

Appendix 20

Fauna, Vegetation & Flora Assessment – Proposed Mt Emerald Wind Farm

Prepared by RPS



Fauna, Vegetation & Flora Assessment - Proposed Mt Emerald Wind Farm

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Contents

EXECUTIVE SUMMARY	VII
1.0 INTRODUCTION	8
1.1 Site Description	8
PART 1 – FAUNA ASSESSMENT	10
2.0 SOURCES OF INFORMATION – FAUNA ASSESSMENT	11
2.1 Existing Information	11
3.0 FIELD METHODOLOGY	12
3.1 Survey Timing	12
3.2 Survey Methodology	12
3.2.1 Pitfall Trapping (May 2010 only)	14
3.2.2 Elliott Trapping (May 2010 only)	14
3.2.3 Funnel Trapping (May 2010 only)	14
3.2.4 Harp Trapping (May 2010 only)	14
3.2.5 Microchiropteran Bat Call Detection (May 2010, March-April 2011, June-July 2011)	14
3.2.6 Diurnal Bird Surveys (May 2010 & March-April 2011)	15
3.2.7 Spotlighting (May 2010 & March-April 2011)	15
3.2.8 Owl Call Playback (March-April 2011)	16
3.2.9 Active Searches	16
3.2.10 Raptor Searches (March-April 2011)	16
3.2.11 Opportunistic Observations	16
3.2.12 Camera Trapping (Targeted Northern Quoll Survey)	17
4.0 RESULTS	18
4.1 Habitat Assessment	18
4.2 Fauna Species Occurrence	18
4.2.1 Mammals	20
4.2.2 Birds	23
4.2.3 Reptiles	23
4.2.4 Amphibians	23
4.3 Potential Faunal Movement through the Landscape	24
5.0 POTENTIAL FAUNAL IMPACTS	25
5.1 Turbine Collisions and Barotrauma	25
5.1.1 Bird & Bat Collisions	25
5.1.2 Barotrauma	26
5.2 Habitat Alienation due to Turbine Avoidance	27
5.3 Habitat Modification	28

5.4	Increased Predation Risk Adjacent to Access Tracks	29
5.5	Potential Impacts on the Endangered Northern Quoll	29
6.0	POTENTIAL MITIGATION OPTIONS AND FURTHER WORK	31
6.1	Rotor Strike/Barotrauma	31
6.2	Habitat Modification	31
6.3	Increased Predation Pressure	33
7.0	CONCLUSION	34
PART 2 – VEGETATION & FLORA ASSESSMENT		38
8.0	METHODS – VEGETATION & FLORA ASSESSMENT	39
8.1	Desktop Review	39
8.1.1	Flora and Vegetation Survey Methods	40
9.0	RESULTS OF DESKTOP REVIEW - VEGETATION	41
9.1	Regional Ecosystem Mapping	41
9.1.1	Amendment to Regional Ecosystem Mapping	43
9.2	Essential Habitat	44
9.3	Wildlife Online Database Search - Flora	45
9.4	Protected Matters Database Search - Flora	46
9.5	HERBRECS – Queensland Herbarium Records	47
9.6	Regional Vegetation Management Codes	48
9.7	Watercourses	48
9.8	Wetlands	49
10.0	FIELD INVESTIGATION – VEGETATION & FLORA	50
10.1	Flora and Vegetation Assessment	50
10.1.1	Vegetation Overview and Condition	50
10.1.2	Effects of Fire	52
10.1.3	Flowering and Fruiting Phenology	52
10.1.4	Regional Ecosystem Mapping Amendment	53
10.2	Description of Vegetation Survey Sites	54
10.2.1	Vegetation Survey Site 1 (Land surrounding Granite Creek)	55
10.2.2	Vegetation Survey Site 2	56
10.2.3	Vegetation Survey Site 3	56
10.2.4	Vegetation Survey Site 4	57
10.2.5	Vegetation Survey Site 5	57
10.2.6	Vegetation Survey Site 6	58
10.2.7	Vegetation Survey Site 7	58
10.2.8	Vegetation Survey Site 8	58
10.2.9	Vegetation Survey Site 9	59
10.2.10	Vegetation Survey Site 10	59

10.2.11	Vegetation Survey Site 11	60
10.2.12	Vegetation Survey Site 12	60
10.2.13	Vegetation Survey Site 13	61
10.2.14	Vegetation Survey Site 14	61
10.2.15	Vegetation Survey Site 15	61
10.2.16	Vegetation Survey Site 16	62
10.2.17	Vegetation Survey Site 17	62
10.2.18	Vegetation Survey Site 18	63
10.2.19	Vegetation Survey Site 19	63
10.2.20	Vegetation Survey Site 20	64
10.2.21	Vegetation Survey Site 21	64
10.2.22	Vegetation Survey Site 22	65
10.2.23	Vegetation Survey Site 23	66
10.2.24	Vegetation Survey Site 24	66
10.2.25	Vegetation Survey Site 25	67
10.2.26	Vegetation Survey Site 26	67
10.3	Important Vegetation Communities and Habitats	68
10.3.1	Summary of Habitat Types	69
10.3.2	Significant Flora	70
11.0	POTENTIAL IMPACTS TO VEGETATION AND FLORA	72
11.1	Vegetation & Flora Impacts	72
12.0	IMPACT MITIGATION – VEGETATION & FLORA	75
12.1	Vegetation Clearing	75
12.2	Weed Management	75
12.3	Vegetation Mapping	76
12.4	Vegetation Connectivity	77
12.5	Vegetation Integrity	77
12.6	Rare and Threatened Plants	77
12.7	Landscape Rehabilitation	77
12.8	Fire Management	78
13.0	CONCLUSION – VEGETATION & FLORA	79
14.0	REFERENCES & BIBLIOGRAPHY	81

Tables

Fauna Assessment

Table 1 List of fauna species of conservation significance recorded or predicted to occur on the site	19
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Vegetation & Flora Assessment

Table 1 Description of regional ecosystems mapped in the project area	43
Table 2 Descriptions of RE 7.12.30 and 7.12.65 from the Regional Ecosystem Description Database	44
Table 3 Plant species shown to have essential habitat in the study area.	45
Table 4 Regional ecosystems corresponding with essential habitat	46
Table 5 Conservation significant flora as listed in the Wildlife Online database	46
Table 6 Conservation significant flora as listed in the EPBC Act's Protected Matters database	47
Table 7 Summary of HERBRECS data for conservation significant flora	48

Figures

Figure 1 Site Location	9
Figure 2 Fauna Survey Site Locations	13
Figure 3 Targeted Northern Quoll Camera Trap Survey	21

Plates

Fauna Assessment

Plate 1 One of the many Northern Quolls	22
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Vegetation & Flora Assessment

Plate 1 <i>Grevillea glossadenia</i> .	72
Plate 2 <i>Homoranthus porteri</i>	72

Appendices

FAUNA ASSESSMENT

Appendix A1:	LOCATION OF FAUNA SURVEY SITES AND SURVEY METHODOLOGY USED
Appendix B1:	LIST OF FAUNA SPECIES RECORDED OR PREDICTED TO OCCUR ON THE SITE
Appendix C1:	QLD WILDLIFE ONLINE SEARCH RESULTS (FAUNA ONLY)
Appendix D1:	EPBC PROTECTED MATTERS SEARCH TOOL RESULTS
Appendix E1:	MICROCHIROPTERAN BAT ANALYSIS REPORTS

VEGETATION & FLORA ASSESSMENT

Appendix A2:	VEGETATION SURVEY SITES
Appendix B2:	CURRENT REGIONAL ECOSYSTEM MAPPING
Appendix C2:	REGIONAL ECOSYSTEM DESCRIPTIONS
Appendix D2:	AMENDED REGIONAL ECOSYSTEM MAPPING
Appendix E2:	DERM WILDLIFE ONLINE DATABASE SEARCH
Appendix F2:	HERBRECS - LOCATION OF CONSERVATION SIGNIFICANT FLORA
Appendix G2:	ADDRESS TO REGIONAL VEGETATION MANAGEMENT CODES
Appendix H2:	WATERCOURSES (DERM)
Appendix I2:	PROVISIONAL CHECKLIST OF FLORA
Appendix J2:	VEGETATION STRUCTURAL DESCRIPTIONS – VEGETATION SURVEY SITES

EXECUTIVE SUMMARY

The Mt Emerald wind farm at completion is proposed to include up to 75 turbines on land described as Lot 7 on Plan SP235244 located approximately 5 km west of the township of Walkamin at the northernmost extension of the Herberton Range, which forms part of the Great Dividing Range. The proposed wind farm will connect directly into the existing Chalumbin to Woree 275 kV transmission line which traverses the site.

The surveys described in this report were conducted on the site as an early-dry season fauna and flora survey in May 2010; a late-wet season flora and fauna survey in March-April 2011; and a targeted camera trap survey for the endangered Northern Quoll and additional microchiropteran bat surveys in the mid-dry season June-July 2011. Additional vegetation surveys were undertaken in June 2011.

Of the 5 plants and 46 fauna species of conservation significance predicted to occur on the site on the basis of previous records or the confirmed presence of suitable habitat on the site, the presence of a total of 3 plant and 12 fauna species were confirmed during the field surveys.

Regional ecosystem mapping for the site indicates the presence of an “of concern” vegetation community located predominately within the ridge top areas where wind turbines are proposed to be sited. However, extensive field surveys covering the proposed turbine locations did not confirm the presence of the tree *Syncarpia glomulifera*: the dominant canopy species characterising this ecosystem. The results of numerous vegetation sampling sites indicate a more correctly defined regional ecosystem for the particular ridge environment that is “least concern”, comprising a mosaic of two units: RE 7.12.30b/7.12.65k.

The construction of access tracks (37.2km: 37.2ha footprint), turbine pads (75 of 30 m x 40 m: 9.0 ha footprint) and electricity substation (1ha footprint) will result in the clearing of approximately 47.2ha of remnant vegetation, of which 20ha will rehabilitated post-construction. This represents approximately 1.9% of the total area of the site. The majority of the clearing is concentrated along rocky ridge-top and mid slope habitats which may be utilised preferentially by some fauna species as foraging, nesting or roosting habitats.

Fauna species of conservation significance were recorded or are predicted to occur on the site, including birds and bats belonging to groups identified as of being at particular risk of mortality from impacts with turbine rotors or from barotraumas. In addition ground-dwelling and hollow-roosting/nesting fauna, in particular Northern Quolls could be potentially impacted by habitat clearing and associated impacts (weed invasion, change in fire regime, increased predation rates etc).

Many of the potential impacts on conservation significant fauna resulting from the construction and operation of the proposed wind farm may be reduced to acceptable levels through the implementation of appropriate management strategies which may include the relocation of turbines away from sensitive areas, weed control, appropriate fire regimes and predator control, site construction timing and rehabilitation measures

The project is likely to result in limited short term impacts to a range of local common species, however these impacts may potentially be minimised through the implementation of appropriate construction phase controls and operational phase management. In the longer term, operational impacts on these species are not considered likely to be significant provided the recommended monitoring and management programs are implemented.

A Statement of Commitments has been prepared which provides the basis for future plans, strategies and direct actions the Proponent proposes to undertake prior to, during and post construction to ensure that all potential environmental impacts are considered.

1.0 Introduction

Mt Emerald Wind Farm Pty Ltd (of which Transfield Services are an equity partner with Port Bajool) are seeking planning approval for the establishment of a wind farm on land at Arriga, located on the Atherton Tablelands, approximately 60 km east of Cairns (**Figure 1**).

The Mt Emerald Wind Farm, at completion, will consist of 75 wind turbines, each with a nominal capacity of between 2-3 MW. While the actual turbine make and model is yet to be confirmed, the typical physical characteristics of the turbines include a tapering steel tower supporting a three blade rotor, which includes blade length up to 50m and a hub height of between 80-90 m. Of the turbines currently being considered the largest has an overall tip height of 131 m (hub height of 80 m and a blade length of 51 m).

Adequate setbacks will be established for each turbine to ensure that no part of the turbine overhangs adjacent properties (not part of the application) or gazetted roads. Each turbine will be connected, via a transformer located adjacent to each tower, to the proposed substation via a network of both underground and overhead cables. The substation will ultimately be connected via overhead transmission lines to the existing Chalumbin to Woree 275 kV transmission corridor which traverses the site.

RPS Group was engaged to undertake a fauna assessment of the area proposed for the wind farm to determine if there are any significant fauna issues associated with the development of this project and to suggest appropriate strategies to mitigate these impacts where possible given the available knowledge.

1.1 Site Description

The wind farm project site, hereafter referred to as the “site” or “project area” is a single rural property, formerly described as Lot 7 on Plan SP235244, and covering an area of approximately 2422 ha (**Figure 1**).

The site is situated at the northern most end of the Herberton Range, which forms part of the Great Dividing Range. The site varies in altitude from 540 m a.s.l at the northern-most point along Kippen Drive to 1089 m a.s.l in the south-eastern most section closest to Mt Emerald. The north-western section of the site is dominated by Walsh’s Bluff (907 m a.s.l) (**Figure 1**).

The site is dominated by a series of three, approximately parallel high rhyolite ridges running in a south-east to north-west direction (**Figure 1**). There is a large area (~500 ha) of relatively flat country located in the western section (**Figure 1**). The site is dissected by a series of steep rocky ephemeral drainage lines and gorges, including the headwaters of a tributary of Granite Creek (**Figure 1**).

The site is intersected by a 5-10 m wide, 6.7 km long access track for Powerlink’s Chalumbin to Woree 275 kV transmission line that roughly traverses the property (**Figure 1**). Two other vehicle tracks, 750 m and 2.95 km in length respectively, connect the two test wind towers with the main power line access track (**Figure 1**).

The site is not currently grazed by domestic stock and aside from the cleared areas of access tracks and test wind monitoring tower pads, consists entirely of remnant vegetation (see Part 2 – Vegetation & Flora section).

The site is located on the boundary of the Einasleigh Uplands and the Wet Tropics Bioregions, both of which are characterized by high levels of bioregional endemic flora and fauna species.

The climate of the local area as indicated by the long-term weather records obtained for the nearby township of Walkamin is monsoonal, with alternating wet and dry seasons that typically last for 4 and 8 months respectively (Weatherzone, 2011), although this can vary considerably depending on the severity of the El Nino/Southern Oscillation.

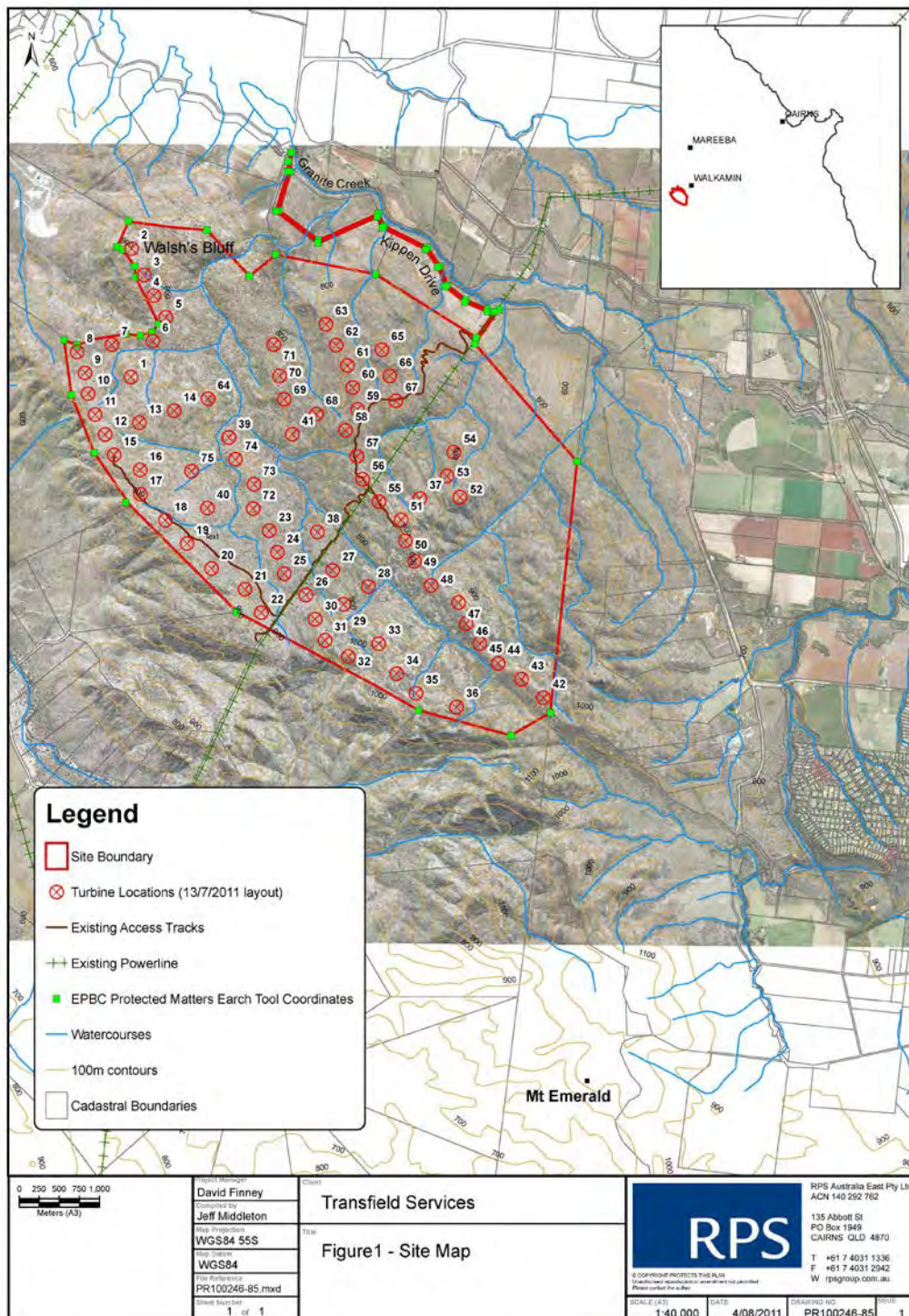


Figure 1. Site Location

PART I – FAUNA ASSESSMENT

2.0 Sources of Information – Fauna Assessment

This section of the report identifies the sources of information and methodology used to assess fauna on the project site and its surrounds. Only terrestrial vertebrate fauna (birds, bats, reptiles, mammals and frogs) were considered during this assessment.

2.1 Existing Information

This investigation is based on the information sources described below.

An *Environmental Protection and Biodiversity Conservation Act 1999* Protected Matters Report was generated using the on-line search function on the federal Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) website (SEWPAC, 2011). This was used to identify matters of national environmental significance that are known from, or have the potential to occur in, the region within 10 km of the cadastral boundaries of the site as defined by the following series of points and shown in **Figure 1**:

-17.15419,145.35489,	-17.15471,145.35634,	-17.15351,145.3618,	-17.15241,145.36547
-17.14409,145.36138,	-17.14093,145.36211,	-17.14191,145.37088,	-17.14705,145.37561,
-17.14465,145.37858,	-17.14683,145.38974,	-17.15376,145.40073,	-17.16774,145.41225,
-17.19577,145.40927,	-17.19832,145.40485,	-17.19551,145.39454,	-17.18454,145.37422,
-17.1727,145.3623,	-17.16678,145.35825 &	-17.16032,145.35571.	

Fauna recorded or known to occur within a 10 km buffer of the centroid of the site (-17.166736, 145.386955), were obtained from the Queensland Department of Environment and Resource Management's (DERM) Wildlife Online Database (DERM, 2011). The information used to produce the wildlife lists is based on collated species lists and wildlife records acquired by the department through a range of sources including specimen collections, research and monitoring programs, inventory programs including extension activities, literature records, wildlife permit returns and community wildlife recording programs. As the department is still in the process of collating and vetting wildlife data, it is possible the information given is not complete. The absence of a species from the list does not mean that it does not occur there, but only that records are not held within the department wildlife database.

Data on bird occurrence in the one degree square containing the centroid of the project site (-17.166736, 145.386955) were reviewed from Birds Australia's (BA) Birddata website (BA, 2011).

Additional information used to derive predictive lists of fauna species likely to occur within the site was obtained from the following sources:

- Mammals - Van Dyck and Strahan (2008); Menkhorst and Knight (2004);
- Bats - Churchill (2009);
- Reptiles – Wilson (2005); Cogger (2000);
- Frogs – Barker *et al.* (1995); Frogs Australia Network (2011); and
- Birds – Pizzey and Knight (2007); Nielsen (1996); Simpson and Day (2010).

3.0 Field Methodology

3.1 Survey Timing

A total of three separate fauna surveys were conducted at the site:

- An early dry season survey conducted between the 10th and 14th May 2010;
- A late wet season survey conducted between the 28th March and 1st April 2011; and
- A targeted Northern Quoll (*Dasyurus hallucatus*) camera trap survey conducted during the breeding season between the 1st June and the 2nd July 2011.

3.2 Survey Methodology

A variety of survey techniques were used to provide a comprehensive assessment of fauna species occurring on the site. The trapping and fauna detection methods used were based on the standard biological survey methodology developed by the NSW Department of Primary Industries and Animal Research Review Panel, and approved by the Queensland Department of Environment and Resource Management (DERM) and the Queensland Department of Employment, Economic Development and Innovation (DEEDI) Animal Ethics Committee. Specifically the survey methodology was developed and undertaken in accordance with the following guidelines:

- Wildlife Survey Guidelines, NSW Department of Agriculture and NSW National Parks and Wildlife Service (recognised and recommended wildlife survey guidelines for Queensland use) including:
- Guideline 3 – General ethical considerations and wildlife surveys;
- Guideline 4 – Surveys of terrestrial and arboreal mammals;
- Guideline 5 - Surveys of bats;
- Guideline 7 – Surveys of birds;
- Guideline 8 – Surveys of reptiles and amphibians;
- ANZCCART Guidelines for the Euthanasia of Animals Used for Scientific Purposes; and
- Hygiene protocol for the control of disease in frogs (NSW National Parks and Wildlife Service).

Standardised early dry season fauna searches were conducted at a total 23 sites through the range of habitat types occurring in the study area, targeting signs of fauna species including visual observations, tracks, scats, nest sites, diggings, fur, feathers and remains (**Figure 2**). At six of the 23 sites, terrestrial fauna species were surveyed using the following methods: pitfall traps, Elliott traps and hair tubes (during the dry season only) (**Figure 3; Appendix A1**). Standardised late wet season fauna searches (timed, area searches for birds and reptiles) were conducted at an additional 29 sites (**Figure 2; Appendix A1**). A detailed description of the survey methods used is as follows:

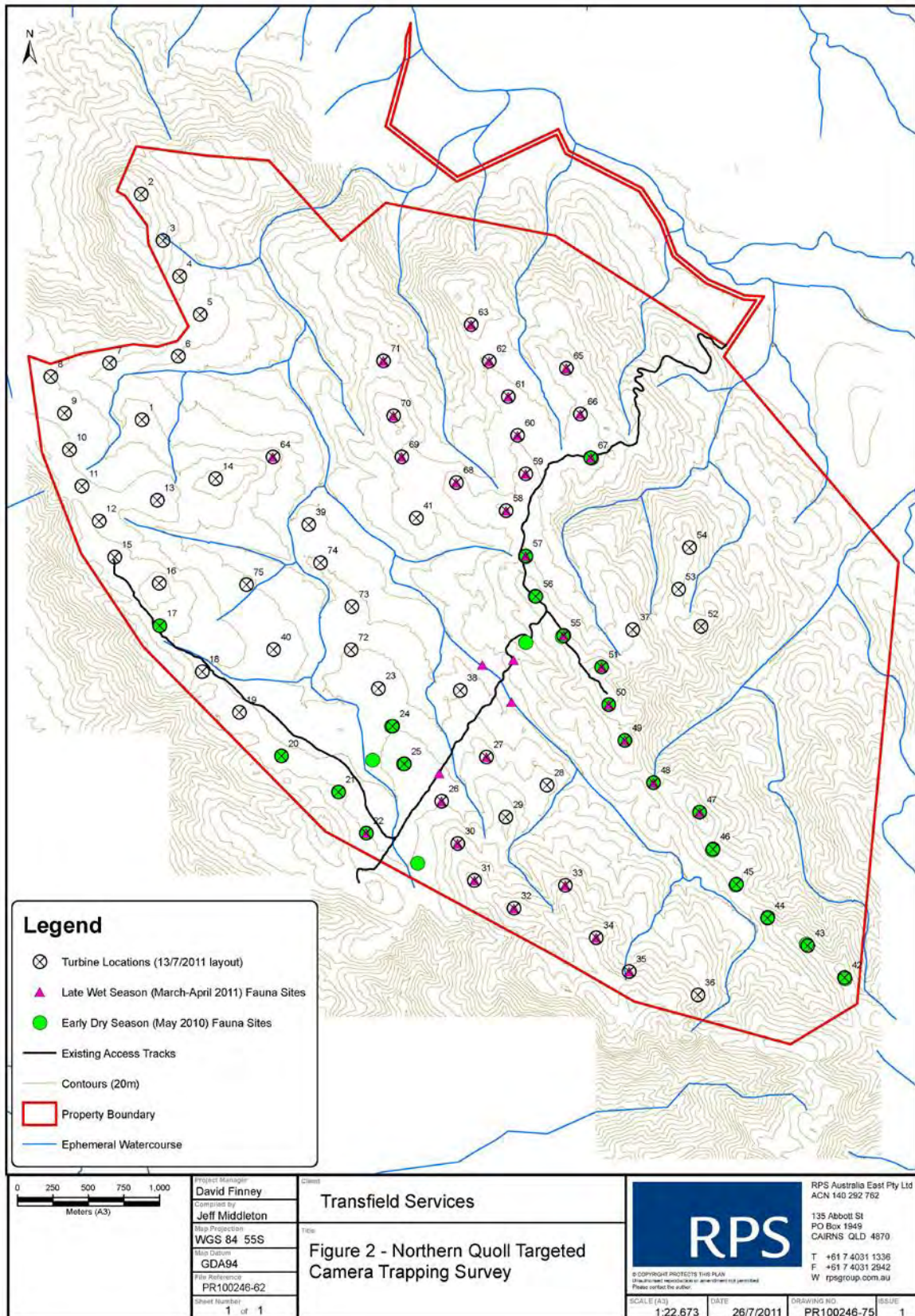


Figure 2. Fauna Survey Site Locations

3.2.1 Pitfall Trapping (May 2010 only)

Pitfall traps were established predominantly to sample for reptiles, amphibians and small mammals. Each pitfall trap line comprised one PVC bucket (200 mm diameter, 400 mm depth) set into the ground with the lip flush with the ground surface, and a 10 m long and 400 mm high drift fencing, also dug into the ground.

Two pitfall traps were established at three sites, set approximately 20 m apart, depending on the habitat, terrain and conditions at each site, with drift fencing positioned at right angles to each other. A total of six pitfall traps were established across three sites in the study area. Traps were checked twice daily in the early morning and late afternoon.

All pitfall traps were opened for four consecutive days and three consecutive nights.

3.2.2 Elliott Trapping (May 2010 only)

Elliott box traps (size A and B) were deployed at six survey sites. Trap-lines consisted of five traps, with the exception of the Granite Creek site which comprised 10 Elliott traps, spaced at approximately 10 m apart. These lines were installed approximately 20 m from and parallel to the pitfall traps. A small bait of peanut butter, rolled oats and honey was placed in Elliott traps as bait at some of the sites targeting small mammals, such as rodents. Pilchards were used to bait the remaining Elliott traps, targeting carnivorous mammals such as dasyurids.

All Elliott traps were left open during the day and night, and checked twice per day. All Elliott traps were opened for three consecutive days/nights, with the exception of Site 67, which were open for two consecutive nights only.

3.2.3 Funnel Trapping (May 2010 only)

One line comprising eight funnel traps was established along a small, first order drainage line close to the centre of the site. Funnel traps were used to target larger reptiles, specifically snakes. These traps were set along potential movement pathways, such as alongside fallen timber and piles of debris and through obvious animal runs in stream bank vegetation.

3.2.4 Harp Trapping (May 2010 only)

One harp trap was deployed for four consecutive nights across a potential flyway over the creek at the Granite Creek site. The trap was strategically placed to trap bats foraging over the water body or to capture bats coming down to drink along the creek. The harp trap was checked at approximately 1900 hours and 2230 hours each night, and 0545 hours each morning.

3.2.5 Microchiropteran Bat Call Detection (May 2010, March-April 2011, June-July 2011)

Microbat calls were sampled using Anabat SD1 (Titley Electronics, Ballina, NSW) and SM2BAT (Wildlife Acoustics, Concord, Massachusetts, US) electronic bat detectors.

During the early dry season surveys, passive monitoring was undertaken for four consecutive nights in the vicinity of the Granite Creek site, and an additional four consecutive nights of passive monitoring was undertaken on the ridge tops at both the southern and northern extents of the site, where some significant rock fissures could be observed during helicopter reconnaissance flights.

During the late wet season surveys (April 2011), passive monitoring using Anabat SD1 detectors was conducted for a single night at the following locations: turbine # 30, #26, #60, #56, #55 (April 2011 layout). At each site, monitoring commenced at dusk (approximately 1830 hours) and continued until dawn (approximately 0545 hours). Anabat units were attached to tree trunks and set ~2m above the ground. Active monitoring was conducted with an Anabat SD1 unit from a slow-moving vehicle travelling along the power line access track from the vicinity of turbine #67 to the south-eastern section of the property in the vicinity of turbine #22 and back again. The vehicle transect was surveyed on the 29th and 31st March.

Additional bat call monitoring was conducted between 1st June and 2nd July 2011 using SM2BAT detectors (Wildlife Acoustics, 2011). A stereo channel unit utilising two ultrasonic omnidirectional microphones was established at both of the existing test wind towers. The locations and microphone set-up used at each tower site was as follows:

- The 80 m tower located in the vicinity of turbine #50 with one microphone set at ~70 m and the other at 30 m above the ground.
- The 50 m tower located in the vicinity of turbine #15 with one microphone located at the top of the tower and the other at ~10 m above the ground).

The main aim of these additional wind tower bat surveys were to attempt to survey the bat species flying above the canopy and within the potential rotor strike zone, in particular the Bare-rumped Sheathail Bat (*Saccolaimus saccolaimus nudiclunatus*). The remaining three single-channel SM2BAT units were attached to tree trunks set at ~2 m above the ground at established in the vicinity of turbine #18, #38 and #56. All SM2BAT units were set to record continuously from sunset to sunrise for a period until either the battery or memory cards were used up. Analysis of microchiropteran bat calls was conducted by Greg Ford from Balance-Environmental, Toowoomba. Copies of the bat analysis reports are provided in **Appendix E1**.

3.2.6 Diurnal Bird Surveys (May 2010 & March-April 2011)

During the early dry season, diurnal audio-visual bird surveys were conducted at 20 of the 75 proposed turbine sites. While it is preferable that bird surveys be conducted within 2-3 hours after dawn to coincide with the period of highest bird vocalisations, site accessibility, the relatively large size of the property and logistical considerations meant that some surveys were conducted outside of this period. Surveys were undertaken by one observer walking slowly through an area of approximately 1 ha in the vicinity of the proposed turbine locations each accessible turbine site recording all bird species seen or heard. No attempt was made to determine estimates of individual species abundance.

During the late wet season, diurnal audio-visual birds surveys were conducted in the vicinity of 12 turbine locations. Bird surveys were conducted up to 2 ½ hours after dawn and consisted of a single observer walking randomly through an area of approximately 1 ha for 15 minutes recording all birds seen or heard.

3.2.7 Spotlighting (May 2010 & March-April 2011)

Spotlighting both on foot (using head torches and variable intensity spotlights) and by slow-moving vehicle (0-5 km/hr), was undertaken targeting reptiles, amphibians, bats, terrestrial and arboreal mammals and nocturnal birds.

During the early dry season, spotlighting surveys on foot were conducted along transects moving through accessible proposed turbine sites, and along the creek at the Granite Creek site, which represented the only accessible, semi-permanent source of fresh water within the study area. Several hundred metres were surveyed in a set time frame. Each foot survey was conducted in the first two hours after sunset, while spotlighting from a slow-moving vehicle generally occurred between 2000 hours and 2200 hours. One experienced observer conducted each survey. All sightings were recorded. During the late wet season, vehicle based spotlighting for nocturnal fauna was conducted on the 29/3/2011 along the power line access track between turbine #22 and #67

3.2.8 Owl Call Playback (March-April 2011)

Call playback of the following species (Barking Owl, Pacific Barn Owl, Masked Owl, Southern Boobook Owl and Grass Owl) using a Toa 15 W megaphone was undertaken at various sites along the power line access tracks during the active bat monitoring and spotlighting surveys. Each call was played for several minutes followed by a period of listening for responses and spotlighting in the immediate vicinity.

3.2.9 Active Searches

3.2.9.1 Dry Season

Active searches were undertaken at 18 sites (**Appendix A1**) and targeting reptiles and amphibians within the study area. This involved hand searches of suitable microhabitats, such as under bark, under and in fallen logs and timber, under rocks, in leaf litter, in and around termite mounds and in rock fissures and crevices. A minimum of 45 people-minutes of habitat searches were conducted at each site. It is noted that weather conditions for herpetofauna surveys was not optimal given the extended period of dry weather and cooler conditions preceding the survey.

3.2.9.2 Late Wet Season

Active searches were undertaken at a total of 12 sites (refer to **Appendix A1**). The methodology was similar to the dry season searches, except that two people searched for a period of 15 minutes (=30 people-minutes). Surveys were conducted during the warmer part of the day between 1000 and 1500 hours. Weather conditions were optimal for surveying reptiles, being largely warm and sunny.

3.2.10 Raptor Searches (March-April 2011)

During the March-April 2011 survey, searches for raptors were undertaken at four sites located on high ridges that afforded good unobstructed views of the surrounding area (**Appendix A1**). Raptor searches were conducted at each site for a minimum of 60 minutes and involved one or two observers scanning the surrounding area for soaring raptors.

3.2.11 Opportunistic Observations

Non-systematic sampling was conducted across all sites and throughout the remainder of the accessible survey area. The presence of all vertebrate species was recorded wherever and whenever possible. Opportunistic sampling included the following:

- Incidental sightings
- Secondary evidence - the presence of evidence or activity, including tracks, scats, pellets, scratches, diggings, burrows, dens and nests were recorded wherever and whenever possible.

3.2.12 Camera Trapping (Targeted Northern Quoll Survey)

A targeted survey for the endangered Northern Quoll (*Dasyurus hallucatus*) was conducted between 1st June and 2nd July 2011 in accordance with the requirements set out in the draft Northern Quoll EPBC Act 1999 referral guidelines (SEWPAC, 2011b).

Trap sites were selected largely on the basis of the latest proposed turbine layout provided by Transfield Services at the time of the survey. The impact sites were located within the immediate vicinity of the proposed turbine locations, which are located predominately along ridges (**Figure 3**).

The 59 'non-impact' sites were predominately located along ephemeral creek lines and were selected so as to cover as much of the site as possible (**Figure 3**).

Only one turbine location (c. UTM 55K 326533 8101046), that was added in the proposed turbine layout was not surveyed; however, a "non-target" camera trap was located only 137 m away in a nearby ephemeral creek line (**Figure 3**).

Camera traps were mounted to tree trunks at a distance of ~1.2 m above the ground and facing downwards at a raw chicken carcass firmly wired to a large rock or log or base of a tree.

Camera traps were set to be triggered for a period of 7 continuous nights. Images were downloaded and all fauna captured were identified to species where possible (all species except for smaller murid rodents). Identification of all individual Northern Quolls from comparison of spot patterns on captured images for the purposes of determining relative abundances was begun but it became apparent that this task would be very time consuming given the relatively high numbers of individuals captured at many of the camera trap locations examined. After consultation with SEWPAC, it was agreed that spatial occupancy data alone would be adequate.

4.0 Results

4.1 Habitat Assessment

The following faunal habitats were identified on the site:

- Dry sclerophyll woodland to open woodland with dominant species including *Eucalyptus cloeziana*, *E. portuensis*, *E. reducta*, *E. drepanophylla* (sens. lat.), *E. shirleyi*, *E. granitica*, *Corymbia leichhardtii*, *C. abergiana*, *C. lockyeri* subsp. *exuta*, *C. pachycalyx*, *C. clarksoniana*, *C. intermedia*, *C. citriodora*, *Allocasuarina littoralis* and *Callitris intratropica* with a grassy understory dominated by *Themeda triandra*. Occurs on ridges and flats throughout the site.
- Low shrub-land/heath land dominated by *Acacia calyculata* and *Jacksonia thesioides*. Occurs on ridges and flats throughout the site.
- Riparian zone vegetation with dominant species including *Lophostemon grandiflorus*, *Bursaria incana*, *Eucalyptus tereticornis*, *Diospyros* sp. A narrow, disjunct band occurs along ephemeral watercourses throughout the site.
- Riparian zone vegetation occurring along the lower reaches of Granite Creek adjacent to Kippen Drive with dominant species including *Eucalyptus tereticornis*, *E. grandiflorus* and *E. platyphylla*.

Faunal microhabitats identified as occurring throughout the site include:

- Dense grassy understory;
- Leaf litter;
- Exfoliating rock slabs, rock pavements, boulder piles and rock fissures;
- Standing living and dead tree hollows;
- Exfoliating bark;
- Termite mounds;
- Fallen dead timber; and
- Ephemeral pools (from <1 m diameter to >10 m diameter)

The site has a high overall degree of ecological integrity with few exotic plant species and minimal habitat modification or clearing associated with the power line easement and associated access tracks.

4.2 Fauna Species Occurrence

Based on the field assessment of habitat availability on the site and a review of existing sources of information on species distributions, a total of 379 species, comprising 27 amphibians (1 introduced), 189 birds, 92 mammals (8 introduced) and 81 reptiles were recorded within the site during the course of the field surveys or are predicted to occur on the basis of their known distributions and the confirmed presence of suitable habitat (**Appendix B1**).

