















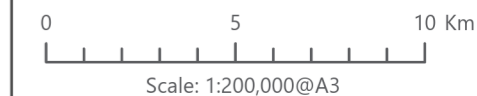
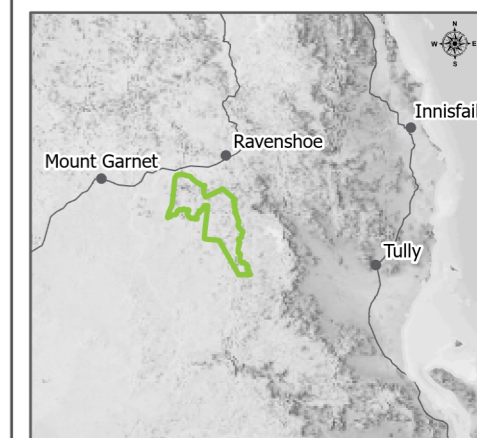
Chalumbin Wind Farm
Observations and Potential Habitat for Northern greater glider

Figure 4.31

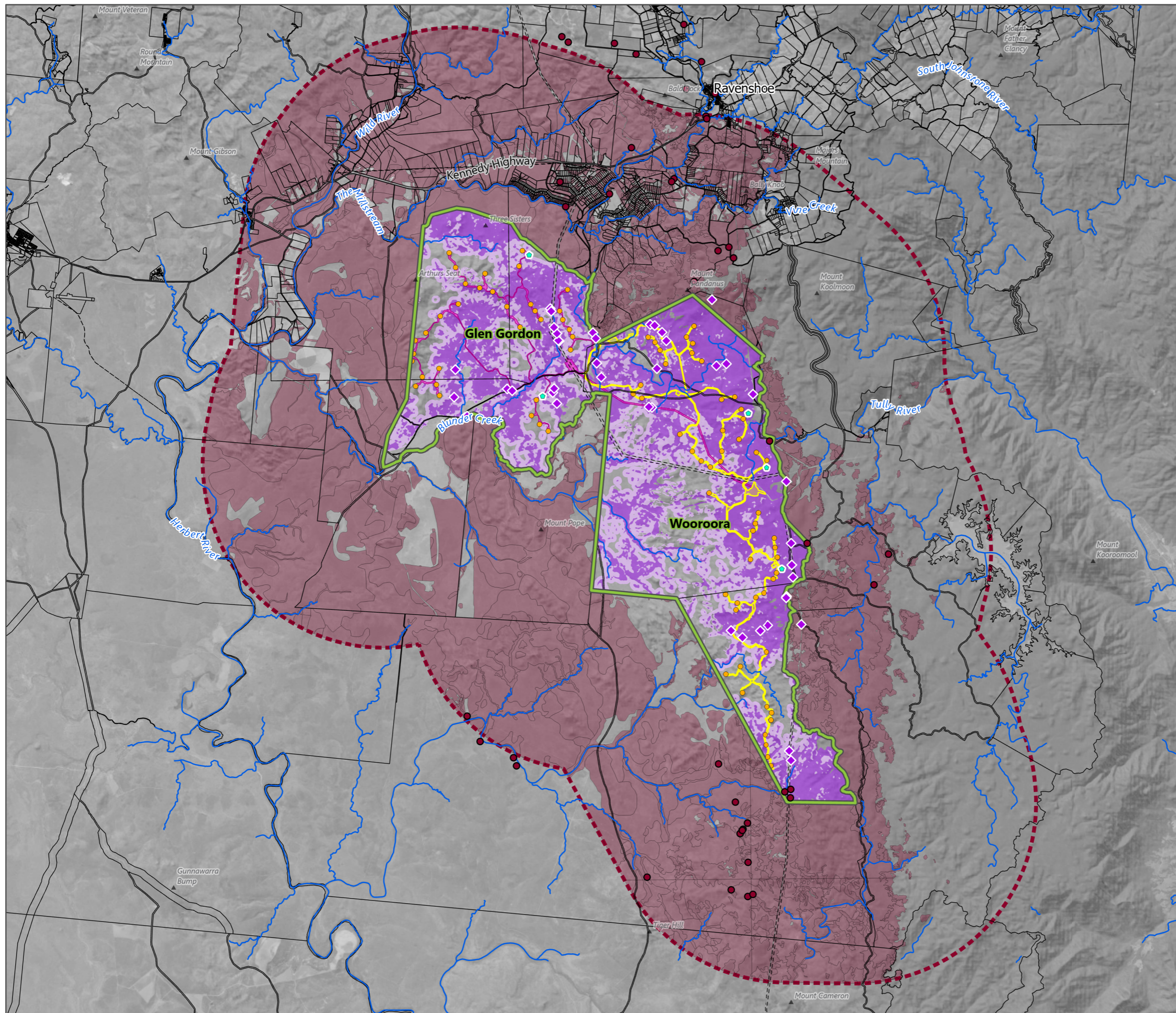
-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
-  Watercourse
-  Survey Observation
-  Threatened Fauna Record (ALA/WildNet)
-  Denning Habitat
-  Foraging Habitat
-  Potential Habitat
-  Lot Boundary
-  Easement

