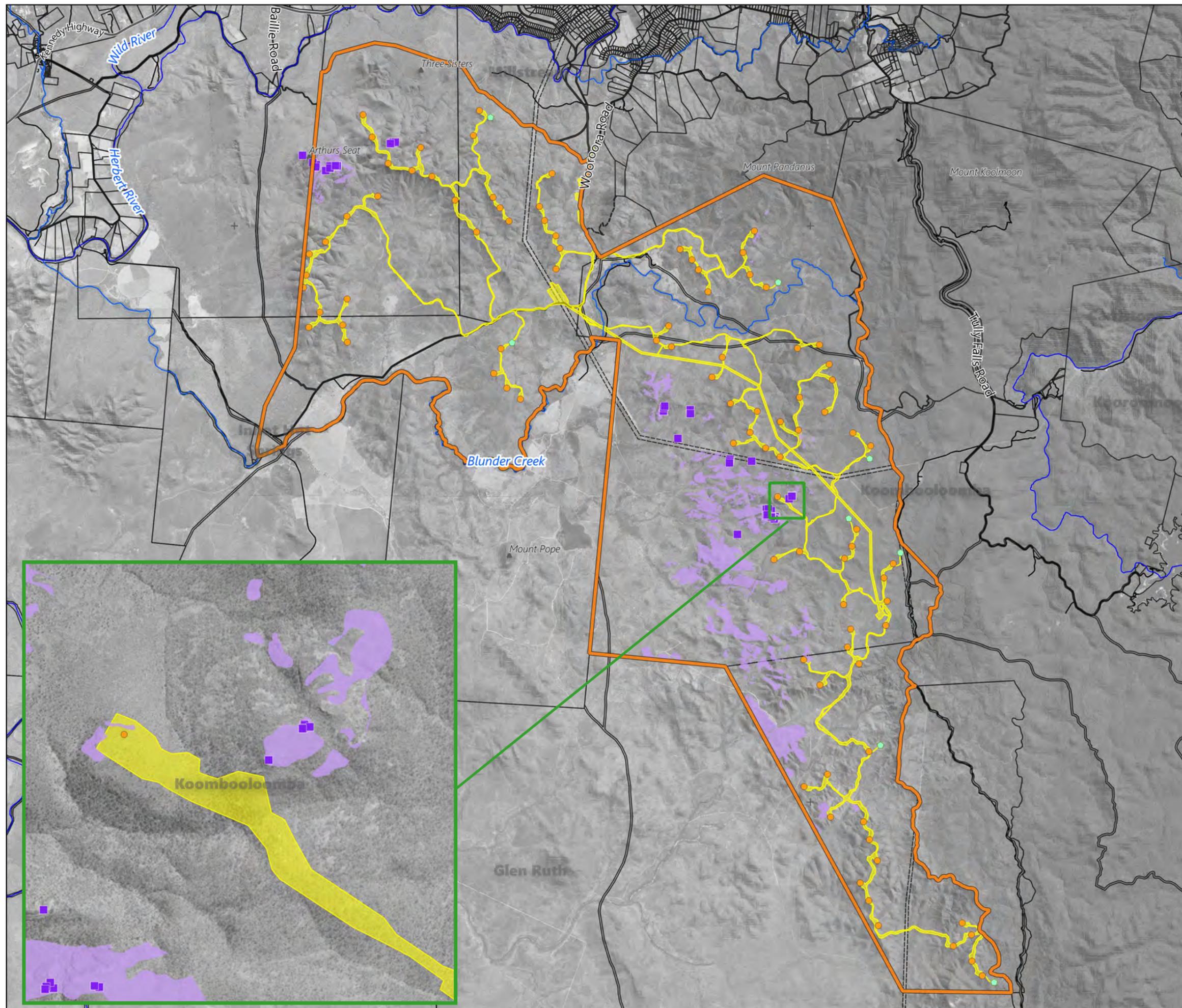
-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Survey Observation
-  Potential Habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-12-12
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 *Dodonaea uncinata*

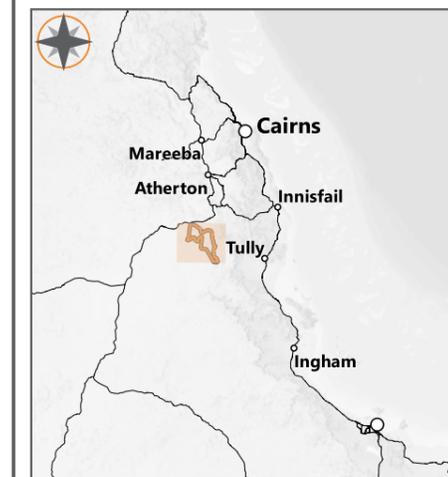
All recorded observations of this species during the field surveys were in association with the rocky pavement shrub complex habitat, corresponding with RE 7.12.65k. This vegetation community occurs on the granite and rhyolite outcrops across the Project area, as mapped in **Figure 8-2**.