Of the 46 fauna species of conservation significance predicted to occur on the site on the basis of known distributions and the confirmed presence of suitable habitat on the site, a total of 12 fauna species (including 10 birds and 2 mammals) were recorded during the field surveys (**Table 1**).

The EPBC Protected Matters Report and the DERM Wildlife Online searches for the region within a 10 km buffer of the site produced 38 fauna species (2 critically endangered, 12 endangered, 9 vulnerable and 16 migratory) listed under the EPBC Act 1999, and 33 species (10 endangered, 9 vulnerable and 13 near-threatened) listed under the Queensland *Nature Conservation Act 1992* (**Appendix C1 & D1**). However the search area for the EPBC Protected Matters Report and the DERM Wildlife Online searches comprising a 10 km buffer around the site boundaries and around the centroid of the site, includes several fauna habitats not occurring on the site including large, artificial, permanent water bodies, such as Nardello's Lagoon and Lake Tinaroo, as well as areas of upland notophyll vine forest and wet sclerophyll forest occurring south of the site near Mt Emerald.

A total of 21 fauna species, comprising mostly obligate rainforest species and water birds, returned by the EPBC Protected Matters Report and the QLD DERM Wildlife Online search are not considered as being likely to utilize the site for foraging, nesting or roosting due to a lack of suitable habitats, that is, rainforest and permanent wetlands with aquatic macrophytes. Areas of mapped wetland occur along the Granite Creek directly adjacent to site along the Kippen Drive access and along Oaky Creek to the west, which may provide a small amount of potential habitat for water birds. Water birds may potentially fly over the site while moving between areas of suitable habitat and therefore could be impacted by the proposed wind farm. Further research is required to quantify the frequency of any such fly-over movements and to determine any potential impacts on waterbirds.

Table 1. List of fauna species of conservation significance recorded or predicted to occur on the site

Family	Common Name	Scientific Name	Status		Likelihood of Occurrence
			EPBC	NCA	
BIRDS					
Accipitridae	Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	M		Recorded
Accipitridae	Brown Goshawk	<i>Accipiter fasciatus</i>	M		Recorded
Accipitridae	Grey Goshawk	<i>Accipiter novaehollandiae</i>	M	NT	Possible
Accipitridae	Wedge-tailed Eagle	<i>Aquila audax</i>	M		Recorded
Accipitridae	Pacific Baza	<i>Aviceda subcristata</i>	M		Possible
Accipitridae	Swamp Harrier	<i>Circus approximans</i>	M		Possible
Accipitridae	Spotted Harrier	<i>Circus assimilis</i>	M		Possible
Accipitridae	Black-shouldered Kite	<i>Elanus axillaris</i>	M		Possible
Accipitridae	Letter-winged Kite	<i>Elanus scriptus</i>	M		Possible
Accipitridae	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	M		Recorded
Accipitridae	Brahminy Kite	<i>Haliastur indus</i>	M		Possible
Accipitridae	Whistling Kite	<i>Haliastur sphenurus</i>	M		Recorded
Accipitridae	Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	M		Possible
Accipitridae	Little Eagle	<i>Hieraaetus morphnoides</i>	M		Recorded
Accipitridae	Square-tailed Kite	<i>Lophoictinia isura</i>	M	NT	Possible
Accipitridae	Black Kite	<i>Milvus migrans</i>	M		Possible
Apodidae	Fork-tailed Swift	<i>Apus pacificus</i>	M		Possible
Apodidae	White-throated Needletail	<i>Hirundapus caudacutus</i>	M		Possible

Family	Common Name	Scientific Name	Status		Likelihood of Occurrence
			EPBC	NCA	
Ardeidae	Great Egret	<i>Ardea alba</i>	M		Possible
Ardeidae	Cattle Egret	<i>Ardea ibis</i>	M		Possible
Dicruridae	Satin Flycatcher	<i>Myiagra cyanoleuca</i>	M		Possible
Dicruridae	Rufous Fantail	<i>Rhipidura rufifrons</i>	M		Recorded
Falconidae	Brown Falcon	<i>Falco berigora</i>	M		Recorded
Falconidae	Nankeen Kestrel	<i>Falco cenchroides</i>	M		Recorded
Falconidae	Grey Falcon	<i>Falco hypoleucos</i>	M	NT	Possible
Falconidae	Australian Hobby	<i>Falco longipennis</i>	M		Possible
Falconidae	Peregrine Falcon	<i>Falco peregrinus</i>	M		Possible
Falconidae	Black Falcon	<i>Falco subniger</i>	M		Possible
Fringillidae	Gouldian Finch	<i>Erythrura gouldiae</i>	E, M	E	Possible
Fringillidae	Star Finch (eastern)	<i>Neochima ruficauda ruficauda</i>	E	E	Possible
Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	M		Possible
Meropidae	Rainbow Bee-eater	<i>Merops ornatus</i>	M		Recorded
Turnicidae	Buff-breasted Button-quail	<i>Turnix olivii</i>	E	V	Possible
Zosteropidae	Silvereye	<i>Zosterops lateralis</i>	M		Possible
MAMMALS					
Dasyuridae	Northern Quoll	<i>Dasyurus hallucatus</i>	E	E	Recorded
Emballonuridae	Bare-rumped Sheath-tail Bat	<i>Saccolaimus saccolaimus nudiclunatus</i>	CE	E	Possible
Emballonuridae	Troughton's Sheath-tail Bat	<i>Taphozous troughtoni</i>		E	Possible
Hipposideridae	Diadem Leaf-nosed Bat	<i>Hipposideros diadema reginae</i>		NT	Recorded
Hipposideridae	Semon's Leaf-nosed Bat	<i>Hipposideros semoni</i>	E		Possible
Megadermatidae	Ghost Bat	<i>Macroderma gigas</i>		V	Possible
Pteropidae	Spectacled Flying-fox	<i>Pteropus conspicillatus</i>	V	V	Possible
Rhinolophidae	Large-eared Horseshoe Bat	<i>Rhinolophus philippinensis maros</i>	E	E	Possible
REPTILES					
Elapidae	Common death adder	<i>Acanthophis antarcticus</i>		NT	Possible
Elapidae	Yellow-naped snake	<i>Furina barnardi</i>		NT	Possible
Scincidae	Yakka skink	<i>Egernia rugosa</i>	V	V	Possible
Typhlopidae	Faint-striped blind snake	<i>Ramphotyphlops broomi</i>		NT	Possible

E-Endangered, V-Vulnerable, NT-Near Threatened, M-Migratory

4.2.1 Mammals

A total of 26 species of mammals were recorded on the site during the field surveys and an additional 48 species are predicted to occur on the site on the basis of their known distributions and the confirmed presence of suitable habitat and microhabitats (**Appendix A1**).

4.2.1.1 Mammals of Conservation Significance

Two mammal species of conservation significance were recorded during the field survey and an additional six mammal species are predicted as being likely to occur on the site (**Table 1**).

Northern Quolls (*Dasyurus hallucatus*) are listed as endangered under both the EPBC Act 1999 and the QLD NCA 1992. The results of extensive targeted camera trapping survey indicate that *D. hallucatus* is abundant and widespread across the site, with images captured at 88 of the 131 camera trap sites (43 impact sites and 45 non-impact creek line sites) (**Figure 3; Plate 1**).

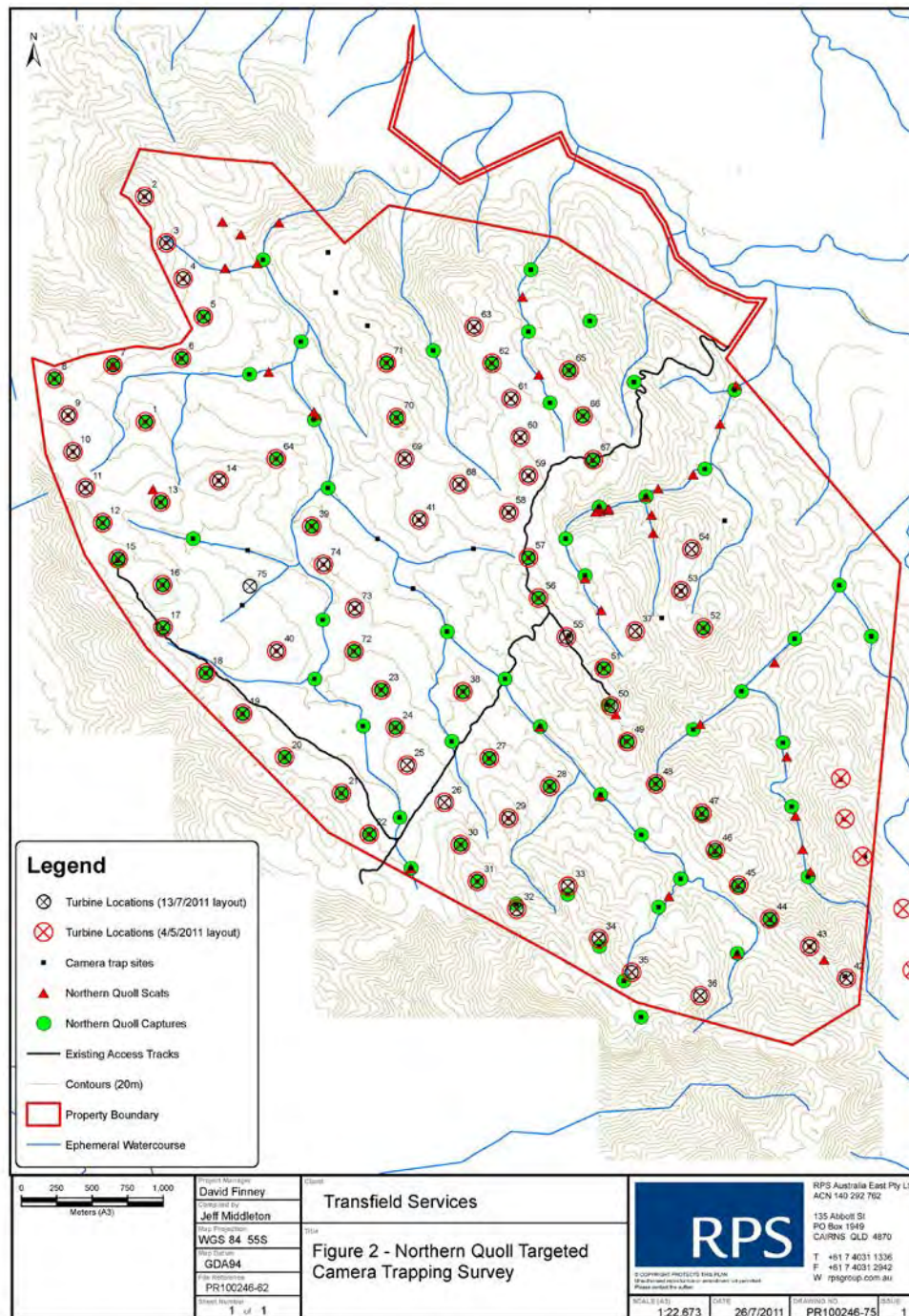


Figure 3. Targeted Northern Quoll Camera Trap Survey Sites



Plate 1. One of the many Northern Quolls (*Dasyurus hallucatus*) captured on an infrared camera trap during the targeted surveys.

The Diadem Horseshoe Bat (*Hipposideros diadema reginae*), listed as near-threatened under the NCA 1992 was positively confirmed to occur on the site from single call recorded during the May 2010 field surveys.

Two calls (out of a total of 1091 detected calls; 0.002% of total) were detected that may have belonged to the Bare-rumped Sheath-tail Bat (*Saccolaimus saccolaimus nudiclunatus*) were recorded in the vicinity of turbine #30 and turbine #38. This high flying species is listed as critically endangered under the EPBC Act and endangered under the NCA. However, it was not possible to differentiate these calls from that of two other high flying species: the Yellow-bellied Sheath-tail Bat (*S. flaviventris*) and Troughton's Sheath-tail Bat (*Taphozous troughtoni*), which is listed as endangered under the NCA.

The Spectacled Flying-fox (*Pteropus conspicillatus*), which is listed as vulnerable under both the EPBC and NCA was not recorded, however is considered to potentially forage on the site during mass flowerings of myrtaceous plant species.

No Ghost Bats (*Macroderma gigas*), listed as vulnerable under the NCA, were recorded during the surveys nor were any potentially suitable roosting sites (caves, mines, boulder piles) were observed on the site. However, potential roost areas may occur within or immediately adjacent to the site (e.g. large granite boulder piles located ~ 2 km to the north) and the site provide foraging habitat for this species. There are sporadic records of *M. gigas* known from the surrounding Atherton Tablelands region (e.g. Black Mountain, Mt Carbine, and Mt Molloy) (J. Middleton, pers. obs)

The Large-eared Horseshoe Bat (*Rhinolophus philippinensis maros*), listed as endangered under both the EPBC and NCA, is known to roost in caves and disused mines and may also roost in dense vegetation and tree hollows (Churchill, 2009). Although no Large-eared Horseshoe Bats were recorded during the survey, suitable roosting and foraging habitat (open woodland and rainforest) are present on or adjacent to the site so it is considered possible that this species may be present on the site. Similarly, although Semon's Leaf-nosed Bat (*Hipposideros semoni*), which is listed as endangered under the EPBC, was not recorded during the surveys, it is known to occur in open savannah woodland and roost in tree hollows and caves (Churchill, 2009) and could therefore potentially occur within the site.

4.2.2 Birds

A total of 56 species of birds were recorded on the site during the field surveys and an additional 140 species are predicted as being likely to occur within the site on the basis of their known distribution and the confirmed presence of suitable habitats and microhabitats on the site (Appendix B1). The most commonly encountered species included Pied Currawongs, Helmeted Friarbirds, Pied Butcherbird, Grey Butcherbird, Weebill, Noisy Miner, Australian Magpie, Brown Treecreeper, Rainbow Bee-eater, Wedge-tailed Eagle, Brown Falcon, Australian Kestrel, Rainbow Lorikeet and Pale-headed Rosella. A total of 99 species, consisting mostly of water birds, are not considered likely to utilize the site for roosting, nesting or foraging habitats due to the lack of large areas of suitable wetland or rainforest, habitats, however, the potential exists for them to fly over the site while moving between surrounding suitable habitats (**Appendix B1**).

4.2.2.1 Birds of Conservation Significance

A total of 10 bird species of conservation significance were recorded on the site during the field surveys and an additional 24 species are predicted to occur on the site on the basis of their known distribution and the confirmed presence of suitable habitats and microhabitats on the site (**Table 1**). The majority of the conservation significant species that were recorded or are likely to occur on the site are listed as migratory species under the EPBC, including all 20 of the raptor species (**Table 1**).

4.2.3 Reptiles

A total of 20 species of reptiles were recorded on the site during the three field survey periods and a further 66 species are predicted as being likely to occur within the site on the basis of their known distribution and the confirmed presence of suitable habitats and microhabitats on the site (**Appendix B1**). The most commonly encountered reptiles including *Carlia jarnoldae*, *Oedura coggeri*, *Gehyra dubia* and *Diporiphora australis*.

4.2.3.1 Reptiles of Conservation Significance

No reptile species of conservation significance were recorded on the site during the field surveys. Four species are predicted to occur on the site on the basis of their known distribution and the confirmed presence of suitable habitats and microhabitats on the site (**Table 1**).

4.2.4 Amphibians

A total of six frog species and the introduced Cane Toad (*Rhinella marina*) were recorded during the field surveys and a further 20 species are considered likely to occur on the site on the basis of their known distribution and the confirmed presence of suitable habitats and microhabitats on the site

(Appendix B1). The most commonly encountered amphibians were the introduced Cane Toad (*Rhinella marinus*) and *Litoria rubella*.

4.2.4.1 Amphibians of Conservation Significance

No frog species of conservation significance are predicted as being likely to occur on the site.

4.3 Potential Faunal Movement through the Landscape

To date, there has been little research documenting the large-scale migratory movements of birds along the east coast of Australia or the local-scale or regional movements of birds within the Atherton Tablelands. The site forms part of the Great Dividing Range which may potentially lie along of the flight path of some EPBC listed migratory bird species.

The site is surrounded to the west, north and east by irrigated agricultural lands with scattered large artificial water bodies, such as Nardello's Lagoon and Lake Tinaroo and QLD DERM mapped important wetland areas along Granite Creek and Oaky Creek. Given the location of the site with respect to these known habitats, the site could potentially lie within the flight path of several species of conservation dependant water birds as they move across the landscape between suitable foraging or roosting habitats. However, there is no local data on the flight paths of water birds.

The Atherton Tablelands is an important over-wintering site for the significant populations of two species of Australian Cranes, the Brolga and the Sarus Crane. Sarus Cranes, which are globally and nationally vulnerable are known to fly down from the southern Gulf of Carpentaria region to the Atherton Tablelands and may fly over the site due to it's proximity to suitable irrigated agricultural and wetlands, numerous Sarus Cranes feeding and roosting sites have been recorded within short flight distances of the site (Elinor Scrambler, Oz Cranes, pers. com.).

Further investigations would be required to clarify the movement patterns (height, frequency, number of individuals etc) of conservation significant bird species that may potentially fly over the site

5.0 Potential Faunal Impacts

The proposed wind farm project may have the following impacts on fauna:

- rotor strike and barotrauma (microchiropteran bats only) (operation phase),
- habitat alienation caused by fauna species avoidance of the turbines due to visual or noise impacts (operation phase),
- habitat modification resulting from clearing for infrastructure, changes in fire regime and weed invasion (construction and operation phase),
- concentration of predation by feral predators along new access tracks (construction and operation phase), and
- changes in fire regime associated with potential weed invasion or increased risk of anthropogenically ignited fires.

Notwithstanding the above, a range of mitigation measures and further pre-construction studies are proposed to offset or minimise potential impacts.

5.1 Turbine Collisions and Barotrauma

5.1.1 Bird & Bat Collisions

Research both in Australia and overseas indicates those groups of birds at most risk of collisions with turbine blades, towers and nacelles are:

- Wetland birds that form large flocks (e.g. ducks, ibis, Magpie-geese etc);
- Migratory birds that follow defined flight paths;
- Night-flying birds (e.g. owls, nightjars, frogmouths);
- Raptors; and
- Species that flock and fly above the tree canopy (e.g. lorikeets, wood-swallows, swifts etc.) (SEWPAC, 2009).

Relatively little published research has been conducted on assessing the risk of bird and bat collisions with wind turbines in Australia. Statistical modelling of collision risk modelling for a range of Australian bird species to date indicates that mortalities are typically low (Smales, 2005; Smales and Muir 2005; Smales, 2006). Overseas research has established that even collision-prone bird species avoid collisions with wind turbines on most occasions, with measured avoidance rates for a variety of bird species ranging from 100% (Percival, 1998) to 98% (Winkelman, 1992; Still *et al.*, 1995). Australian studies conducted at the Codrington Wind Farm have so far demonstrated a 95-100% avoidance rate (Meredith *et al.*, 2002). Data over the longer-term is likely to be consistent with that from overseas with avoidance rates for some species being less than 100%, but still very high, possibly 98% (Meredith *et al.*, 2002). Mortality rates documented for Australian wind farms sited predominately in cleared agricultural settings typically average collision rates between <1 to 4 birds per turbine per year (BLA, 2005).

Resident birds may learn to show a degree of habituation and ability to avoid turbines, which does not however, eliminate the risk of turbine collision entirely. Vacancies in free territories caused by death of residents may be filled by turbine naïve adult “floaters” and dispersing juveniles, both of which are likely to be at a higher risk of mortality than turbine habituated residents, thereby creating a potential

population 'sink effect'. This sink effect may be especially relevant for large, territorial raptors such as Wedge-tailed Eagles, and could potentially lead to long-term declines in the local populations.

A number of bird species were recorded or are predicted to occur on the site that belong to those groups identified as being at risk of collisions. Previous Australian wind farm assessments, suggest that it is unlikely that the proposed wind farm will result in a significant impact to any of the bird species at a regional or national scale, although some species may potentially experience a reduction in their local populations as a result of turbine strike.

Flying-foxes have the potential to be at risk from turbine collisions because they regularly fly within the proposed wind turbine rotor strike zone and often fly in large aggregations. Flying fox populations have a "low capacity for increase and depend on low levels of natural mortality and high survival rates of adults to maintain stable population levels" (TSSC, 2007). Little information is available on the risks posed by wind farms to flying foxes in Australia as most wind farms have been located away from flying-fox roosts or foraging areas. Although no flying foxes were recorded during the survey, it is highly likely that three species, including the Spectacle Flying-fox (*Pteropus conspicillatus*), listed as vulnerable under the EPBC will forage seasonally within the site (David Westcott, CSIRO, pers. com.). The nearest confirmed *P. conspicillatus* roost sites are located at Tolga Scrub, only approximately 9 km to the SW, and in Mareeba, approximately 20 km to the north. Spectacled Flying-foxes are known to travel at least 20 km from their roost sites to feed in dry sclerophyll woodlands and forests on blossoms and nectar of *Eucalyptus*, *Corymbia* and *Melaleuca* species (Parsons, *et al.*, 2007). Myrtaceous species typically undergo mass flowering and are likely to represent an easily locatable, densely distributed and super-abundant food resource for *P. conspicillatus* (Parsons, *et al.*, 2007), in addition to *P. scapularis* and *P. alecto*.

Additional utilisation surveys conducted during periods of mass flowering of the various Myrtaceous species (typically August-September but likely to be substantial variation amongst dominant species (S. Gleed, pers. com.)), would be required in order to quantify the potential risk of turbine strike on flying-foxes.

5.1.2 Barotrauma

Recent overseas research indicates that inappropriately sited wind farms have caused significant microchiropteran bat mortality, mostly amongst high-flying or migratory species (Arnett *et al.*, 2011). The major cause of bat deaths has been shown to be due to *barotrauma*, that is, damage to the lungs caused by changes in air pressure near the moving blades, rather than direct turbine collisions (Kunz *et al.*, 2007). There is a significant lack of information on the population dynamics of most Australian microchiropteran bat species, therefore the context and influence of any wind-turbine related fatalities remains uncertain. Some bat deaths have been reported from wind farms in Australia for example, occasional deaths of the White-striped Freetail Bat have been reported at Codrington Wind Farm in Victoria (BIOSIS, 2005b). Wind farms could potentially have cumulative effects on bat populations, partly because bats are typically relatively long-lived for their size, have low reproductive rates compared to other mammals (Findley, 1993) and tend to make slow recoveries after declines (Arnett *et al.*, 2011). Previous wind farm assessments in Victoria indicate that the rate of bat collisions is between 1 and 4 bats per wind farm per year (BLA, 2008).

Most of the microchiropteran bat species recorded during the surveys or predicted to occur on the site are known to forage predominately below the canopy with the exception of *Chaerephon jobiensis*, *Saccolaimus flaviventris*, *Taphozous troughtoni* and *Saccolaimus saccolaimus nudicluniatatus*, which are all high flying species that forage predominately above the canopy (Churchill, 2009). However, the surveys using ultrasonic bat detectors set up the test wind towers within the rotor strike/barotrauma

zone (one microphones set at 70 m for 4 nights, one at 30 m for 3 nights and one at 30 m for 4 nights) confirmed the presence of at least three common bat species, including *Chaerephon jobiensis*, *Austronomus australis* and *Miniopterus orianae*.

In addition, a total of 67 unidentified bat calls were detected within the potential rotor strike/barotrauma zone. These unidentified calls could potentially have belonged to any of the bats recorded during the surveys (refer **Appendix E1**). It should be noted that there is a degree of uncertainty as to the detection range of the ultrasonic microphones and thus, the approximate height that the bats were flying at, as this depends upon a range of factors including the frequency of the particular species call, the humidity and the presence of mist. However, it is reasonable to assume that at least some of the detected bat calls, including from some of the species recorded from detectors set at 2 m above the ground were from bats flying within the potential rotor strike/barotraumas zone.

Further utilisation studies involving active call detection and visual estimation of flying heights would be required to quantify the potential barotrauma mortality risk of the proposed wind farm on the bat species recorded or predicted as possibly occurring within the site, in particular the five threatened species (Table 1).

5.2 Habitat Alienation due to Turbine Avoidance

Certain overseas research indicates that one of the most commonly reported impacts of wind farms on fauna is the displacement of birds away from the vicinity of turbines, due to noise and/or visual disturbances (Sharp, 2010). Studies have reported displacement effects ranging from 75 m to as far as 800 m away from turbines (Strickland, 2004). Avoidance behaviour is likely to reduce the risk of bird mortality due to rotor strike, but may affect populations where the alienated habitats are important to the survival of the affected species. There has been little published research investigating avoidance behaviour of fauna groups other than birds.

The degree of disturbance to bird communities, and potentially other fauna groups, due to avoidance behaviour is likely to be influenced by the following factors (Sharp, 2010):

- The number, spatial arrangement and type of turbines
- The species composition of the bird community
- The seasonal pattern of habitat use by species
- The availability of alternative habitat

Displacement of a fauna species from an area around wind turbines may effectively result in a degree of habitat loss and a reduction in carrying capacity of the site for sensitive species. Avoidance behaviour may also lead to a linear barrier effect where turbines are located in linear arrays, such as along ridges as is proposed for Mt Emerald, where the spatial proximity of turbines exceeds the zone of disturbance for a particular species. Alienation of important habitat such as updraft areas above ridge lines may have important impacts on soaring raptors.

It is not clear to what extent the fauna species on the project site, particularly those species of conservation significance, may be affected by the avoidance of turbines as there have been no comprehensive peer-reviewed investigations of avoidance behaviour and distances for any fauna species made at any wind farm in Australia (Smales, 2006). It is possible that species that rely upon hearing to detect prey or predators (e.g. quolls and owls) may avoid the area immediately beneath the turbines due to the elevated noise levels or be subject to higher levels of predation. .

5.3 Habitat Modification

The construction of access tracks (37.2 km: 37.2 ha footprint), turbine pads (75 of 30 m x 40 m: 9.0 ha footprint) and electricity substation (1 ha footprint) will result in the disturbance of approximately 20 ha (temporary) and 27.6 ha (permanent) of remnant vegetation, although this figure is indicative only and is likely to be subject to alteration depending upon the final layout of the proposed turbines. Although the proposed total clearing footprint only represents approximately 1.9% of the total area of the site, the majority of the clearing is concentrated along rocky ridgetop and mid slope habitats which may be utilised preferentially by some fauna species as foraging, nesting or roosting habitats. It should be noted that turbine pad clearings will be rehabilitated post construction and 50% of the initial cleared area of access tracks will be rehabilitated.

Some individuals belonging to ground-dwelling and tree hollow-dwelling species are likely to be directly killed as result of the clearing of habitat during the construction phase. Conservation significant fauna recorded or predicted to occur within the site that could potentially be directly impacted by habitat clearing includes the Northern Quoll, Yakka Skink (*Egernia rugosa*), a blind snake (*Ramphotyphlops broomi*), the Yellow-naped Snake (*Furina barnardi*), Gouldian Finch and Bare-rumped Sheath-tail Bat (*Saccolaimus saccolaimus nudiclunatus*).

It is not certain what the long-term impacts of clearing ridge-top habitats would be to the local populations of the threatened species recorded or predicted as possibly occurring within the site. If the ridge-top habitat provides essential nesting/roosting/denning/foraging habitat for some species, e.g. complex rocky fissures and boulder piles for Northern Quolls, it is possible that the loss of some of this habitat may result in a permanent reduction in the carrying capacity of the site for those species. The importance of these areas is currently not clear. For species that are listed as endangered or critically endangered, the loss of small amounts of critical habitats may have a disproportionate impact on their local populations. The indirect impacts of habitat clearing on some fauna species, in particular the loss of foraging habitat, may decline over time with rehabilitation for cleared areas, but this is unlikely to be the case for the destruction of complex rocky fissures or boulder piles and of large tree hollows, which may take decades to form. Direct and indirect impacts of habitat clearing on fauna could potentially be ameliorated to some extent through the implementation of appropriate mitigation strategies (see section 6.0).

Connectivity is the “linkages of habitats, communities and ecological processes at multiple spatial and temporal scales” (Noss, 1991 in Lindenmayer & Burgman, 2005). Landscapes which retain more connections between remnant habitats are assumed to be more likely to maintain populations of species (Lindenmayer & Burgman, 2005). Connectivity is species-specific because it depends on a number of life history factors of the species (including dispersal behaviour and mode of movement) and their interaction with landscape patterns (Lindenmayer & Burgman, 2005). Clearing can often result in the habitat fragmentation through creation of barriers to the movement of individuals between faunal populations (i.e. disruption to habitat connectivity). The dry sclerophyll fauna recorded or predicted to occur on the site is either highly mobile, or well adapted to the presence of open ground, therefore, the relatively small amount of proposed habitat clearing is unlikely to cause any significant changes to connectivity to habitats on the site and thus to the movement of fauna species within the site.

During the construction phase, the creation of dust, noise, vibration and activity associated with the construction of access tracks, turbine pads, underground cable lines and the electricity substation may temporally disturb susceptible fauna species which could potentially result in their displacement from the immediate vicinity of the works for the duration of the disturbance. However, this is unlikely to have a significant long-term impact on any species.

In the absence of a comprehensive weed management programme, there exists the potential for invasive grasses including Gamba Grass (*Andropogon gayanus*), Thatch Grass (*Hyparrhenia rufa*), Guinea Grass (*Megathyrsus maximus* var. *maximus*) and Grader Grass (*Themeda quadrivalvis*) to be carried onto the site on construction machinery and other vehicles and spread along access tracks and in the vicinity of turbine clearings, particularly during the construction phase of the project. These exotic grasses can readily invade undisturbed dry sclerophyll woodland habitat away from road verges and clearings and can significantly increase the frequency, intensity and extent of fires due to their elevated fuel loads compared to existing native grasses. Effective control of these grasses would be difficult if they spread away from access tracks and clearings due to the rugged terrain. Changes in fire regime, particularly an increase in the frequency and intensity of late dry season fires, has been identified as a potentially threatening process under the EPBC Act for several conservation significant fauna species that occur or are predicted to occur on the site including the Gouldian Finch, Black-throated Finch, Yakka Skink and Northern Quoll. The risk of weed invasion is currently present on the site due to unregulated public access and the regular maintenance of the power transmission access tracks by Powerlink. Effective construction and post construction phase weed monitoring, control and management will therefore be critical to the maintenance of fauna biodiversity on the site.

5.4 Increased Predation Risk Adjacent to Access Tracks

Access tracks are known to be used preferentially for hunting by introduced predators including feral cats and dingo's or wild dogs. Although feral predators are known to currently occur throughout the site, the construction of an additional 37.2 km of access tracks may potentially result in elevated levels of predation of susceptible fauna, including Northern Quolls, ground-dwelling reptiles and ground-nesting birds, by foxes, cats and wild dogs along ridge habitats where the proposed access tracks and turbine clearings will be concentrated, unless appropriately managed

5.5 Potential Impacts on the Endangered Northern Quoll

The targeted camera trapping survey indicates that Northern Quolls are widely distributed across the majority of the site and appear to be in relatively high numbers. Given the precipitate decline of Northern Quolls through most of their former range following invasion by Cane Toads (e.g. Cape York and Northern Territory), the potentially large population of Northern Quoll within the site is likely to be an "important population" as defined under the EPBC Act 1999, that is, a "population that is necessary for the species' long-term survival and recovery" and a "key source population for either breeding or dispersal". Rocky areas, such as those occurring on the site predominantly along the ridge lines, throughout the Northern Quoll distribution are known to be important refugial areas for the species (SEWPAC, 2011a). In particular, Northern Quolls are known to frequently den in rocky boulder piles, often at the highest points of hills or outliers (Oakwood, 1997).

Northern Quolls are sedentary with a moderately large home range with female home ranges known to average 35 ha and male home ranges covering 100ha or more during the breeding season (SEWPAC, 2011a). Northern Quolls reproduce once per year and have on average seven young; however they have a short lifespan with most males and females usually only surviving approximately one year (SEWPAC, 2011a). In rocky habitats, both sexes can have longer life spans (2-3 years) (Oakwood, 1997).

This species exhibits highly synchronous mating which begins between in the mid-dry season (May-July) (Oakwood, 1997). Young start to eat insects at four months old, (Oakwood, 1997) and leave the den to forage at five months old, whilst still suckling from their mother. Juveniles are weaned at 6 months old, in November to early December (Oakwood, 1997). Females wean two to three young which become reproductively mature at 11 months (Oakwood, 1997). Young are left in the den when

they are eight to nine weeks old, in late August or September (Braithwaite & Begg, 1995), whilst the mother forages at night (Oakwood, 1997). Females have been shown to utilize between 20-55 different dens and move their dependant young between dens frequently (Oakwood, 1997). Mortality of young is highest during the denning stage; although it seems likely that the main cause is predation by feral cats, pythons and owls, it is unclear whether this mainly occurs in the den or during transit between dens (Oakwood, 1997).

The intense physical effort of male quolls (roving during the breeding season) appears to cause the physiological decline of most males and their subsequent die off, which is unique in a mammal of this size (SEWPAC, 2011a). These unusual life history traits can exacerbate the effects of population decline and habitat loss, and make recovery of population very slow (SEWPAC, 2011a). Management of the potential direct and indirect impacts of habitat clearing, disturbance due to noise, dust and vibration, increased predation rates and changes in fire regime will be essential to ensure that this important population is not adversely impacted by the proposed development.

6.0 Potential Mitigation Options and Further Work

6.1 Rotor Strike/Barotrauma

The most effective potential strategy to reduce the potential impact of rotor strike and/or barotrauma on susceptible bird and bats species would be to relocate turbines away from areas of high bird/bat utilization (e.g. ridges in the case of soaring raptors) to areas of lower utilization. As previously mentioned, the potential risk of rotor strike and/or barotrauma for susceptible bird and bat species identified could not be assessed at the site with a high degree of certainty based on the preliminary studies conducted to date.

An accurate quantitative assessment of the risk posed by the proposed wind farm to birds and bats would require well designed, spatially and temporally replicated utilisation studies to be conducted prior to construction. Bird and bat utilisation studies would require sufficient temporal replication to take into account seasonal differences in utilisation rates.

Additional bat utilisation surveys involving a combination of active ultrasonic call detection surveys together with either spotlighting or thermal imaging video to determine the numbers and species of bats flying within the potential barotrauma zone should be conducted within the vicinity of all of the proposed turbine locations. This would enable a more informed assessment of the risks associated with rotor strike or barotrauma than would be possible through the use of passive ultrasonic call detection alone.

A post-construction monitoring programme of bird and bat mortality due to collisions/barotrauma would allow the determination of the impacts of the wind farm on bird and bat species that utilise the site and to help develop appropriate adaptive mitigation measures such as turning specific turbines off during periods of high mortality.

One potentially highly effective strategy to reduce the impact of barotrauma on microchiropteran bats that has been identified to date is to raise the wind-turbine cut-in speed, defined as the lowest wind speed at which turbines generate power to the utility system. Recent research from a single wind farm in the US, suggests that reducing turbine operation during periods of low wind speed resulted in nightly reductions in bat mortality, from between 44% to 93%, with minor annual losses of $\leq 1\%$ of total output (Arnett *et al.*, 2011). Bat activity at a proposed wind farm site in Leonard's Hill in Victoria showed a 50% reduction when wind increased from 3-3.9 m.s⁻¹ to 5-5.9 m.s⁻¹ (Richards, 2011) which indicates that a reduction in cut-in-speed could also be an effective mitigation strategy for Australian bat species.

Further long-term surveys using ultrasonic call detection and thermal imaging set up the two existing test wind towers within the potential rotor strike/barotrauma zone to examine the relationship between wind speed and bat activity to be examined would enable the effectiveness of increasing turbine cut-in speeds to reduce bat mortality to be assessed.

6.2 Habitat Modification

The following general recommendations are proposed for areas to be cleared to reduce the impacts on susceptible fauna:

- survey of vegetation including locating, recording and marking specific habitat features (e.g. hollows, hollow bearing trees, hollow-bearing limbs, complex rock fissures and boulder piles);

- inspection of habitat features to identify resident fauna species for relocation;
- development of appropriate capture and release methods (depending on observed fauna);
- identification of appropriate release areas for the relocation of fauna species prior to clearing; and installation of temporary artificial nest/retreat sites such as nest boxes and hollows adjacent to the area proposed to be cleared before clearance.
- cleared vegetation to be stockpiled (not burned);
- All stockpiled vegetation(including any hollow tree trunks) to be respread over cleared area after turbine construction; and
- Re-creation of boulder piles in cleared turbine sites and along track verges where possible

As a preference, (i.e. where access to trees by an excavator is safe and practical), clearing of hollow bearing trees is recommended to be performed in a two stage process where surrounding vegetation is cleared one day before the removal of habitat trees to allow fauna an opportunity to move. Where the removal of hollow bearing trees cannot be avoided, it is preferable that the clearing operation is performed by careful felling and leaving felled trees in situ for a suitable period to allow fauna an opportunity to escape. A minimum of 24 hours would be ideal, especially in the case of nocturnally active animals. The loss of critical tree-hollows and complex rocky outcrops and fissures could potentially be partially offset by the provision of artificial roosting/nesting/denning habitat adjacent to the cleared footprint.

It is recommended that prior to construction, targeted surveys of the proposed clearing footprint be undertaken for the following ground-dwelling species of conservation significance that are predicted as possibly occurring on the site on the basis of their known distribution and the confirmed presence of suitable habitat: Yakka Skink (*Egernia rugosa*), Common Death Adder (*Acanthophis antarcticus*), Yellow-naped Snake (*Furina barnardi*) and the blind snake (*Ramphotyphlops broomi*).