Date: 12/10/2022
Project: EPU-004

Author: TOD
Reviewed: NOD



Data Source(s):
Digital Cadastral Database - Department of Resources (2022);
Regional Ecosystem Mapping, WildNet - Department of Environment and Science (2022); Atlas of Living Australia (2020)
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4.7.8 Northern Quoll

4.7.8.1 Threat Status, Distribution, Population, Ecology and Habitat Preferences

The northern quoll (*Dasyurus hallucatus*) is listed as Endangered under the EPBC Act and Least Concern under the NC Act. It is listed globally as Endangered on the IUCN Red List.

The northern quoll formerly occurred across northern Australia, from Western Australia to southeast Queensland. Its distribution has declined dramatically especially in the more arid parts of its range, with populations declining rapidly after the arrival of cane toads (SPRAT 2021). The northern quoll has been in gradual decline in population density and distribution for the last 50 years, with declines preceding the arrival of cane toads in FNQ and Kakadu NP (DoE 2016). Extant populations occur in the Pilbara, the Kimberley, parts of the NT and near-coastal Queensland; genetic differentiation of these populations is considered probable. Remnant populations are associated with rocky areas (SPRAT 2021).

It currently occurs in five regional populations across Queensland, the Northern Territory and Western Australia. In Queensland, it is known to occur as far south as Gracemere and Mt Morgan, as far north as Weipa and as far west as Carnarvon Gorge National Park. In northern Queensland, recent records exist from Mareeba, Mount Carbine, Tolga and around Cooktown (SPRAT 2021).

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. Eucalypt forest or woodland habitats usually have a high structural diversity containing large-diameter trees, termite mounds or hollow logs for denning purposes. Shelter habitat is important for breeding and refuge from fire / predation. 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 were closer to permanent water (Hill and Ward 2010, TSSC 2005, DoE 2016, SPRAT 2021).

Little is understood about the characteristics of foraging or dispersal habitat for the northern quoll. However, on current knowledge, it is considered to be any land comprising predominantly native vegetation in the immediate area (i.e. 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 species is sedentary and has a home range of approximately 35 ha. The intense physical effort exerted by males during the breeding season appears to result in a near-complete annual male die-off, making the species highly susceptible to local extinction (DoE 2016).

Habitat critical to the survival of the species is habitat within the modelled distribution which provides shelter for breeding, refuge from fire and/or predation and potential poisoning from cane toads. It 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 or connecting populations important for the long-term survival of the northern quoll is also considered habitat critical to the species' survival. Such populations are:

- High density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present;



- Occurring in habitat that is free of cane toads and unlikely to support cane toads upon arrival;
- Subject to ongoing conservation or research actions.