Chalumbin Wind Farm Potential Habitat for *Dodonaea uncinata*

Figure 8.2

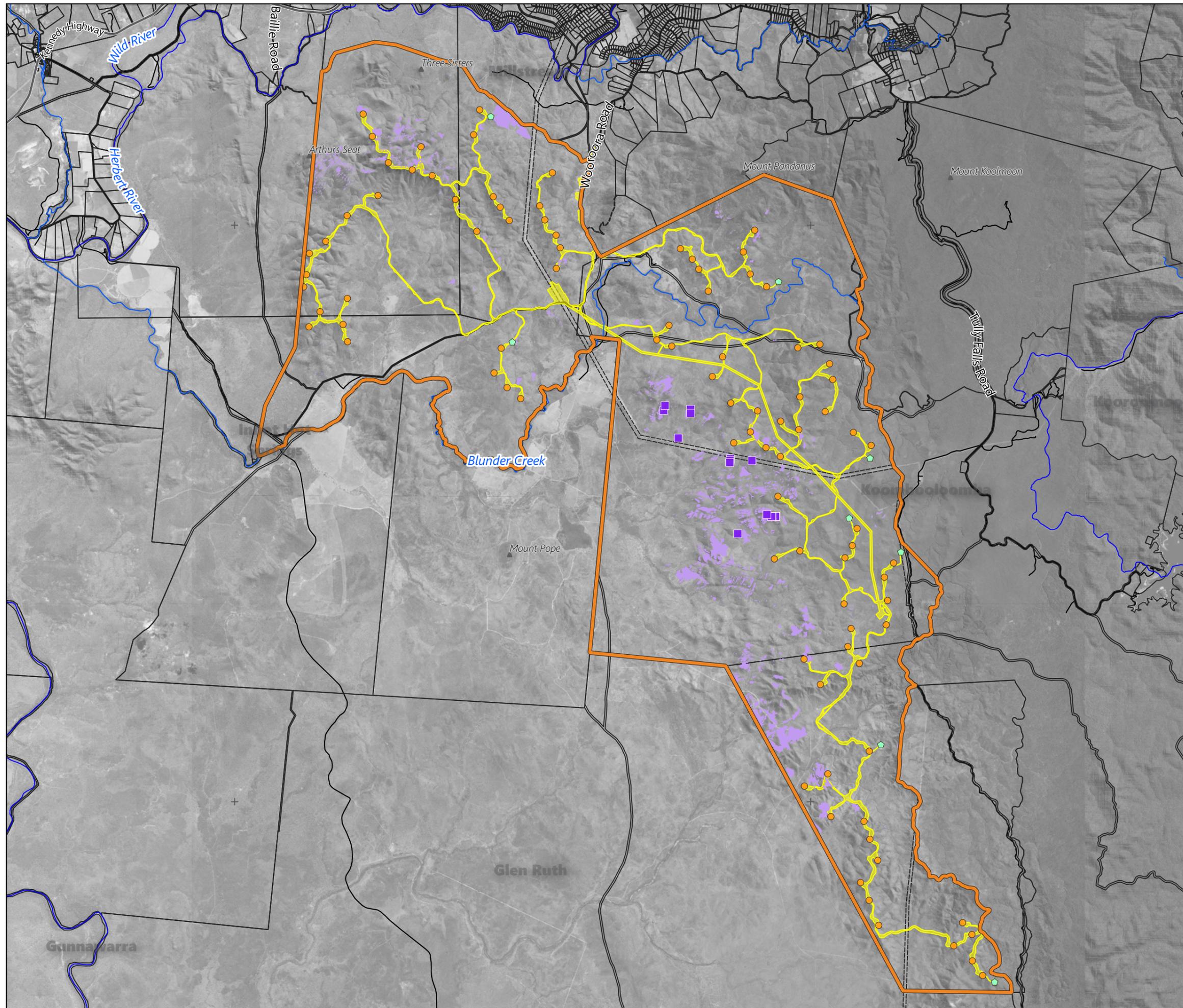
-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Survey Observation
-  Potential Habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-12-12
 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





8.3 *Coleus amoenus*

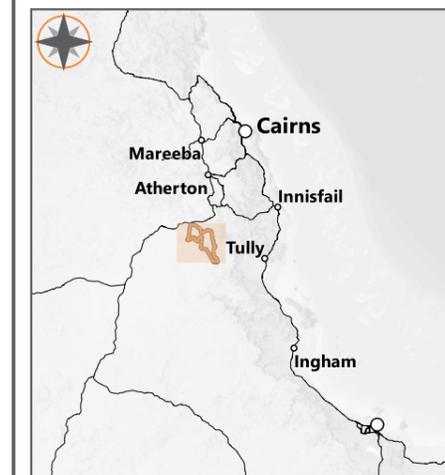
This species was also found in rocky pavement habitats, although more broadly than the other listed threatened plant species. Potential habitat was mapped as REs 7.12.65, 7.12.52, 7.12.66 and 7.12.34 across the Project area, as shown in **Figure 8-3**.