The specific impacts of habitat clearing on Northern quolls are discussed in detail below given their wide distribution and likely high density within the site. It is considered that further research could provide valuable information in order to design mitigation strategies to reduce or avoid the impacts of actions that have a high risk of significant impact (as defined by SEWPAC (2011b)) on the Northern Quoll population on the site. An understanding of the species habitat utilisation, in particular the importance of the rocky ridge lines as foraging habitat, maternal den habitat and as a fire refuge is essential in order to develop appropriate and effective mitigation strategies and ensure the survival of this important Northern Quoll population. Adult female Northern Quoll have been shown to live longer and therefore experience greater lifetime reproductive success when their home ranges include a greater proportion of rocky areas (Oakwood, 1997). Such crucial habitat utilization information could be gathered through systematic surveys of Northern Quolls using detection dogs to locate active dens in both target and not-target areas and an intensive radio-tracking study of individual animals live-trapped in the vicinity of the proposed infrastructure footprint for the duration of an entire breeding season (May to November) to determine habitat usage and to locate day-time den sites, especially maternal dens.

It should be recognised that the live-trapping, particular of females with dependant young in dens, may itself pose a mortality risk and procedures would need to be followed to ensure that animals are retained for as short a time as possible, especially during the period when the highly altricial young are largely unfurred and poikilothermic (Oakwood, 1997). Suggested mitigation strategies to avoid significant direct impacts on the local population of Northern Quolls would be to avoid construction during the breeding season (May-November) (SEWPAC, 2011b) or to relocate infrastructure such as tracks or even turbine sites to avoid clearing maternal den sites or critical foraging areas.

As previously mentioned, it is important to understand the importance of ridge habitats containing complex rocky outcrops and fissures to the long-term maintenance of a viable quoll population, given that they are known to frequently den in rocky areas particularly at the highest point of hills (Oakwood, 1997). It may be possible that non impacted areas (e.g. creek lines) are also important which would lessen the overall potential impact on the population, however this is currently unknown.

All hollow bearing trees that lie within the proposed clearing footprint should be thoroughly investigated with a fibre optic scope to search for roosting sites of critically endangered Bare-rumped Sheathail bats (*Saccolaimus saccolaimus nudiclunatus*) and other hollow-roosting/nesting conservation significant species that may potentially occur on the site.

Threatened species management plans for each of the conservation significant species confirmed or predicted to occur on the site are recommended to manage all potential impacts of the project on these species.

The development and implementation of a rigorous invasive weed management programme is strongly recommended to ensure that exotic weeds with the potential to increase the intensity and frequency of late dry season fires do not become established on the site. Furthermore, a fire management plan for the site should be designed and implemented to ensure that the incidence, severity and extent of hot, late dry season fires is reduced. The successful complete eradication of invasive grasses would be difficult to achieve once they spread away from clearing edges into the rugged terrain, highlighting the need for a rigorous Weed Management Plan to be implemented (see section 13.2 below).

The development and implementation of an ecological Fire Management Plan is recommended to reduce the frequency, intensity and extent of hot, late dry season fires which are known to be a significant threat to Northern Quolls and several other species of conservation significant fauna predicted to occur on the site.

6.3 Increased Predation Pressure

The development and implementation of a comprehensive feral predator monitoring and control programme is strongly recommended, in particular for cats and foxes. Although the control of dingo, which is currently classified as a Class 2 pest is required under the Queensland *Land Protection (Pest and Stock Route Management) Act 2002*, recent research indicates that stable packs of dingos can effectively control populations of feral cats and foxes to the benefit of many native species (Johnson, 2007).

7.0 Conclusion

The project may potentially result in limited short term impacts to a range of local common species, however impacts can be minimised through the implementation of appropriate construction phase controls and operational phase management. In the longer term, operational impacts on these species are not considered likely to be significant provided the recommended monitoring and management programs are implemented.

Fauna species of conservation significance were recorded or are predicted to occur on the site, including birds and bats belonging to groups identified as of being at particular risk of mortality from impacts with turbine rotors or from barotraumas. In addition ground-dwelling and hollow-roosting/nesting fauna, in particular Northern Quolls could potentially be impacted by habitat clearing and associated impacts (weed invasion, change in fire regime, increased predation rates etc).

These impacts may be manageable with the implementation of appropriate wind farm construction and operational measures. Measures may include the relocation of turbines away from sensitive areas, weed control, appropriate fire regimes, predator control, and site construction timing and rehabilitation measures.

References

- Arnett, E. B., Huso, M. M. P., Schirmacher, M. R., and Hayes, J. P. (2011). Altering turbine speed reduces bat mortality at wind-energy facilities. *Frontiers in Ecology and Environment*, 9(4), pp 209-214.
- Australian Wind Energy Association (AusWEA) (2006). *Best Practice Guidelines for Implementation of Wind Energy Projects in Australia*. Australian Wind Energy Association
- Biosis Research Pty. Ltd. (BIOSIS) (2005a). *Risk level to select species listed under the EPBC Act, of collision at wind farms in Gippsland, Victoria*. Report for the Department of Environment and Heritage.
- Biosis Research Pty. Ltd. (BIOSIS) (2005b). *Preliminary flora and fauna assessment of a proposed wind farm, Yarram, Victoria*. Report for Synergy Wind Pty Ltd.
- Braithwaite, R. W. & R.J. Begg (1995). Northern quoll *Dasyurus hallucatus* Gould, 1842. In: Strahan, R., ed. *The Mammals of Australia: National Photographic Index of Australian Wildlife*. Page(s) 65-66. Sydney: Reed Book
- Brett Lane and Associates Pty. Ltd. (BLA) (2005). Proposed Mount Gellibrand Windfarm: targeted flora and fauna investigations. Report No, 2004.24(2.1) prepared for Pro Ventum International GmbH
- Brett Lane and Associates Pty. Ltd. (BLA) (2008). Proposed Ararat Wind Farm – Flora and Fauna Assessment. Report for Renewable Energy Systems Australia Pty Ltd.
- Churchill, S. (2009). *Australian Bats*. Second Edition. Allen and Unwin, St Leonards, NSW.
- Findley, J. S. (1993). *Bats: a Community Perspective*. Cambridge University Press,
- Fox, S., Lulu, J., Mitchell, C., Maclean, J. & Westcott, D. A. (2008). Demographic indications of decline in the spectacled flying fox (*Pteropus conspicillatus*) on the Atherton Tablelands of northern Queensland. *Wildlife Research*, 35 (5). pp. 417-424.
- Johnson, C. (2007). *Australia's Mammal Extinctions – a 50,000 year history*. Cambridge University Press, U.K.
- Kunz, T. H., E. B. Arnett, W. P. Erickson, A. R. Hoar, G. D. Johnson, R. P. Larkin, M. D. Strickland, R. W. Thresher, and M. D. Tuttle. (2007). Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses. *Frontiers of Ecology and Environment*, 5: 315-24.
- Lindenmayer, D. and Burgman, M. (2005) *Practical Conservation Biology*.
- Meredith, C., Venosta, M. and Ressom, R. (2002). *Codrington Wind Farm Avian Avoidance Behaviour Report*. Biosis Research Pty. Ltd.

-
- Noss, R.F. (1991) Landscape connectivity: different functions at different scales. pp. 27-39 in Landscape Linkages and Biodiversity. W.E. Hudson (editor). Island Press, Covelo.
- Oakwood, M. (1997). The ecology of the northern quoll, Dasyurus hallucatus. PhD thesis, Australian National University, Canberra.
- Parsons, J. G., Cairns, A., Johnson, C.N., Robson, S. K. A., Shilton, L. A., and Westcott, D. A. (2006). Dietary variation in spectacled flying foxes (*Pteropus conspicillatus*) of the Australian Wet Tropics. Australian Journal of Zoology 54, 417–428.
- Percival, S. M. (2003). Birds And Windfarms In Ireland: A Review Of Potential Issues And Impact Assessment. Consultant Report, Durham, UK.
- Richards, G. (2011). An assessment of the bat fauna at the Hepburn Community Wind Farm, Leonards Hill, Victoria. Prepared for Hepburn Wind Park Co-operative Ltd, March 2011
- Australian Government Department of Sustainability, Environment, Populations and Communities (SEWPAC) (2009). *EPBC Act Policy Statement 2.3 Wind Farm Industry*.
- Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) (2011a). *Dasyurus hallucatus* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Tue, 26 Jul 2011 05:40:59 +1000
- Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) (2011b). Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the endangered northern quoll, *Dasyurus hallucatus*. EPBC Policy Statement 3.25
- Australian Government Department of Sustainability, Environment, Water, Population and Communities (2011c). *Pseudophryne covacevichae* in Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed Mon, 25 Jul 2011 12:41:30 +1000.
- Sharp, A. (2010). *Briefing Note On The Effects Of Wind Farms On Bird And Bat Populations. Report For Lower North Natural Resource Management Group*. South Australia Department of Environment and Heritage.
- Smales, I. (2006). *Impacts of Avian Collisions With Wind Power Turbines: An Overview Of The Modelling Of Cumulative Risks Posed By Multiple Wind Farms*. Report for Department of Environment and Heritage. Biosis Research Pty. Ltd.
- Smales, I. (2005). *Modelled cumulative impacts on the White-bellied Sea-eagle of wind farms across the species' Australian range. Report for Department of Environment and Heritage*. Biosis Research Pty. Ltd.
-

- Smales, I., and Muir, S. (2005). *Modelled Cumulative Impacts On The Tasmanian Wedge-Tailed Eagle Of Wind Farms Across The Species' Range*. Report for Department of Environment and Heritage. Biosis Research Pty. Ltd.
- Still, D., Little, B. and Lawrence, S. (1995). *The effect of wind turbines on the bird population at Blyth Harbour*. ETSU Report.
- Strickland, D. (2004). Overview of Non-Collision Related Impacts from Wind Projects. In: *American Wind Energy Association and American Bird Conservancy*. Proc. Wind Energy and Birds/Bats Workshop. Washington, D. C.
- Threatened Species Scientific Committee (TSSC) (2007). Recommendation to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on a public nomination for a species listing on the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)).
<http://www.environment.gov.au/biodiversity/threatened/species/pubs/pteropus-conspicillatus-advice.pdf> Accessed 17th May 2011.
- Wet Tropics Management Authority (WTMA) (2004). *Wet Tropics Conservation Strategy - The conservation, rehabilitation and transmission to future generations of the Wet Tropics World Heritage Area*.
- Winkelman, J.E. 1992. The impact of the SEP wind park near Oosterbierum (Fr.), the Netherlands, on birds, 2: nocturnal collision risks (Dutch, English summary). RIN report 92/3, DLO-Institute for Forestry and Nature Research, Arnhem.

PART 2 – VEGETATION & FLORA ASSESSMENT

8.0 Methods – Vegetation & Flora Assessment

The methods adopted for completing the vegetation and flora studies are detailed below and consist of two primary aspects: a desktop review of published environmental information; and a physical ground investigation of the environmental characteristics of the study area. The primary objective was to gain a sound understanding of the vegetation and floristic qualities of the land intersected or likely to be impacted by the proposed wind farm.

8.1 Desktop Review

A review of databases and information relating primarily to rare and threatened species of flora and fauna was undertaken as a preliminary exercise to determine the probability of particular species occurring at or in the vicinity of the study sites. The results of these searches and reviews of information assisted with planning targeted field surveys for conservation significant species, as well as gaining a better understanding of the ecology of certain species. Concurrent with this review was an examination of vegetation mapping for the region.

The following databases and sources of information were reviewed:

- *Regional Ecosystem mapping.* The most recent version of the Department of Environment and Resource Management's (DERM) regional ecosystem (RE) vegetation mapping (version 6.0, November 2009) was used to provide an indication of the status and position of remnant vegetation in relation to landforms of the project site. This mapping was overlaid on a digital colour aerial photograph base sourced from Google Earth™;
- *Regional Ecosystem Description Database (REDD).* Detailed descriptions of remnant vegetation communities (regional ecosystems) in Queensland. Version 6.0b, January 2011.
- *Essential Habitat mapping.* In association with the RE mapping for the study area, essential habitat mapping has been prepared by DERM for conservation significant species. A review of this mapping in relation to the vegetation types and respective habitats was made to establish its relevance;
- *Wildlife Online* database of flora and fauna. This database holds records of plants and animals that have either been sighted or collected within a given radius of the site (a search parameter was prescribed limiting the search area to a 10 km radius around an approximate central point of the study area). The records held in this database are jointly maintained by Queensland's Environmental Protection Agency and the Queensland Parks and Wildlife Service - now incorporated into DERM;
- *Protected Matters* database of Matters of National Environmental Significance (NES). This database applies a range of bio-models to predict the presence of species of flora and fauna and other matters of NES within a given radius of the site (a search parameter was prescribed limiting the search area to a 10 km radius around an approximate central point of the study area), as cited under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *HERBRECS* database of plant records. This database provides confirmed records of plant collections made within a specified area, of which voucher specimens are held by the Environmental Protection Agency's (EPA) Queensland Herbarium. Data from this source provides useful information on the location of rare and threatened species and expedites targeted surveys for such plants in the field;

- *Queensland Museum Biodiversity database*. This database provides confirmed records of fauna species recorded within a specified area. Data from this source provides additional information on the known location of rare and threatened fauna species;
- *Regional Vegetation Management Code – Coastal & Western Bioregions*. The 'Performance Requirements' of these codes (as issued under the *Vegetation Management Act 1999*) were addressed and interpreted for their relevance to the project; and
- Literature review. A range of scientific papers and other literature were reviewed for a number of related matters.

8.1.1 Flora and Vegetation Survey Methods

Representative sites were selected across the project area in order to sample the broadest vegetation types likely to be impacted by the establishment of the wind farm, and to understand the diversity of vegetation types and probable locations of particular flora species restricted to certain habitats or limited by environmental conditions. The location of the vegetation survey sites is shown in **Appendix A2**).

Methods adopted for the survey are in keeping with protocols outlined and issued by DERM (Wannan, 2009). We note however, that it was unnecessary to determine whether a particular vegetation type is considered remnant or non-remnant as defined under the *Vegetation Management Act 1999*, as all the turbines are considered to occur in areas mapped as remnant vegetation. The remnant status of these sites has been accepted and thus detailed transects to determine percentage foliage intercept were not undertaken. Structural formations were ascribed according to Specht, *et al.*, (1974).

A minimum 500 m² plot area was surveyed at each vegetation survey site. Plots were orientated so that the longest side was parallel to the prevailing land contour. Within each survey plot the structural layers of the vegetation were characterised according to five strata: the dominant tree layer (tallest layer), the sub canopy or secondary tree layer, the dominant shrub layer, a secondary shrub layer (if present), and the ground layer. Emergent trees above the dominant tree canopy layer were noted, but not recorded as a layer.

Only vascular plant species were recorded including trees, shrubs, grasses, forbs and graminoids. An inventory of species was compiled. For species that could not be identified in the field, a voucher specimen was collected and used for later identification. A number of specimens are currently being prepared for lodgement with the Queensland Herbarium (BRI) for formal identification. Ground searches were made for plants of conservation interest. In many cases, these searches extended beyond the bounds of the vegetation survey plot, and typically included sections of land between turbines. This land is mostly associated with ridge topography.

Access constraints and the limited time of the ground survey precluded the opportunity to survey all 75 proposed wind turbine sites. This is relevant particularly for the southern end of the project area, where plant diversity is expected to be highest, given the juncture of the Einasleigh Uplands and Wet Tropics bioregions. Also, Mount Emerald, an area regarded for its concentration of plants with narrow or limited distribution occurs in this location, and its geographical influence is considered important.

The habitat qualities of these sites in respect to supporting rare and threatened plants was also assessed based on a range of characteristics such as the maturity of the vegetation, the complexity of structural layers and an interpretation of plant functional groups and how they relate to ecological processes. A broad assessment was also made of landscape and vegetation connectivity, refugial areas, and fireproof niches.

9.0 Results of Desktop Review - Vegetation

A review of published literature, as well as a range of databases provided a historical and scientific basis from which ecological considerations could be made in relation to flora and vegetation in the project area and the regional perspective; particularly for rare and threatened species, and the landscape importance of environmental features. The findings of this exercise are discussed in the following section.

9.1 Regional Ecosystem Mapping

Remnant vegetation communities in Queensland are classified as Regional Ecosystems (REs) for the purposes and administration of the *Vegetation Management Act 1999* (VMA). Vegetation mapping of these communities in the wet tropics bioregion was revised and updated in September 2009 and released as version 6.0. The scale of this mapping is 1:50,000. DERM (2009) describe regional ecosystems as:

“Regional ecosystems are communities of vegetation that are consistently associated with a particular combination of geology, land form and soil in a bioregion. Each regional ecosystem has been assigned a conservation status which is based on its current remnant extent (how much of it remains) in a bioregion”.

The Regional Ecosystem (RE) mapping for the study area encompasses two bioregions: the Wet Tropics (1:50,000) and the Einasleigh Uplands (1:100,000). The map production scale for each bioregion renders the resolution of the mapping significantly different. For example, heterogeneous polygons are applied for many areas in the Einasleigh Uplands due to the scale of the mapping and the possible presence of small patches of vegetation associations that cannot be differentiated at a scale of 1:100,000; whereas, the percentage of heterogeneous polygons shown in the Wet Tropics bioregion is much lower due to the finer resolution of the mapping at 1:50,000.

Regional ecosystem mapping shows the remnant vegetation communities found within the broader study area occur primarily on a single land zone type - 12, described as: Mesozoic to Proterozoic igneous rocks, forming ranges, hills and lowlands. Predominantly granitic rocks and intermediate to acid volcanics such as granites, granodiorites, andesites and rhyolites, as well as minor areas of associated interbedded sediments and basic intrusive rock types such as gabbros and dolerites. Excludes serpentinites (land zone 11) and younger igneous rocks (land zone 8). Soils are mainly Tenosols and Rudosols on steeper slopes with Chromosols and Sodosols on lower slopes and gently undulating areas. Soils are typically of low to moderate fertility. The principal geology across the site is rhyolite.

Descriptions of these REs are given in **Table 1** with their respective conservation status as listed under the VMA. Effectively this interpretation reflects what types of remnant vegetation will be potentially affected by clearing and disturbance during the construction phase.

Current mapping showing the landscape position of remnant communities (REs) in relation to the study area and each turbine site is given in **Appendix B2**. Descriptions of remnant vegetation are reproduced from the information and data held in the latest version of REDD updated in January 2011 (version 6.0b). Complete descriptions of REs are given in **Appendix C2** (some information from the REDD description of less ecological relevance has been omitted for brevity).

Table 1. Description of regional ecosystems mapped in the project area.

RE	Description	Status ¹
7.12.34	<i>Eucalyptus portuensis</i> (white mahogany) and/or <i>E. drepanophylla</i> (ironbark), +/- <i>C. intermedia</i> (pink bloodwood) +/- <i>C. citriodora</i> (lemon-scented gum), +/- <i>E. granitica</i> (granite ironbark) open-woodland to open-forest. Uplands on granite, of the dry rainfall zone.	LC
7.12.57	Shrubland and low woodland mosaic with <i>Syncarpia glomulifera</i> (turpentine), <i>Corymbia abergiana</i> (range bloodwood), <i>Eucalyptus portuensis</i> (white mahogany), <i>Allocasuarina littoralis</i> (black sheoak) and <i>Xanthorrhoea johnsonii</i> (grasstree). Uplands and highlands on granite and rhyolite, of the moist and dry rainfall zones.	OC
9.12.2	Mixed open forest to occasionally low open woodland including combinations of the species <i>Eucalyptus portuensis</i> (white mahogany), <i>Corymbia citriodora</i> (lemon-scented gum), <i>E. granitica</i> (granite ironbark) or <i>E. drepanophylla</i> (narrow-leaved ironbark), <i>C. intermedia</i> (pink bloodwood) or <i>C. clarksoniana</i> (Clarkson's bloodwood) +/- <i>E. cloeziana</i> (Gympie messmate) +/- <i>Corymbia</i> spp. There is often an open to mid-dense sub-canopy containing canopy species +/- <i>Melaleuca viridiflora</i> (broad-leaved paperbark) +/- <i>Lophostemon suaveolens</i> (swamp mahogany) +/- <i>C. leichhardtii</i> (yellowjacket). The shrub layer varies from scattered shrubs to mid-dense and includes juvenile canopy species, <i>Acacia flavescens</i> (yellow wattle), <i>Callitris intratropica</i> (cypress pine), <i>L. suaveolens</i> , <i>Xanthorrhoea johnsonii</i> (grasstree) and <i>Petalostigma pubescens</i> (quinine). The dense grassy ground layer is generally dominated by <i>Themeda triandra</i> (kangaroo grass) +/- <i>Heteropogon triticeus</i> (giant speargrass) +/- <i>Mnesithea rottboellioides</i> (northern canegrass). In some areas, patches dominated by <i>E. moluccana</i> (gum-topped box) or <i>E. cloeziana</i> may occur. Occurs on rises, hill and ranges.	LC
9.12.4c	Low woodland to low open woodland of <i>Callitris intratropica</i> (cypress pine) and <i>Eucalyptus shirleyi</i> (silver-leaved ironbark) and/or <i>E. melanophloia</i> (silver-leaved ironbark) +/- <i>Corymbia leichhardtii</i> (yellowjacket). The sparse mid layer can include juvenile canopy species, <i>Melaleuca monantha</i> (teatree), <i>Dolichandrone heterophylla</i> (lemonwood), <i>Alphitonia obtusifolia</i> , <i>Petalostigma pubescens</i> (quinine), <i>Acacia bidwillii</i> (corkwood wattle) and <i>Grevillea</i> spp. The dominants in the grassy ground can include <i>Schizachyrium fragile</i> (firegrass), <i>Heteropogon contortus</i> (black speargrass) or <i>Themeda triandra</i> (kangaroo grass). Occurs predominantly on sandy shallow soils derived from granite on rolling low hills to hills.	LC
9.12.20	Woodland to low woodland of <i>Eucalyptus pachycalyx</i> (pumpkin gum) +/- <i>E. cloeziana</i> (Gympie messmate) +/- <i>Corymbia leichhardtii</i> (yellowjacket) +/- <i>Callitris intratropica</i> (cypress pine) +/- <i>E. portuensis</i> (white mahogany) +/- <i>E. cullenii</i> (Cullen's ironbark) or <i>E. atrata</i> . The mid-dense shrub layer includes juvenile canopy species, <i>Grevillea glauca</i> (bushman's clothepeg), <i>Persoonia falcata</i> and <i>Xanthorrhoea johnsonii</i> (grass-tree). The medium to dense grassy ground layer is mostly dominated by <i>Themeda triandra</i> (kangaroo grass). Occurs on steep rugged hills on acid volcanics.	LC
9.12.30a	Woodland to open forest of <i>Corymbia leichhardtii</i> (yellowjacket) and <i>Eucalyptus cloeziana</i> (Gympie messmate) +/- <i>E. portuensis</i> (white mahogany) +/- <i>C. citriodora</i> (lemon-scented gum) +/- <i>E. cullenii</i> (Cullen's ironbark) +/- <i>Callitris intratropica</i> (cypress pine). Some canopy species can occur as emergents. The sparse to mid-dense shrub layer is dominated by juvenile canopy species, <i>Persoonia falcata</i> , <i>Grevillea glauca</i> (bushman's clothepeg) and <i>Allocasuarina inophloia</i> (stringybark sheoak) and a lower shrub with <i>Jacksonia thesioides</i> and <i>Xanthorrhoea johnsonii</i> (grass-tree) can occur. The sparse to mid-dense ground layer is dominated by <i>Themeda triandra</i> (kangaroo grass). Rocky rhyolite hills to steep hills.	LC

¹ Conservation status as listed under the *Vegetation Management Act 1999*: LC – Least Concern, OC – Of Concern.

9.1.1 Amendment to Regional Ecosystem Mapping

It is noted that RE 7.12.57 (Of Concern) was not found to occur in the ridge areas shown on the mapping. This is evidenced by the absence of the constituent canopy tree for this RE – *Syncarpia glomulifera*. Ridge vegetation was found to more closely correspond with the descriptions for RE 7.12.30, with frequent occurrences of rock pavements and sparsely vegetated zones of skeletal soil, which are consistent with the description for RE 7.12.65k (listed as Least Concern under the *Vegetation Management Act 1999*).

Due to the small area that RE 7.12.65k occupies along ridges, it is proposed to amend the mapping to show a heterogeneous polygon that reflects this vegetation condition. Proportionately, the proposed heterogeneous unit will include 80 percent of RE 7.12.30b and 20 percent of RE 7.12.65k. These REs are described in **Table 2** and shown on the mapping in **Appendix D2**.

Table 2. Descriptions of RE 7.12.30 and 7.12.65 from the Regional Ecosystem Description Database (Queensland Herbarium, 20011b).

Descriptions of REs in proposed heterogeneous polygon to replace RE 7.12.57	
7.12.30	
<i>Corymbia citriodora</i> (lemon-scented gum) +/- <i>Eucalyptus portuensis</i> (white mahogany) woodland to open-forest. Granite and rhyolite (often coarse-grained red earths and lithosols with much surface rock). (BVG1M: 10b). Listed as Least Concern under the <i>Vegetation Management Act 1999</i> .	
Major vegetation communities of 7.12.30:	
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. (BVG1M: 10b)
7.12.30b	<i>Corymbia citriodora</i> and <i>Eucalyptus granitica</i> , +/- <i>E. reducta</i> , +/- <i>C. abergiana</i> woodland to low open-woodland often with <i>Acacia calyculata</i> and <i>Jacksonia</i> sp., and with <i>Themeda triandra</i> in the ground stratum. Rocky granite footslopes and mid-slopes. (BVG1M: 10b)
7.12.30c	<i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> , <i>Syncarpia glomulifera</i> woodland and shrubland with a shrubby understorey of <i>Lophostemon confertus</i> and <i>S. glomulifera</i> , and a ground stratum of <i>Xanthorrhoea johnsonii</i> . Rocky slopes on rhyolite and granite. (BVG1M: 10b)
7.12.65	
Rock pavements or areas of skeletal soil, on granite and rhyolite, mostly of dry western or southern areas, often with shrublands to closed forests of <i>Acacia</i> spp. (wattles) and/or <i>Lophostemon suaveolens</i> (swamp mahogany) and/or <i>Allocasuarina littoralis</i> (black sheoak) and/or <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> . (BVG1M: 28e). Listed as Least Concern under the <i>Vegetation Management Act 1999</i> .	
Major vegetation communities of 7.12.65:	
7.12.65a	Rock pavement communities of the dry rainfall zone with <i>Acacia leptostachya</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Lophostemon confertus</i> , <i>L. suaveolens</i> , <i>Persoonia falcata</i> , <i>Ficus rubiginosa</i> and <i>Allocasuarina inophloia</i> . (BVG1M: 28e)
7.12.65b	Rock pavement communities of the dry rainfall zone with <i>Acacia leptostachya</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Lophostemon confertus</i> , <i>L. suaveolens</i> , <i>Persoonia falcata</i> , <i>Ficus rubiginosa</i> and <i>Allocasuarina inophloia</i> . Far northern areas including Adeline Creek. (BVG1M: 28e)
7.12.65c	Low woodland and shrubland complex with <i>Lophostemon suaveolens</i> , <i>Corymbia citriodora</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>E. granitica</i> , <i>E. drepanophylla</i> and <i>E. portuensis</i> . Shrubs often occur in clumps or groves either as an understorey or scattered shrubland communities within the type and include <i>Lophostemon suaveolens</i> , <i>L. confertus</i> , <i>Acacia leptostachya</i> , <i>Allocasuarina inophloia</i> and <i>Melaleuca viridiflora</i> . Dry rainfall zone areas of abundant surface rock and shallow or

Descriptions of REs in proposed heterogeneous polygon to replace RE 7.12.57

	skeletal soils. (BVG1M: 9d)
7.12.65d	<i>Eucalyptus cloeziana</i> , <i>Corymbia abergiana</i> , <i>C. citriodora</i> , <i>E. portuensis</i> , <i>E. shirleyi</i> , <i>E. lockyeri</i> subsp. <i>lockyeri</i> woodland with a shrubby understorey dominated by <i>Petalostigma pubescens</i> , <i>Bursaria spinosa</i> , <i>Grevillea sessilis</i> , <i>Grevillea glauca</i> , <i>Allocasuarina inophloia</i> , and <i>Xanthorrhoea johnsonii</i> . Rocky slopes on granite. (BVG1M: 28e)
7.12.65e	Complex of open to closed shrublands, low to medium woodlands and forests and grasslands of mountain granite and rhyolite rock pavements. Main component: scrub (<i>Allocasuarina littoralis</i> , <i>Syncarpia glomulifera</i> , <i>Lophostemon confertus</i>), shrubland (<i>Banksia aquilonia</i> , <i>Leptospermum</i> sp.) and heath (<i>Xanthorrhoea johnsonii</i> , <i>Gahnia</i> spp., <i>Dicranopteris linearis</i>). Granite and rhyolite rock pavements. (BVG1M: 28e)
7.12.65f	Rock pavement communities on granite, of the dry rainfall zone with <i>Acacia leptostachya</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Lophostemon confertus</i> , <i>L. suaveolens</i> , <i>Persoonia falcata</i> , <i>Ficus rubiginosa</i> and <i>Allocasuarina inophloia</i> . All areas except Adeline Creek and other northern areas. Rock pavement communities on granite. (BVG1M: 28e)
7.12.65g	Open to closed-scrub and low forest with <i>Leptospermum neglectum</i> , <i>Banksia aquilonia</i> , <i>Allocasuarina littoralis</i> , <i>A. torulosa</i> (in valleys), <i>Acacia celsa</i> (in valleys), <i>Syncarpia glomulifera</i> , and <i>Rhodomyrtus trineura</i> . Low forest is confined to the lower sections of deep valleys. Escarpments and rocky knolls and adjacent deep valleys. (BVG1M: 28e)
7.12.65h	<i>Acacia</i> spp. low closed shrubland and forest. Areas of skeletal soils. (BVG1M: 28e)
7.12.65i	<i>Lophostemon suaveolens</i> low closed shrubland. Steep rocky slopes on the drier margins of Herbert Gorge. (BVG1M: 28e)
7.12.65j	<i>Bombax ceiba</i> or <i>Cochlospermum gillivraei</i> deciduous low woodland to open woodland. Granite. (BVG1M: 7b)
7.12.65k	Bare granite and rhyolite rock, of dry western areas, associated with shrublands to closed forests of <i>Acacia</i> spp. (wattles) and/or <i>Lophostemon suaveolens</i> (swamp mahogany) and/or <i>Allocasuarina littoralis</i> (black sheoak) and/or <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> . Dry western areas. Granite and rhyolite. (BVG1M: 28e)

9.2 Essential Habitat

A review of regional ecosystem and the associated essential habitat mapping was made to determine what areas of vegetation constitute this important type of habitat for conservation significant species of flora and fauna. A circular area associated with the south-western corner of the study area is shown to be essential habitat for the species listed in **Table 3**. Proposed turbines 26 and 28-35 occur within the mapped essential habitat zone. Turbines 22 and 27 are shown to be just outside of this area.

Table 3 - Plant species shown to have essential habitat in the study area.

Scientific Name	Common Name	NCA ¹	EPBC ²
<i>Acacia purpureopetala</i>	A wattle (prostrate)	V	V
<i>Grevillea glossadenia</i>	A shrub	V	V
<i>Homoranthus porteri</i>	A shrub	V	V
<i>Plectranthus amoenus</i>	A herb	V	-
¹ Conservation status as listed under the <i>Nature Conservation Act 1992</i> : E – Endangered, V – Vulnerable, LC – Least Concern ² Conservation status as listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> : E – Endangered, V – Vulnerable			

Grevillea glossadenia is widespread across the project area south of the power line, and is in fact growing *en masse* in disturbed ground around the cleared wind monitoring tower near turbine 50, as well as at numerous other sites.

Homoranthus porteri was found in precisely the area shown on the essential habitat mapping, and in a number of other locations. This species clearly favours the edges of rock pavements and forms almost mono-specific thickets. It is entirely restricted to exposed ridge topography.

Plectranthus amoenus was found at a number of sites on rock pavements in small colonies. It is entirely restricted to the depauperate growing environment of rock pavements and sites with little if any soil.

Despite concerted ground searches, the prostrate wattle *Acacia purpureopetala* was not found in this area. However, this does not discount its presence in similar habitat at this location, and the steeply dissected country of the south-western corner of the study area is likely to harbour this inconspicuous species. It is recommended that detailed ground searches are undertaken at precise locations of the turbines in this area, at a time when more focussed investigation can be undertaken.

The REs which correspond with the essential habitat mapping and associated species are listed in **Table 4**.

Table 4 - Regional ecosystems corresponding with essential habitat (not all REs shown here are present in the study area).

Species	RE (Habitat)
<i>Acacia purpureopetala</i>	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
<i>Grevillea glossadenia</i>	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
<i>Homoranthus porteri</i>	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
<i>Plectranthus amoenus</i>	7.12.7; 7.12.27; 7.12.30; 7.12.34; 7.12.52; 7.12.57; 7.12.65; 9.12.4; 9.12.17; 9.12.20

9.3 Wildlife Online Database Search - Flora

A total of 95 records of flora were returned in a search of the Wildlife Online database. This search was based on a four kilometre search radius established around the approximate centre of the study area (centred on coordinates latitude 17.1676° and longitude 145.3814°). Given the wind farms relatively isolated position in the landscape – separated from different landforms by steeply dissected rocky terrain, this search area was considered sufficient to capture representative data from the range of vegetation and habitat types likely to be found.

Of these records, seven species are listed as conservation significant and are shown in **Table 5**. It is noted that these records from the Wildlife Online database are either confirmed through visual sightings or by voucher specimens held in the Queensland Herbarium (cf. HERBRECS data). Field surveys confirmed the presence of three conservation significant plant species: *Grevillea glossadenia*, *Homoranthus porteri* and *Plectranthus amoenus*. The complete Wildlife Online search results are given in **Appendix E2**.

Table 5 - Conservation significant flora as listed in the Wildlife Online database (search centred on coordinates: latitude 17.1676°, longitude 145.3814° within a four kilometre radius search around the site).

Scientific Name	Common Name	NCA ¹	EPBC ²
<i>Acacia purpureopetala</i>	A prostrate wattle	V	V
<i>Goodenia stirlingii</i>	A woody subshrub	V	-
<i>Grevillea glossadenia</i>	A shrub	V	V
<i>Homoranthus porteri</i>	A shrub	V	V
<i>Melaleuca uxorum</i>	A shrub	E	-
<i>Peripleura scabra</i>	A forb	NT	-
<i>Plectranthus amoenus</i>	A succulent	V	-
¹ Conservation status as listed under the <i>Nature Conservation Act 1992</i> : E – Endangered, V – Vulnerable, NT – Near Threatened ² Conservation status as listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> : E – Endangered, V – Vulnerable			

9.4 Protected Matters Database Search - Flora

A polygon search was made of the EPBC Act's Protected Matters database for 'matters of national environmental significance' that could occur within the study area. This database returns records of conservation significant species as listed under the EPBC Act, and are based on a range of parameters and predictions using a range of bio-models and data. The search resulted in eight records of flora that could possibly occur within the study area in suitable habitats. Records for plants of conservation interest are shown in **Table 6**. The complete Protected Matters report including an account of the conservation significant flora) is given in **Appendix DI** (as per fauna section).

The landscape context of the wind farm proposal is important to consider when predicting whether a certain species is likely to occur; for example, epiphytic ferns such as *Huperzia marsupiformis* are most unlikely to occur on ridge topography where turbines are proposed to be constructed, due simply to a complete absence of suitable, closed forest habitat. It is noted that the search of the Protected Matters database did not return results for plants of conservation interest (and listed under the EPBC Act) that obviously occur within the search area, and have been validated by voucher specimens held in the Queensland Herbarium. Two species that are relevant in this context are *Grevillea glossadenia* and *Homoranthus porteri* – both of which were found during the current survey in the south-west portion of the study area.

Table 6 - Conservation significant flora as listed in the EPBC Act's Protected Matters database.

Scientific Name	Common Name	Status ¹	Presence in Study Area
<i>Acacia guymeri</i>	A wattle	V	Low possibility although no specimens collected or shown in HERBRECS data.
<i>Acacia ramiflora</i>	A wattle	V	Low possibility although no specimens collected or shown in HERBRECS data.
<i>Chamaesyce carissoides</i>	A forb	V	Unlikely - no specimens collected or shown in HERBRECS data.
<i>Dendrobium superbiens</i>	Curly Pinks	V	Unlikely – sub-optimal habitat.
<i>Huperzia marsupiformis</i>	Water Tassel-fern	V	Unlikely due to absence of well-developed vine forest habitat.
<i>Phalaenopsis rosenstromii</i>	An orchid	E	Unlikely due to altitude above sea level. Generally occurs at lower elevation in well-developed rainforest.

Scientific Name	Common Name	Status ¹	Presence in Study Area
<i>Taeniophyllum muelleri</i>	Minute Orchid, Ribbon-root Orchid	V	Unlikely due to sub-optimal habitat.
<i>Tropilis callitrophilis</i>	Thin Feather Orchid	V	Low possibility although no specimens collected or shown in HERBRECS data.
¹ Conservation status as listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> : CE – Critically Endangered, E – Endangered, V – Vulnerable, X – Extinct.			

9.5 HERBRECS – Queensland Herbarium Records

HERBRECS is the Queensland Herbarium's specimen records database and lists voucher specimen label data for plants that have been collected from a given region. A request was made to the Herbarium to supply the records data for the project area.

From the HERBRECS data, 1048 species of plants have been recorded from a grid that encompasses the project area. This grid incorporates a wide zone extending well beyond the project's footprint, and consequently takes in a range of habitats that are not present in the study area. To retrieve a more representative account of the flora presence in the study area, the HERBRECS data was reviewed and redundant taxa excluded. For example, rainforest-obligate species collected from east of the Kennedy Highway were pruned from the dataset.

The pruned dataset identifies that 12 specimens comprising nine species of conservation significant plants have been collected within or adjacent to the project area. A summary of significant species extracted from the HERBRECS data is given in **Table 7**. The location of these species in relation to the study area is shown in **Appendix F2**.