A high density population may be characterized by numerous camera triggers of multiple individuals across multiple cameras and/or traps on the site. A low density population may be characterized 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 (DoE 2016).

4.7.8.2 Known Threats

The Recovery Plan (Hill and Ward 2010) lists the following threats to the northern quoll:

- Cane toads – although some populations in QLD persist following the invasion of cane toads;
- Predation and/or competition from red fox and feral cats;
- Inappropriate fire regimes;
- Habitat degradation e.g. trampling and grazing by cattle;
- Habitat destruction and fragmentation – one study has found no quolls were recorded from fragments with less than 65% woodland within a 4km radius of the trapping site; modelling has predicted quolls would disappear from landscapes with less than 70% woodland within a 4km radius;
- Weeds;
- Disease;
- Hunting and accidental poisoning; and
- Population isolation.

SPRAT 2021 lists the following threat abatement plans as being relevant to this species:

- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC 2011c);
- Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPC 2012a); and
- Threat abatement plan for predation by feral cats (DoE 2015).

4.7.8.3 Survey Effort

The EPBC Referral Guideline for Northern Quoll (DoE 2016) recommend an initial reconnaissance survey is undertaken to detect the northern quoll and assess the suitability of habitat for the species. Data collected should describe the habitat quality including information on vegetation, potential sheltering sites, fire history, presence of introduced predators, grazing history and landscape connectivity and condition. Depending on the outcomes of the reconnaissance survey, targeted surveys may then be required; these typically involve a trapping programme (wire cage traps or Elliott traps) or a more refined camera survey (DoE 2016). The Queensland Terrestrial Vertebrate Fauna Survey Guidelines indicate that camera trapping is recommended over cage trapping for the northern quoll (Eyre et al 2018).



As described in **Section 4.2.2.3** an extensive camera trapping program was undertaken across the full extent of the Project area, comprising nearly 6,000 camera trap nights between January and December 2021.

4.7.8.4 Project Area Habitat Assessment

There is a 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 (ALA), see **Figure 4-32**. Despite nearly 5,000 camera trap nights in suitable habitat, there have been no observations of northern quoll within the Project area.

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 4-32**):

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

Chalumbin Wind Farm

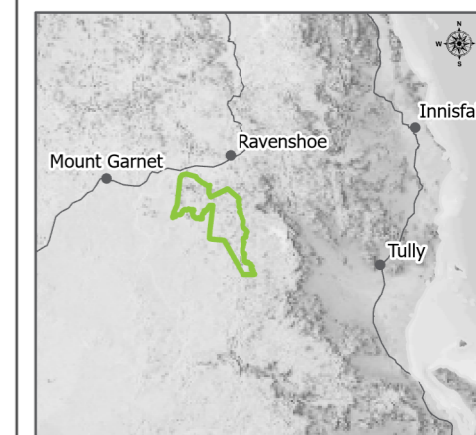
Potential habitat for Northern quoll

Figure 4.32

-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
-  Threatened Fauna Record (ALA/WildNet)
-  Watercourse
-  Camera Trap (Wet Season)
-  Camera Trap (Dry Season)
-  Potential Shelter Habitat
-  Potential Foraging and Dispersal Habitat
-  Lot Boundary
-  Easement