Chalumbin Wind Farm Potential Habitat for *Coleus amoenus*

Figure 8.3

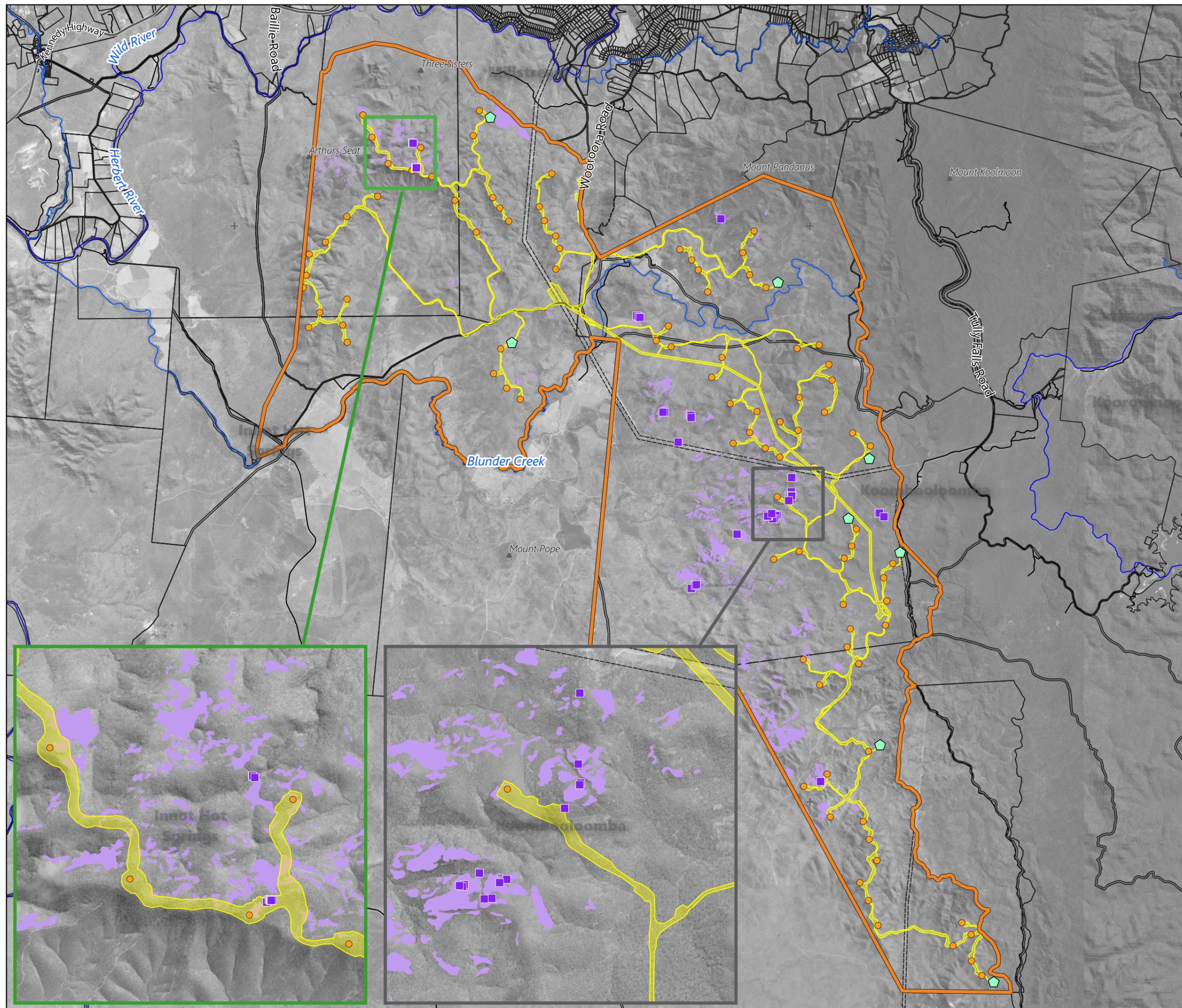
- Project Area
- Wind Turbine
- ◆ Met-mast
- Project Footprint
- Survey Observation
- Potential Habitat
- Major Road
- River
- Creek
- Lot Type Parcel
- Easement

Date: 2021-12-12
 Author: TOD
 Reviewed: CC
 Project: EPU-004



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Data Source(s):
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 Mines and Energy (2021)
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8.4 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.

Conservatively, any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees is considered potential koala habitat (DoE 2014a). 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.

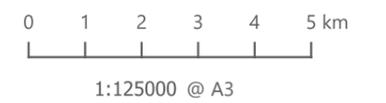
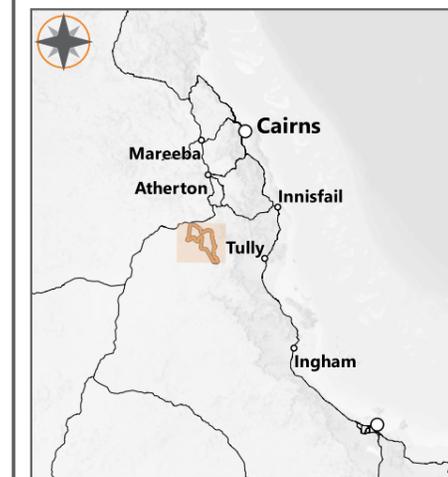
Potential koala habitat within the Project area is mapped in **Figure 8-4**.