Several taxa shown in the HERBRECS data may not be encountered within the project area. It is noted also, that the conservation status under the NCA has recently been revised, and some species such as *Tephrosia savannicola* are no longer conservation significant. Given the proximity of the project area to Mt Emerald and the Stannary Hills region, where several species of conservation interest have been collected, there is reasonable probability that a number of taxa shown in the table could occur in the project area.

Table 7 - Summary of HERBRECS data for conservation significant flora.

Name	NCA ¹	EPBC ¹	No. Collections	Comments
<i>Acacia longipedunculata</i>	NT	-	3	Outside project area. Stannary Hills.
<i>Acacia purpureopetala</i>	V	V	2	Specimens collected from south of turbine 31. Also from Stannary Hills.
<i>Agathis microstachya</i>	NT	-	4	Significantly outside project area. Associated with poor rainforest.
<i>Alloxylon flammeum</i>	V	V	1	Outside project area. Rocky Creek.
<i>Archidendropsis xanthoxylon</i>	NT	-	1	Outside project area. Atherton district.
<i>Brasenia schreberi</i>	NT	-	1	Outside project area. Nardello's lagoon.
<i>Cajanus mareebensis</i>	E	E	2	Outside project area. Near Dimbulah, and Gorge Creek west of Mareeba.
<i>Chamaesyce carissoides</i>	V	V	1	Outside project area. Stannary Hills.
<i>Elaeocarpus coorangooloo</i>	NT	-	2	Outside project area. Atherton district and

Name	NCA ¹	EPBC ¹	No. Collections	Comments
				Tolga.
<i>Glossocardia orthochaeta</i>	E	-	1	Outside project area. Stannary Hills.
<i>Grevillea glossadenia</i>	V	V	3	Specimens collected from south of turbine 31 and just SW of 51. Confirmed sightings during this survey 500 m SE of turbine 22.
<i>Homoranthus porteri</i>	V	V	3	Specimens collected from south of turbine 31. Confirmed sightings during this survey 500 m SE of turbine 22.
<i>Lysiana filifolia</i>	NT	-	1	Significantly outside project area. Stannary Hills.
<i>Melaleuca uxorum</i>	E	-	2	Specimen collected from rocky country just south of turbine 36.
<i>Peripleura scabra</i>	NT	-	2	Outside project area. Stannary Hills.
<i>Peripleura sericea</i>	NT	-	2	Outside project area. Stannary Hills.
<i>Plectranthus amoenus</i>	V	-	5	Specimens collected from near turbine 66. Other specimens collected outside of study area south of turbine 31.
<i>Prostanthera</i> sp. (Dinden P.I.Forster+ PIF17342)	E	-	1	South of project area near Oaky Creek.
<i>Rhaphicarpa australiensis</i>	NT	-	1	Outside project area. Nardello's Lagoon.
<i>Tephrosia savannicola</i>	R	-	1	Outside project area. Stannary Hills. Note, this species is no longer listed under the NCA.
<i>Thaleropia queenslandica</i>	NT	-	3	Significantly outside project area. In rainforest.
<i>Zieria obovata</i>	V	V	1	Outside project area. Stannary Hills.
¹ The conservation status codes under the <i>Nature Conservation Act 1992</i> and the <i>Environment Protection and Biodiversity Conservation Act 1999</i> as follows: E – Endangered, V – Vulnerable, R – Rare (former status), NT – Near Threatened.				

9.6 Regional Vegetation Management Codes

A review was made of the Regional Vegetation Management Codes as issued under the *Vegetation Management Act 1999*. Two codes are relevant, as the project area encompasses two bioregions: the Einasleigh Uplands (Western Bioregions Code), and the Wet Tropics (Coastal Bioregions code). Both code versions were released in November 2009.

A provisional address to the performance requirements of the codes is given in **Appendix G2**.

9.7 Watercourses

Watercourses occurring in the study area were mapped using the Department of Environment and Resource Management's (DERM) Regrowth Watercourses data (version 2.0, 2010). These features are shown on the mapping given in **Appendix H2**. The mapping shows that a number of lower order watercourses will be crossed (mostly first order stream features). All these features flow intermittently during the wet season, and their integrity is expected to remain in near natural condition with expected limited levels of disturbance. It is noted that where these features are intersected, the proposed track will use existing stream crossings currently used as maintenance access for the powerline infrastructure.

A comprehensive survey of watercourses was not undertaken in the field, although detailed floristic investigations were undertaken of a reach of Granite Creek approximately situated in the centre of the study area. This section of watercourse is in sound ecological condition. Vegetation lining this feature is limited to a narrow band of *Lophostemon grandiflorus* trees, which form the only differentiation between stream bank dependent vegetation and the surrounding woodland. This limited floristic diversity is an indicator of seasonal flows and relatively dry bank conditions.

9.8 Wetlands

Granite Creek at the base of the wind farm project area is mapped as a Wetland by DERM. A reach of this watercourse adjacent to the main entry point and lower access road into the site has a 100 m buffer shown as a Wetland Management Area trigger zone. Approximately, 1 km of the lower access road passes through this trigger area due to the proximity of the existing track to Granite Creek.

It is noted however, that no wetlands or wetland trigger areas are present in the project footprint where wind turbines are proposed at higher elevation.

10.0 Field Investigation – Vegetation & Flora

A five-day field survey of the study area was undertaken in early May 2010 to investigate the vegetation, floristic composition, and range of habitats present in the study area. Several field surveys were also undertaken in 2011 during February, March, April and June. A total of 120 vegetation surveys were completed across the project area.

An opportunity was also taken during the field investigation to make an assessment of the probable level of impact that the proposed project might have on the immediate environmental character of the study area, with reference to vegetation communities and flora of conservation interest.

The survey aimed at investigating a number of sites where wind turbines are proposed to be located. These sites were determined through consultation with representatives of the project's proponent, and through interpretation of aerial photography of the study area showing the remnant vegetation overlay and the provisional position of each wind turbine. A degree of lateral investigation was allowed for in order to accommodate for site-specific changes if required (e.g. in the event that a provisional position of a turbine occurred in an environmentally sensitive area). Several turbine location amendments were made during the course of the investigations.

Quaternary level vegetation surveys focussed on determining the accuracy of RE mapping and making assessments of the conspicuous floristic composition of mapped vegetation communities. This level of survey is consistent with the methods outlined by Neldner *et al* (2005) and records the landform characteristics, and the floristic composition of all structural layers (canopy, subcanopy, shrub and ground layers). Wherever possible, flora surveys were inclusive of an area approximating the expected cleared footprint for a turbine, plus a buffer distance around the proposed site.

A small number of turbine locations could not be investigated due to their remoteness and the difficulty in reaching these sites within the timeframe allocated for the investigation. Nevertheless, a number of sites were adopted as surrogates for those that could not be reached and investigated. Detailed floristic accounts for these surrogate sites, particularly for the ground flora could not be compiled.

The findings of the field investigations of vegetation and flora, as well as an overview of fauna and habitats are presented in the following sections.

10.1 Flora and Vegetation Assessment

10.1.1 Vegetation Overview and Condition

The project area has high levels of ecological integrity and intactness, which is evidenced by low levels of disturbance and the contiguous nature of remnant vegetation. Consequently, vegetation condition is high, with areas of physical disturbance restricted to the existing powerline easement and access roads that link the tower infrastructure for this power line. Small populations of grader grass (*Themeda quadrivalvis*) are a weed of significance observed in the project area that detracts from the landscape condition.

Other notable exotic grasses found in the project area include molasses grass (*Melinis minutiflora*); pigeon grass (*Setaria pumila*) and thatch grass (*Hyparrhenia rufa*). These species are found adjacent to existing access tracks and the powerline easement. *M. minutiflora* is found outside of this typical

disturbance footprint in remnant woodland on sheltered slopes on the eastern side of the project area. Molasses grass and grader grass are known to exacerbate wildfires and will outcompete native grasses, such as Kangaroo grass - *Themeda triandra* (Humphries & Stanton, 1992). Where these exotic grasses occur, floristic integrity in the groundlayer is compromised.

The current RE mapping and respective descriptions of each vegetation community (version 6.0 data) is provided in **Appendix B2** and **C2** respectively.

Outside of the disturbance footprint of the powerline infrastructure, vegetation integrity is at its highest, with no signs of physical modification, and only marginal incursions of weeds, of which *Praxelis* (*Praxelis clematidea*) and *M. repens* are noteworthy species. *Praxelis* is invariably found as widely dispersed individuals in intact woodland communities, and its presence is a consequence of its wind dispersed seeds, or possibly carried in the fur of mammals. There appears to be no particular preference for *Praxelis* to inhabit a certain niche (unlike grader grass for example, which has the propensity to occupy the verges of roads). Molasses grass is found in a number of locations in woodland communities, and generally has a preference for the eastern half of the project - particularly on eastern facing slopes with higher levels of moisture retention and capacity to capture prevailing wind-borne moisture.

Several remnant vegetation communities are present in the project area. Many of these have limited patterns of distribution and occupy relatively small niches associated with the rocky and dissected terrain. The commonest and most widespread community is the woodland association comprising *Callitris intratropica*, *Corymbia leichhardtii* and *Eucalyptus shirleyi* on flatter land in the centre of the project area. This landform is characterised by less surface rocks; whereas a majority of the other communities are found on ridges or in the limited growing environment afforded by accumulated organic material amongst outcropping rhyolite rock formations and rock pavements with skeletal soils.

A woodland community typified by *Eucalyptus cloeziana* occurs as patches mostly across western facing slopes. This woodland merges with other woodland types and may include other co-dominant trees such as *Corymbia citriodora* and *Eucalyptus portuensis*.

Ridges are characterised by the ironbark *Eucalyptus granitica* (primarily along northern ridges), *Eucalyptus lockyeri* subsp. *exuta*, *Eucalyptus portuensis* and *Corymbia abergiana* (mostly along southern ridges). The tree diversity in this situation is relatively simple, where greater plant diversity is found in the ground and lower shrub layers.

Stream dependent vegetation is confined to a very narrow band of a single, interrupted line of trees along Granite Creek that flows through the valley and exits the survey area through the ravine just east of Walsh's Bluff. Detailed surveys of vegetation in this ravine were not undertaken as this area is considered to be outside of the proposed zone of impact. The common species of this watercourse and other seasonal drainage lines is *Lophostemon grandiflorus*, which is entirely restricted to the immediate bank environment. A number of deeply incised ravines and gorges are likely to support similar vegetation types, or may afford habitats for unusual types in inaccessible areas.

The project area, particularly south of the existing powerline infrastructure and in the vicinity of Mt Emerald, has important habitat values for rare and threatened plants (conservation significant fauna are discussed separately). These plants include species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Queensland's *Nature Conservation Act 1992*. Commonly occurring conservation significant species in this respect are *Eucalyptus lockyeri* subsp. *exuta*, *Grevillea glossadenia* and *Homoranthus porteri*. Less common, but encountered on rock pavements, is *Plectranthus amoenus*.

Although not encountered in field surveys, the conservation significant prostrate wattle *A. purpureopetala* is likely to occur in the south-west of the project area and possibly elsewhere. Similarly, although not encountered, the highly restricted and endangered *Melaleuca uxorum* is also known to occur around the south-west portion of the project area.

10.1.2 Effects of Fire

Fire mapping based on interpretation of satellite imagery obtained from the Northern Australia Fire Information (NAFI, 2011) indicates that the entire site was burnt most recently in 2009. No other fires were mapped on the site back until at least 2004. It should be noted that the pixel size of the MODIS satellite imagery is approximately 300 m² so the mapping is unable to provide a realistic indication of the degree of the spatial heterogeneity of fires.

From visual assessments of the extent of scorching on trees, the fires are presumed to have been relatively hot and ferocious – extending completely into the crowns of trees in the canopy of vegetation to 10 m high. Emergence of epicormic shoots and young branchlet formation provide evidence that the fires severely affected sections of ridgeline vegetation (particularly smaller trees such as *Corymbia abergiana*). Dense, monospecific stands of low wattle regrowth (believed to be *Acacia calyculata*) have developed as the dominant shrub layer in areas where fire appears to have had the severest impact. Little other ground layer vegetation is present in these situations except for clumps of tussock grasses (an *Aristida* sp.).

The 2009 fires do not appear to have affected the whole project area. For example, the flat-bottomed valley in the interior and the western ridgeline has remained relatively unburnt and show fewer signs of severe fire events. In this sense, it is believed that fire passes through the project area on a periodic basis – enough to limit the development of excessive fuel loads. For example, sections of woodland or open forest where the pronounced effect of recent fires was not evident, did not support a conspicuously ‘heavy’ fuel load in the ground layer, and in fact, were relatively easy to traverse. In these circumstances, grasses such as *Themeda triandra* and *Heteropogon triticeus* are invariably present and favour the under-canopy environment afforded by the structural formation of woodland to open forest, rather than sparser open woodland. Generally, it was found that ironbarks (*Eucalyptus drepanophylla* and *E. granitica*) are sparsely represented in these vegetation communities.

10.1.3 Flowering and Fruiting Phenology

No trees were observed to be flowering or fruiting at the time of the surveys. The vestiges of capsules of *Corymbia abergiana* (rarely), *C. leichhardtii*, *Eucalyptus cloeziana*, *E. lockyeri* subsp. *exuta* and *E. shirleyi* aided their identification in the early stages of the survey. Scorched flower buds of *E. reducta* were also observed.

Shrubs, notably *Homoranthus porteri* and *Grevillea glossadenia* were flowering along with a range of subshrubs and woody legumes. Wattles (*Acacia* spp.) do not feature prominently as floristic elements other than the relatively common presence of *Acacia umbellata* on flat surfaces and *A. calyculata* along fire-affected ridges and on rock pavements. The latter species is the most widespread and is the commonest wattle across the study area and clearly favours open woodland communities and landforms that are sparsely populated by trees. A number of shrubs were observed to be sterile, rendering their identification difficult. Most of these shrubs occurred on rocky substrates with a particular preference to exposed rocky knolls and outcropping rhyolite.

The ground layer was observed to be relatively productive in terms of flowering and fruiting. Herbaceous legumes are relatively uncommon across the study area, and only two taxa were encountered in sterile form. All species of grass were seen in fertile form, as were non-leguminous forbs and subshrubs. Two species of *Lomandra* were found to be sterile. Two ferns: a hirsute *Cheilanthes* species and an indeterminate species were sterile.

10.1.4 Regional Ecosystem Mapping Amendment

Regional ecosystem mapping was found to have varying levels of accuracy, particularly in regard to the floristic composition when compared to the RE descriptions. Polygon boundary accuracy is difficult to detect on the ground, but such accuracy is assumed to be greater in the wet tropics bioregion portion of the project site, where mapping has been prepared at a scale of 1:50,000.

Mapping accuracy is markedly different for the remainder of the study area (mostly the northern section) where this area is included in the Einasleigh Uplands bioregion. Mapping for this region was prepared at a scale of 1:100,000 and the application of heterogeneous polygons are more frequent.

An important observation was made of a significant mapping error in the Wet Tropics bioregion section of the project area south of the powerline. Here, the RE 7.12.57 (Of Concern) is erroneously mapped along ridges and higher ground. This unit, characterised by trees of *Syncarpia glomulifera* is clearly absent. *S. glomulifera* is a distinctive species and easily identified by its pseudo-whorled leaves and very pale abaxial leaf surface. The species was not found as a constituent canopy tree at any of the 120 vegetation survey sites along ridges or in the project area.

Woodland communities mapped adjacent to the RE 7.12.57 unit are shown to be RE 7.12.34 (Least Concern). Surveys confirmed that the 7.12.34 unit is correct. It was found to extend to ridgeline topography, where it is typically intersected by rock pavements and areas of skeletal soils. These smaller areas of rock pavement and rocky soils were determined to be RE 7.12.65 or subunit derivatives thereof (e.g. 7.12.65k). The RE mapping for the project area in the Wet Tropics bioregion is therefore amended to reflect the presence of these rock pavements and sparsely vegetated zones. The proposed new heterogeneous polygon is 7.12.30b / 7.12.65k – this descriptor replaces occurrences of RE 7.12.57 within the project area. Amended RE mapping is shown in **Appendix D2**.

The REDD description (Queensland Herbarium, 2011b) for RE 7.12.30b and 7.12.65k is as follows:

7.12.30b – *Corymbia citriodora* and *Eucalyptus granitica*, +/- *E. reducta*, +/- *C. abergiana* woodland to low open-woodland often with *Acacia calyculata* and *Jacksonia* sp., and with *Themeda triandra* in the ground stratum. Rocky granite footslopes and mid-slopes. (BVG1M: 10b).

7.12.65k – Bare granite and rhyolite rock, of dry western areas, associated with shrublands to closed forests of *Acacia* spp. (wattles) and/or *Lophostemon suaveolens* (swamp mahogany) and/or *Allocasuarina littoralis* (black sheoak) and/or *Eucalyptus lockyeri* subsp. *exuta*. Dry western areas. Granite and rhyolite. (BVG1M: 28e).

The amended RE mapping does not apply to any vegetation communities represented outside of the project area boundary. It is also noted that more detailed vegetation information could be required for the extreme south-eastern section of the project area; although no turbines are proposed in this area.

10.2 Description of Vegetation Survey Sites

Several ground surveys were undertaken to sample as widely as possible, a range of vegetation communities over an 18 month period. Field investigations aimed at sampling representative communities in which turbines are proposed to be established. Given the scale of the project (75 wind turbines) it was not possible to sample the entire project area, and consequently the complete areas of vegetation likely to be impacted. For example, vegetation between a number of turbines where the construction of roads is proposed was not possible given the provisional nature of the layout, and the need to refine track routes. In this respect, it is recommended that further vegetation studies are undertaken closer to the final layout of the project, with reference to ground searches for plants of conservation interest and important or novel vegetation units.

Emphasis was placed on surveying sites for flora where a wind turbine is proposed to be located. Surveys were undertaken by establishing sample plots with a minimum area of 50 x 50 m or greater if the location allowed for such. Note that some ridge lines are less than 50 m wide, and therefore, the vegetation sampling area was reconfigured accordingly. Plots were systematically surveyed for all vascular plants in all structural layers. To gauge floristic variation and discrete vegetation patterns, random meander surveys were also performed outside of the plot and through vegetation that links one turbine to the next where a string of turbines are proposed to be situated on ridges.

The survey recorded native species (deemed to occur naturally in the region), and naturalised species (i.e. not native to Australia and often expressed as weeds). A checklist list of the flora species identified during this survey is provided in **Appendix I2**. It is noted that at the time of the first ground survey in 2010, the ridges along the eastern boundary of the survey area had been affected by severe fires during 2009, and many plants in the shrub and ground layers had not fully recuperated, rendering their identification difficult or impossible. Similarly, given the relatively low structure of the vegetation on these ridges, many of the principal canopy tree species had responded to the fires by developing dense epicormic growth with atypical leaf forms.

Many plants in the ground layer along ridges are expected to be ephemeral or annual species, and are quite likely to regenerate once suitable conditions prevail. The survey for flora must therefore be viewed as provisional, being more indicative of the woody, perennial component rather than the ephemeral or annual component, which is expected to comprise grasses, legumes and a number of forbs and sub-shrubs.

Typical descriptions of the vegetation survey points are given in the following sub-sections. The location of these sites is shown in **Appendix A2** and structural descriptions for the 120 sites surveyed are given in **Appendix J2**. The vegetation integrity ratings were derived from Wannan (2009) and shown in the box below.

Vegetation Integrity Ratings (after Wannan, 2009)					
Rating	Structure & Floristics	Weed Invasion	Woody Vegetation	Herbaceous Vegetation	Physical Disturbance
1	Intact or almost so	Minimal or absent	Intact	90-100% native cover	Minimal or nil
2	Substantially intact	Low levels	Intact	70-90% native cover	Low
3	Partially intact	Moderate levels	Intact	>50% native cover	Moderate
4	< 50% cover of native spp. & much reduced richness	>50% cover of weeds	Upper strata moderate-high cover	With <50% native cover	High
5	Grossly modified	Very high cover	Scattered dominants of upper strata persisting	Understorey and groundcover >90% exotic	High to very high

Vegetation Integrity Ratings (after Wannan, 2009)					
Rating	Structure & Floristics	Weed Invasion	Woody Vegetation	Herbaceous Vegetation	Physical Disturbance
6	Plantations of exotic or 'native' vegetation				

The level of survey was equivalent to the secondary site detail outlined in Neldner *et al.* (2005) except where stated. The minimum area surveyed was 500 m². Generally, additional survey was undertaken outside a plot or detailed investigation area to detect species outliers and occurrences of indiscrete plant communities.

Terminology used in the following descriptions is as follows: **T1** – tallest tree layer (equivalent to the ecologically dominant layer); **T2** – secondary tree layer; **T3** - third tree layer (if discernible); **S1** – tallest shrub layer; **S2** – secondary shrub layer (if present and discernible); **G** – ground layer. **E** indicates an emergent (generally scattered) tree above the tallest stratum. Height was estimated in the field. Cover is equivalent to the projected foliage cover of each structural layer. Underlined taxa indicate that a species is dominant. A taxon in parenthesis indicates a rare occurrence in the 500 m² plot, or was recorded outside of the plot area. An asterisk (*) preceding a species name indicates that the plant is naturalised. Nomenclature follows Bostock & Holland (2010). Numbered survey sites are shown previously on the mapping in **Appendix A2**.

10.2.1 Vegetation Survey Site 1 (Land surrounding Granite Creek)

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Open woodland to woodland 8-15 m of *Callitris intratropica* and *Corymbia leichhardtii* interspersed with ± bare rock pavements.

T1 (8-10 m): *Callitris intratropica*, *Corymbia leichhardtii*, (*Eucalyptus lockyeri* subsp. *exuta*), *Corymbia citriodora*, (*E. drepanophylla*).

T2 (4-6 m): *Callitris intratropica*, *Corymbia leichhardtii*, *E. shirleyi*, (*Melaleuca nervosa*), *M. viridiflora*, (*E. drepanophylla*).

S1 (3 m): *Acacia umbellata*, *Breynia oblongifolia*, (*Grevillea glauca*, *G. parallela*), *C. leichhardtii*, *Persoonia falcata*, *Xanthorrhoea johnsonii*, (*Asparagus* sp.), (*Petalostigma pubescens*), (*Dendrobium canaliculatum*), *Erythroxylon ellipticum*, (*Dolichandrone heterophylla*), (*Clerodendrum floribundum*).

S2 (1.5 m): *Acacia umbellata* in small patches, otherwise S2 is absent.

G (1 m): *Xanthorrhoea johnsonii*, *Eragrostis schultzei*, (*Aristida* sp.), *Pseudopogonatherum contortum*, *Arundinella setosa*, *Glossocardia bidens*, *Aeschynomene* sp., *Rhynchospora* sp., (**Praxelis clematidea*), *Melinis repens*, *Tacca leontopetaloides*, *Panicum effusum*, *Panicum seminudum* var. *cairnsianum*, *Vernonia cinerea*, *Lomandra* sp., (*Haemodorum coccineum*), *Cheilanthes tenuifolia*, (*Themeda triandra*), (*Persoonia falcata*), *Hibbertia stirlingii*, *Acacia humifusa*, *Cymbopogon bombycinus*, *Eriachne ciliata*, *Eriachne* sp. (short grass to 10 cm), *Polycarpaea spirostylis*, *Setaria surgens*, *Schizachyrium pseudoeulalia*, *Cartonema spicatum*, *Crotalaria brevis*, *Scleria brownii*, *Eragrostis* sp., (*Heteropogon triticeus*), (*Euphorbia mitchellii*).

Habitat Features: Exfoliating flakes on rock pavements (geckos). Limited, but longer term availability of water in rock pools in Granite Creek. Significant tree hollows not observed. Numerous dead standing trees - *Callitris intratropica* (stags).

Notes: A fairly uniform landscape with little topographical differentiation and relief. Includes the flatter parts of the project area, and excludes ridges, mid and upper slopes.

Ground becomes increasingly rockier as it gently ascends towards Walsh Bluff in the north. Country south of the existing power line is more dissected, where *Eucalyptus shirleyi* and *E. leichhardtii* become co-dominant and form a lower woodland community (~ 5-8 m). A vegetation integrity rating of 2 has been applied to this survey area, with the only disturbance limited to the infrequently used vehicle track that passes through the area. Weeds are virtually absent, and comprise widely dispersed individuals of herbaceous species (**P. clematidea* and **M. repens*).

10.2.2 Vegetation Survey Site 2

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland to open woodland 8-12 m of *Eucalyptus shirleyi* and *Callitris intratropica* with *E. cloeziana* on rolling hills.

T1 (8-12 m): *Eucalyptus shirleyi*, *Callitris intratropica*, *E. cloeziana* (tallest trees in disjunct groups).

T2 (5-7 m): *C. intratropica*, *E. shirleyi*, *E. drepanophylla*.

S1 (1.5 m): *C. intratropica*, (*Petalostigma pubescens*), *E. shirleyi*, (*Corymbia leichhardtii*), *Dolichandrone heterophylla*, *Breynia oblongifolia*, *Alphitonia excelsa*, *Alyxia spicata*, *Melaleuca* sp. (multi-stemmed, hirsute branchlets), *Grevillea dryandri*.

S2: Absent.

G (0.6 m): *Xanthorrhoea johnsonii*, *Cymbopogon bombycinus*, *Cheilanthes* sp., *Themeda triandra*, *Rhynchospora corymbosa*, *Grevillea dryandra*, *Asparagus racemosus*, *Haemodorum coccineum*, *Panicum effusum*, *Schizachyrium pseudoulalia*, (*Praxelis clematidea*), *Aristida utilis*, *Eriachne ciliata*, *Glossocardia bidens*, *Eragrostis* sp., *Arundinella setosa*.

Habitat Features: Limited features, although small rock pavement provides habitat for skinks. Possible development of good tree hollows in larger specimens of *E. cloeziana* trees. Canopy of nearby *E. cloeziana* trees provides cover for sheltering birds. Small zones of vegetated rock pavement provide habitat for skinks and geckos (fissures and cracks).

Notes: Site occurs on edge of roll over of hill where *E. cloeziana* trees are present. Top of roll-over characterised by more open and widespread vegetation dominated by *E. shirleyi*, with greater exposure and lower growing plant forms. Indeterminate *Melaleuca* sp. collected. No conservation significant species recorded. Weeds limited to isolated specimens of *Praxelis clematidea*. Vegetation integrity rating of 1: given absence of significant weeds, separation from tracks and power line easement.

10.2.3 Vegetation Survey Site 3

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Eucalyptus drepanophylla* and *Corymbia citriodora* to 10 – 12 m on relatively uniform surface.

T1 (10 -12 m): *Eucalyptus drepanophylla*, *Corymbia citriodora*.

T2 (6 – 8 m): *Callitris intratropica*, *E. drepanophylla*, *Corymbia citriodora*.

S1 (1.2 – 1.8 m): *Eucalyptus drepanophylla*, *Persoonia falcata*.

S2: Absent.

G (0.9): *Heteropogon triticeus*, *Themeda triandra*, *Pseudopogonatherum contortum*, *Xanthorrhoea johnsonii*, *Schizachyrium pseudoeulalia*, *Arundinella setosa*.

Habitat Features: Relatively low given the patchy distribution of larger trees. Some small tree hollows in older specimens of *Corymbia citriodora*. The ground and shrub layers are floristically simple.

Notes: The vegetation integrity rating is 2 due to the proximity to an infrequently used vehicle track.

10.2.4 Vegetation Survey Site 4

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Low woodland to open woodland of *Eucalyptus shirleyi* to 4 – 5 m on stony rises.

T1 (4 – 5 m): *Eucalyptus shirleyi*.

T2 (3.5 m): *Melaleuca monantha*.

S1 (1.2 m): *Grewia retusifolia*, *Eucalyptus shirleyi*, *Persoonia falcata*.

S2: Absent.

G (0.5 m): *Heteropogon triticeus*, *Cymbopogon bombycinus*, *Themeda triandra*, *Breynia oblongifolia*, *Xanthorrhoea johnsonii*, *Melinis repens*, *Arundinella setosa*, *Hibbertia stirlingii*, *Schizachyrium pseudoeulalia*, *Hibiscus meraukensis*.

Habitat Features: Limited to niche availability for reptiles (geckos and skinks) in outcropping rock jumbles.

Notes: This type is representative of what appears to be the most depauperate ground conditions in the study areas, and is also represented in other areas north and just south of the power line. The vegetation integrity rating is 2 due its proximity to an infrequently used vehicle track.

10.2.5 Vegetation Survey Site 5

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Eucalyptus drepanophylla* to 8 – 10 m on rocky surfaces of brow of hill.

T1 (8 – 10 m): *Eucalyptus drepanophylla*, *Corymbia citriodora*.

T2 (6 m): (*Melaleuca nervosa*), (*Corymbia leichhardtii*).

S1 (2 – 3 m): *Eucalyptus drepanophylla*.

S2: Absent.

G (0.6 m): *Xanthorrhoea johnsonii*, *Themeda triandra*, *Pseudopogonatherum contortum*, *Heteropogon triticeus*, Poaceae sp. (superficially similar to *Sarga plumosum*).

Habitat Features: Potential tree hollows in old specimens of *Corymbia citriodora*. A structurally simple vegetation type with limited floristic diversity.

Notes: The vegetation integrity rating is 2 due its proximity to an infrequently used vehicle track.

10.2.6 Vegetation Survey Site 6

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Eucalyptus cloeziana* and *Corymbia citriodora* to 8 – 10 m on uneven ground with rocky soils.

T1 (8 – 10 m): *Eucalyptus cloeziana*, *Corymbia citriodora*, (*Eucalyptus portuensis*).

T2 (5 – 7 m): *Corymbia citriodora*.

S1 (1.2 – 3 m): *Corymbia citriodora*, *Acacia calyculata*, *Grevillea parallela*, *Erythroxylon ellipticum*, *Jacksonia thesioides*, *Capparis canescens*, *Pogonolobus reticulatus*, *Persoonia falcata*, *Bursaria spinosa*.

S2: Absent.

G (0.3 – 0.9 m): *Grevillea dryandri*, *Indigofera pratensis*, **Vernonia cinerea*, *Heteropogon triticeus*, *Xanthorrhoea johnsonii*, *Tephrosia juncea*, *Schizachyrium pseudoulalia*, *Themeda triandra*, *Hibbertia stirlingii*, *Crotalaria brevis*, *Panicum effusum*, *Pseudopogonatherum contortum*, *Breynia oblongifolia*, *Lomandra* sp. (glaucous leaves), *Heteropogon triticeus*, *Grewia retusifolia*, *Aeschynomene micranthos*, *Arundinella setosa*.

Habitat Features: Not recorded.

Notes: The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement.

10.2.7 Vegetation Survey Site 7

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Low woodland of *Eucalyptus lockyeri* to 5 m on rocky, uneven surfaces.

T1 (4 – 5 m): *Eucalyptus lockyeri*.

T2 (3 m): (*Melaleuca viridiflora*).

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Sparsely vegetated with limited important habitat opportunities, except perhaps rocky ground surface (geckos and skinks).

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement.

10.2.8 Vegetation Survey Site 8

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Callitris intratropica* to 8 m on stony and rocky soils.

T1 (8 m): *Callitris intratropica*, (*Eucalyptus lockyeri* subsp. *exuta*).

T2 (4 – 5 m): *Corymbia leichhardtii*.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Limited due to absence of complexity is vegetated layers. Although not recorded, the ground and shrub layers are simple with limited floristic diversity.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement.

10.2.9 Vegetation Survey Site 9

Mapped RE: 7.12.34 (Least Concern under VMA)

Field Description: Woodland of *Corymbia leichhardtii* and *Eucalyptus lockyeri* subsp. *exuta* to 10 m on very rocky surfaces.

T1 (10 m): *Corymbia leichhardtii*, *Eucalyptus lockyeri* subsp. *exuta*, (*Eucalyptus cloeziana*).

T2 (6 – 8 m): *Corymbia leichhardtii*, *Eucalyptus lockyeri* subsp. *exuta*.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Limited due to absence of complexity is vegetated layers. Although not recorded, the ground and shrub layers are simple with limited floristic diversity.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.10 Vegetation Survey Site 10

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Eucalyptus shirleyi* to 5 m on rocky surfaces.

T1 (5 m): *Eucalyptus shirleyi*, (*Callitris intratropica* emergent to 8 m).

T2: Absent.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Tree hollows not observed. As with other areas where *Callitris intratropica* is present, this tree provides useful perching opportunities, but rarely exhibits hollows due to its

resilience to decay. Minimal structural layering in vegetation, and limited diversity in ground and shrub layers.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.11 Vegetation Survey Site 11

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Woodland of *Eucalyptus drepanophylla* to 12 m on sloping ground.

T1 (12 m): *Eucalyptus drepanophylla*, (*Corymbia leichhardtii*).

T2: Not recorded.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Not recorded in detail; although tree hollows possibly present. Greater structural diversity and layering than sites to south-west (supporting *Eucalyptus shirleyi*). Potential edge zone of refugial areas leading into watercourse.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.12 Vegetation Survey Site 12

Mapped RE: 7.12.34 (Least Concern under VMA)

Field Description: Woodland of *Corymbia leichhardtii* and *Eucalyptus granitica* to 10 – 12 m on sloping ground with rocky surfaces.

T1 (10 – 12 m): *Corymbia leichhardtii*, *Eucalyptus granitica*, (*Corymbia citriodora*).

T2: Not recorded.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Not recorded in detail; although tree hollows possibly present. Has greater structural diversity and layering than sites to south-west (supporting *Eucalyptus shirleyi*). Has potential edge zone of refugial areas leading into watercourse.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.13 Vegetation Survey Site 13

Mapped RE: 7.12.34 (Least Concern under VMA)

Field Description: Woodland to open forest of *Eucalyptus cloeziana* and *Corymbia citriodora* to 15 m on side of rocky hill.

T1 (12 – 15 m): *Eucalyptus cloeziana*, *Corymbia citriodora*.

T2: Not recorded.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Not recorded in detail; although tree hollows possibly present in old *Corymbia citriodora* trees. Has greater structural diversity and layering than sites to south-west (supporting *Eucalyptus shirleyi*). Has potential edge zone of refugial areas leading into watercourse.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.14 Vegetation Survey Site 14

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Woodland of *Eucalyptus portuensis* to 8 m on rocky hill slope approaching ridge.

T1 (8 m): *Eucalyptus portuensis*.

T2 (5 -6 m): *Eucalyptus lockyeri* subsp. *exuta*.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Reduction in structural layering and floristic diversity, which is likely to correspond with lesser habitat resources and fewer niche opportunities. Tree hollows not observed.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared track immediately below the power line; otherwise, vegetation is relatively intact.

10.2.15 Vegetation Survey Site 15

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Mixed woodland of *Corymbia abergiana*, *Eucalyptus lockyeri* subsp. *exuta*, *Corymbia citriodora* and *Eucalyptus shirleyi* on ridge with pale soils and scattered surface rocks (with small areas of rock pavement).

T1 (6 – 8 m): *Eucalyptus lockyeri* subsp. *exuta*, *Corymbia citriodora*, (*C. abergiana*).

T2 (4 – 5 m): *Eucalyptus shirleyi*.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: No tree hollows observed. Probable niche opportunities for reptiles (geckos and skinks) in fissures and flakes associated with scattered rock pavements. Vegetation structural layering is simple. Although recorded in detail, ground and shrub layer diversity is relatively low.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared vehicle track; otherwise, vegetation is relatively intact.

10.2.16 Vegetation Survey Site 16

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Woodland of *Eucalyptus cloeziana* and *E. portuensis* with *Callitris intratropica* to 8 m on ridge with pale, rocky soils.

T1 (8 m): *Eucalyptus cloeziana*, *E. portuensis*, *Callitris intratropica*, *Corymbia citriodora*.

T2: Not recorded.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Potential for tree hollows in older specimens of *Eucalyptus cloeziana* and *Corymbia citriodora* trees, but not observed. Structural layering and floristic diversity is expected to be higher than turbine site 56 (VP 15), as this trait has been observed at other sites where *E. cloeziana* occurs.

Notes: Observational survey from vehicle. The vegetation integrity rating is 2 due to close proximity of site to power line and cleared easement. Significant disturbance is restricted to the cleared vehicle track; otherwise, vegetation is relatively intact.

10.2.17 Vegetation Survey Site 17

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Low open woodland to woodland of *Eucalyptus portuensis* and *Allocasuarina littoralis* to 4 m.

T1 (4 m): *Eucalyptus portuensis*.

T2 (3 m): *Allocasuarina littoralis*.

S1 (1 – 1.5 m): *Xylomelum scottianum*, *Eucalyptus portuensis*, *Jacksonia thesioides*, *Persoonia falcata*.

S2: Absent.

G (0.5 m): *Aristida* sp. (*utilis*?), *Themeda triandra*, *Helichrysum newcastlianum*, *Tephrosia juncea*, *Grevillea dryandri*, *Evolvulus alsinoides*, Epacridaceae sp., *Jacksonia thesioides*, *Hibbertia stirlingii*, *Crotalaria brevis*, *Panicum effusum*, *Schizachyrium pseudoulalia*, *Tricoryne anceps*, **Vernonia cinerea*, *Xanthorrhoea johnsonii*, **Crassocephalum crepidioides*, **Praxelis clematidea*, *Breynia oblongifolia*, *Lindernia* sp.

Habitat Features: Potential habitat for skinks and geckos in angular rocks that characterise the ground surface.

Notes: Small area of perched rocks. The vegetation integrity rating is 1. This site was unaffected by the previous season's fires.

10.2.18 Vegetation Survey Site 18

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Low woodland of *Corymbia abergiana* and *Eucalyptus portuensis* to 5 – 6 m on broad ridge with pale, sandy soil.

T1 (5 – 6 m): *Corymbia abergiana*, *Eucalyptus portuensis*.

T2: Absent.

S1 (1.2 m): *Acacia calyculata*.