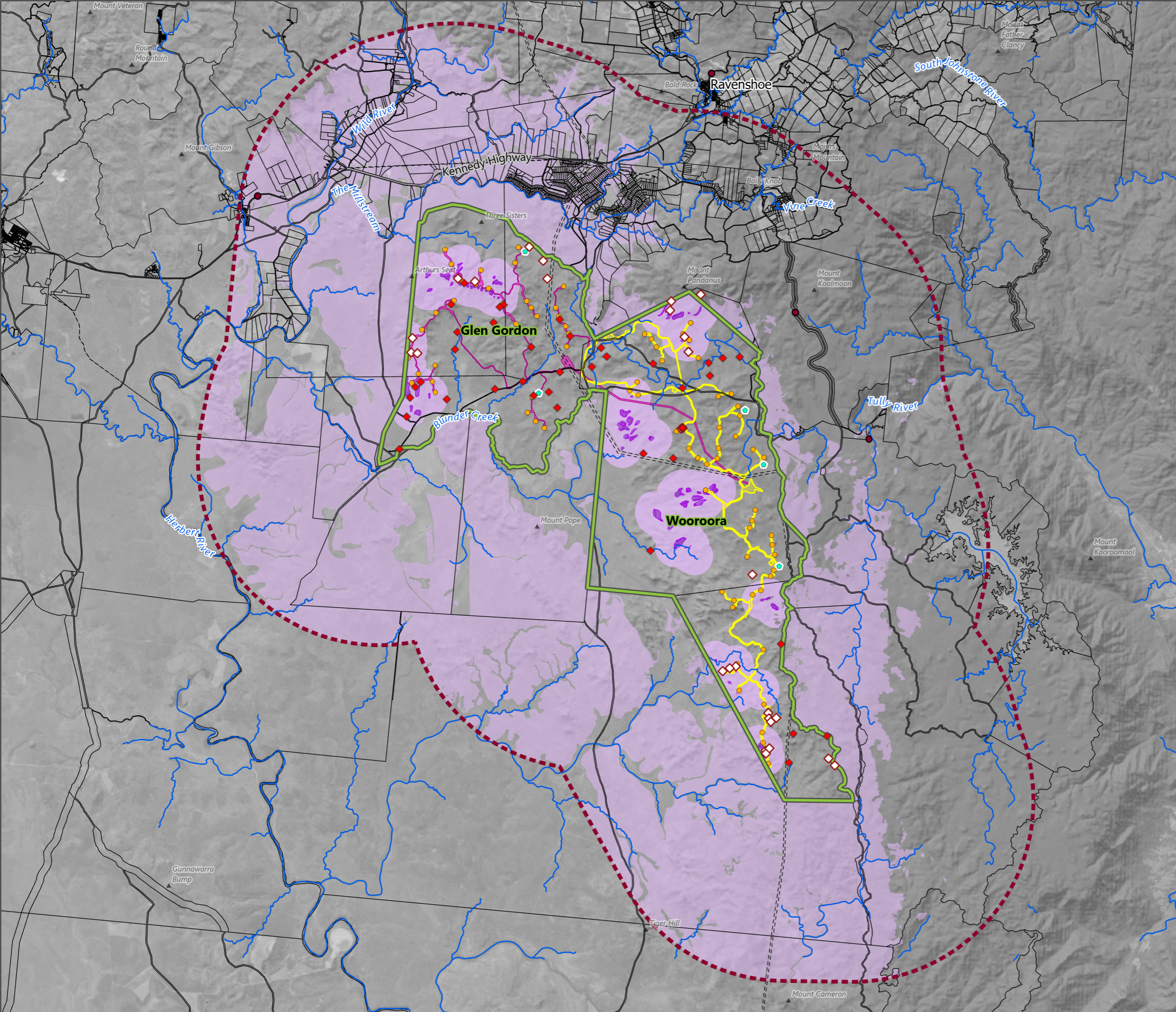
Date: 12/10/2022
Project: EPU-004

Author: TOD
Reviewed: NOD



Scale: 1:200,000@A3

Data Source(s):
Digital Cadastral Database - Department of Resources (2022);
Regional Ecosystem Mapping, WildNet - Department of Environment and Science (2022); Atlas of Living Australia (2020)
Earthstar Geographics, © State of Queensland (Department of Resources) 2022





4.7.9 Semon's Leaf-nosed Bat

4.7.9.1 Threat Status, Distribution, Population, Ecology and Habitat Preferences

Semon's leaf-nosed bat (*Hipposideros semoni*) is listed as Vulnerable under the EPBC Act and Endangered under the NC Act. It is listed globally as Least Concern on the IUCN Red List.