Chalumbin Wind Farm Koala Habitat

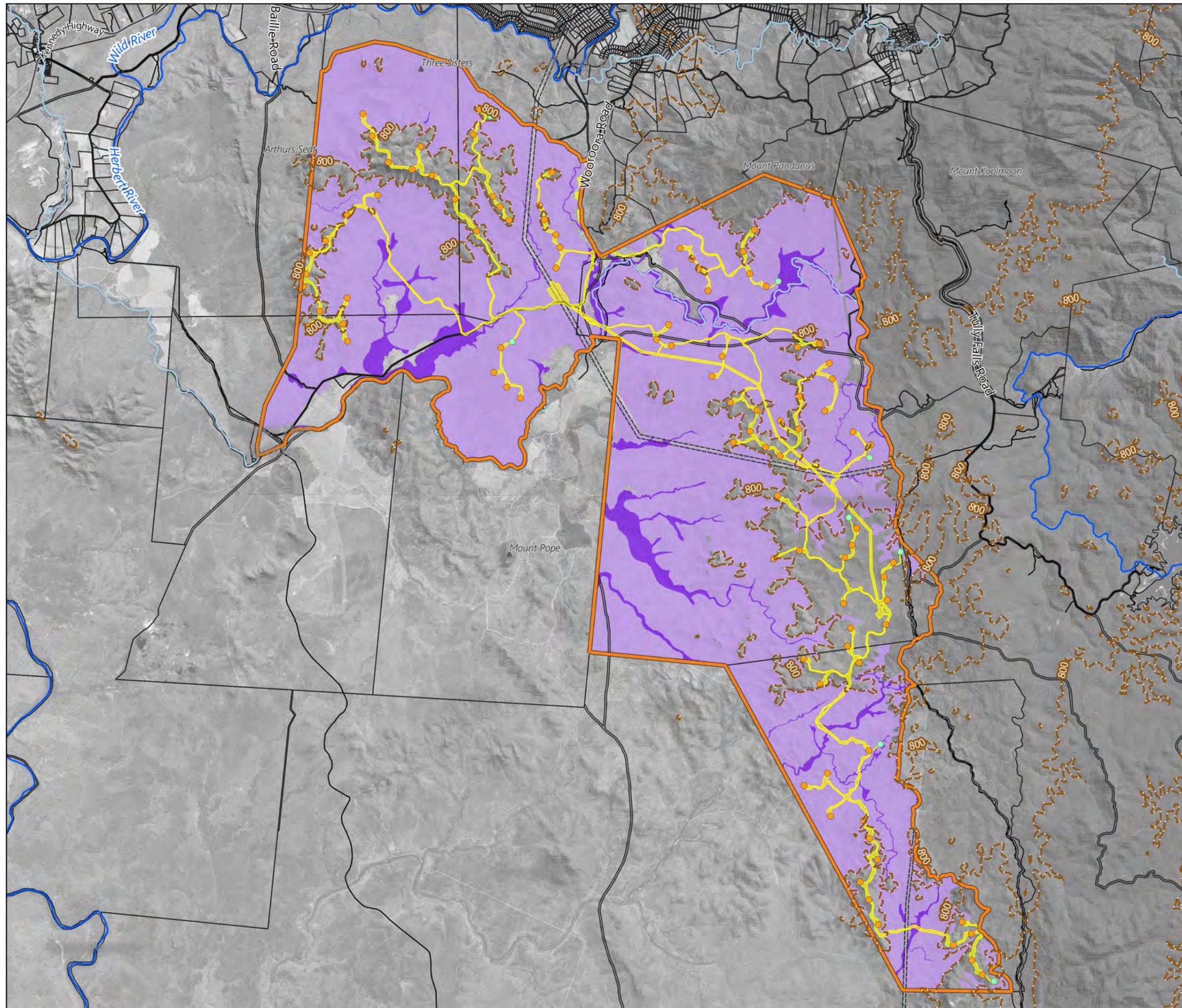
Figure 8.4

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

Date: 2021-12-12
 Author: TOD
 Reviewed: CC
 Project: EPU-004



Data Source(s):
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 Queensland Imagery Whole Of State
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8.5 Greater Glider

Northern greater gliders were observed on both properties during the nocturnal spotlighting surveys as noted in **Section 6.2.1.1**. 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:

- Preferred habitat – 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.

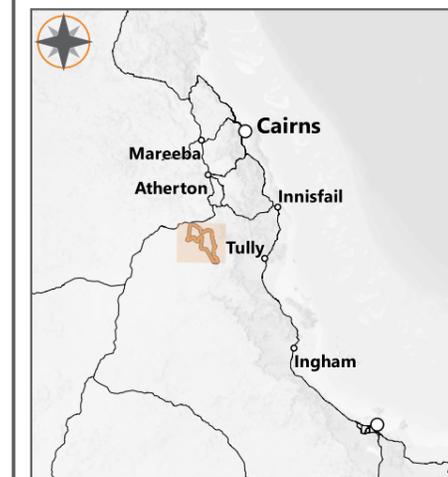
Habitat mapping for the greater glider is presented in **Figure 8-5**.