S2 (0.6 m): *Acacia calyculata* – formed by mass regrowth of basal coppice shoots after fire event.

G (0.6 m): *Arundinella setosa*, *Mnesithea formosa*, *Lomandra* sp., *Helichrysum newcastlianum*, *Grevillea dryandri*, *Phyllanthus* sp., **Crassocephalum crepidioides*, *Cheilanthes* sp., *Xanthorrhoea johnsonii*, *Jacksonia thesioides*, Epacridaceae sp., *Aeschynomene micranthos*.

Habitat Features: Limited due to development of thick *Acacia* thickets (i.e. absence of structural complexity). No tree hollows observed. Ground layer flora is simple.

Notes: Comparatively 'thicker' soil development than other sites on same ridge. Site affected severely by previous season's fires (~October 2009). The vegetation integrity rating is 1, given its separation from disturbance influences such as tracks and power lines.

10.2.19 Vegetation Survey Site 19

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Low woodland of *Corymbia abergiana* and *Eucalyptus portuensis* to 4 – 5 m on broad ridge.

T1 (4 – 5 m): *Corymbia abergiana*, *E. portuensis*, (*Callitris intratropica*).

T2: Absent.

S1 (~1.2 m): *Persoonia falcata*, (*Callitris intratropica*), *Acacia calyculata*, (*Eucalyptus shirleyi*), *Xanthorrhoea johnsonii*.

S2: Absent.

G (0.4 – 0.7 m): *Cymbopogon bombycinus*, *Grevillea dryandri*, *Aristida* sp., *Haemodorum coccineum*, *Vernonia cinerea*, *Helichrysum newcastlianum*, (*Eucalyptus shirleyi*), *Themeda triandra*, *Tricoryne anceps*, *Schizachyrium pseudoulalia*, *Jacksonia thesioides*, *Hibbertia stirlingii*.

Habitat Features: Relatively limited compared to other sites along the same ridge. The ridge topography is wider with greater development of the soil profile, but does not feature large class trees. The ground and shrub layers are structurally and floristically simple.

Notes: Affected severely by the previous season's fires (~October 2009), with scorch height extending through the canopies of trees. The vegetation integrity rating is 1, despite the site's unremarkable floristic composition. Northwards from this site, other sites along the ridge show similar traits of relatively simple floristic and structural composition.

10.2.20 Vegetation Survey Site 20

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Open forest of *Callitris intratropica* to 8 – 10 m on ridge.

T1 (8 – 10 m): *Callitris intratropica*, *Eucalyptus cloeziana* (emergent to 16 m).

T2 (8 m): *Corymbia citriodora*, *Callitris intratropica*.

S1 (1.5 – 2.0 m): *Corymbia abergiana*, *Acacia calyculata*, *Jacksonia thesioides*, *Larsenaikia ochreatea*.

S2: Absent.

G (0.4 m): *Glossocardia bidens*, **Praxelis clematidea*, *Euphorbia mitchellii*, *Cymbopogon bombycinus*, *Cheilanthes* sp. (glabrous), *Cheilanthes* sp. (hirsute, grey), *Helichrysum newcastlianum*, *Xanthorrhoea johnsonii*, *Themeda triandra*, Poaceae sp. (5 cm, tufted, very narrow leaves), Apiaceae sp. (forb), *Rhynchospora* sp., *Haemodorum coccineum*, Epacridaceae sp., *Schizachyrium pseudoulalia*, *Buchnera* sp., *Hibbertia stirlingii*, *Phyllanthus* sp., *Crotalaria brevis*, *Aeschynomene micranthos*, *Panicum effusum*.

Habitat Features: Site characterised by its rocky substrate and revealed areas of rock pavement. This occurs on edge of steep drop-away, and above rock shelves. Has potential edge zone of refugial habitat for plants. Tree hollows not observed, but possible in larger specimens adjacent to site in surrounding woodland.

Notes: At the time of the inspection, this site was not windy – unlike other sites along the same ridge. The vegetation integrity rating is 1.

10.2.21 Vegetation Survey Site 21

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Woodland to open forest to 14 m of *Eucalyptus reducta* and *Corymbia citriodora* on flat top ridge.

T1 (14 m): *Eucalyptus reducta*, *Corymbia citriodora*.

T2 (7 – 9 m): *Corymbia abergiana*, *Eucalyptus portuensis*.

S1 (1.6 m): *Persoonia falcata*, *Jacksonia thesioides*, *Acacia aulacocarpa*.

S2 (0.6 m): Formed as a response to fire, with uniform development of *Acacia aulacocarpa*.

G (0.4 m): *Themeda triandra*, *Leucopogon* sp., *Hovea nana*, *Grevillea dryandri*, Epacridaceae sp., *Panicum trichoides*, *Hibbertia stirlingii*, *Vernonia cinerea*, *Lomandra* sp., *Schizachyrium* sp., *Thysanotus tuberosus*, *Tricoryne anceps*, *Xanthorrhoea johnsonii*.

Habitat Features: Site occurs on edge of eastern fall of steep ridge, where large rocks form crevices and broad cracks: potential for geckos and other dependent reptiles. Has potential habitat for rare and threatened plant species on rock ledges below site. No tree hollows observed, but possible in older specimens.

Notes: Small patches of rock pavement. Site exhibits no evidence of disturbance, and hence the vegetation integrity rating is 1.

10.2.22 Vegetation Survey Site 22

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Rock pavement at terminus of ridge with sparse vegetation cover limited to scattered trees of *Corymbia citriodora* and *Eucalyptus leptophleba* to 4 m.

T1: Absent (scattered stunted trees present: *C. citriodora* and *Eucalyptus* sp. to 4 m).

T2: Absent.

S1 (1.2 m): *Persoonia falcata*, *Acacia disparrima*.

S2: Absent.

G (0.6 m): *Xanthorrhoea johnsonii*, *Dianella* sp. (*nervosa*?), *Themeda triandra*, *Cheilanthes* sp., *Pseudopogonatherum contortum*, Poaceae sp. (5 cm, tufted, very fine leaves), *Grevillea dryandri*, *Phyllanthus* sp., **Praxelis clematidea*, *Hibbertia stirlingii*, *Thelymitra fragrans*, **Ageratum conyzoides*, *Evolvulus alsinoides*, *Schizachyrium* sp., *Breynia oblongifolia*, *Tricoryne anceps*, *Panicum* sp.

Habitat Features: Very limited: absence of exfoliating rocks and vegetated layering. Possible tree hollows in older trees of surrounding area.

Notes: Very simple vegetation structure, where plants persist on a thin veneer of soil in patches (i.e. many bare areas of exposed rock). The vegetation integrity rating is 1 – 2, and the natural erosive effects of wind stripping appear to be the conspicuous modifier.

10.2.23 Vegetation Survey Site 23

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Shrubland to low woodland 4-8 m of *Acacia leptostachya* (thickets), *Eucalyptus portuensis* and *E. cloeziana* on western edge of ridge.

T1 (4-8 m): *Acacia leptostachya*, *Eucalyptus portuensis*, *E. cloeziana*.

T2 (4 m): *Acacia leptostachya*, (*E. shirleyi*), (*Callitris intratropica*), *Alphitonia excelsa*, (*E. pachycalyx*), *E. lockyeri* subsp. *exuta*.

S1 (0.6-3 m): *Acacia leptostachya*, *Grevillea glossadenia*, *Homoranthus porteri* (common), *Xanthorrhoea johnsonii*, *Capparis canescens*, *Persoonia falcata*.

S2: Absent.

G (0.6 m): *Haemodorum coccineum*, *Phyllanthus* sp., *Dodonaea* sp., *Lomandra* sp., *Xanthorrhoea johnsonii*, *Grevillea glossadenia*, *Homoranthus porteri*, **Praxelis clematidea*, **Chloris virgata*, *Themeda triandra*, *Thysanotus tuberosus*, *Panicum trichoides*, **Vernonia cinerea*, *Pseudopogonatherum contortum*.

Habitat Features: Habitat for two species of rare and threatened plants: *Homoranthus porteri* and *Grevillea glossadenia*. Expected habitat for *Acacia purpureopetala*, but not sighted in ground survey. Numerous habitat opportunities for fauna making transition from ranges to land to the west in the vicinity of Oak Creek. Tree hollows in older tree specimens (*Eucalyptus pachycalyx*).

Notes: Site is located to south-east of power line where land and ridges drop away dramatically to the west. Vegetation integrity rating is 2, with evidence of minor disturbance and presence of weeds in low abundance. *Acacia leptostachya* forms dense thickets on rocky substrates and is clearly associated with *Homoranthus porteri*, but less so for *G. glossadenia*, which grows amongst rhyolite rocks in fissures with poor soil development.

10.2.24 Vegetation Survey Site 24

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Open woodland to 8 m of *Eucalyptus portuensis* with *Allocasuarina inophloia* on colluvial slope.

T1: (8 m): *Eucalyptus portuensis*, *Allocasuarina inophloia*, (*E. cloeziana*), (*Corymbia leichhardtii*).

T2: (4-6 m): *Allocasuarina inophloia*.

S1 (1.2 – 2.0 m): *Allocasuarina inophloia*, *Melaleuca viridiflora*, *Melaleuca* sp. (multi-stemmed, hirsute branchlets), *Acacia leptostachya*, *Jacksonia thesioides*, (*Eucalyptus shirleyi*), *Persoonia falcata*.

S2: Absent.

G (0.6 m): *Breynia oblongifolia*, *Rhynchospora* sp., (**Crassocephalum crepidioides*), *Haemodorum coccineum*, *Schizachyrium pseudeulalia*, *Phyllanthus* sp., *Pseudopogonatherum contortum*, *Xanthorrhoea johnsonii*, *Eriachne* sp., *Themeda triandra*.

Habitat Features: Limited, simple ground and shrub layer flora. Surface rocks absent – soil is sandy. Tree hollows not observed, large class trees not present.

Notes: A relatively simple vegetation type with little structural development. The vegetation integrity rating is 2, and is affected by the proximity of the power line to the south of the survey site (presence of the Asteraceae weed *Crassocephalum crepidioides* is a part-indicator of nearby land disturbance). Fires had affected the ground and shrub layer significantly, many woody species regenerating from basal coppice shoots.

10.2.25 Vegetation Survey Site 25

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Small rock pavement surrounded by low woodland of *Eucalyptus portuensis* to 6 m.

T1 (6 m): Absent on rock pavement, but formed by *Eucalyptus portuensis* (6 m), *Corymbia citriodora* in surrounding woodland.

T2: Absent on rock pavement.

S1 (1.5 - 3 m): *E. portuensis*, *E. shirleyi*, *Clerodendrum floribundum*, *Dodonaea lanceolata*, *Callitris intratropica*, *Breynia oblongifolia*, *Grevillea parallela*, *Xanthorrhoea johnsonii*, *Tephrosia* sp., *Acacia humifusa*, *A. leptostachya*, *Persoonia falcata*, *Erythroxylon ellipticum*, *Capparis canescens*, *Jacksonia thesioides*, *Melaleuca* sp. (multi-stemmed, hirsute branchlets).

S2: Absent.

G (0.3 – 0.7 m): *Crotalaria brevis*, *Helichrysum newcastlianum*, *Heteropogon contortus*, **Praxelis clematidea*, *Commelina ensifolia*, *Themeda triandra*, *Panicum trichoides*, *Euphorbia mitchellii*, *Cymbopogon bombycinus*, *Vernonia cinerea*, *Polycarpaea spirostylis*, *Pterocaulon sphacelatum*, *Lomandra* sp. (grey short leaves, apex obtuse), *Eustrephus latifolia*, *Schizachyrium pseudeulalia*, indeterminate fern species.

Habitat Features: Niches for geckos, skinks amongst rocks, but site lacking exfoliating faces. Tree hollows possibly present in larger trees adjacent to survey area. Sheltered aspect to west of site, where land drops away steeply.

Notes: Narrow site will require significant levelling. Access tracks proposed along very narrow sections of ridge. The vegetation integrity rating is 1 given the absence of disturbance and very low abundance of introduced plant species (scattered individuals of *Praxelis clematidea*).

10.2.26 Vegetation Survey Site 26

Mapped RE: 9.12.4c/9.12.2 (both Least Concern under VMA)

Field Description: Rock pavement surrounded by shrubland of *Acacia leptostachya* to 4-5 m.

T1: Absent on rock pavement, but formed by *Eucalyptus portuensis* and *E. lockyeri* subsp. *exuta* in surrounding woodland.

T2: Absent on rock pavement, but *Callitris intratropica* in surrounding woodland.

S1: *Acacia leptostachya*, *Callitris intratropica* – peripheral zones of rock pavement. Otherwise: *Jacksonia thesioides*, *Dodonaea lanceolata*, *Eucalyptus shirleyi*, *Persoonia falcata*, *Alphitonia excelsa*, *Petalostigma pubescens*, *Larsenaikia ochreatea*.

S2: Absent.

G: *Eriachne ciliata*, *Breynia oblongifolia*, *Borya septentrionalis*, *Lomandra filiformis*, *Drynaria rigidula*, *Xanthorrhoea johnsonii*, *Cheilanthes* sp., *Rhynchospora* sp., *Apiaceae* sp., *Aristida utilis*, *Waltheria indica*, *Poaceae* sp. (5 cm, very fine leaves), *Polycarpaea spirostylis*, *Schizachyrium pseudeulalia*, *Evolvulus alsinoides*, (**Praxelis clematidea*), *Helichrysum newcastlianum*.

Habitat Features: Long-term availability is limited to the cover given by large rock flakes (Cogger's Gecko). Short-term availability of water is surface scoops on pavement. No tree hollows observed.

Notes: The site of the turbine supports very little vegetation. Surrounding woodland has higher diversity with high levels of natural integrity with little if any weeds or evidence of disturbance.

10.3 Important Vegetation Communities and Habitats

Specialist habitats for plants were recognised in the project area across a range of landscape situations. The study area is broadly characterised by the perched basin located centrally and surrounded by undulated landforms which are terminated at the periphery by dissected, rocky ridge lines. These ridges are the preferred locations for a majority of the wind turbines.

The intermittently flowing Granite Creek passes more or less through the centre of the study area - flowing from south to north. This watercourse culminates in a series of pools and waterfalls before its outfall through the gorge at the northeast of the study area (just east of Walsh Bluff). Given the presence of this water in a mostly dry landscape, it is expected that small nodes of plant habitats could occur in the gorge in sheltered positions, although these will not be affected by the wind farm proposal. The gorge could be considered partially fireproof, and therefore constitutes an important refugial area for fauna as well as discrete vegetation types.

Despite Granite Creek not being directly affected by the wind farm proposal, this watercourse has important ecological values. Although not directly impacted by the need to clear vegetation for the establishment of turbines, access tracks that may have to cross this feature should take into consideration its ecological relevance in that it forms an important artery for ecological 'flows' through the project area. Watercourses can act as conduits for wildlife through the landscape, where even poorly treed features afford some cover and resources, and can link important habitats within a broad region.

The ridge country, particularly south of the existing power line, features niche habitats in highly restricted situations for a unique range of species not found elsewhere in the study area. Soil genesis at these sites is minimal and tends to be accumulated deposits from weathered rhyolite settling between rocks and in fissures. These soils are however, enriched with organic matter rendering their texture somewhat peat-like, with greater water holding capacity than less organic soils on broader landforms. These niches are almost exclusively occupied by low growing heath-type plants, mostly with microphyll or reduced needle-like leaves. Where trees have established, these are stunted, wind-sheared forms with coarse, often tessellated bark. Nearly all the ridge sites inspected had been affected by fire in the latter half of 2009 (probably around October). Clearing of ridgelines could result in the loss or reduction of specialist plant communities reliant on the unusually characterised

substrate and extreme exposure. Proposed clearing of this landform type will be limited to tracks of between 5 and 10 m (expected to regenerate to 5 m width after construction), and turbine footprints of 30 x 40 m. Turbines are spatially separated by 300-400 m, and therefore, gross modification is unlikely to occur. There is also some probability that species of conservation interest could occupy these niches given their relatively small area and inaccessible locations, which renders them less prone to disturbance from anthropogenic sources. Species that are known to occur in this type of landform include *Homoranthus porteri*, *Grevillea glossadenia*, *Acacia purpureopetala*, and the poorly known *Melaleuca uxorum* amongst others. Detailed ground searches would be required at each proposed turbine location to determine whether such species occur.

Ridges to the north of the power line and dominated by trees of *Eucalyptus granitica* and *E. portuensis* did not support the same diversity of plant species described above, and have a simpler ground flora with lower abundance of heath-like plants.

10.3.1 Summary of Habitat Types

The rugged, dissected terrain of the study area creates several habitat types for flora and fauna. These habitats include:

- Dissected and rocky ridgelines of granite and rhyolite geology, including knolls of outcropping rock. The vegetation structure in these exposed situations rarely develops beyond woodland and is primarily sparse, low open woodland. Around wind turbine site 44, the vegetation structure is open forest, probably due to the marginally higher shelter aspect and less exposure to constant wind.
- Undulating hills of less rugged terrain supporting woodland to open forest (occasionally). Trees on this landform are taller, have wider girths and present a number of tree hollows greater than 10 cm diameter. Kangaroo grass (*Themeda triandra*) and giant spear grass (*Heteropogon triticeus*) dominate the grass layer. The primary species of trees in this situation are *Corymbia citriodora*, *Eucalyptus cloeziana*, and *E. portuensis*.
- Low bank environments adjacent to watercourses with temporary flow (steeper bank systems occur where land falls away from the 'plateau' to lower-lying areas to the east of the project area). This habitat type is characterised by exposed root systems of *Lophostemon grandiflorus* and sometimes *Callitris intratropica* trees, which along with large, angular rocks and boulders create deep crevices and capture points for organic matter with higher moisture content and a localised humidity than the surrounding woodland.
- Rock pavements, generally in elevated situations, are exposed and support wind-sheared, heath-like plants. Trees when present, are sparsely represented, and are invariably stunted with gnarled forms. Wattles (usually *Acacia calyculata* and *A. leptostachya*) sometimes create dense, impenetrable thickets around bare rock surfaces where some semblance of soil development has occurred. The resurrection plant *Borya septentrionalis* finds a foothold in hollowed scoops on these rock pavements. These small surface hollows also afford short-lived watering points for fauna on an otherwise desiccated landform. This landform is also the preferred habitat for rare and threatened plants including *Grevillea glossadenia*, *Homoranthus porteri* and *Plectranthus amoenus*.
- Sheltered valleys and broad gullies supporting higher densities of trees (bloodwoods). Some of these areas should be considered as partially fire-resistant niches, and are therefore important as refugial zones for fauna and nodes of more mesophytic vegetation than surrounding sclerophyll vegetation. These zones also support a longer-term soil-water status and promote a higher percentage foliage cover; where the vegetation structure merges to open forest communities where the moisture gradient is highest and more persistent.

- Micro-gilgai and semi-aquatic environments (algae encrusted depressions on flat, clay plains and country with no or slight surface relief). These are temporary features and dependent solely on rainfall, and thus evaporate relatively quickly. Algal crusts are occasionally present where grasses have not been able to establish. These are potential micro-habitats for semi-aquatic plants such as *Rhamphicarpa australiensis*. Although this conservation significant species was not observed, it has been collected from north of the project area around Nardello's Lagoon.

10.3.2 Significant Flora

A number of conservation significant plants were identified in the desktop review of literature and databases (HERBRECS, Wildlife Online, EPBC Act's Protected Matters search tool) as potentially (or confirmed) occurring in the project area. These searches provide a useful background from which to determine where targeted ground investigations are best directed. Field surveys were then made of the range of habitats for conservation significant flora considered to be representative of the project area that will be potentially affected (impacted) by the proposed wind farm.

Ground searches detected three species of plants noted as being of conservation interest under both Queensland and Commonwealth legislation. These were the shrubs *Grevillea glossadenia* (**Plate 1**) and *Homoranthus porteri* (**Plate 2**), and the succulent *Plectranthus amoenus*. These species are found in association with ridge topography, skeletal soils and rock pavements (for example, RE 7.12.65).

No other species rare or threatened flora species were recorded during the surveys; however, this does not imply that species such as *Acacia purpureopetala* and *Melaleuca uxorum* do not occur in the project area. It is also important to recognise that the probability of emergence of the ground flora is imminent following rainfall, and therefore a range of forbs, grasses and subshrubs may become apparent from March onwards (April and May are considered to be appropriate months for gaining a representative account of the ground layer vegetation in north Queensland). In this respect, it is recommended that detailed flora surveys of the groundlayer at potentially affected sites should be undertaken prior to construction when conditions are conducive to active growth and flowering of this important vegetation stratum.

For species of flora listed under the EPBC Act 1999, a separate referral under the Act is being submitted to SEWPAC to address the appropriate strategies for mitigation.

For those species of conservation significant flora listed under Queensland's *Nature Conservation Act 1992* (and the schedules of the associated *Nature Conservation (Wildlife) Regulation 2006*), a clearing permit will be required. The permit is issued by DERM and requires information regarding the number of each species to be cleared, the respective schedule of the Regulation under which the species is listed, and a range of strategies outlined to offset the impacts from clearing the species.

In respect to the the NCA, the following species are listed under Schedule 3 of the Regulation: *Acacia purpureopetala*, *Grevillea glossadenia*, *Homoranthus porteri* and *Plectranthus amoenus* (all vulnerable). *Melaleuca uxorum* is listed under Schedule 2 (endangered).



Plate 1. *Grevillea glossadenia*. Top – whole plant (shrub to 1.2 m). Bottom – seedling.

Plate 2. *Homoranthus porteri*. Top – whole plant (shrub to 1.7 m). Bottom – flower and leaves.

Photos taken from Mt Emerald wind farm site (S. Gleed, 2010)

11.0 Potential Impacts to Vegetation and Flora

11.1 Vegetation & Flora Impacts

The potential impacts of the project are difficult to categorise and quantify at this stage of the investigation as the preliminary layout may change as a result of detailed site planning and approval conditions. Nevertheless, it is expected that linear and patch clearing of vegetation will be required for the construction pad of each turbine (approximately 30m x 40m), construction of access tracks and where underground cabling is required to connect each turbine and finally connect to the main electricity grid. Such clearing has the potential to interrupt connectivity of vegetation and remove important wildlife microhabitats such as standing and fallen tree hollows and boulder piles in some areas. This is particularly relevant for the narrow ridges that characterise a majority of the sites chosen for turbine placement. These impacts can however, be mitigated or substantially reduced with considered placement of each wind turbine and the incorporation into the construction phase of a range of specially developed impact mitigation strategies.

Direct impacts on flora are expected to occur during the construction phase of the project. Hard stand construction pads, access tracks and trenching for underground cabling that links each turbine and eventually feeds into the electricity grid will require vegetation clearing. In non-remnant areas (i.e. the existing cleared corridor of the power line easement), these impacts are considered of less significance from an environmental perspective. Nevertheless, the immediate effects of linear clearing within woodland remnants introduces a range of impacts, most of which could be managed and offset through the provision of stringent work practices determined through the compilation of detailed Environmental Work Plans (EMPs).

The ingress of weeds into otherwise weed-free sites is also a possibility, with confirmed evidence that the grass weed *Themeda quadrivalvis* (grader grass) has already established in linear strips and patches associated with the existing powerline through the project area. This species tends to establish in thick, banded swards and can quickly out-compete native grasses and other native plants. The dry bulk (dead foliage and seed heads) of grader grass has the capacity to exacerbate fires by developing abnormal fuel loads.

Given that the project area is relatively unaffected by serious weed incursion, the ecological integrity of vegetation has the potential to be compromised, and in the worst case scenario, irreversibly altered by the ingress of noxious plants.

Human visitation and machinery movement (during construction and infrequently during maintenance activities) is likely to have a temporary impact assuming that such activities are undertaken and offset with consideration to Weed Management Plans, EMPs and other specifically prepared management strategies.

The stripping and loss of ground vegetation has the potential to exacerbate soil erosion unless checked by appropriate erosion and sediment control measures and a recovering of bare soil surfaces with plant matter. It is recommended that a suite of locally occurring native plants are researched and designated for site rehabilitation.

The construction of access tracks and the turbine construction pads could result in impacts to plants of conservation interest, particularly in the south of the project area. Here, plant diversity is influenced by the proximity to Mount Emerald, as this area is known for its concentration of species of

conservation interest, where plants such as *Acacia purpureopetala*, *Grevillea glossadenia*, *Homoranthus porteri* and *Plectranthus amoenus* have been collected.

Based on HERBRECS data (Queensland Herbarium, 2001a), it is noted that these species are not entirely restricted to this portion of the project area, and their presence, and possibly other species could occur in the vicinity of Walsh Bluff and in similar habitats along ridges of the western portion of the project area. Dedicated rare and threatened plant surveys should be undertaken prior to the construction stage and when the final configuration of the wind farm is determined.

Direct impacts to vegetation communities will be most prevalent at each turbine site and along the road and cabling network that is proposed to connect each turbine and eventually to the main electricity grid. These impacts will result from vegetation clearing and ground surface levelling expected to be in the order of 20 or 30m wide for turbine construction pads, and road-cabling access tracks expected to be approximately 10 metres wide.

Removal of vegetation along narrow ridges at a number of turbine sites will result in a thin band of trees remaining either side of the clearing. Clearing of vegetation in these width-restricted situations could result in loss of discrete vegetation communities – many of which are too narrow or small in area to accurately show on mapping. For example, short sections of the ridgeline between turbines 42 and 50 support a band of *Eucalyptus abergiana* (range bloodwood) trees. Generally, this community is expressed as an area no wider than 20m, where the ridge falls away abruptly and almost vertically to the northeast and more gradually to the southwest. Loss of the canopy in these situations could result in a different group of species developing in the ground layer at the edge of the clearing.

Ridges also support heath-type vegetation comprising low shrubs and plants which occupy small niches. These inconspicuous plant communities could be irreversibly altered given the scale of clearing required to accommodate a wind turbine. It is not known how these communities will respond to disturbance of this nature, or what successional traits will occur. For example, whether the communities will be replaced by a similar floristic composition or whether a different suite of colonising plants will eventuate. One scenario could be a community dominated by the wattle *Acacia calyculata*, which occurs naturally, but could preclude the growth of other native species.

Vegetation clearing will also remove and modify the groundcover, whether this comprises grasses and herbaceous plants, or rocky cover. On rocky country, plants are woody sub-shrubs with stunted and contorted forms – an adaptation to persistent wind shearing, lower temperatures, lengthy periods of dry and rapidly drained substrates. Whether these plant communities are able to recuperate after significant alteration is unknown. A possible result is a change in floristic composition to more herbaceous species, or replacement by colonisers such as wattles (*Acacia* spp.) as discussed above.

The creation or widening of access tracks could in some situations, result in the ground surface being, at least temporarily, destabilised by machinery beyond its natural condition. Possible impacts in this sense could include the transport of sediment, the development of rill and gully erosion, as well as possible sheet erosion after heavy rainfall events. Given the gravelly-clay nature of the substrate over most of the study area, the movement of finer soil particles can be expected. It was observed during the surveys that the vehicle track entering the site to higher elevations had recently been resurfaced by a bulldozer, and within five days of traversing this track, the surface had been reduced in many sections to fine dust. This effect could be heightened along ridges where the zone of erosion is not contained due to the ridge dropping off either side. In this situation, surface erosion of narrow ridges could 'spill' over, carrying sediment to downhill settlement areas. Accumulated soil deposits could create favourable niches for weed development. Rock armouring of these edges is advised, and

should be incorporated into the mitigation methods implemented under the erosion and sediment control plan.

A discernible characteristic of the study area is its rugged and markedly dissected ridge topography. This landscape situation becomes increasingly pronounced at the study area's southern end, and sections of the western edge. The provision of wind turbines on these ridges (many of which are narrow with very steep to near-vertical sides) will require the establishment of a series of access tracks and construction pads and the need to clear undisturbed vegetation. Clearing of these ridgeline communities could result in fragmentation of the vegetation's current contiguous condition. It is noted however, that the original cleared width of 10 m will be allowed to regenerate under natural circumstances to 5 m width: at which stage vegetation connectivity will be in an improved state.

12.0 Impact Mitigation – Vegetation & Flora

12.1 Vegetation Clearing

- All vegetation clearing should be restricted to the actual development footprint. Careful micro-site locating of roads, cabling and turbine construction pads should be undertaken to minimise potential impacts. All areas to be cleared should be visibly marked taking into account poorly represented plant communities, important habitats and conservation significant flora.
- Turbine locations should be ‘micro-sited’ to take advantage of areas of least ecological significance to further protect native vegetation and habitats.
- Access roads and cabling should be aligned along existing tracks wherever possible to minimise vegetation removal and loss of hollow-bearing trees, the number of easements, and the spread of weeds.
- Power line (cabling) between turbines should be constructed underground and along existing road and track infrastructure to minimise the area of remnant vegetation clearing and potential for disrupting vegetation connectivity. After initial clearing and construction, the cabling and road network should be allowed to regenerate under natural conditions to 5 m cleared width. Similarly, natural regeneration of plants should be promoted around wind turbines at each construction footprint as soon as possible after clearing and disturbance.
- A wildlife ‘spotter-catcher’ should be engaged to oversee construction work at each site where clearing of vegetation, particularly mature trees with hollows, is required. In the event that fauna are found in hollows or other nests, these individuals should be relocated to an appropriate site and the Queensland Parks and Wildlife Service should be contacted with the details of the find. Stranded or injured fauna should be cared for by a qualified and licensed wildlife carer.
- Where possible, all dead standing timber and living, hollow-bearing trees should be retained. These hollow-bearing trees have reached mature age and senesced as a natural consequence, and old trees such as these provide important and nesting and roosting habitats for a variety of fauna species, including many of conservation significance.
- Where construction requires felling of vegetation, logs and coarse woody debris should be retained on the site and as close to where it was felled as possible without increasing fire hazards in the immediate vicinity of turbine sites. Retention of this woody matter increases the diversity of the ground layer habitat. Stockpiling of felled timber should be avoided in order that fuel loads and the potential for severe bushfires is offset to most practical level. Scattering felled vegetation around the cleared site is less likely to concentrate fuel loads in one place.

12.2 Weed Management

- Weed management is critical given that invasive species such as *Themeda quadrivalvis* (Grader Grass) are well-known to have a detrimental effect on the function of woodland and open forest plant communities in north Queensland and elsewhere in Australia. The invasion of some introduced pasture grasses (e.g. Gamba Grass, Thatch Grass and Grader Grass) is of particular concern, as these species can out-compete native grasses and increase fuel loads promoting intense, extensive late dry season fires. Such fires may be detrimental to conservation significant species by causing direct mortality both from exacerbated fire frequency and intensity, or by promoting the development of exclusive, exotic plant communities.
- A property-based Weed Management Plan (WMP) should be developed that addresses the strategies and impact mitigation for deleterious species. The WMP should be informed by the findings of a pre-construction weed survey, and evaluated and adapted according to a post-

construction weed survey (see following recommendation).

- A pre and post-construction weed survey should be completed once the final layout is confirmed. The pre-construction weed survey will identify the location and severity of weeds and their populations in the project area. The post-construction weed survey should be undertaken after construction is completed and allowing for the seasonal emergence of weeds; for example, 6-12 months after final construction. This survey is important to evaluate the effectiveness of weed control measures (e.g. vehicle and machinery washdown facilities, pre-control of weeds along entry road). The post-construction survey will inform whether the WMP requires adaptation according to actual field conditions.
- In the event that serious environmental or declared weeds are detected prior to the post-construction survey, control should be implemented as a matter of priority in order to arrest seed-set. Small populations of weeds are easier and can be more effectively controlled than established populations.
- All incidences of new weed introductions should be controlled and managed as a priority. This is particularly relevant to 'declared' species listed under Queensland legislation. Exotic species of pasture legumes such as Wynn Cassia (*Chamaecrista rotundifolia*) and Stylo (*Stylosanthes* spp.), as well as exotic grasses and plants should not be used for soil stabilisation. These species can be serious detractors from natural vegetation values and can become problematic weeds that compromise the integrity of native plant communities, and limit the rate of successful natural plant regeneration.
- A properly designed and managed vehicle wash-down bay should be constructed at the base of the project area in a weed free zone. During construction and maintenance, all vehicles and machinery should be washed down and prior to entering the site. Appropriate vehicle inspections and protocols should be stringently followed.
- Both sides of the access road at the base of the project area are currently infested with weeds such as Grader Grass (*Themeda quadrivalvis*) and Hyptis (*Hyptis suaveolens*) amongst several other species. This stretch of the road poses a significant risk in transporting weeds into the site, and concerted weed control is required prior construction machinery entering the site. Concurrently, consideration should be given to revegetating this entry point with locally occurring native plants; notably wattles (*Acacia* spp.) that will over time, assist in precluding the re-establishment of invasive grasses and weeds.

12.3 Vegetation Mapping

- The Regional Ecosystem mapping for the section of the project area south of the existing powerline (i.e. the area represented in the Wet Tropics bioregion) is incorrect. Mapping erroneously identifies the Of Concern RE 7.12.57 as occurring along ridges and the land that is intersected by a number of proposed wind turbines. It is recommended that the mapping is rectified by way of submitting an appropriate map amendment to the Queensland Herbarium (DERM). Although the mapping is provisional at this stage and will require further refinement prior to submission to DERM, the proposed mapping units to replace RE 7.12.57 is a heterogeneous polygon that includes RE 7.12.30b / 7.12.65k with an approximate representation of each type of 80 / 20 percent respectively. These communities are listed as Least Concern under the *Vegetation Management Act 1999*. Therefore, from a legislative viewpoint, an approved mapping amendment negates the requirement to clear Of Concern remnant communities. It is also noted that endangered remnant communities do not occur in the project area.

12.4 Vegetation Connectivity

- Initial vegetation clearing should be kept to the absolute minimum width necessary to facilitate machinery movement and access. Clearing should not exceed 10 m wide for tracks and 30 m for turbine construction pads. All access tracks should be allowed to regenerate to a width of 5 m or less. The regenerating vegetation should comprise native species only, and vigilance will need to be exercised to ensure that weeds are not allowed to establish.

12.5 Vegetation Integrity

- Any vegetation rehabilitation efforts should adopt the use of locally occurring plants species, and with a regional provenance with consideration given to the geology and distinct landforms of the project site. No introduced plants should be used for this purpose or for landscaping for 'aesthetic' reasons. Weeds should not be allowed to detract from the vegetation or floristic integrity of the project site.

12.6 Rare and Threatened Plants

- Avoidance of populations of rare and threatened plants is the preferred mitigation measure. This can be achieved by micro-situating each turbine where such species are found. In the event that rare and threatened plants are found along access tracks or in positions where clearing is unavoidable, a translocation plan or propagation plan should take effect.
- A dedicated, property-based Threatened Plant Management Plan should be developed. This should include photographic and descriptive accounts of the conservation significant plants likely to be present on the site, and strategies for translocation in accordance with the requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Queensland's *Nature Conservation Act 1992*. Specific reference should be made to the guidelines presented in Vallee *et al.* (2004) for the translocation of threatened plants.
- All populations of rare and threatened plants should be identified in the areas where vegetation is to be cleared prior to the vegetation being removed. Species that will be encountered include *Grevillea glossadenia*, *Homoranthus porteri* and *Plectranthus amoenus*. Others species that may be encountered include *Acacia purpureopetala* and possibly *Melaleuca uxorum*. For species listed under the NCA, a clearing permit will be required from DERM. For species listed under the EPBC Act, a referral is being submitted to SEWPAC.
- There is a reasonable probability that conservation significant plants can be successfully managed, and opportunities for translocating or propagating such species should be investigated. For example, *Grevillea glossadenia* was observed to successfully establish in highly disturbed ground around the wind monitoring tower. Similarly, *Homoranthus porteri* has been successfully propagated in the nursery industry. The succulent *Plectranthus amoenus* is unlikely to present difficulties in cultivation due to its known ease of reproduction through vegetative cuttings. Rare and threatened plants should be considered for incorporation into rehabilitated areas. For example, there may be opportunities to use these species around the turbine construction pad after construction or in machinery turn-around areas.

12.7 Landscape Rehabilitation

- After construction, cleared land such as machinery turn-around areas, borrow pits and peripheral areas to turbine construction pads should be rehabilitated using native plants known to occur in the region surrounding the project site and on similar landform and geology. The use of exotic species of plants should not be permitted.
- A Rehabilitation Plan should be prepared in accordance with the fundamental criteria outlined

above, and should include a strategic element of rehabilitation monitoring to assess the success or otherwise of rehabilitation works.

- To assist the natural regeneration process, any topsoil or soil matter from the upper horizon should be scraped to the edge of the tracks and turbine construction footprints. This 'medium' has the potential to hold reserves of native plant seed, and should be re-spread over the construction footprint after turbines are erected and related construction work is finalised.
- Seed collection of plant species from a localised provenance (i.e. within the project area), should be considered prior to vegetation clearing in order to accumulate suitable stock for rehabilitation work.
- Consideration should be given to incorporating rare and threatened plant species such as *Grevillea glossadenia* and *Homoranthus porteri* into rehabilitation. Opportunities will be presented where individuals of these species (and others) could be transplanted *in situ*, thereby maximising their chances of successful establishment. *Grevillea glossadenia* was observed to successfully establish on disturbed ground around the wind monitoring tower near proposed turbine 50.

12.8 Fire Management

This report does not propose specific fire management protocols or regimes. Nevertheless, fire is an important landscape function and should be managed in respect to vegetation communities, cultural significance and human safety. Appropriate advice should be sought in respect to this matter. Burning of cleared (windrowed) vegetation should not be allowed, unless specifically endorsed in a Fire Management Plan.

13.0 Conclusion – Vegetation & Flora

Environmental diligence should be commensurate with many of the unique the ecological values held in the project site. Some of these important values include the dominance of undisturbed vegetation communities, where almost the entire site where wind turbines are proposed to be located is covered by remnant vegetation (as defined under the *Vegetation Management Act 1999* and shown on current Regional Ecosystem mapping). The project site's elevation, vegetation coverage and presence of a number of rare and threatened plant species requires the need to observe and practice higher order levels of environmental stewardship.