The species has been recorded from PNG as well as northern Queensland. In Queensland, the most recent records are from the eastern side of Cape York Peninsula (Armstrong and Kaplin 2021). It's known distribution in Australia extends from Cape York to just south of Cooktown although the southern limit is unclear (TSSC 2016d, SPRAT 2022).

There is no information available on current population size or trend (Armstrong and Kaplin 2021, SPRAT 2022).

The species is found primarily in rainforest and wet sclerophyll forest; it may also use strips of riparian forest to move out from patches of rainforest (TSSC 2016d, Armstrong and Kaplin 2021, SPRAT 2022). It roosts in caves, overhangs, mines, tree hollows and occasionally man-made structures such as culverts under roads (Armstrong and Kaplin 2021).

4.7.9.2 Known Threats

Major threats to the species are not known with certainty but are thought to include inappropriate fire regimes, fragmentation and modification of habitat from pastoralism and other land uses, and predation by feral cats (Armstrong and Kaplin 2021).

4.7.9.3 Survey Effort

Surveys for Semon's leaf-nosed bat were undertaken in accordance with the Survey Guidelines for Australia's Threatened Bats (DEWHA 2010a) using a combination of anabats and harp traps as described in **Section 4.2.2.3**. The total survey effort comprised 96 detector nights at 48 sites (wet and dry season) and 21 nights of harp trapping at 7 locations across the Project area (dry season only).











4.7.9.4 Project Area Habitat Assessment

There are no historical records of the large-eared horseshoe bat within the Study area and no individuals were recorded within the Project area during field surveys.

Potential habitat within the Project area is limited, and was mapped as rainforest, wet sclerophyll forest and riparian forest (see **Figure 4-33**).

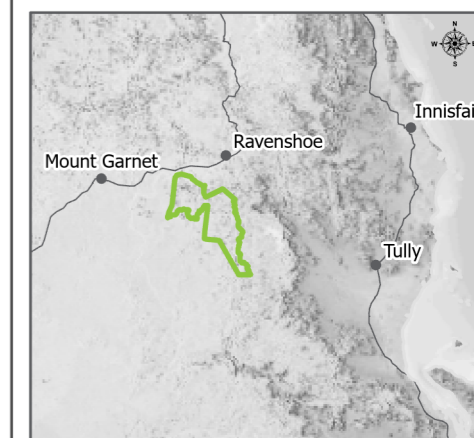
Chalumbin Wind Farm
Potential Habitat for Semon's leaf-nosed bat

Figure 4.33

-  Project Area Boundary
-  Study Area
-  Turbine
-  Met-mast
- Clearance Envelope**
-  Stage 1
-  Stage 2
-  Potential Habitat
-  Watercourse
-  Lot Boundary
-  Easement