Chalumbin Wind Farm Greater glider Habitat

Figure 8.5

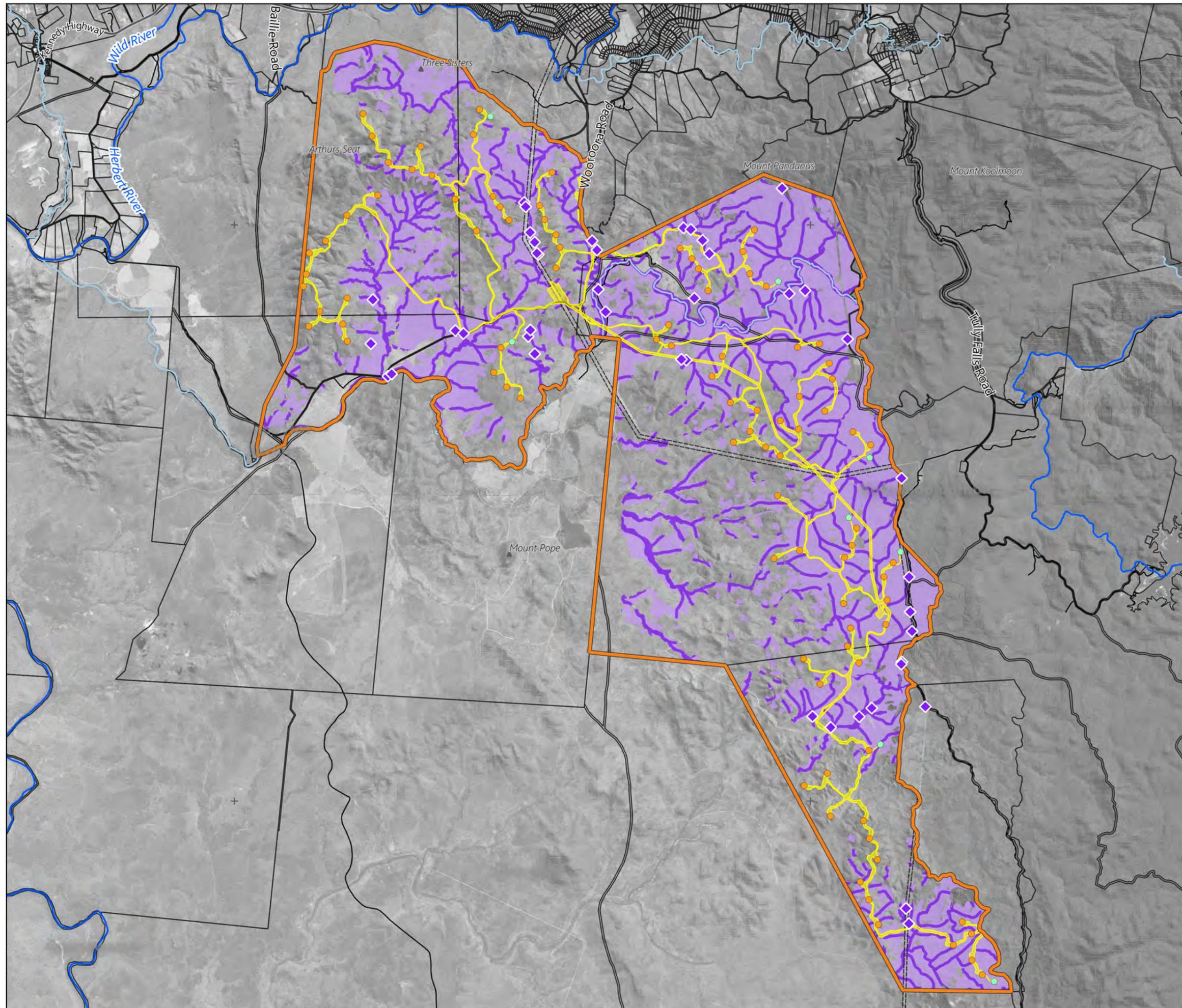
-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Survey Observation
-  Preferred habitat
-  Potential habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-12-12
 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)
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8.6 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 (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 (Jessup et al 2020, SPRAT 2021).

Across the Project area, the following habitat mapping has been undertaken for yellow-bellied glider:

- Potential habitat – 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 (*Eucalyptus grandis* or *E. resinifera* respectively).

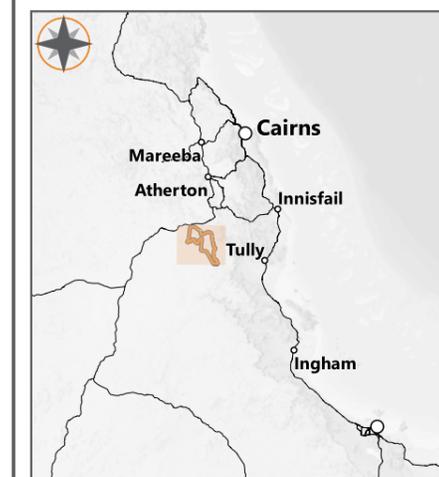
Habitat mapping for the yellow-bellied glider is presented in **Figure 8-6**.