In regard to the conservation status of remnant vegetation, the current RE mapping incorrectly indicates that RE 7.12.57 (Of Concern) is present along a majority of the ridges south of the existing powerline, and where a number of turbines are proposed to be located. Field surveys identified that RE 7.12.57 is not present in any of the areas mapped. Amended mapping showing the presence of RE 7.12.65k (Least Concern) is provided with this report. Polygons containing the RE 7.12.57 label will be relabelled as a heterogeneous polygon of RE 7.12.30b / 7.12.65k with a respective proportional representation of each community of 80 / 20 percent.

Vegetation clearing should be managed appropriately and with consideration of the unique landform characteristics of the project area. All clearing should be kept to an absolute minimum in order to avoid significant levels of impacts. Particular emphasis is placed on the risk and long-term impacts associated with the ingress of weeds that can have irreversible impacts to native plant communities, their composition and ecological function.

Tracks and associated cabling layouts presented in this report are provisional and based on spatial analysis of the 5 metre contour interval to determine routes of lower ecological impact. Some gradients are in the order of 50-33 percent slope, which will require a holistic design approach encompassing engineering and environmental concepts.

The design of the final layout will require a greater level of understanding of micro-topographical relief and the relevance of watercourses and drainage features. To achieve this, detailed walk-through surveys of vegetation and flora habitats prior to track construction and vegetation clearing will be undertaken to locate the most appropriate routes and locations of turbine footprints.

Consideration has been given to allowing tracks to naturally regenerate to approximately 5 m width after construction. Rehabilitation of turn-around areas and other areas of vegetation disturbance should also be taken into account, where emphasis is placed on the use of native plants known to occur in the region and on similar geology and landforms. Maintenance of vegetation, floristic and ecological integrity is crucial.

Stringent and project-focussed impact mitigation measures will need to be formulated and implemented at the pre-construction and construction stages. Similarly, longer-term measures will need to be considered for decommissioning.

Given the high integrity of the vegetation and the presence of rare and threatened species, a high level of attention to impact mitigation and implementation will be required. The probability of reducing the significance of impacts will be considerably enhanced if the range of mitigation strategies such as weed management plans, rare and threatened plant translocation plans, and general environmental management strategies are implemented and progressed for the life of the project.

It is therefore concluded that potential impacts to conservation significant flora and the values of vegetation can be managed such that permanent or long-term impacts to these values are maintained at acceptable environmental levels in accordance with Commonwealth and State legislation and policies.

14.0 References & Bibliography

- Bostock, P.D. & Holland, A.E. (eds) (2007). *Census of the Queensland Flora 2010*. Queensland Herbarium, Department of Environment and Resource Management, Brisbane.
- DERM (2009). Department of Environment and Resource Management website. <http://www.derm.qld.gov.au/>
- Hacker, J.B. (1990). *A Guide to Herbaceous and Shrub Legumes of Queensland*. University of Queensland Press, Brisbane.
- Humphries, S.E. and Stanton, J.P. (1992). Weed Assessment in the Wet Tropics World Heritage Area of North Queensland. Report to the Wet Tropics Management Agency, Cairns.
- Hyland, B.P., Whiffin, T., Christophel, D.C., Gray, B. & Elick, R.W. (2003). *Australian Tropical Rain Forest Plants. Trees, Shrubs and Vines*. CSIRO, Melbourne.
- Morgan, G. (1999). Einasleigh Uplands. In P. Sattler and R. Williams (eds). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.
- Neldner, V.J., Wilson, B. A., Thompson, E.J. and Dillewaard, H.A. (2005). *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 3.1. Updated September 2005. Queensland Herbarium, Environmental Protection Agency, Brisbane. 128 pp.
- Queensland Herbarium (2011a). *HERBRECS data*. Queensland Herbarium, Department of Environment and Resource Management, Brisbane.
- Queensland Herbarium (2011b). *Regional Ecosystem Description Database (REDD)*. Version 6.0b - January 2011. Department of Environment and Resource Management, Brisbane.
- Sattler, P. S. and Williams, R. D. (eds) (1999). *The Conservation Status of Queensland Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.
- Specht, R.L., Roe, E.M. and Boughton, V.H. (1974). Conservation of major plant communities in Australia and Papua New Guinea. *Aust. J. Bot. Suppl. Series No. 7*.
- Tracey, J. G. (1982). *The Vegetation of the Humid Tropical Region of North Queensland*. CSIRO, Melbourne.
- Tracey, J. G. and Webb, L.J. (1975). *Vegetation of the Humid Tropical Region of North Queensland*. (15 maps at 1: 100,000 scale + key.) CSIRO Aust. Long Pocket Labs: Indooroopilly, Queensland.
- Vallee, L., Hogbin, T., Monks, L., Makinson, B., Matthes, M. and Rossetto, M. (2004). *Guidelines for the Translocation of Threatened Plants in Australia*. Second Edition. Australian Network for Plant Conservation, Canberra.
- Wannan, B. (2009). *Guidelines for Flora Survey & Assessment in Northern Queensland*. Department of Environment and Resource Management, Cairns.

Appendix A1. Location of fauna survey sites and survey methodology used

May 2010 Dry Season Survey Sites.

Site	Easting	Northing	Elliot Trapping	Pitfall Trapping	Anabat Detection	Harp Trapping	Funnel Trapping	Spotlighting	Bird Survey	Habitat Assessment
20	326789	8099837	X	X				X	X	X
21	327190	8099583							X	X
South 22	327386	8099294								
Far South 22	327747	8099082							X	X
Granite Creek	327430	8099808	X	X	X	X			X	X
25	327648	8099782							X	X
24	327562	8100046								X
56	328572	8100957	X					X		
55	328764	8100673						X		
57	328506	8101234	X					X		
67	328969	8101927	X					X		
42	330751	8098270							X	X
43	330481	8098514							X	X
44	330210	8098705							X	X
45	329985	8098930							X	X
46	329820	8099174							X	X
47	329729	8099441							X	X
48	329404	8099649							X	X
49	329203	8099946							X	
50	329091	8100198						X		
51	329040	8100460						X		
Powerline creek	328506	8100633					X			
17	325934	8100748	X	X				X	X	X

March-April 2011 Late Wet Season Survey Sites

Site Name	Easting	Northing	Active Reptile Search	Bird Survey	Habitat Assessment	Raptor Search	Owl Call Playback	Anabat
22	327386	8099294			X	X		
26	327915	8099518	X		X			X
27	328230	8099829	X		X			
30	328029	8099220	X		X			X
31	328146	8098962	X		X			
32	328425	8098766	X		X			
33	328786	8098927			X			
34	329002	8098559			X			
35	329234	8098320			X			
47	329729	8099441	X		X			
48	329404	8099649	X		X			
49	329203	8099946	X		X			
50	329091	8100198			X	X		
51	329040	8100460		X	X	X		
55	328773	8100681		X	X			X
56	328578	8100955	X	X	X			X
57	328506	8101239		X	X	X		
58	328368	8101559			X			
59	328507	8101817		X	X			
60	328450	8102087		X	X			X
61	328384	8102361		X	X			
62	328250	8102610		X	X			
63	328123	8102866		X	X			
64	326730	8101936		X	X			
65	328792	8102560		X	X			
66	328891	8102237		X	X			
67	328964	8101930		X	X		X	
68	328019	8101756	X		X			
69	327636	8101937	X		X			
70	327578	8102225	X		X			
71	327508	8102611			X			
Creek #2	328407	8100217		X	X			
Creek #1	328203	8100475		X	X			
Owl#1	327900	8099713					X	
Owl#2	328930	810049			X	X		
Owl#3	328421	8100510					X	

Appendix BI. List of fauna species recorded or predicted to occur on the site

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
AMPHIBIANS								
Bufonidae	Cane Toad	<i>Bufo marinus</i>				✓	Recorded	
Hylidae	Striped Burrowing Frog	<i>Cyclorana alboguttata</i>					Possible	
Hylidae	Long-footed Frog	<i>Cyclorana longipes</i>					Possible	
Hylidae	New Holland Frog	<i>Cyclorana novaehollandiae</i>					Possible	
Hylidae	Northern Dwarf Tree Frog	<i>Litoria bicolor</i>				✓	Possible	
Hylidae	Green Tree Frog	<i>Litoria caerulea</i>					Recorded	
Hylidae	Eastern Sedgefrog	<i>Litoria fallax</i>				✓	Possible	
Hylidae	Dainty Tree Frog	<i>Litoria gracilentia</i>					Possible	
Hylidae	Floodplain Frog	<i>Litoria inermis</i>				✓	Recorded	
Hylidae	Giant White-lipped Tree Frog	<i>Litoria infrafrenata</i>					Possible	
Hylidae	Broad-palmed Frog	<i>Litoria latopalmata</i>					Recorded	
Hylidae	Javelin Frog	<i>Litoria microbelos</i>					Possible	
Hylidae	Waterfall Frog	<i>Litoria nannotis</i>	E	✓	E		Unlikely	No suitable waterfalls along permanent flowing creeks adjacent to rainforest habitats present on site
Hylidae	Rocket Frog	<i>Litoria nasuta</i>					Recorded	
Hylidae	Bridled Frog	<i>Litoria nigrofrenata</i>					Possible	
Hylidae	Mountain Mistfrog	<i>Litoria nyakalensis</i>	CE	✓	E		Unlikely	No suitable rainforest stream habitats present on the site
Hylidae	Pale Frog	<i>Litoria pallida</i>					Possible	
Hylidae	Common Mistfrog	<i>Litoria rheocola</i>	E	✓			Unlikely	No suitable rainforest stream habitats present on the site
Hylidae	Roth's Tree Frog	<i>Litoria rothi</i>				✓	Possible	

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Hylidae	Desert Tree Frog	<i>Litoria rubella</i>					Recorded	
Hylidae	Cairns Lacelid	<i>Nyctimystes dayi</i>	E	✓			Unlikely	No suitable rainforest stream habitats present on the site
Myobatrachidae	Remote Froglet	<i>Crinia remota</i>					Possible	
Myobatrachidae	Marbled Marsh Frog	<i>Limnodynastes convexiusculus</i>					Possible	
Myobatrachidae	Striped Marsh Frog	<i>Limnodynastes peroni</i>					Possible	
Myobatrachidae	Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>					Possible	
Myobatrachidae	Northern Banjo Frog	<i>Limnodynastes terraereginae</i>					Possible	
Myobatrachidae	Northern Spadefoot Toad	<i>Notaden melanoscaphus</i>					Possible	
Myobatrachidae	Ornate Burrowing Frog	<i>Opisthodon ornatus</i>					Possible	
Myobatrachidae	Magnificent Brood Frog	<i>Pseudophryne covacevichae</i>	V	✓	V		Unlikely	This species is known only from a small area near Ravenshoe, north Queensland, where it has been found at 22 discrete sites with 36 populations (McDonald <i>et al.</i> 2000). The species has only a small area of occupancy (less than 50ha; McDonald <i>et al.</i> 2000). All records of the species have been from above 800m a.s.l (McDonald <i>et al.</i> 2000). It is known from Timber Reserve 245, State Forest 754,488, and 251; Millstream National Park and Ravenshoe rubbish dump reserve, road reserves and freehold land (Ingram and Corben 1994; McDonald <i>et al.</i> 2000).
Myobatrachidae	Montane Toadlet	<i>Uperoleia altissima</i>				✓	Recorded	
Myobatrachidae	Stonemason Toadlet	<i>Uperoleia lithomoda</i>					Possible	
Myobatrachidae	Mimic Toadlet	<i>Uperoleia mimula</i>					Possible	
BIRDS								
Acanthizidae	Yellow Thornbill	<i>Acanthiza nana</i>					Recorded	

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Acanthizidae	Buff-rumped Thornbill	<i>Acanthiza reguloides</i>					Possible	
Acanthizidae	Large-billed Gerygone	<i>Gerygone magnirostris</i>					Possible	
Acanthizidae	Brown Gerygone	<i>Gerygone mouki</i>				✓	Unlikely	No suitable rainforest present on site
Acanthizidae	White-throated Gerygone	<i>Gerygone olivacea</i>				✓	Possible	
Acanthizidae	Fairy Gerygone	<i>Gerygone palpebrosa</i>					Possible	
Acanthizidae	Fernwren	<i>Oreoscopus gutturalis</i>				✓	Unlikely	No suitable rainforest present on site
Acanthizidae	Yellow-throated Scrubwren	<i>Sericornis citreogularis</i>				✓	Unlikely	No suitable rainforest present on site
Acanthizidae	White-browed Scrubwren	<i>Sericornis frontalis</i>				✓	Unlikely	No suitable rainforest present on site
Acanthizidae	Atherton Scrubwren	<i>Sericornis kerri</i>				✓	Unlikely	No suitable rainforest present on site
Acanthizidae	Weebill	<i>Smicronis brevirostris</i>					Recorded	
Accipitridae	Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	M				Recorded	
Accipitridae	Brown Goshawk	<i>Accipiter fasciatus</i>	M			✓	Recorded	
Accipitridae	Grey Goshawk	<i>Accipiter novaehollandiae</i>	M		NT	✓	Possible	
Accipitridae	Wedge-tailed Eagle	<i>Aquila audax</i>	M			✓	Recorded	
Accipitridae	Pacific Baza	<i>Aviceda subcristata</i>	M				Possible	
Accipitridae	Swamp Harrier	<i>Circus approximans</i>	M			✓	Possible	
Accipitridae	Spotted Harrier	<i>Circus assimilis</i>	M			✓	Possible	Flying high (>200m above ground) in vicinity of proposed turbine # 56
Accipitridae	Black-shouldered Kite	<i>Elanus axillaris</i>	M			✓	Possible	
Accipitridae	Letter-winged Kite	<i>Elanus scriptus</i>	M			✓	Possible	
Accipitridae	Red Goshawk	<i>Erythrotriochis radiatus</i>	V, M	✓	E	✓	Possible	
Accipitridae	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	M	✓		✓	Recorded	

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Accipitridae	Brahminy Kite	<i>Haliastur indus</i>	M				Possible	
Accipitridae	Whistling Kite	<i>Haliastur sphenurus</i>	M			✓	Recorded	
Accipitridae	Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	M				Possible	
Accipitridae	Little Eagle	<i>Hieraaetus morphnoides</i>	M				Recorded	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Accipitridae	Square-tailed Kite	<i>Lophoictinia isura</i>	M		NT	✓	Possible	Suitable open grassy woodland habitat is present on site, however no recent records in the region. Occasional records from Chillagoe, ~ 90km to the west
Accipitridae	Black Kite	<i>Milvus migrans</i>	M			✓	Possible	
Acrocephalidae	Australian reed-warbler	<i>Acrocephalus australis</i>				✓	Unlikely	No suitable dense streamside reeds or grasses occurs on site
Aegothelidae	Australian Owlet-nightjar	<i>Aegotheles cristatus</i>					Possible	
Alaudidae	Horsfield's Bushlark	<i>Mirafrja javanica</i>					Possible	
Alcedinidae	Azure Kingfisher	<i>Ceyx azureus</i>					Recorded	
Anatidae	Chestnut Teal	<i>Anas castanea</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Grey Teal	<i>Anas gracilis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Northern Mallard	<i>Anas platyrhynchos</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Australasian Shoveler	<i>Anas rhynchotis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Anatidae	Pacific Black Duck	<i>Anas superciliosa</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Hardhead	<i>Aythya australis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Australian Wood Duck	<i>Chenonetta jubata</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Black Swan	<i>Cygnus atratus</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Wandering Whistling-Duck	<i>Dendrocygna arcuata</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Pink-eared Duck	<i>Malacorhynchus membranaceus</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	M	✓	NT	✓	Unlikely	
Anatidae	Green Pygmy-goose	<i>Nettapus pulchellus</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anatidae	Radjah Shelduck	<i>Tadorna radjah</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Anhingidae	Australasian Darter	<i>Anhinga novaehollandiae</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Anseranatidae	Magpie Goose	<i>Anseranas semipalmata</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Apodidae	Australian Swiftlet	<i>Aerodramus terrareginae</i>			NT		Possible	
Apodidae	House Swift	<i>Apus affinis</i>					Possible	
Apodidae	Fork-tailed Swift	<i>Apus pacificus</i>	M	✓			Possible	
Apodidae	White-throated Needletail	<i>Hirundapus caudacutus</i>	M	✓			Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Great Egret	<i>Ardea alba</i>	M	✓			Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Cattle Egret	<i>Ardea ibis</i>	M	✓			Possible	
Ardeidae	Intermediate Egret	<i>Ardea intermedia</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	White-necked Heron	<i>Ardea pacifica</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Great-billed Heron	<i>Ardea sumatrana</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Striated Heron	<i>Butorides striata</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Ardeidae	Little Egret	<i>Egretta garzetta</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	White-faced Heron	<i>Egretta novaehollandiae</i>				✓	Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Pied Heron	<i>Egretta picata</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Black Bittern	<i>Ixobrychus flavicollis</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Little Bittern	<i>Ixobrychus minutus</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ardeidae	Nankeen Night-Heron	<i>Nycticorax caledonicus</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Artamidae	Black-faced Woodswallow	<i>Artamus cinereus</i>					Possible	
Artamidae	Dusky Woodswallow	<i>Artamus cyanopterus</i>					Possible	
Artamidae	White-breasted Woodswallow	<i>Artamus leucorhynchus</i>				✓	Possible	
Artamidae	Little Woodswallow	<i>Artamus minor</i>					Possible	
Artamidae	Masked Woodswallow	<i>Artamus personatus</i>					Possible	
Artamidae	White-browed Woodswallow	<i>Artamus superciliosus</i>					Possible	
Artamidae	Pied Butcherbird	<i>Cracticus nigrogularis</i>				✓	Recorded	
Artamidae	Grey Butcherbird	<i>Cracticus torquatus</i>					Recorded	

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Artamidae	Australian Magpie	<i>Gymnorhina tibicen</i>				✓	Recorded	
Artamidae	Pied Currawong	<i>Strepera graculina</i>				✓	Recorded	
Burhinidae	Bush Stone-curlew	<i>Burhinus grallarius</i>				✓	Possible	
Cacatuidae	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>				✓	Recorded	
Cacatuidae	Little Corella	<i>Cacatua sanguinea</i>					Possible	
Cacatuidae	Red-tailed Black-Cockatoo	<i>Calyptorhynchus banksii</i>				✓	Possible	
Cacatuidae	Galah	<i>Eolophus roseicapillus</i>					Possible	
Cacatuidae	Cockatiel	<i>Nymphicus hollandicus</i>					Possible	
Campephagidae	Barred Cuckoo-shrike	<i>Coaracina lineata</i>					Possible	
Campephagidae	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>				✓	Possible	
Campephagidae	White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>				✓	Recorded	
Campephagidae	Cicadabird	<i>Coracina tenuirostris</i>				✓	Possible	
Campephagidae	Varied Triller	<i>Lalage leucomela</i>				✓	Unlikely	No suitable habitat present on site. May fly over site at rotor height between rainforest areas.
Campephagidae	White-winged Triller	<i>Lalage sueurii</i>				✓	Possible	
Caprimulgidae	Large-tailed Nightjar	<i>Caprimulgus macrurus</i>					Possible	
Caprimulgidae	Spotted Nightjar	<i>Eurostopodus argus</i>					Possible	
Caprimulgidae	White-throated Nightjar	<i>Eurostopodus mystacalis</i>					Possible	
Casuariidae	Southern Cassowary (Australian)		E	✓		E	Unlikely	
Casuariidae	Emu	<i>Dromaius novaehollandiae</i>					Possible	
Centropodidae	Pheasant Coucal	<i>Centropus phasianinus</i>				✓	Recorded	

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Charadriidae	Black-fronted Dotterel	<i>Elseya melanops</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Charadriidae	Red-kneed Dotterel	<i>Erythronyx cinctus</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Charadriidae	Pacific Golden Plover	<i>Pluvialis fulva</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Charadriidae	Masked Lapwing	<i>Vanellus miles</i>				✓	Possible	
Charadriidae	Banded Lapwing	<i>Vanellus tricolor</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Ciconiidae	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>			NT		Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Climacteridae	White-throated Treecreeper	<i>Climacteris leucophaea</i>				✓	Unlikely	Not often observed in NQ outside of rainforest and nearby wet sclerophyll forests.
Climacteridae	Brown Treecreeper	<i>Climacteris picumnus</i>					Recorded	
Columbidae	Diamond Dove	<i>Geopelia cuneata</i>					Possible	
Columbidae	Bar-shouldered Dove	<i>Geopelia humeralis</i>					Recorded	
Columbidae	Rock Dove	<i>Geopelia livia</i>				✓	Unlikely	No suitable human modified habitat present on site
Columbidae	Peaceful Dove	<i>Geopelia striata</i>				✓	Recorded	
Columbidae	Squatter Pigeon	<i>Geophaps scripta scripta</i> (southern subspecies)	V		V	✓	Possible	

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Columbidae	Brown Cuckoo-Dove	<i>Macropygia amboinensis</i>				✓	Unlikely	No suitable rainforest habitat present on site. Unlikely to utilize site for foraging but may fly over at rotor height as moves between rainforest patches e.g. Mt Emerald and Lamb Range; one recent record in Mareeba (Babara warren, pers. com.)
Columbidae	Crested Pigeon	<i>Ocyphaps lophotes</i>				✓	Possible	
Columbidae	Common Bronzewing	<i>Phaps chalcoptera</i>					Recorded	
Coraciidae	Dollarbird	<i>Eurystomus orientalis</i>				✓	Possible	
Corcoraciidae	Apostlebird	<i>Struthidea cinerea</i>					Possible	
Corvidae	Australian Raven	<i>Corvus coronoides</i>					Possible	
Corvidae	Torresian Crow	<i>Corvus orru</i>				✓	Recorded	
Cuculidae	Chestnut-breasted Cuckoo	<i>Cacomantis castaneiventris</i>					Possible	
Cuculidae	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>					Possible	
Cuculidae	Pallid Cuckoo	<i>Cacomantis pallidus</i>					Recorded	
Cuculidae	Brush Cuckoo	<i>Cacomantis variolosus</i>					Possible	
Cuculidae	Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>				✓	Possible	
Cuculidae	Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>					Possible	
Cuculidae	Little Bronze-Cuckoo	<i>Chalcites minutillus</i>					Possible	
Cuculidae	Black-eared Cuckoo	<i>Chalcites osculans</i>					Possible	
Cuculidae	Oriental Cuckoo	<i>Cuculus optatus</i>					Possible	
Cuculidae	Eastern Koel	<i>Eudynamys orientalis</i>				✓	Possible	
Cuculidae	Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>				✓	Possible	
Dicaeidae	Mistletoebird	<i>Dicaeum hirundinaceum</i>				✓	Recorded	

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Dicruridae	Spangled Drongo	<i>Dicrurus bracteatus</i>				✓	Recorded	
Dicruridae	Magpie-lark	<i>Grallina cyanoleuca</i>				✓	Possible	
Dicruridae	Black-faced Monarch	<i>Monarcha melanopsis</i>	M	✓		✓	Unlikely	Recent recorded (10/03/11) from Mareeba (Cairns Birds, 2011). May fly over site within rotor strike zone as dispersed between rainforest areas
Dicruridae	Shining Flycatcher	<i>Myiagra alecto</i>				✓	Possible	
Dicruridae	Satin Flycatcher	<i>Myiagra cyanoleuca</i>	M	✓			Possible	
Dicruridae	Restless Flycatcher	<i>Myiagra inquieta</i>					Possible	
Dicruridae	Leaden Flycatcher	<i>Myiagra rubecula</i>				✓	Recorded	
Dicruridae	Grey Fantail	<i>Rhipidura albiscapa</i>				✓	Recorded	
Dicruridae	Willie Wagtail	<i>Rhipidura leucophrys</i>				✓	Possible	
Dicruridae	Rufous Fantail	<i>Rhipidura rufifrons</i>	M	✓		✓	Recorded	
Dicruridae	Northern Fantail	<i>Rhipidura rufiventris</i>					Possible	
Dicruridae	Spectacled Monarch	<i>Symposiachrus trivirgatus</i>	M	✓		✓	Unlikely	
Falconidae	Brown Falcon	<i>Falco berigora</i>	M			✓	Recorded	
Falconidae	Nankeen Kestrel	<i>Falco cenchroides</i>	M			✓	Recorded	
Falconidae	Grey Falcon	<i>Falco hypoleucos</i>	M		NT		Possible	
Falconidae	Australian Hobby	<i>Falco longipennis</i>	M				Possible	
Falconidae	Peregrine Falcon	<i>Falco peregrinus</i>	M				Possible	
Falconidae	Black Falcon	<i>Falco subniger</i>	M				Possible	
Fringillidae	Gouldian Finch	<i>Erythrura gouldiae</i>	E, M	✓	E	✓	Possible	
Fringillidae	Pictorella Mannikin	<i>Heteromunia pectoralis</i>					Possible	
Fringillidae	Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>				✓	Possible	
Fringillidae	Nutmeg Mannikin	<i>Lonchura punctulata</i>				✓	Recorded	

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Fringillidae	Star Finch (eastern)	<i>Neochima ruficauda ruficauda</i>	E	✓	E		Possible	No suitable rainforest habitat present on the site
Fringillidae	Crimson Finch	<i>Neochmia phaeton</i>					Possible	
Fringillidae	Red-browed Finch	<i>Neochmia temporalis</i>				✓	Possible	
Fringillidae	Black-throated Finch (northern black-rumped subspecies)	<i>Poephila cincta atropydialis</i>					Recorded	
Fringillidae	Masked Finch	<i>Poephila personata</i>					Possible	
Fringillidae	Double-barred Finch	<i>Taeniopygia bichenovii</i>					Possible	
Fringillidae	Zebra Finch	<i>Taeniopygia guttata</i>					Possible	
Gruidae	Sarus Crane	<i>Grus antigone</i>	M	✓		✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Gruidae	Brolga	<i>Grus rubicunda</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Halcyonidae	Blue-winged Kookaburra	<i>Dacelo leachii</i>				✓	Recorded	
Halcyonidae	Laughing Kookaburra	<i>Dacelo novaeguineae</i>				✓	Recorded	
Halcyonidae	Forest Kingfisher	<i>Todiramphus macleayii</i>				✓	Possible	
Halcyonidae	Red-backed Kingfisher	<i>Todiramphus pyrrhopygius</i>				✓	Possible	
Halcyonidae	Sacred Kingfisher	<i>Todiramphus sanctus</i>					Possible	
Hirundinidae	White-backed Swallow	<i>Cheramoeca leucosterna</i>				✓	Unlikely	Site is well outside known distribution of this species. Likely to be a misidentification in the DERM Wildlife Online database
Hirundinidae	Welcome Swallow	<i>Hirundo neoxena</i>				✓	Possible	
Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	M	✓			Possible	
Hirundinidae	Fairy Martin	<i>Petrochelidon ariel</i>					Possible	

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Hirundinidae	Tree Martin	<i>Petrochelidon nigricans</i>					Possible	
Maluridae	Red-backed Fairy-wren	<i>Malurus melanocephalus</i>				✓	Recorded	
Megapodiidae	Australian Brush-turkey	<i>Alectura lathamii</i>				✓	Possible	
Megapodiidae	Orange-footed Scrubfowl	<i>Megapodius reinwardti</i>				✓	Unlikely	No suitable rainforest habitat present on site
Meliphagidae	Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>				✓	Possible	
Meliphagidae	Banded Honeyeater	<i>Cissomela pectoralis</i>					Possible	
Meliphagidae	Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>				✓	Possible	
Meliphagidae	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>				✓	Possible	
Meliphagidae	Yellow Honeyeater	<i>Lichenostomus flavus</i>				✓	Possible	
Meliphagidae	Bridled Honeyeater	<i>Lichenostomus frenatus</i>				✓	Recorded	Unusual record of single individual in the vicinity of proposed turbine #36
Meliphagidae	Fuscous Honeyeater	<i>Lichenostomus fuscus</i>					Possible	
Meliphagidae	White-gaped Honeyeater	<i>Lichenostomus unicolor</i>					Possible	
Meliphagidae	Brown Honeyeater	<i>Lichmera indistincta</i>				✓	Recorded	
Meliphagidae	Yellow-throated Miner	<i>Manorina flavigula</i>					Possible	
Meliphagidae	Noisy Miner	<i>Manorina melanocephala</i>					Recorded	
Meliphagidae	White-throated Honeyeater	<i>Melithreptus albogularis</i>				✓	Recorded	
Meliphagidae	Black-chinned Honeyeater	<i>Melithreptus gularis</i>			NT	✓	Possible	
Meliphagidae	White-naped Honeyeater	<i>Melithreptus lunatus</i>				✓	Possible	
Meliphagidae	Dusky Honeyeater	<i>Myzomela obscura</i>				✓	Possible	
Meliphagidae	Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>				✓	Recorded	
Meliphagidae	Silver-crowned Friarbird	<i>Philemon argenticeps</i>					Possible	

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Meliphagidae	Helmeted Friarbird	<i>Philemon buceroides</i>				✓	Possible	
Meliphagidae	Little Friarbird	<i>Philemon citreogularis</i>					Possible	
Meliphagidae	Noisy Friarbird	<i>Philemon corniculatus</i>				✓	Recorded	
Meliphagidae	White-cheeked Honeyeater	<i>Phylidonyris niger</i>				✓	Possible	
Meliphagidae	Bar-breasted Honeyeater	<i>Ramsayornis fasciatus</i>				✓	Possible	
Meliphagidae	Brown-backed Honeyeater	<i>Ramsayornis modestus</i>					Possible	
Meropidae	Rainbow Bee-eater	<i>Merops ornatus</i>	M	✓		✓	Recorded	
Motacillidae	Australasian Pipit	<i>Anthus novaeseelandiae</i>					Possible	
Nectariniidae	Olive-backed Sunbird	<i>Nectarinia jugularis</i>					Possible	
Neosittidae	Varied Sittella	<i>Daphoenositta chrysoptera</i>					Recorded	
Oriolidae	Yellow Oriole	<i>Oriolus flavocinctus</i>					Possible	
Oriolidae	Olive-backed Oriole	<i>Oriolus sagittatus</i>					Recorded	One individual recorded along ephemeral creek in April 2011
Oriolidae	Australasian Figbird	<i>Sphecotheres vieilloti</i>					Possible	Scattered <i>Ficus spp.</i> occur in deep rocky ephemeral creek lines
Otididae	Australian Bustard	<i>Ardeotis australis</i>					Possible	
Pachycephalidae	Grey Shrike-thrush	<i>Colluricincla harmonica</i>					Recorded	
Pachycephalidae	Golden Whistler	<i>Pachycephala pectoralis</i>				✓	Possible	
Pachycephalidae	Rufous Whistler	<i>Pachycephala rufiventris</i>				✓	Recorded	
Pardalotidae	Spotted Pardalote	<i>Pardalotus punctatus</i>					Recorded	
Pardalotidae	Red-browed Pardalote	<i>Pardalotus rubricatus</i>				✓	Possible	
Pardalotidae	Striated Pardalote	<i>Pardalotus striatus</i>				✓	Possible	
Pelecanidae	Australian Pelican	<i>Pelecanus conspicillatus</i>					Possible	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Petroicidae	Jacky Winter	<i>Microeca fascinans</i>					Possible	
Petroicidae	Lemon-bellied Flycatcher	<i>Microeca flavigaster</i>					Possible	
Phalacrocoracidae	Little Pied Cormorant	<i>Microcarbo melanoleucos</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Phalacrocoracidae	Great Cormorant	<i>Phalacrocorax carbo</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Phalacrocoracidae	Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Phalacrocoracidae	Pied Cormorant	<i>Phalacrocorax varius</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Phasianidae	King Quail	<i>Coturnix chinensis</i>					Possible	
Phasianidae	Brown Quail	<i>Coturnix ypsilophora</i>				✓	Recorded	
Podargidae	Papuan Frogmouth	<i>Podargus papuensis</i>					Possible	
Podargidae	Tawny Frogmouth	<i>Podargus strigoides</i>					Recorded	
Podicipedidae	Great Crested Grebe	<i>Podiceps cristatus</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Podicipedidae	Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Podicipedidae	Australasian Grebe	<i>Tachybaptus novaehollandiae</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Pomatostomidae	Grey-crowned Babbler	<i>Pomatostomus temporalis</i>				✓	Recorded	
Psittacidae	Red-winged Parrot	<i>Aprosmictus erythropterus</i>				✓	Possible	
Psittacidae	Little Lorikeet	<i>Glossopsitta pusilla</i>					Recorded	
Psittacidae	Pale-headed Rosella	<i>Platycercus adscitus</i>				✓	Recorded	
Psittacidae	Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>				✓	Recorded	
Psittacidae	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>				✓	Recorded	
Ptilonorhynchidae	Great Bowerbird	<i>Chlamydera nuchalis</i>					Recorded	
Rallidae	Pale-vented Bush-hen	<i>Amauornis moluccana</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Eurasian Coot	<i>Fulica atra</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Dusky Moorhen	<i>Gallinula tenebrosa</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Buff-banded Rail	<i>Gallirallus philippensis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Purple Swamphen	<i>Porphyrio porphyrio</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	White-browed Crane	<i>Porzana cinerea</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Rallidae	Australian Spotted Crane	<i>Porzana fluminea</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Baillon's Crane	<i>Porzana pusilla</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Spotless Crane	<i>Porzana tabuensis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Red-necked Crane	<i>Rallina tricolor</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rallidae	Black-tailed Native-hen	<i>Tribonyx ventralis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Recurvirostridae	Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>				✓	Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Rostratulidae	Australian Painted Snipe	<i>Rostratula australis</i>	M	✓	V		Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Ruddy Turnstone	<i>Arenaria interpres</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.