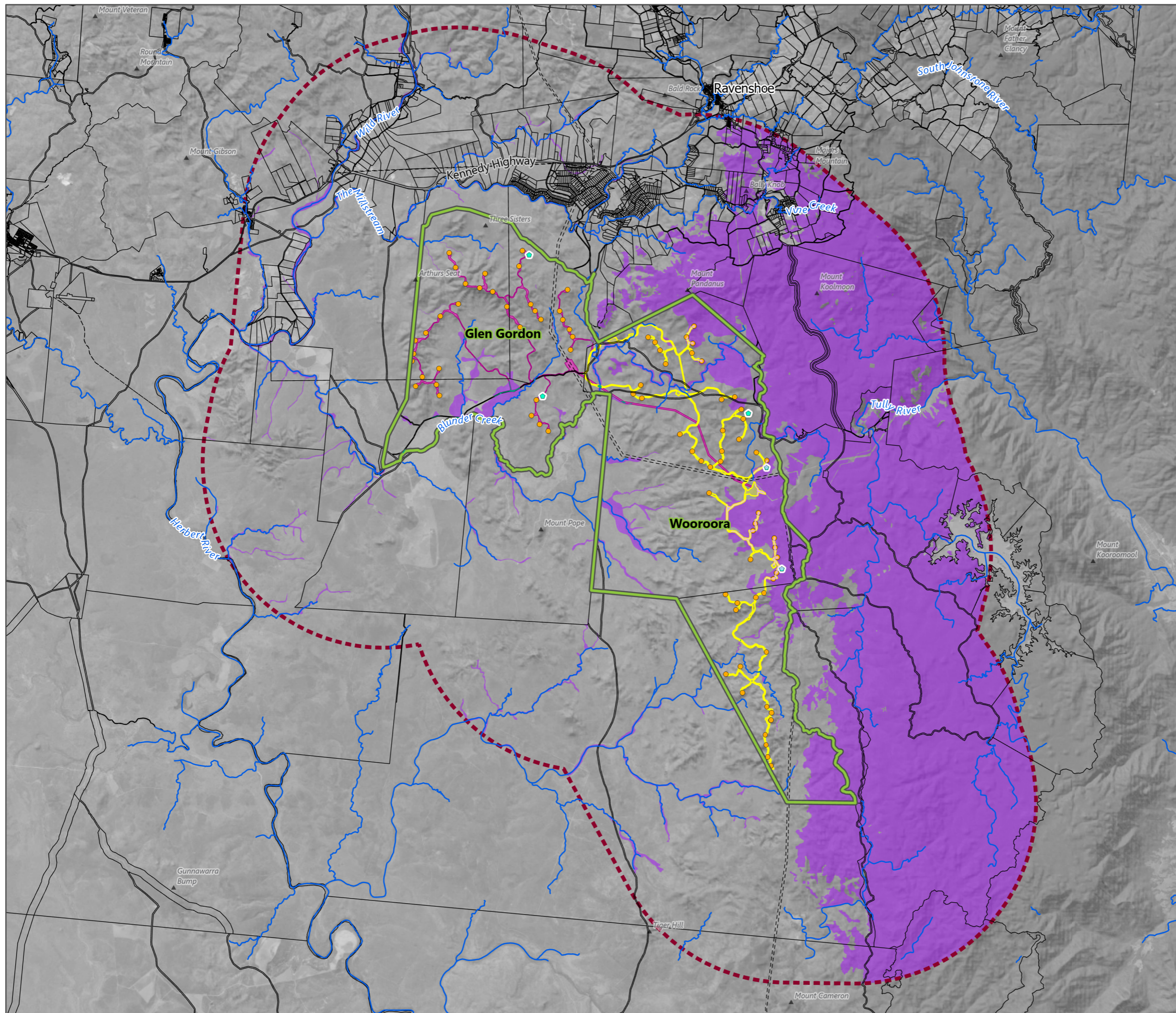
Date: 12/10/2022
Project: EPU-004

Author: TOD
Reviewed: NOD



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Data Source(s):
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4.7.10 Spectacled Flying-Fox

4.7.10.1 Threat Status, Distribution, Population, Ecology and Habitat Preferences

The spectacled flying-fox (*Pteropus conspicillatus*) is listed as Endangered under the EPBC Act and the NC Act. It occurs in north-eastern Queensland, between Ingham and Cooktown, and between the McIlwraith and Iron Ranges of Cape York.

The spectacled flying-fox is listed globally as Endangered on the IUCN Red List. It occurs in Indonesia and PNG, as well as Far North Queensland. It is reported to have an upper elevation limit of 750 m for roosting but has been found feeding as high as 1,100 m (Roberts et al 2020). The extent of occurrence of the spectacled flying-fox has probably changed little since European settlement, although extensive clearing of lowland vegetation, particularly rainforests, has likely reduced its area of occupancy substantially (TSSC 2019b).

The extent of occupancy is estimated at 10,124 km² and the area of occupancy at 124 km². Approximately 50 roost sites have been identified in the Wet Tropics but only 10 are usually occupied at any point in time (TSSC 2019b). The largest population of spectacled flying-fox is known from the area between Townsville and Cooktown (TSSC 2019b); any spectacled flying-fox within the Project area would be part of this population.