Chalumbin Wind Farm Potential Habitat for Yellow-bellied Glider

Figure 8.6

-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Potential Shelter Habitat
-  Potential Foraging and Dispersal Habitat 700m
-  Contour
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

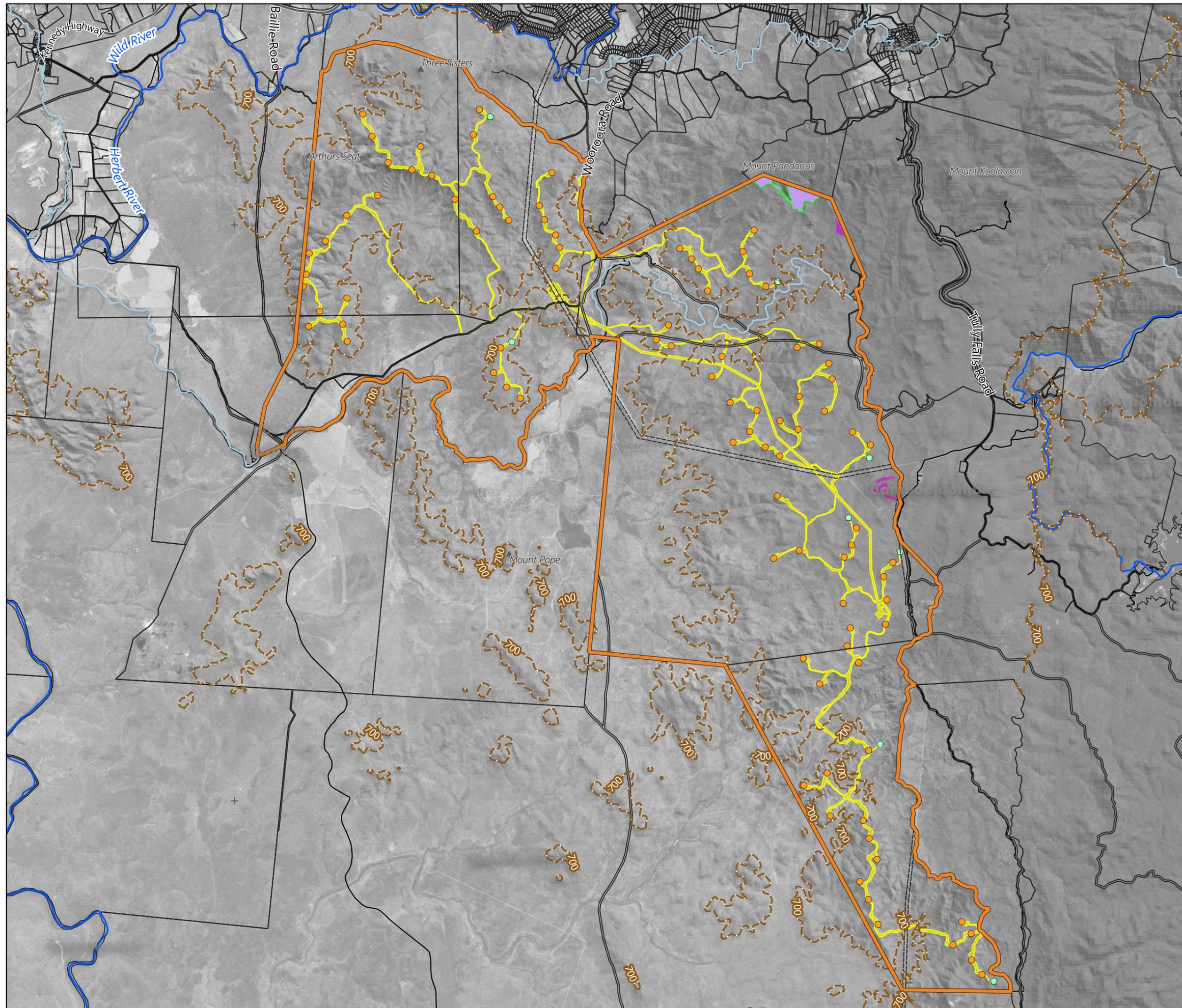
Date: 2021-12-12
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 Reviewed: CC
 Project: EPU-004



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Data Source(s):
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 Queensland Imagery Whole Of State
 Satellite Public Basemap Service





8.7 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). 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).

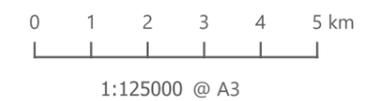
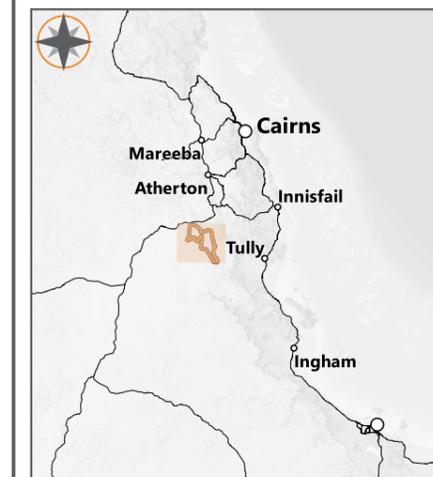
There is limited potential habitat for the spotted-tailed quoll within the Project area and this has been conservatively mapped as all notophyll, mesophyll and wet sclerophyll forest (above and below 900 m) within the Project area, see **Figure 8-7**.