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Scolopacidae	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Latham's Snipe	<i>Gallinago hardwickii</i>	M	✓			Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Eastern Curlew	<i>Numenius madagascariensis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Whimbrel	<i>Numenius phaeopus</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Grey-tailed Tattler	<i>Tringa brevipes</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Marsh Sandpiper	<i>Tringa stagnatilis</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Scolopacidae	Terek Sandpiper	<i>Xenus cinereus</i>					Unlikely	No suitable habitat present on site and unlikely to utilise small ephemeral water bodies. May fly over site at rotor height between suitable nearby water bodies.
Strigidae	Barking Owl	<i>Ninox connivens</i>				✓	Possible	
Strigidae	Southern Boobook	<i>Ninox novaeseelandiae</i>				✓	Recorded	

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Strigidae	Rufous Owl	<i>Ninox rufa</i>					Possible	
Sturnidae	Common Myna	<i>Acridotheres tristis</i>			I	✓	Unlikely	No suitable human modified habitat present on site
Sylviidae	Rufous Songlark	<i>Cincloramphus mathewsi</i>					Recorded	
Sylviidae	Golden-headed Cisticola	<i>Cisticola exilis</i>					Possible	
Threskiornithidae	Yellow-billed Spoonbill	<i>Platalea flavipes</i>					Unlikely	May fly over site at rotor height; unlikely to utilise small ephemeral water bodies
Threskiornithidae	Royal Spoonbill	<i>Platalea regia</i>					Unlikely	May fly over site at rotor height; unlikely to utilise small ephemeral water bodies
Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>					Unlikely	May fly over site at rotor height; unlikely to utilise small ephemeral water bodies
Threskiornithidae	Australian White Ibis	<i>Threskiornis molucca</i>					Unlikely	May fly over site at rotor height; unlikely to utilise small ephemeral water bodies
Threskiornithidae	Straw-necked Ibis	<i>Threskiornis spinicollis</i>				✓	Unlikely	May fly over site at rotor height whilst moving between nearby water bodies.; unlikely to utilise small ephemeral water bodies
Turnicidae	Red-backed Button-quail	<i>Turnix maculosus</i>					Possible	
Turnicidae	Buff-breasted Button-quail	<i>Turnix olivii</i>	E		V		Possible	
Turnicidae	Red-chested Button-quail	<i>Turnix pyrrhthorax</i>					Possible	
Turnicidae	Painted Button-quail	<i>Turnix varius</i>					Possible	
Tytonidae	Pacific Barn Owl	<i>Tyto javanica</i>				✓	Possible	
Tytonidae	Eastern Grass Owl	<i>Tyto longimembris</i>				✓	Possible	
Tytonidae	Masked Owl	<i>Tyto novaehollandiae kimberli</i>	V		V		Possible	
Zosteropidae	Silvereye	<i>Zosterops lateralis</i>	M			✓	Possible	

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MAMMALS								
Acrobatidae	Feathertail Glider	<i>Acrobates pygmaeus</i>					Possible	
Canidae	Dingo/Wild Dog	<i>Canis lupus dingo/C. Familiaris</i>					Recorded	
Canidae	Red Fox	<i>Vulpes vulpes</i>					Possible	
Dasyuridae	Northern Quoll	<i>Dasyurus hallucatus</i>	E	✓	E	✓	Recorded	
Dasyuridae	Tiger Quoll	<i>Dasyurus maculatus gracilis</i>	E	✓			Unlikely	Only NQ populations known from rainforest areas above 900m a.s.l in the Lamb Range and Mt Lewis/Mt Carbine Tablelands.
Dasyuridae	Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>					Possible	
Dasyuridae	Common Planigale	<i>Planigale maculata</i>				✓	Possible	
Dasyuridae	Common Dunnart	<i>Sminthopsis murina taei</i>					Possible	Recorded from Brooklyn Station, approximately 70km to the north
Dasyuridae	Red-cheeked Dunnart	<i>Sminthopsis virginiae</i>					Possible	
Emballonuridae	Yellow-bellied Sheathtail Bat	<i>Saccolaimus flaviventris</i>					Recorded	
Emballonuridae	Bare-rumped Sheathtail Bat	<i>Saccolaimus saccolaimus nudiclunatus</i>	CE	✓	E		Possible	Several call were detected that could belong to this species but it was not possible to differentiate it from other similar calls belonging to <i>Saccolaimus flaviventris</i> or <i>Taphozous troughtoni</i>
Emballonuridae	Common Sheathtail Bat	<i>Taphozous georgianus</i>					Possible	
Emballonuridae	Troughton's Sheathtail Bat	<i>Taphozous troughtoni</i>			E		Possible	Several calls were detected that could belong to this species but it was not possible to differentiate if from calls belonging to <i>Saccolaimus spp.</i> or <i>Mormopterus beccarii</i>
Equidae	Domestic Horse	<i>Equus caballus</i>					Recorded	
Felidae	House Cat	<i>Felis silvestris catus</i>					Recorded	
Hipposideridae	Dusky Leafnosed Bat	<i>Hipposideros ater</i>					Possible	
Hipposideridae	Diadem Leafnosed	<i>Hipposideros diadema</i>			NT	✓	Recorded	

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	Bat	<i>reginae</i>						
Hipposideridae	Semon's Leafnosed Bat	<i>Hipposideros semoni</i>	E	✓			Possible	
Leporidae	European Rabbit	<i>Oryctolagus cuniculus</i>				✓	Recorded	
Macropodidae	Spectacled Hare-wallaby	<i>Lagorchestes conspicillatus</i>					Possible	
Macropodidae	Agile Wallaby	<i>Macropus agilis</i>				✓	Possible	
Macropodidae	Eastern Grey Kangaroo	<i>Macropus giganteus</i>					Possible	
Macropodidae	Whiptail Wallaby	<i>Macropus parryi</i>				✓	Recorded	
Macropodidae	Wallaroo or Euro	<i>Macropus robustus</i>					Recorded	
Macropodidae	Mareeba Rock-wallaby	<i>Petrogale mareeba</i>			NT	✓	Unlikely	No scats or observations of individuals recorded despite extensive foot surveys of all rocky habitats. No suitable deeply dissected granite rocky outcrops present on site.
Macropodidae	Red-legged Pademelon	<i>Thylogale stigmatica</i>				✓	Unlikely	No suitable rainforest habitat occurring on site or directly adjacent to site
Macropodidae	Swamp Wallaby	<i>Wallabia bicolor</i>					Possible	
Megadermatidae	Ghost Bat	<i>Macroderma gigas</i>			V		Possible	
Molossidae	White-striped Freetail Bat	<i>Austronomus australis</i>					Recorded	
Molossidae	Northern Freetail Bat	<i>Chaerephon jobensis</i>					Recorded	
Molossidae	Beccari's Freetail Bat	<i>Mormopterus beccarii</i>					Possible	
Molossidae	Little Northern Freetail Bat	<i>Mormopterus loriae</i>					Possible	
Molossidae	Eastern Freetail Bat	<i>Mormopterus ridei</i>					Recorded	
Muridae	Brush-tailed Rabbit Rat	<i>Conilurus penicillatus</i>	V	✓			Unlikely	Only QLD records are known from Bentinck Island in the Gulf of Carpentaria.
Muridae	Water Rat	<i>Hydromys chrysogaster</i>					Recorded	
Muridae	Lakeland Downs Mouse	<i>Leggadina lakedownensis</i>					Possible	Recorded from Brooklyn Station, approximately 70km to the north

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Muridae	Grassland Melomys	<i>Melomys burtoni</i>					Recorded	
Muridae	Fawn-footed Melomys	<i>Melomys cervinipes</i>					Possible	
Muridae	Black-footed Tree-rat	<i>Mesembriomys gouldi</i>					Possible	
Muridae	House Mouse	<i>Mus musculus</i>					Possible	
Muridae	Delicate Mouse	<i>Pseudomys delicatulus</i>					Possible	
Muridae	Eastern Chestnut Mouse	<i>Pseudomys gracilicaudatus</i>					Possible	Recorded from Brooklyn Station, approximately 70km to the north
Muridae	Bush Rat	<i>Rattus fuscipes</i>					Possible	Unidentified <i>Rattus spp.</i> were recorded on the site during camera trapping surveys
Muridae	Black Rat	<i>Rattus rattus</i>					Possible	Unidentified <i>Rattus spp.</i> were recorded on the site during camera trapping surveys
Muridae	Canefield Rat	<i>Rattus sordidus</i>				✓	Possible	Unidentified <i>Rattus spp.</i> were recorded on the site during camera trapping surveys
Muridae	Pale Field Rat	<i>Rattus tunneyi</i>					Possible	Unidentified <i>Rattus spp.</i> were recorded on the site during camera trapping surveys
Muridae	Giant White-tailed Rat	<i>Uromys caudimaculatus</i>					Recorded	
Muridae	Common Rock-rat	<i>Zyzomys argurus</i>					Possible	
Peramelidae	Northern Brown Bandicoot	<i>Isoodon macrourus</i>					Recorded	
Peramelidae	Southern Brown Bandicoot (Cape York subspecies)	<i>Isoodon obesulus peninsulae</i>					Possible	Population known from from Lamb Range, ~ 20km to the east
Peramelidae	Long-nosed Bandicoot	<i>Perameles nasuta</i>				✓	Possible	
Petauridae	Striped Possum	<i>Dactylopsila trivirgata</i>				✓	Unlikely	No rainforest or well-developed riparian vegetation present on site
Petauridae	Yellow-bellied Glider	<i>Petaurus australis</i> (unamed subspecies)	✓	✓	✓		Unlikely	This species is only known from open forests with <i>Eucalyptus resinifera</i> which is not present on the site
Petauridae	Sugar Glider	<i>Petaurus breviceps</i>					Possible	
Petauridae	Squirrel Glider	<i>Petaurus norfolcensis</i>					Possible	
Phalangeridae	Common Brushtail	<i>Trichosurus vulpecula</i>				✓	Recorded	

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	Possum							
Phascolarctidae	Koala	<i>Phascolarctos cinereus</i>					Possible	
Potoroidae	Rufous Bettong	<i>Aepyprymnus rufescens</i>				✓	Possible	
Potoroidae	Northern Bettong	<i>Bettongia tropica</i>	E	✓	E	✓	Unlikely	Regional surveys conducted by Scott Burnett from QPWS failed to detect this species outside of known Davies Creek. Bioclim modelling by Brooke Bateman (JCU) identifies the site as a potential reintroduction location
Pseudocheiridae	Greater Glider	<i>Petauroides volans</i>					Possible	
Pseudocheiridae	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>				✓	Possible	
Pseudocheiridae	Green Ringtail Possum	<i>Pseudochirulus archeri</i>			NT	✓	Unlikely	No suitable rainforest vegetation present on site
Pteropidae	Black Flying-fox	<i>Pteropus alecto</i>					Possible	
Pteropidae	Spectacled Flying-fox	<i>Pteropus conspicillatus</i>	V	✓	V	✓	Possible	
Pteropidae	Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	✓			Unlikely	Nearest population occurs in the vicinity of Rockhampton, ~ 1000km to the south
Pteropidae	Little Red Flying-fox	<i>Pteropus scapulatus</i>				✓	Possible	
Rhinolophidae	Eastern Horseshoe Bat	<i>Rhinolophus megaphyllus</i>					Recorded	
Rhinolophidae	Large-eared Horseshoe Bat	<i>Rhinolophus philippinensis maros</i>	E	✓	E		Possible	
Suidae	Pig	<i>Sus scrofa</i>					Recorded	
Tachyglossidae	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>				✓	Recorded	
Vespertilionidae	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>					Recorded	
Vespertilionidae	Hoary Wattled Bat	<i>Chalinolobus nigrogriseus</i>					Possible	Several calls were detected that could belong to this species but it was not possible to differentiate if from calls belonging to <i>Scotorepens sanborni</i>
Vespertilionidae	Little Bentwing Bat	<i>Miniopterus australis</i>					Recorded	

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Vespertilionidae	Large Bentwing Bat	<i>Miniopterus orianae oceanensis</i>					Recorded	
Vespertilionidae	Northern Large-footed Myotis	<i>Myotis moluccarium</i>					Possible	
Vespertilionidae	Northern Longeared Bat	<i>Nyctophilus bifax</i>					Possible	Calls belonging to <i>Nyctophilus</i> spp. were recorded but not possible to distinguish between <i>N. bifax</i> , <i>N. geoffroyi</i> and <i>N. gouldii</i>
Vespertilionidae	Lesser Longeared Bat	<i>Nyctophilus geoffroyi</i>					Possible	Calls belonging to <i>Nyctophilus</i> spp. were recorded but not possible to distinguish between <i>N. bifax</i> , <i>N. geoffroyi</i> and <i>N. gouldii</i>
Vespertilionidae	Gould's Long-eared Bat	<i>Nyctophilus gouldii</i>					Possible	Calls belonging to <i>Nyctophilus</i> spp. were recorded but not possible to distinguish between <i>N. bifax</i> , <i>N. geoffroyi</i> and <i>N. gouldii</i>
Vespertilionidae	Greater Broadnosed Bat	<i>Scoteanax rueppellii</i>					Possible	
Vespertilionidae	Eastern Broadnosed Bat	<i>Scotorepens orion</i>					Recorded	
Vespertilionidae	Northern Broadnosed Bat	<i>Scotorepens sanborni</i>					Recorded	
Vespertilionidae	Eastern Forest Bat	<i>Vespadelus pumilus</i>					Possible	
Vespertilionidae	Eastern Cave Bat	<i>Vespadelus troughtoni</i>					Recorded	
REPTILES								
Agamidae	Nobbi dragon	<i>Amphibolurus nobbi</i>					Possible	
Agamidae	Frill-necked dragon	<i>Chlamydosaurus kingii</i>					Possible	
Agamidae	Tommy roundhead	<i>Diporiphora australis</i>					Recorded	
Agamidae	Two-lined dragon	<i>Diporiphora bilineata</i>					Possible	
Agamidae	Eastern water dragon	<i>Physignathus lesueurii</i>					Possible	
Agamidae	Eastern bearded dragon	<i>Pogona barbata</i>					Possible	
Cheluidae	Saw-shelled turtle	<i>Wollumbinia latisternum</i>					Recorded	Several specimens observed in large, deep pool at base of waterfall along a ephemeral

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
								watercourse
Colubridae	Brown tree snake	<i>Boiga irregularis</i>					Possible	
Colubridae	Common tree snake	<i>Dendrelaphis punctulatus</i>					Recorded	
Colubridae	Keelback	<i>Tropidonophis mairii</i>				✓	Possible	
Elapidae	Common death adder	<i>Acanthophis antarcticus</i>			NT	✓	Possible	
Elapidae	Robust burrowing snake	<i>Antaioserpens warro</i>					Possible	
Elapidae	Australian coral snake	<i>Brachyuropsis australis</i>					Possible	
Elapidae		<i>Cacophis churchilli</i>				✓	Unlikely	No suitable rainforest habitat present on site
Elapidae	Carpentaria snake	<i>Cryptophis boschmai</i>					Possible	
Elapidae	Black-striped snake	<i>Cryptophis nigrostriatus</i>					Recorded	
Elapidae	Greater black whipsnake	<i>Demansia papuensis</i>					Possible	
Elapidae	Yellow-faced whipsnake	<i>Demansia psammophis</i>					Possible	
Elapidae	Collared whipsnake	<i>Demansia torquata</i>					Possible	
Elapidae	Lesser black whipsnake	<i>Demansia vestigiata</i>					Possible	
Elapidae	Yellow-naped snake	<i>Furina barnardi</i>			NT		Possible	
Elapidae	Orange-naped snake	<i>Furina ornata</i>					Possible	
Elapidae	Pale-headed snake	<i>Hoplocephalus bitorquatus</i>					Possible	
Elapidae	Coastal taipan	<i>Oxyuranus scutellatus</i>					Possible	
Elapidae	Mulga snake	<i>Pseudechis australis</i>					Possible	Shed skin found with 17 mid-body scales and divided anal scale which could belong to <i>Psuedechis australia</i> , <i>Psuedonaja nuchalis</i> or <i>P. textilis</i> .

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Elapidae	Western brown snake	<i>Pseudonaja nuchalis</i>					Possible	Shed skin found with 17 mid-body scales and divided anal scale which could belong to <i>Psuedechis australia</i> , <i>Psuedonaja nuchalis</i> or <i>P. textilis</i> .
Elapidae	Eastern brown snake	<i>Pseudonaja textilis</i>				✓	Possible	Shed skin found with 17 mid-body scales and divided anal scale which could belong to <i>Psuedechis australia</i> , <i>Psuedonaja nuchalis</i> or <i>P. textilis</i> .
Elapidae	Eastern small-eyed snake	<i>Rhinoplocephalus nigrescens</i>				✓	Unlikely	No suitable rainforest habitat present on site
Elapidae	Curl snake	<i>Suta suta</i>					Possible	
Elapidae	Bandy-bandy	<i>Vermicella annulata</i>					Possible	
Gekkonidae	Ring-tailed gecko	<i>Cyrtodactylus lousiadensis</i>					Possible	
Gekkonidae	Fat-tailed gecko	<i>Diplodactylus conspicillatus</i>					Possible	
Gekkonidae	Box-patterned gecko	<i>Diplodactylus steindachneri</i>					Possible	
Gekkonidae	Dubious dtella	<i>Gehyra dubia</i>					Recorded	
Gekkonidae	Northern spotted rock dtella	<i>Gehyra nana</i>					Recorded	
Gekkonidae	Bynoe's gecko	<i>Heteronotia binoei</i>					Recorded	
Gekkonidae	Chevert's gecko	<i>Nactus cheverti</i>					Possible	
Gekkonidae	Prickly knob-tailed gecko	<i>Nephurus asper</i>					Possible	
Gekkonidae	Northern velvet gecko	<i>Oedura castelnaui</i>					Possible	
Gekkonidae	Northern spotted velvet gecko	<i>Oedura coggeri</i>					Recorded	
Gekkonidae	Zigzag velvet gecko	<i>Oedura rhombifer</i>				✓	Possible	
Gekkonidae	Eastern spiny-tailed gecko	<i>Strophurus williamsi</i>					Possible	
Pygopodidae	Excitable delma	<i>Delma tincta</i>					Recorded	
Pygopodidae	Burton's legless lizard	<i>Lialis burtonis</i>					Possible	

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Pythonidae	Spotted python	<i>Antaresia maculosa</i>					Possible	
Pythonidae	Black-headed python	<i>Aspidites melanocephalus</i>				✓	Possible	
Pythonidae	Water python	<i>Liasis mackloti</i>					Possible	
Pythonidae	Scrub python	<i>Morelia kinghorni</i>				✓	Recorded	
Pythonidae	Carpet python	<i>Morelia spilota</i>				✓	Possible	
Scincidae	Speckled worm-skink	<i>Anomalopus gowi</i>					Possible	
Scincidae		<i>Carlia foliorum</i>					Possible	
Scincidae	Lined rainbow-skink	<i>Carlia jarnoldae</i>					Recorded	
Scincidae		<i>Carlia longipes</i>					Recorded	
Scincidae	Shaded-litter rainbow-skink	<i>Carlia munda</i>					Recorded	
Scincidae		<i>Carlia mundivensis</i>					Recorded	
Scincidae	Open-litter rainbow-skink	<i>Carlia pectoralis</i>					Possible	
Scincidae	Black-throated rainbow-skink	<i>Carlia rostralis</i>					Recorded	
Scincidae	Robust rainbow-skink	<i>Carlia schmeltzii</i>					Possible	
Scincidae		<i>Carlia stori</i>				✓	Possible	
Scincidae	Lively rainbow skink	<i>Carlia vivax</i>					Possible	
Scincidae		<i>Cryptoblepharus plagiocephalus</i>					Recorded	
Scincidae	Wall skink	<i>Cryptoblepharus virgatus</i>					Possible	
Scincidae	Black-backed yellow-lined ctenotus	<i>Ctenotus eutaenius</i>					Possible	
Scincidae	Atherton ctenotus	<i>Ctenotus monticola</i>					Possible	
Scincidae	Eastern striped skink	<i>Ctenotus robustus</i>					Possible	

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Scincidae	Straight-browed ctenotus	<i>Ctenotus spaldingi</i>					Possible	
Scincidae	Copper-tailed skink	<i>Ctenotus taeniolatus</i>					Recorded	
Scincidae	Pink-tongued skink	<i>Cyclodomorphus gerrardii</i>					Possible	
Scincidae	Major skink	<i>Egernia frerei</i>					Recorded	
Scincidae	Hosmer's skink	<i>Egernia hosmeri</i>					Possible	
Scincidae	Yakka skink	<i>Egernia rugosa</i>	V	✓	V		Possible	
Scincidae	Northern barsided skink	<i>Eulamprus brachysoma</i>				✓	Recorded	Listed in Wildlife Online search as <i>Eulamprus tenuis</i> , which has undergone taxonomic revision and now only occurs in QLD between Eungella to the SE corner
Scincidae	Cape York mulch-skink	<i>Glaphyromorphus crassicaudus</i>					Possible	
Scincidae	Grass skink	<i>Lampropholis delicata</i>					Possible	
Scincidae	Common dwarf skink	<i>Menetia greyii</i>					Possible	
Scincidae	Dwarf litter-skink	<i>Menetia timlowi</i>					Possible	
Scincidae	Fire-tailed skink	<i>Morethia taeniopleura</i>					Recorded	
Scincidae	Northern soil-crevice skink	<i>Proablepharus tenuis</i>					Possible	
Scincidae	Common blue-tongued skink	<i>Tiliqua scincoides</i>					Possible	
Typhlopidae	Faint-striped blind snake	<i>Ramphotyphlops broomi</i>			NT		Possible	
Typhlopidae	North-eastern blind snake	<i>Ramphotyphlops polygrammicus</i>					Possible	
Typhlopidae	Claw-snouted blind snake	<i>Ramphotyphlops unguistrostris</i>					Possible	
Varanidae	Sand goanna	<i>Varanus gouldii</i>					Possible	
Varanidae	Yellow-spotted monitor	<i>Varanus panoptes</i>					Possible	
Varanidae	Spotted tree monitor	<i>Varanus scalaris</i>					Possible	
Varanidae	Storr's monitor	<i>Varanus storri</i>					Possible	

Family	Common Name	Scientific Name	EPBC	EPBC Protected Matters Report	NCA	DERM Wildlife Online Search	Likelihood of Occurrence	Notes
Varanidae	Black-headed monitor	<i>Varanus tristis</i>					Possible	
Varanidae	Lace monitor	<i>Varanus varius</i>					Possible	

Appendix CI. QLD Wildlife Online Search Results

Search Criteria: Species List for a Specified Point

Species: Animals
Type: All
Status: All
Records: All
Date: All
Latitude: 17.1667
Longitude: 145.387
Distance: 10 km
Email: jeff.middleton@rpsgroup.com.au
Date submitted: Tuesday 19 Jul 2011 11:34:39
Date extracted: Tuesday 19 Jul 2011 11:46:02
The number of records retrieved = 194

Disclaimer

As the DERM 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.

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Feedback about Wildlife Online should be emailed to Wildlife.Online@derm.qld.gov.au

Description of the 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).

The second number located after the / indicates the number of specimen records for the taxon.

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
amphibians	Bufonidae	<i>Rhinella marina</i>	Cane Toad	Y			1	0
amphibians	Hylidae	<i>Litoria fallax</i>	Eastern Sedgefrog		C		2	0
amphibians	Hylidae	<i>Litoria rothii</i>	Northern Laughing Treefrog		C		1	0
amphibians	Hylidae	<i>Litoria bicolor</i>	Northern Sedgefrog		C		1	0
amphibians	Hylidae	<i>Litoria caerulea</i>	Common Green Treefrog		C		1	0
amphibians	Hylidae	<i>Litoria inermis</i>	Bumpy Rocketfrog		C		1	0
amphibians	Myobatrachidae	<i>Uperoleia altissima</i>	Tableland Gungan		C		1	0
birds	Acanthizidae	<i>Sericornis citreogularis</i>	Yellow-Throated Scrubwren		C		1	0
birds	Acanthizidae	<i>Smicromis brevirostris</i>	Weebill		C		2	0
birds	Acanthizidae	<i>Sericornis kerri</i>	Atherton Scrubwren		C		1	0
birds	Acanthizidae	<i>Sericornis frontalis</i>	White-Browed Scrubwren		C		1	0
birds	Acanthizidae	<i>Oreoscopus gutturalis</i>	Fernwren		C		1	0
birds	Acanthizidae	<i>Sericornis magnirostra</i>	Large-Billed Scrubwren		C		2	0
birds	Acanthizidae	<i>Gerygone albogularis</i>	White-Throated Gerygone		C		4	0
birds	Acanthizidae	<i>Gerygone mouki</i>	Brown Gerygone		C		2	0
birds	Accipitridae	<i>Aquila audax</i>	Wedge-Tailed Eagle		C		1	0
birds	Accipitridae	<i>Haliaeetus leucogaster</i>	White-Bellied Sea-Eagle		C		4	0
birds	Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite		C		3	0
birds	Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk		C		2	0
birds	Accipitridae	<i>Lophoictinia isura</i>	Square-Tailed Kite		NT		2	0
birds	Accipitridae	<i>Circus approximans</i>	Swamp Harrier		C		1	0

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
birds	Accipitridae	<i>Elanus axillaris</i>	Black-Shouldered Kite		C		6	0
birds	Accipitridae	<i>Circus assimilis</i>	Spotted Harrier		C		2	0
birds	Accipitridae	<i>Elanus scriptus</i>	Letter-Winged Kite		C		1	0
birds	Accipitridae	<i>Milvus migrans</i>	Black Kite		C		11	0
birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	Red Goshawk		E	V	1	0
birds	Accipitridae	<i>Accipiter novaehollandiae</i>	Grey Goshawk		NT		1	0
birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed-Warbler		C		1	0
birds	Anatidae	<i>Cygnus atratus</i>	Black Swan		C		5	0
birds	Anatidae	<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose		NT		1	0
birds	Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-Eared Duck		C		1	0
birds	Anatidae	<i>Nettapus pulchellus</i>	Green Pygmy-Goose		C		1	0
birds	Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck		C		6	0
birds	Anatidae	<i>Dendrocygna arcuata</i>	Wandering Whistling-Duck		C		1	0
birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter		C		3	0
birds	Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose		C		1	0
birds	Ardeidae	<i>Egretta novaehollandiae</i>	White-Faced Heron		C		2	0
birds	Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird		C		3	0
birds	Artamidae	<i>Artamus leucorhynchus</i>	White-Breasted Woodswallow		C		2	0
birds	Artamidae	<i>Strepera graculina</i>	Pied Currawong		C		1	0
birds	Artamidae	<i>Cracticus tibicen</i>	Australian Magpie		C		4	0
birds	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-Curlew		C		4	0
birds	Cacatuidae	<i>Cacatua galerita</i>	Sulphur-Crested Cockatoo		C		7	0
birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	Red-Tailed Black-Cockatoo		C		3	0
birds	Campephagidae	<i>Lalage sueurii</i>	White-Winged Triller		C		2	0
birds	Campephagidae	<i>Lalage leucomela</i>	Varied Triller		C		2	0
birds	Campephagidae	<i>Coracina papuensis</i>	White-Bellied Cuckoo-Shrike		C		8	0
birds	Campephagidae	<i>Coracina novaehollandiae</i>	Black-Faced Cuckoo-Shrike		C		7	0
birds	Campephagidae	<i>Coracina tenuirostris</i>	Cicadabird		C		1	0
birds	Charadriidae	<i>Vanellus miles</i>	Masked Lapwing		C		4	0
birds	Cisticolidae	<i>Cisticola exilis</i>	Golden-Headed Cisticola		C		2	0
birds	Climacteridae	<i>Cormobates leucophaea minor</i>	White-Throated Treecreeper (Northern)		C		2	0

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
birds	Columbidae	<i>Columba livia</i>	Rock Dove	Y			1	0
birds	Columbidae	<i>Macropygia amboinensis</i>	Brown Cuckoo-Dove		C		1	0
birds	Columbidae	<i>Streptopelia chinensis</i>	Spotted Dove	Y			4	0
birds	Columbidae	<i>Geopelia humeralis</i>	Bar-Shouldered Dove		C		1	0
birds	Columbidae	<i>Geopelia striata</i>	Peaceful Dove		C		9	0
birds	Columbidae	<i>Geophaps scripta</i>	Squatter Pigeon		C		2	1
birds	Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon		C		2	0
birds	Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird		C		2	0
birds	Corvidae	<i>Corvus orru</i>	Torresian Crow		C		5	0
birds	Cuculidae	<i>Chalcites basal</i>	Horsfield's Bronze-Cuckoo		C		1	0
birds	Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-Billed Cuckoo		C		2	0
birds	Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal		C		6	1
birds	Cuculidae	<i>Eudynamis orientalis</i>	Eastern Koel		C		1	0
birds	Dicruridae	<i>Dicrurus bracteatus</i>	Spangled Drongo		C		7	0
birds	Estrildidae	<i>Erythrura gouldiae</i>	Gouldian Finch		E	E	3	0
birds	Estrildidae	<i>Lonchura punctulata</i>	Nutmeg Mannikin	Y			1	0
birds	Estrildidae	<i>Taeniopygia bichenovii</i>	Double-Barred Finch		C		3	0
birds	Estrildidae	<i>Neochmia temporalis</i>	Red-Browed Finch		C		4	0
birds	Estrildidae	<i>Lonchura castaneothorax</i>	Chestnut-Breasted Mannikin		C		2	0
birds	Falconidae	<i>Falco berigora</i>	Brown Falcon		C		1	0
birds	Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel		C		2	0
birds	Gruidae	<i>Grus antigone</i>	Sarus Crane		C		1	0
birds	Gruidae	<i>Grus rubicunda</i>	Brolga		C		1	0
birds	Halcyonidae	<i>Dacelo leachii</i>	Blue-Winged Kookaburra		C		1	0
birds	Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra		C		11	0
birds	Halcyonidae	<i>Todiramphus macleayii</i>	Forest Kingfisher		C		1	0
birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	Red-Backed Kingfisher		C		1	0
birds	Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow		C		5	0
birds	Hirundinidae	<i>Cheramoeca leucosterna</i>	White-Backed Swallow		C		2	0
birds	Jacaniidae	<i>Irediparra gallinacea</i>	Comb-Crested Jacana		C		2	0
birds	Laridae	<i>Gygis alba</i>	White Tern		C		1	0

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
birds	Maluridae	<i>Malurus melanocephalus</i>	Red-Backed Fairy-Wren		C		2	0
birds	Megapodiidae	<i>Alectura lathamii</i>	Australian Brush-Turkey		C		6	0
birds	Megapodiidae	<i>Megapodius reinwardt</i>	Orange-Footed Scrubfowl		C		1	0
birds	Meliphagidae	<i>Meliphaga notata</i>	Yellow-Spotted Honeyeater		C		1	0
birds	Meliphagidae	<i>Myzomela obscura</i>	Dusky Honeyeater		C		1	0
birds	Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-Faced Honeyeater		C		2	0
birds	Meliphagidae	<i>Lichenostomus flavus</i>	Yellow Honeyeater		C		5	0
birds	Meliphagidae	<i>Philemon buceroides</i>	Helmeted Friarbird		C		1	0
birds	Meliphagidae	<i>Phylidonyris niger</i>	White-Cheeked Honeyeater		C		3	0
birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater		C		6	0
birds	Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater		C		9	0
birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill		C		1	0
birds	Meliphagidae	<i>Melithreptus albogularis</i>	White-Throated Honeyeater		C		5	0
birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater		C		4	0
birds	Meliphagidae	<i>Lichenostomus frenatus</i>	Bridled Honeyeater		C		1	0
birds	Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-Faced Honeyeater		C		2	0
birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	Bar-Breasted Honeyeater		C		1	0
birds	Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird		C		2	0
birds	Meliphagidae	<i>Melithreptus lunatus</i>	White-Naped Honeyeater		C		1	0
birds	Meropidae	<i>Merops ornatus</i>	Rainbow Bee-Eater		C		6	0
birds	Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher		C		2	0
birds	Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher		C		1	0
birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	Spectacled Monarch		C		2	0
birds	Monarchidae	<i>Monarcha melanopsis</i>	Black-Faced Monarch		C		1	0
birds	Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-Lark		C		24	0
birds	Nectariniidae	<i>Nectarinia jugularis</i>	Olive-Backed Sunbird		C		1	0
birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird		C		4	0
birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella		C		1	0
birds	Oriolidae	<i>Oriolus sagittatus</i>	Olive-Backed Oriole		C		2	0
birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian Figbird		C		3	0
birds	Otididae	<i>Ardeotis australis</i>	Australian Bustard		C		1	0

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
birds	Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-Thrush		C		2	0
birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	Little Shrike-Thrush		C		1	0
birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler		C		5	0
birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler		C		1	0
birds	Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote		C		4	0
birds	Pardalotidae	<i>Pardalotus rubricatus</i>	Red-Browed Pardalote		C		1	0
birds	Passeridae	<i>Passer domesticus</i>	House Sparrow	Y			2	0
birds	Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin		C		2	0
birds	Petroicidae	<i>Heteromyias cinereifrons</i>	Grey-Headed Robin		C		1	0
birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant		C		4	0
birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant		C		3	0
birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		C		2	0
birds	Phasianidae	<i>Coturnix ypsilophora</i>	Brown Quail		C		1	0
birds	Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe		C		1	0
birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe		C		5	0
birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-Crowned Babbler		C		2	0
birds	Psittacidae	<i>Platycercus adscitus</i>	Pale-Headed Rosella		C		3	0
birds	Psittacidae	<i>Cyclopsitta diophthalma macleayana</i>	Macleay's Fig-Parrot		V		1	0
birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	Rainbow Lorikeet		C		9	0
birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-Breasted Lorikeet		C		5	0
birds	Psittacidae	<i>Aprosmictus erythropterus</i>	Red-Winged Parrot		C		1	0
birds	Psophodidae	<i>Psophodes olivaceus</i>	Eastern Whipbird		C		1	0
birds	Ptilonorhynchidae	<i>Ailuroedus melanotis</i>	Spotted Catbird		C		6	2
birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	Great Bowerbird		C		1	0
birds	Ptilonorhynchidae	<i>Scenopoeetes dentirostris</i>	Tooth-Billed Bowerbird		C		2	0
birds	Rallidae	<i>Fulica atra</i>	Eurasian Coot		C		3	0
birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	Red-Necked Avocet		C		1	0
birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail		C		5	0
birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail		C		8	0
birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail		C		1	0
birds	Strigidae	<i>Ninox boobook</i>	Southern Boobook		C		1	0

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
birds	Strigidae	<i>Ninox connivens</i>	Barking Owl		C		1	0
birds	Sturnidae	<i>Sturnus tristis</i>	Common Myna	Y			19	0
birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-Necked Ibis		C		2	0
birds	Timaliidae	<i>Zosterops lateralis</i>	Silvereye		C		6	0
birds	Turdidae	<i>Zoothera heinei</i>	Russet-Tailed Thrush		C		1	0
birds	Turnicidae	<i>Turnix maculosus</i>	Red-Backed Button-Quail		C		1	0
birds	Tytonidae	<i>Tyto javanica</i>	Eastern Barn Owl		C		1	1
birds	Tytonidae	<i>Tyto longimembris</i>	Eastern Grass Owl		C		3	0
birds	Tytonidae	<i>Tyto tenebricosa multipunctata</i>	Lesser Sooty Owl		C		1	0
bony fish	Belonidae	<i>Strongylura krefftii</i>	Freshwater Longtom				1	0
bony fish	Clupeidae	<i>Nematalosa erebi</i>	Bony Bream				1	0
bony fish	Eleotridae	<i>Hypseleotris galii</i>	Firetail Gudgeon				1	0
bony fish	Melanotaeniidae	<i>Melanotaenia eachamensis</i>	Lake Eacham Rainbowfish			E	1	1
bony fish	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	Eastern Rainbowfish				2	0
bony fish	Melanotaeniidae	<i>Melanotaenia splendida inornata</i>	Checkered Rainbowfish				1	0
bony fish	Terapontidae	<i>Leiopotherapon unicolor</i>	Spangled Perch				1	0
mammals	Dasyuridae	<i>Planigale maculata</i>	Common Planigale		C		3	2
mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	Northern Quoll		C	E	2	1
mammals	Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit	Y			2	0
mammals	Macropodidae	<i>Petrogale mareeba</i>	Mareeba Rock-Wallaby		NT		3	2
mammals	Macropodidae	<i>Macropus robustus</i>	Common Wallaroo		C		1	0
mammals	Macropodidae	<i>Macropus parryi</i>	Whiptail Wallaby		C		1	0
mammals	Macropodidae	<i>Macropus agilis</i>	Agile Wallaby		C		2	0
mammals	Macropodidae	<i>Thylogale stigmatica</i>	Red-Legged Pademelon		C		2	0
mammals	Muridae	<i>Rattus rattus</i>	Black Rat	Y			1	1
mammals	Muridae	<i>Uromys caudimaculatus</i>	Giant White-Tailed Rat		C		1	0
mammals	Muridae	<i>Rattus sordidus</i>	Canefield Rat		C		1	1
mammals	Peramelidae	<i>Perameles nasuta</i>	Long-Nosed Bandicoot		C		2	1
mammals	Petauridae	<i>Petaurus breviceps</i>	Sugar Glider		C		2	2
mammals	Petauridae	<i>Dactylopsila trivirgata</i>	Striped Possum		C		1	0
mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum		C		3	1

Class	Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	Rufous Bettong		C		1	0
mammals	Pseudocheiridae	<i>Pseudocheirops archeri</i>	Green Ringtail Possum		NT		2	2
mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum		C		1	1
mammals	Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying-Fox		C		1	0
mammals	Pteropodidae	<i>Pteropus conspicillatus</i>	Spectacled Flying-Fox		C	V	9	2
mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-Beaked Echidna		C		2	2
reptiles	Boidae	<i>Morelia spilota</i>	Carpet Python		C		4	0
reptiles	Boidae	<i>Morelia kinghorni</i>	Amethystine Python (Australian Form)		C		1	0
reptiles	Boidae	<i>Aspidites melanocephalus</i>	Black-Headed Python		C		2	0
reptiles	Colubridae	<i>Tropidonophis mairii</i>	Freshwater Snake		C		1	1
reptiles	Elapidae	<i>Cacophis churchilli</i>			C		1	1
reptiles	Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake		C		1	1
reptiles	Elapidae	<i>Acanthophis antarcticus</i>	Common Death Adder		NT		1	1
reptiles	Elapidae	<i>Rhinoplocephalus nigrescens</i>	Eastern Small-Eyed Snake		C		1	1
reptiles	Gekkonidae	<i>Oedura rhombifer</i>	Zig-Zag Gecko		C		1	0
reptiles	Scincidae	<i>Carlia storri</i>			C		1	1
reptiles	Scincidae	<i>Eulamprus tenuis</i>			C		1	1
reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	Metallic Snake-Eyed Skink		C		1	0

Appendix DI. EPBC Protected Matters Search Tool Results



Australian Government

Department of Sustainability, Environment,
Water, Population and Communities

EPBC Act Protected Matters Report: Coordinates

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 about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 26/07/11 12:29:23



[Summary](#)

[Details](#)

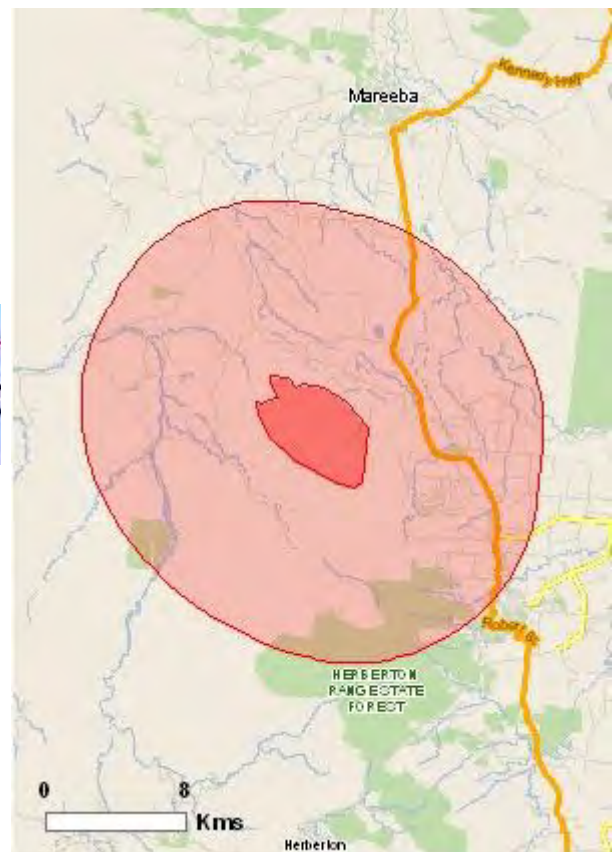
[Matters of NES](#)

[Other matters protected by
the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

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 - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance (Ramsar Wetlands):	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	1
Threatened Species:	41
Migratory Species:	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 and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

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. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None

Critical Habitats:	None
Commonwealth Reserves:	None

Report Summary for Extra Information

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

Place on the RNE:	1
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	12
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

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
Mabi Forest (Complex Notophyll Vine Forest 5b)	Critically Endangered	Community known to occur within area

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

Name	Status	Type of Presence
------	--------	------------------

BIRDS

Casuarius casuarius johnsonii Southern Cassowary (Australian), Southern Cassowary [25986]	Endangered	Species or species habitat known to occur within area
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Erythroriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
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Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat known to occur within area
--	------------	---

Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
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Rostratula australis Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
--	------------	--

FISH

Melanotaenia eachamensis Lake Eacham Rainbowfish [26185]	Endangered	Species or species habitat known to occur within area
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FROGS

[Litoria nannotis](#)

Waterfall Frog, Torrent Tree Frog [1817]	Endangered	Species or species habitat may occur within area
--	------------	--

[Litoria nyakalensis](#)