The spectacled flying-fox is associated mainly with rainforests, with most camps occurring in or near (within several kilometres of) rainforest areas (TSSC 2019b). However, it will forage across a wide range of vegetation types, including mangroves, *Melaleuca* forests, eucalypt forests (including *Eucalyptus* spp., *Corymbia* spp.), gardens and orchards (TSSC 2019b, SPRAT 2022). It will forage up to 50 km from the camp in a night although more typically mean foraging distance from the camp is 11.8 km (DERM 2010). The EPBC listed TEC, Mabi Forest (Complex Notophyll Vine Forest 5b) is considered a key habitat for the species (SPRAT 2021, TSSC 2019b).

Spectacled flying-foxes are highly mobile and have complex and irregular movement patterns primarily determined by seasonal nectar flows (SPRAT 2021). The species plays a vital role in pollination and the dispersal of rainforest seeds, and is considered an important value of the WTQWHA.

Habitat and associated seasonal resources critical to the survival of the species have not been mapped (DERM 2010).

4.7.10.2 Known Threats

The Conservation Advice (TSSC 2019b) and Recovery Plan (DERM 2010) for the spectacled flying-fox identify the following threats to the species:

- Climatic factors including cyclones and climate change;
- Habitat loss and fragmentation due to land clearing;
- Culling and persecution at orchards and camps;
- Tick paralysis – this is a significant threat in the Southern Atherton Tablelands;
- Birth abnormalities including cleft palate syndrome;
- Mortality associated with entanglement or collision with barbed wire, powerlines and fruit netting;
- Secondary poisoning through chemicals used in agriculture;



- Habitat degradation due to myrtle rust and fire exclusion

SPRAT (2021) does not list any threat abatement plans as relevant for this species.

4.7.10.3 Survey Effort

Surveys for spectacled flying-fox were undertaken in accordance with the Survey Guidelines for Australia's Threatened Bats (DEWHA 2010a) as described in **Section 4.2.2.3**. A total of 1,260 person hours were spent undertaking daytime searches for camps and feeding signs (the observation of which was hampered by extensive ground cover), and 103 person hours were spent undertaking night-time surveys for individual flying-foxes, split evenly across wet and dry seasons in 2021. Note that this survey effort is for the entire Project area whilst most camps are typically observed in or near (within a few kilometres of) rainforest (TSSC 2019b), which is only present in a few isolated locations along the eastern boundary of the Project area. In addition, 440 person hours were spent undertaking flora surveys to identify food trees across the Project area.

4.7.10.4 Project Area Habitat Assessment

The National Flying Fox Monitoring programme (DAWE 2022d) reports a spectacled flying-fox camp at Malan, east of Ravenshoe and just outside the Study area (see **Figure 4-34**). The Project area is approximately 20 km from this camp (and hence within the foraging range of the species). In February 2021, between 2,500 and 9,999 spectacled flying-fox were recorded at this camp (DAWE 2022d). The National Flying Fox Monitoring programme identifies two further flying-fox camps just outside the 50 km foraging range of the species from the Project area as indicated on **Figure 4-34**: a little red flying-fox camp at 40 Mile Scrub, approximately 55 km to the south-west (> 50,000 little red flying-fox recorded in February 2017) and a mixed camp of little red and spectacled flying-foxes at Tolga, 50 km to the north (between 2,500 and 9,999 spectacled flying-fox recorded in November 2021) (DAWE 2022d).

The desktop assessment also indicates that the species was recorded in the Ravenshoe Forest Reserve 1 in 1999 (ALA). This is within the Study area, and abuts the Project area immediately to the north, see **Figure 4-34**. There is limited rainforest habitat within the Project area to support a camp, but potential foraging habitat is widespread and has been mapped as all eucalypt forest and rainforest within the Project area.

The Project will result in the clearing of 976 ha of spectacled flying-fox foraging habitat.