Chalumbin Wind Farm Potential habitat for Spotted-tailed quoll

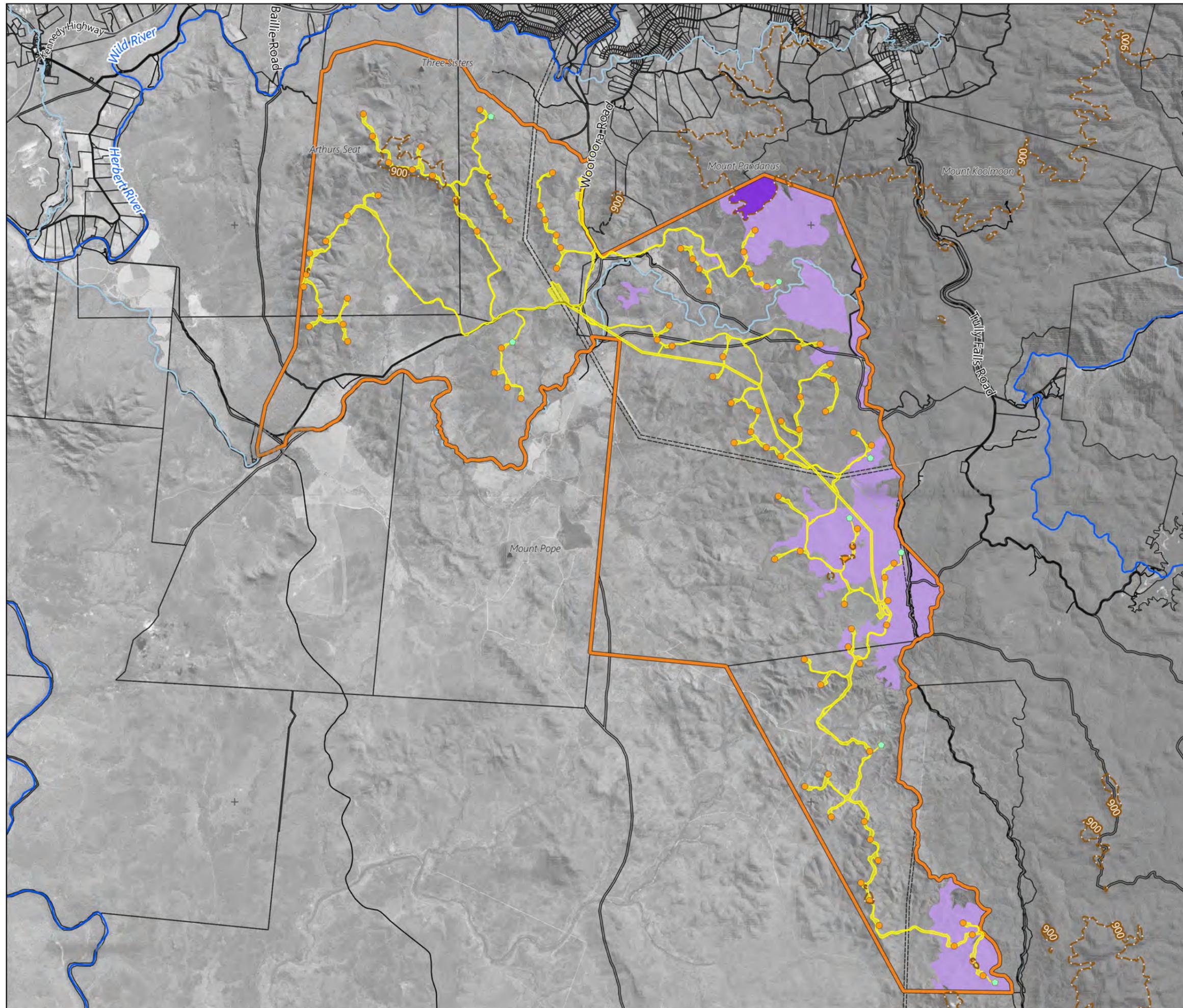
Figure 8.7

-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Preferred potential habitat
-  Marginal potential habitat
-  900m Contour
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

Date: 2021-12-12
 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
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8.8 Lumholtz Tree-kangaroo

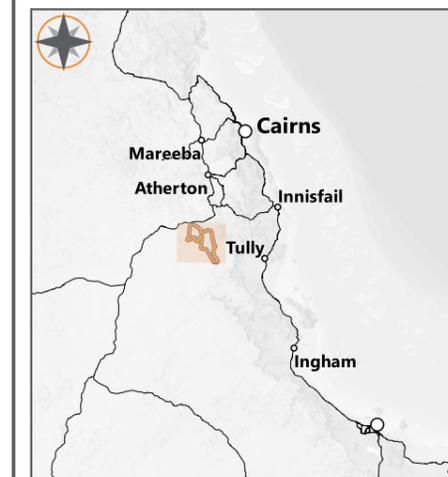
Potential habitat for the Lumholtz tree-kangaroo was mapped as rainforest habitats, riparian vegetation through primarily open forest habitats and wet sclerophyll forests as shown in **Figure 8-8**.

Chalumbin Wind Farm Lumholtz tree-kangaroo Habitat

Figure 8.8

-  Project Area
-  Wind Turbine
-  Met-mast
-  Project Footprint
-  Survey Observation
-  Potential Habitat
-  Major Road
-  River
-  Creek
-  Lot Type Parcel
-  Easement

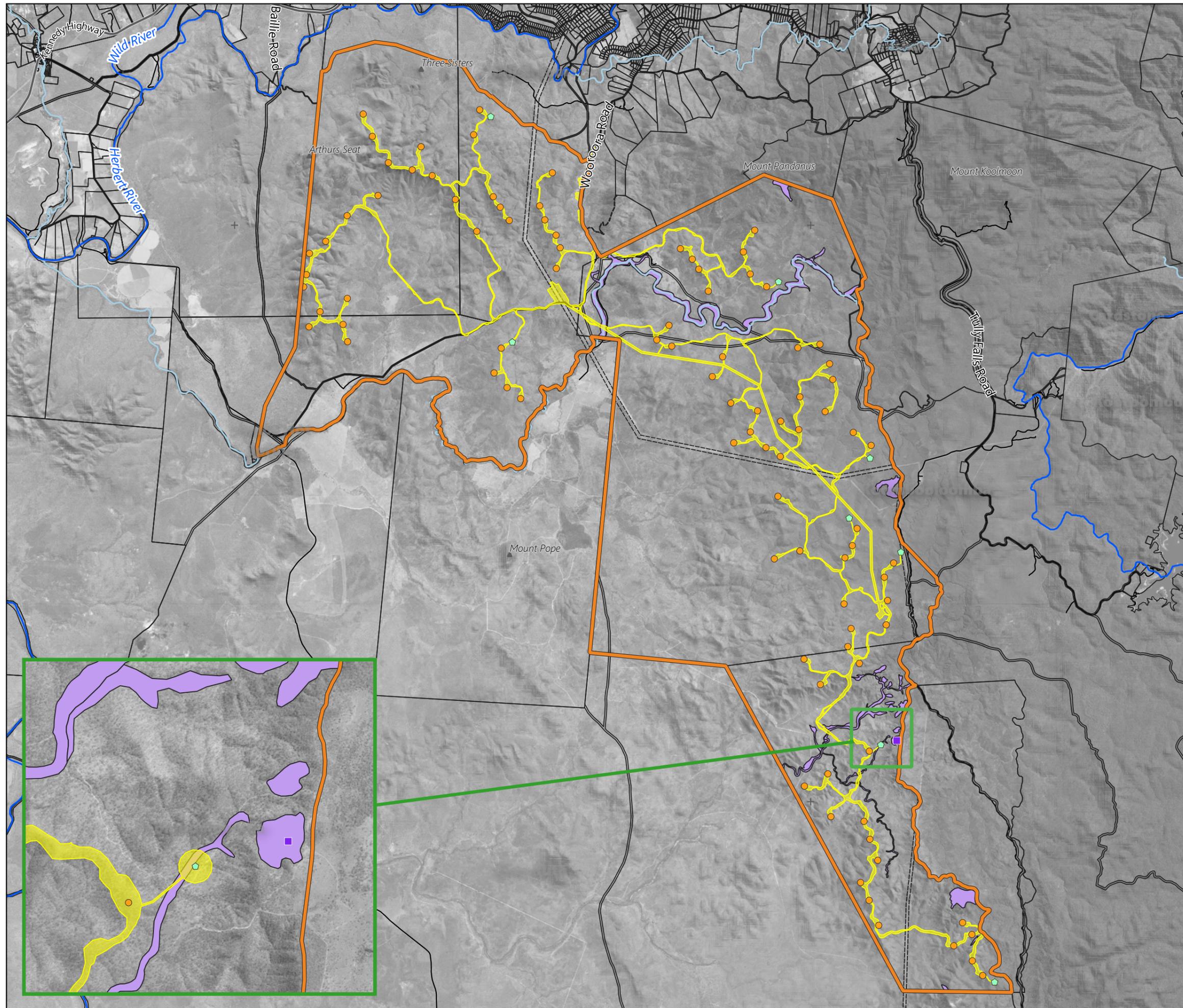
Date: 2021-12-12
 Author: TOD
 Reviewed: CC
 Project: EPU-004



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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 Platypus

The platypus requires permanent water. Its habitat was mapped as REs 7.3.2 or 9.3.15 on a named watercourse with evidence of water in aerial imagery and defined banks (as observed through hill shade), as shown in **Figure 8-9**.