Mountain Mistfrog [1820]	Critically Endangered	Species or species habitat likely to occur within area
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[Litoria rheocola](#)

Common Mistfrog [1802]	Endangered	Species or species habitat may occur within area
------------------------	------------	--

[Nyctimystes dayi](#)

Lace-eyed Tree Frog, Australian Lacelid [1813]	Endangered	Species or species habitat may occur within area
--	------------	--

[Pseudophryne covacevichae](#)

Magnificent Brood Frog [64385]	Vulnerable	Species or species habitat likely to occur within area
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MAMMALS

[Bettongia tropica](#)

Northern Bettong [214]	Endangered	Species or species habitat likely to occur within area
------------------------	------------	--

[Conilurus penicillatus](#)

Brush-tailed Rabbit-rat, Brush-tailed Tree-rat [132]	Vulnerable	Species or species habitat may occur within area
--	------------	--

[Dasyurus hallucatus](#)

Northern Quoll [331]	Endangered	Species or species habitat known to occur within area
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[Dasyurus maculatus gracilis](#)

Spotted-tailed Quoll or Yarri (North Queensland subspecies) [64475]	Endangered	Species or species habitat likely to occur within area
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[Hipposideros semoni](#)

Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Endangered	Species or species habitat may occur within area
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[Petaurus australis unnamed subsp.](#)

Yellow-bellied Glider (Wet Tropics), Fluffy Glider [66668]	Vulnerable	Species or species habitat likely to occur within area
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[Pteropus conspicillatus](#)

Spectacled Flying-fox [185]	Vulnerable	Species or species habitat may occur within area
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[Pteropus poliocephalus](#)

Grey-headed Flying-fox [186]	Vulnerable	Species or species habitat may occur within area
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[Rhinolophus philippinensis \(large form\)](#)

Greater Large-eared Horseshoe Bat [66890]	Endangered	Species or species habitat known to occur within area
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[Saccolaimus saccolaimus nudicluniatus](#)

Bare-rumped Sheath-tail Bat [66889]	Critically Endangered	Species or species habitat may occur within area
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OTHER

[Cycas platyphylla](#)

a cycad [55796]	Vulnerable	Species or species habitat likely to occur within area
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PLANTS

<u>Acacia guyeri</u> [20972]	Vulnerable	Species or species habitat likely to occur within area
<u>Acacia ramiflora</u> [7242]	Vulnerable	Species or species habitat may occur within area
<u>Alloxylon flammeum</u> Red Silky Oak, Queensland Waratah, Tree Waratah [56400]	Vulnerable	Species or species habitat likely to occur within area
<u>Arthraxon hispidus</u> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
<u>Cajanus mareebensis</u> [8635]	Endangered	Species or species habitat likely to occur within area
<u>Chamaesyce carissoides</u> [67187]	Vulnerable	Species or species habitat likely to occur within area
<u>Dendrobium superbiens</u> Curly Pinks [64885]	Vulnerable	Species or species habitat likely to occur within area
<u>Grevillea glossadenia</u> [7979]	Vulnerable	Species or species habitat likely to occur within area
<u>Hodgkinsonia frutescens</u> Atherton Turkey Bush [14763]	Vulnerable	Species or species habitat likely to occur within area
<u>Huperzia filiformis</u> Rat's Tail Tassel-fern [24163]	Endangered	Species or species habitat likely to occur within area
<u>Huperzia marsupiiiformis</u> Water Tassel-fern [56632]	Vulnerable	Species or species habitat likely to occur within area
<u>Huperzia phlegmarioides</u> Layered Tassel-fern [24166]	Vulnerable	Species or species habitat likely to occur within area
<u>Phalaenopsis rosenstromii</u> [15984]	Endangered	Species or species habitat likely to occur within area
<u>Sauropus macranthus</u> [13189]	Vulnerable	Species or species habitat likely to occur within area
<u>Taeniophyllum muelleri</u> Minute Orchid, Ribbon-root Orchid [10771]	Vulnerable	Species or species habitat likely to occur within area
<u>Tropilis callitrophilis</u> Thin Feather Orchid [82771]	Vulnerable	Species or species habitat likely to occur within area
<u>Tylophora rupicola</u> [55237]	Endangered	Species or species habitat likely to occur within area
<u>Tylophora williamsii</u> [55235]	Vulnerable	Species or species habitat likely to occur within area

SHARKS

[Pristis microdon](#)

Freshwater Sawfish [66182] Vulnerable Species or species habitat likely to occur within area

Migratory Species

[Resource Information]

Name	Status	Type of Presence
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Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678] Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret [59541] Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542] Species or species habitat may occur within area

Migratory Marine Species

[Crocodylus porosus](#)

Salt-water Crocodile, Estuarine Crocodile [1774] Species or species habitat likely to occur within area

Migratory Terrestrial Species

[Erythrura gouldiae](#)

Gouldian Finch [413] Endangered Species or species habitat known to occur within area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943] Species or species habitat likely to occur within area

[Hirundapus caudacutus](#)

White-throated Needletail [682] Species or species habitat may occur within area

[Hirundo rustica](#)

Barn Swallow [662] Species or species habitat may occur within area

[Merops ornatus](#)

Rainbow Bee-eater [670] Species or species habitat may occur within area

[Monarcha melanopsis](#)

Black-faced Monarch [609] Breeding may occur within area

[Monarcha trivirgatus](#)

Spectacled Monarch [610] Breeding likely to occur within area

[Myiagra cyanoleuca](#)

Satin Flycatcher [612] Species or species habitat likely to occur within area

[Rhipidura rufifrons](#)

Rufous Fantail [592] Breeding may occur within area

Migratory Wetlands Species

[Ardea alba](#)

Great Egret, White Egret [59541] Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542] Species or species habitat may occur within area

[Gallinago hardwickii](#)

Latham's Snipe, Japanese Snipe [863] Species or species habitat may occur within area

[Grus antigone](#)

Sarus Crane [904] Species or species habitat likely to occur within area

[Nettapus coromandelianus albipennis](#)

Australian Cotton Pygmy-goose
[25979]

Species or species habitat may occur within area

[Rostratula benghalensis s. lat.](#)

Painted Snipe [889]

Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[[Resource Information](#)]

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

Defence - ATHERTON RIFLE RANGE

Listed Marine Species

[[Resource Information](#)]

Name	Status	Type of Presence
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Birds

[Anseranas semipalmata](#)

Magpie Goose [978]

Species or species habitat may occur within area

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret
[59541]

Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542]

Species or species habitat may occur within area

[Gallinago hardwickii](#)

Latham's Snipe, Japanese Snipe
[863]

Species or species habitat may occur within area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]

Species or species habitat likely to occur within area

[Hirundapus caudacutus](#)

White-throated Needletail [682]

Species or species habitat may occur within area

[Hirundo rustica](#)

Barn Swallow [662]

Species or species habitat may occur within area

[Merops ornatus](#)

Rainbow Bee-eater [670]

Species or species habitat may occur within area

[Monarcha melanopsis](#)

Black-faced Monarch [609]

Breeding may occur within area

[Monarcha trivirgatus](#)

Spectacled Monarch [610]

Breeding likely to occur within area

[Myiagra cyanoleuca](#)

Satin Flycatcher [612]

Species or species habitat likely to occur within area

[Nettapus coromandelianus albipennis](#)

Australian Cotton Pygmy-goose
[25979]

Species or species habitat may occur within area

[Rhipidura rufifrons](#)

Rufous Fantail [592]

Breeding may occur within area

[Rostratula benghalensis s. lat.](#)

Painted Snipe [889]

Species or species habitat may occur within area

Reptiles

[Crocodylus johnstoni](#)

Freshwater Crocodile,
Johnston's Crocodile, Johnston's
River Crocodile [1773]

Species or species habitat may occur within area

[Crocodylus porosus](#)

Salt-water Crocodile, Estuarine
Crocodile [1774]

Species or species habitat likely to occur within area

Extra Information

Places on the RNE

[Resource Information]

Note that not all Indigenous sites may be listed.

Name

Status

Natural

[Brydes Granite Gorge Beetle Site QLD](#)

Indicative Place

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

Mammals

[Felis catus](#)

Cat, House Cat, Domestic Cat
[19]

Species or species habitat likely to occur within area

[Oryctolagus cuniculus](#)

Rabbit, European Rabbit [128]

Species or species habitat likely to occur within area

[Sus scrofa](#)

Pig [6]

Species or species habitat likely to occur within area

Plants

[Acacia nilotica subsp. indica](#)

Prickly Acacia [6196]

Species or species habitat may occur within area

[Annona glabra](#)

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

[Cabomba caroliniana](#)

Cabomba, Fanwort, Carolina
Watershield, Fish Grass,
Washington Grass, Watershield,
Carolina Fanwort, Common
Cabomba [5171]

Species or species habitat likely to occur within area

[Cenchrus ciliaris](#)

Buffel-grass, Black Buffel-grass
[20213]

Species or species habitat may occur within area

[Cryptostegia grandiflora](#)

Rubber Vine, Rubbervine, India

Species or species habitat likely to occur within area

Rubber Vine, India Rubbervine,
Palay Rubbervine, Purple
Allamanda [18913]

[Hymenachne amplexicaulis](#)

Hymenachne, Olive
Hymenachne, Water Stargrass,
West Indian Grass, West Indian
Marsh Grass [31754]

[Lantana camara](#)

Lantana, Common Lantana,
Kamara Lantana, Large-leaf
Lantana, Pink Flowered
Lantana, Red Flowered Lantana,
Red-Flowered Sage, White
Sage, Wild Sage [10892]

[Parthenium hysterophorus](#)

Parthenium Weed, Bitter Weed,
Carrot Grass, False Ragweed
[19566]

[Salvinia molesta](#)

Salvinia, Giant Salvinia,
Aquarium Watermoss, Kariba
Weed [13665]

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

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 Heritage and Register of National Estate properties, Wetlands of International 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

-17.15419 145.35489,-17.15471 145.35634,-17.15351 145.3618,-17.15241 145.36547,-17.14409 145.36138,-17.14093 145.36211,-17.14191 145.37088,-17.14705 145.37561,-17.14465 145.37858,-17.14683 145.38974,-17.15376 145.40073,-17.16774 145.41225,-17.19577 145.40927,-17.19832 145.40485,-17.19551 145.39454,-17.18454 145.37422,-17.1727 145.3623,-17.16678 145.35825,-17.16032 145.35571,-17.15419 145.35489

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:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA 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, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)

-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.

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Last updated: Thursday, 16-Sep-2010 09:13:25 EST

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| [Australian Government](#) |

Appendix EI. Microchiropteran Bat Analysis Reports

Anabat echolocation data interpretation summary

Client: RPS (Cairns/Townsville)

Job no.: RPS-1002

Analysis Date: 11/06/2010

Project name/location: Arriga Palteau (May 2010 Survey)

Numbers in columns represent number of calls attributed to each species or species group

Species	10-May	11-May	12-May	13-May	Total calls for species
Calls positively identified					
<i>Hipposideros diadema</i>			1		1
<i>Scotorepens sanborni</i>	3				3
<i>Vespertilio troughtoni</i>	1				1
<i>Miniopterus australis</i>	5		1	4	10
<i>Miniopterus arianae oceanensis</i>	20	3	13	21	57
<i>Austronomus australis</i>	1		4		5
<i>Chaerephon jobensis</i>	1				1
<i>Mormopterus ridei</i>				2	2
<i>Saccolaimus flaviventris</i>	1				1
Total calls positively identified	32	3	19	27	81
Calls NOT positively identified					
<i>Chalinolobus nigrogriseus</i> / <i>S. sanborni</i>	1				1
<i>S. flaviventris</i> / <i>C. jobensis</i>	2	1		2	5
Unknown bat call	24	1	4	13	42
Total calls NOT positively identified	27	2	4	15	48
Total calls for night	59	5	23	42	129

Species nomenclature:

Species names used in this summary follow Churchill (2008).

Call identification & reporting standard:

Call identification was based on published call descriptions for southern Queensland (Reinhold *et al.* 2001) and the Northern Territory (Milne 2002) and on reference calls collected from central and northern Qld.

Determination of species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and van Dyck & Strahan (2008).

The format and content of this report complies with nationally accepted standards for the interpretation and reporting of Anabat data (Reardon 2003); latest version available from the Australasian Bat Society on-line at <http://www.ausbats.org.au/>.

Notes to the table - discussion of species/groups with low reliability of identification

<i>Chalinolobus nigrogriseus</i> / <i>S. sanborni</i>	calls are at similar frequencies; usually differentiated on slightly different pulse shapes but one call from this survey with intermediate shape and could have been either species
<i>S. flaviventris</i> / <i>C. jobensis</i>	call frequency overlaps; usually have different pulse shapes but a few brief calls could have been either species
Unknown calls	these are calls that were too brief, weak or noisy to enable reliable species identification; they represent species already listed above, not additional species

References:

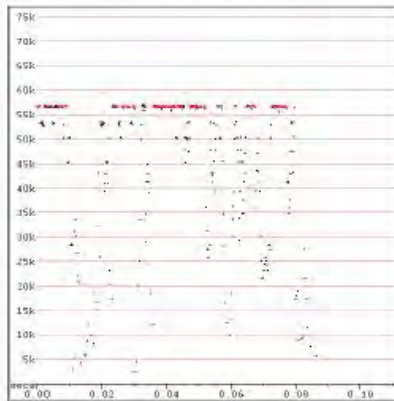
- Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin, Sydney.
- Milne, D.J. (2002). *Key to the Bat Calls of the Top End of the Northern Territory*. Technical Report No. 71, Parks and Wildlife Commission of the Northern Territory, Darwin.
- Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* 20, 41-43.
- Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.
- van Dyck, S. and Strahan, R. (ed.) (2008). *The Mammals of Australia* (Third Edition); New Holland; Sydney.

Anabat Data Analysis Summary

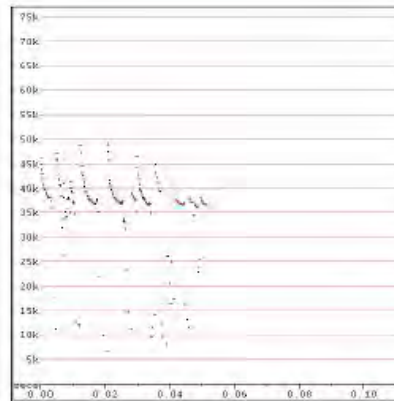
Sample calls extracted from the Arriga Plateau survey data (RPS Townsville; May 2010)

Scale: 10 msec per tick; time between pulses removed (AnalogW F7 compressed mode)

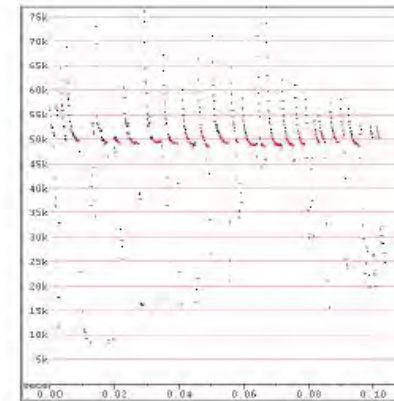
Species positively identified



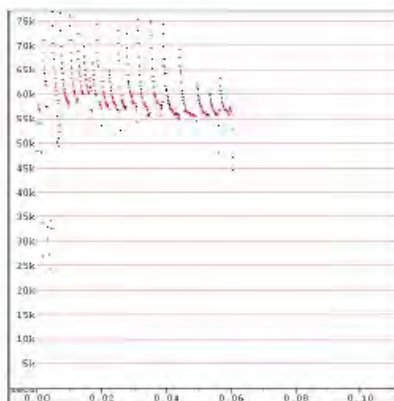
Hipposideros diadema



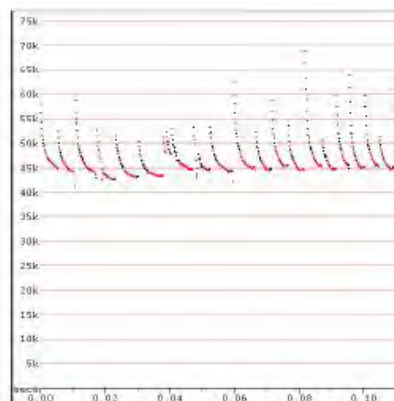
Scotorepens sanborni



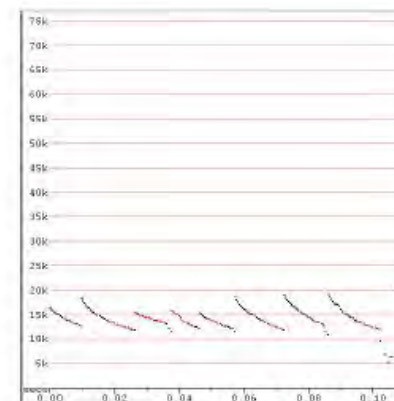
Vespadelus troungtoni



Miniopterus australis



Miniopterus orianae oceanensis



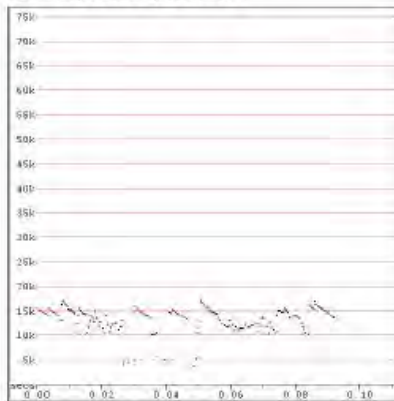
Austronomus australis

Anabat Data Analysis Summary

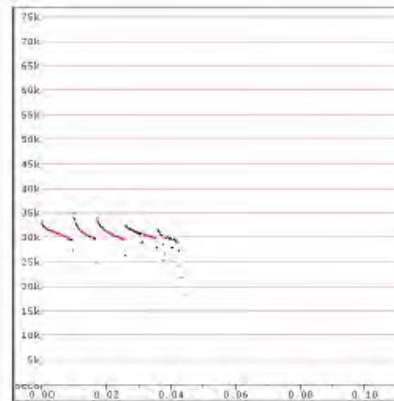
Sample calls extracted from the Arriga Plateau survey data (RPS Townsville; May 2010)

Scale: 10 msec per tick; time between pulses removed (AnalogokW F7 compressed mode)

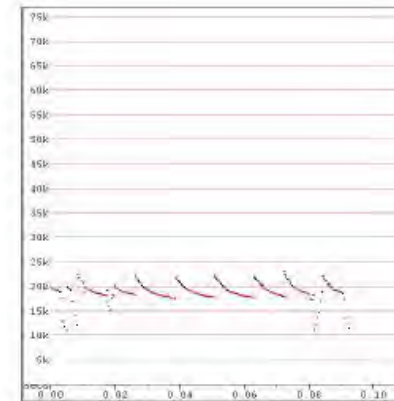
Species positively identified



Chaerephon jobensis

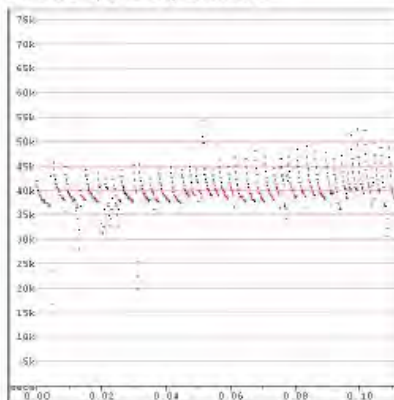


Mormopterus ridei

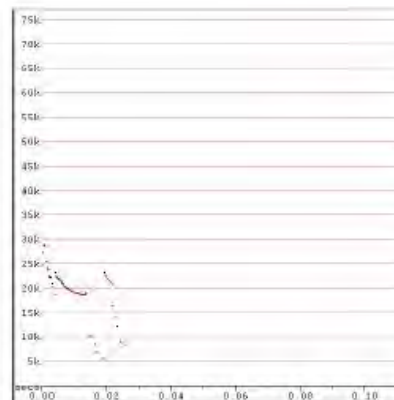


Saccolaimus flaviventris

Calls NOT positively identified



Chalinolobus nigrogriseus / *S. sanborni*



S. flaviventris / *C. jobensis*

Anabat echolocation data interpretation summary

Client: RPS (Townsville)

Client reference: PR100246-1

Balance Job no.: RPS-1104

Project name/location: Arriga Plateau, Atherton Tableland; 28-31 March 2011

Species identification summary:

Numbers in columns represent number of calls attributed to each species or species group

Detector: Date:	AB01				AB03			RPS Zcain			
	28-Mar	29-Mar	30-Mar	31-Mar	28-Mar	29-Mar	31-Mar	28-Mar	29-Mar	30-Mar	31-Mar
Species positively identified											
<i>Rhinolophus megaphyllus</i>			3		7	1					
<i>Chalinolobus gouldii</i>							4				
<i>Nyctophilus species</i>	2	1	1			3		1			
<i>Scotorepens orion</i>	3	1	1		4	1		1			
<i>Vespadelus trougtoni</i>										1	
<i>Miniopterus australis</i>	1	1	6	1	33	15	6	3	5	2	3
<i>Miniopterus orianae oceanensis</i>	1	5	122	39	11	8	54	29	16	1	1
<i>Chaerephon jobensis</i>			3			1					
<i>Mormopterus beccarii</i>	2	4	5							1	
<i>Saccolaimus flaviventris</i>	2	3	7		2		2	3	2	2	
Total positively identified calls	11	15	148	40	57	29	66	35	25	7	4
Calls NOT positively identified *											
<i>Scotorepens sanborni</i> or <i>Chalinolobus nigrogriseus</i>	7	3	7		11	81		1	2	5	2
<i>C. jobensis</i> or <i>S. flaviventris</i>	1		1								
<i>M. beccarii</i> or <i>Taphozous trougtoni</i>	1		3								
<i>M. beccarii</i> or <i>S. flaviventris</i>	1		1								
<i>S. flaviventris</i> or <i>S. saccolaimus</i> or <i>T. trougtoni</i>			1								
Unidentified bat calls	1		10	1	5	10				1	
Total calls NOT positively identified	11	3	23	1	16	91	0	1	2	6	2
Total calls recorded	22	18	171	41	73	120	66	36	27	13	6

* Species listed in this section and not above should be considered as possibly present in the study area.
See notes below regarding species identity for calls with poor resolution.

Anabat Data Analysis Summary

Client: RPS (Townsville)

Client reference: PR100246-1

Balance Job no.: RPS-1104

Project name/location: Arriga Plateau, Atherton Tableland; 28-31 March 2011

Species nomenclature:

Species names used in this summary follow Churchill (2008).

Call identification & reporting standard:

No call descriptions or key exists for the survey region; however, published keys and descriptions from other regions (Milne 2001; Reinhold *et al.* 2001; Pennay *et al.* 2004) were used to guide this analysis. Reference was also made to calls collected from bats of known identity in southern, central and north-eastern Queensland.

Determination of species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and van Dyck & Strahan (2008).

The format and content of this report complies with nationally accepted standards for the interpretation and reporting of Anabat data (Reardon 2003); latest version available from the Australasian Bat Society on-line at <http://www.ausbats.org.au/>.

Notes - species/calls not reliably identified

Nyctophilus species

The long-eared bats produce distinctive linear calls that are usually distinguishable from other species; however, the species within the genus *Nyctophilus* cannot be differentiated using Anabat data. Three species potentially occur in the survey area: *N. bifax*, *N. geoffroyi* and *N. gouldii*.

Scotorepens sanborni or *Chalinolobus nigrogriseus*

Calls from these species are virtually impossible to differentiate and both are likely to occur in the study area.

C. jobensis or *S. flaviventris*

Most calls from these bats are easy to distinguish; however, brief and/or weak calls in the frequency overlap zone (*ca.* 17-20kHz) can sometimes be confused. A few such calls from this survey could not be reliably identified.

M. beccarii or *Taphozous troughtoni*

These species overlap in frequency around 23-25kHz, but can usually be distinguished due to unique pulse shapes. *M. beccarii* was positively identified from a number of calls; however, a few low quality calls in the frequency range had insufficient definition in the pulse shape to reliably attribute to either species.

M. beccarii or *S. flaviventris*

Some attack-phase pulses from *S. flaviventris* are similar in appearance to the erratic, steep pulses of *M. beccarii*. Most calls were positively attributed to either species based on distinctive search-phase pulses, but a couple of noisy and weak calls could not be reliably differentiated.

S. flaviventris or *S. saccolaimus* or *T. troughtoni*

A single call from AB01 on 30/3 contains clear search-phase pulses like those of *S. flaviventris*, but the frequency is higher than expected for such a call (around 22kHz). It is possible that the call came from *T. troughtoni*, but that species usually generates flatter pulses than those exhibited in this call. With a frequency at *ca.* 22kHz and smoothly-curved, low-bandwidth pulses, it is considered highly probable that this call came from the endangered *S. saccolaimus* as they match the description provided by Corben (2010).

Unidentified bat calls

These were calls that were too brief and/or weak and/or noisy to allow reliable attribution to any species or species group. All such calls were within the frequency ranges of species otherwise listed in the table and are unlikely to represent additional species.

Anabat Data Analysis Summary

Client: RPS (Townsville)

Client reference: PR100246-1

Balance Job no.: RPS-1104

Project name/location: Arriga Plateau, Atherton Tableland; 28-31 March 2011

References:

Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.

Corben, C. (2010). Acoustic identification of *Saccolaimus*. *Proceedings of the 14th Australasian Bat Society Conference, Darwin, Australia, 12-14 July 2010*.

Milne, D.J. (2002). *Key to the Bat Calls of the Top End of the Northern Territory*. Technical Report No. 71, Parks and Wildlife Commission of the Northern Territory, Darwin.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.

van Dyck, S. and Strahan, R. (ed.) (2008). *The Mammals of Australia* (Third Edition); New Holland; Sydney.

Anabat Data Analysis Summary

Client: RPS (Townsville)

Client reference: PR100246-1

Balance Job no.: RPS-1104

Project name/location: Arriga Plateau, Atherton Tableland; 28-31 March 2011

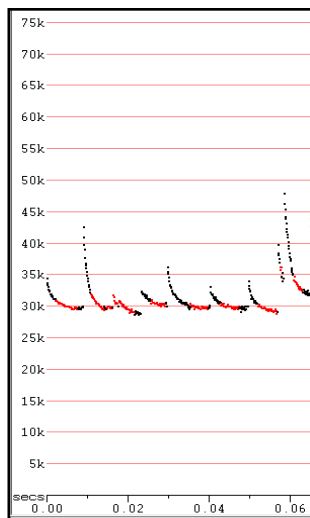
Sample calls extracted from the survey data.

Scale: 10 msec per tick; time between pulses removed
(AnalogW F7 compressed mode)

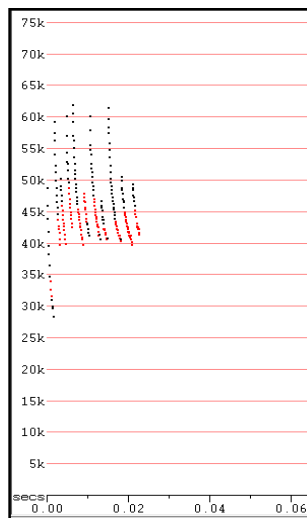
Species positively identified



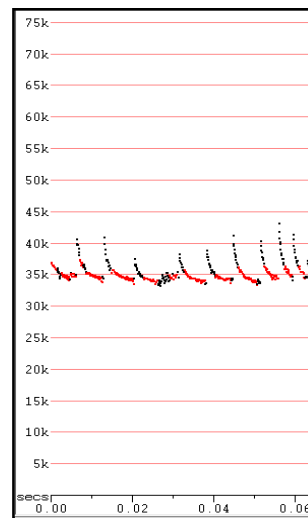
Rhinolophus megaphyllus



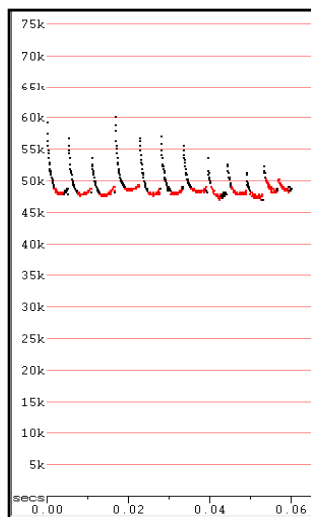
Chalinolobus gouldii



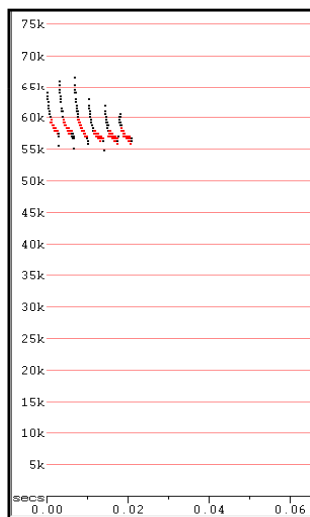
Nyctophilus species



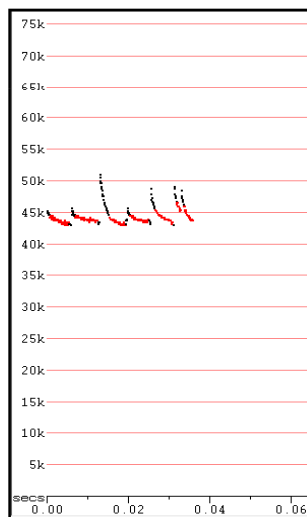
Scotorepens orion



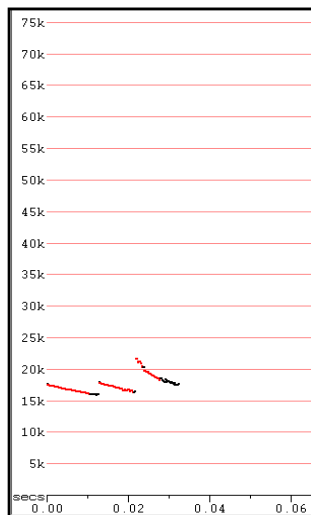
Vespadelus troughtoni



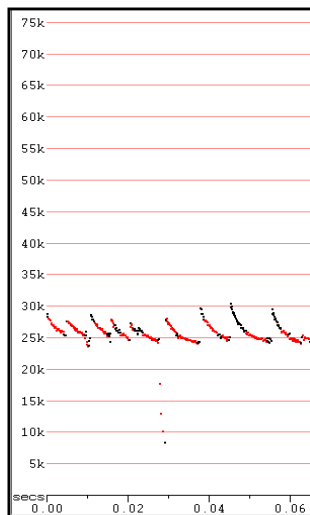
Miniopterus australis



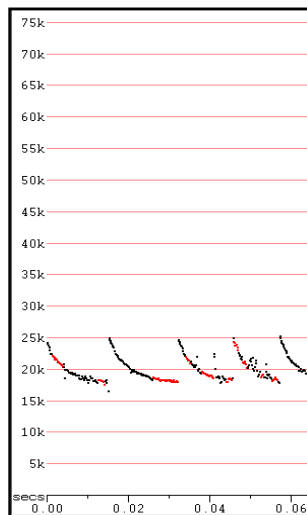
Miniopterus orianae oceanensis



Chaerephon jobensis



Mormopterus beccarii



Saccolaimus flaviventris

Anabat Data Analysis Summary

Client: RPS (Townsville)

Client reference: PR100246-1

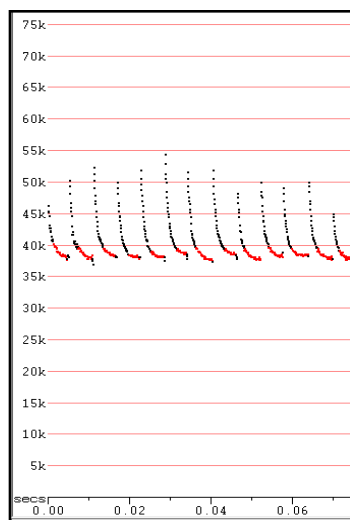
Balance Job no.: RPS-1104

Project name/location: Arriga Plateau, Atherton Tableland; 28-31 March 2011

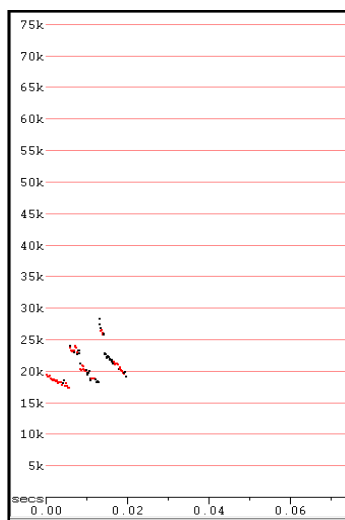
Sample calls extracted from the survey data.

Scale: 10 msec per tick; time between pulses removed
(AnalogW F7 compressed mode)

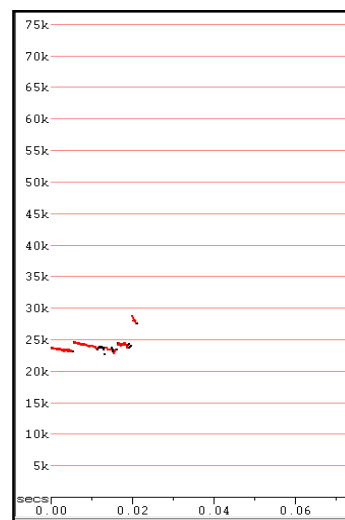
Calls not positively identified



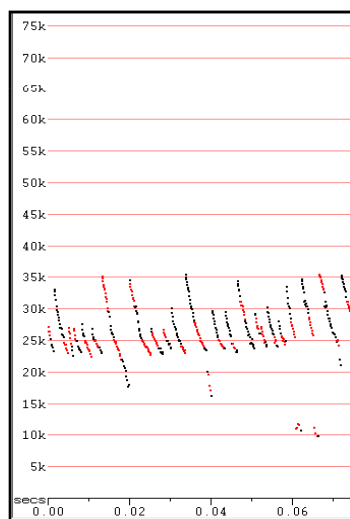
S. sanborni or *C. nigrogriseus*



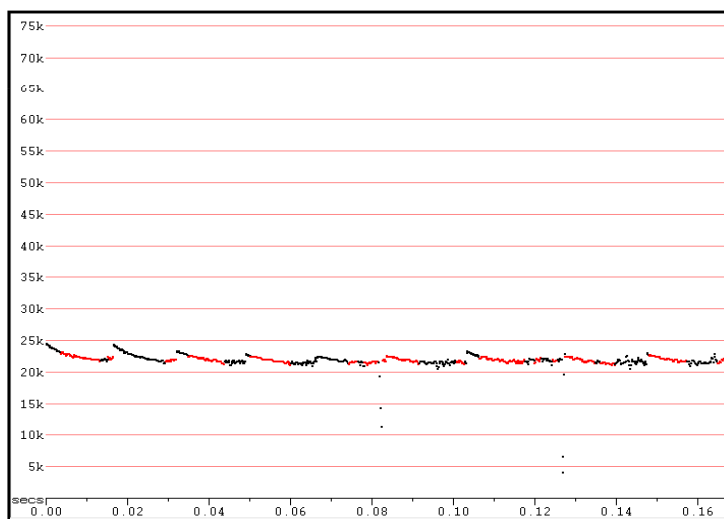
C. jobensis or *S. flaviventris*



M. beccarii or *Taphozous troughtoni*



M. beccarii or *S. flaviventris*



S. flaviventris or *S. saccolaimus* or *T. troughtoni*

Anabat Data Analysis Summary

Client: RPS Cairns

Contact: Jeff Middleton

Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Data received for analysis

The echolocation call data analysed here was recorded using several Wildlife Acoustics SongMeter SM2BAT detectors (192kHz Stereo model).

Data was received as WAC files (Wildlife Acoustics proprietary lossless compression format), sorted by SM2BAT unit number or Turbine (site) number.

WAC files were converted to zero-crossing files (ZCA) using *WAC2WAV Version 3.2.3* (Wildlife Acoustics, 2011).

ZCA files were then viewed and calls identified in *AnalogW Version 3.7w* (Corben, 2009).

The WAC to ZCA conversion process generated very large data sets (2,000-10,000 ZCA files) for each detector; however, noise filters applied in *AnalogW* (and also in additional trials using *WAC2WAV*) produced relatively low numbers of files that actually contained bat calls (<100 per night per detector).

TABLE 1 Species identified from the Mt Emerald echolocation call data

Note: The following three SM2BAT detectors were operated with just one microphone connected to the **Left** channel and set at shrub level.

Detector Date Channel	SM2BAT_005106				
	8/06/2011 left	9/06/2011 left	10/06/2011 left	11/06/2011 left	Total Calls
Species					
<i>Austronomus australis</i>	2	8	6	17	33
<i>Chaerephon jobensis</i>		2			2
<i>Chalinolobus nigrogriseus</i> or <i>Scotorepens sanborni</i>	3	3		2	8
<i>Miniopterus australis</i>	4	7	2	8	21
<i>Miniopterus orianae oceanensis</i>	11	27	23	15	76
<i>Mormopterus ridei</i>					0
<i>Rhinolophus megaphyllus</i>		2			2
<i>Taphozous troughtoni</i> or <i>Saccolaimus</i> species		1			1
Unidentified bat calls	7	11	4	7	29
Total calls recorded	27	61	35	49	172

Detector Date Channel	SM2BAT_0057322			SM2BAT_005733	
	8/06/2011 left	9/06/2011 left	Total Calls	8/06/2011 left	Total Calls
Species					
<i>Austronomus australis</i>	1		1	4	4
<i>Chaerephon jobensis</i>			0	2	2
<i>Chalinolobus nigrogriseus</i> or <i>Scotorepens sanborni</i>	2		2		0
<i>Miniopterus australis</i>			0	13	13
<i>Miniopterus orianae oceanensis</i>	1	2	3	6	6
<i>Mormopterus ridei</i>			0		0
<i>Rhinolophus megaphyllus</i>			0		0
<i>Taphozous troughtoni</i> or <i>Saccolaimus</i> species			0		0
Unidentified bat calls	1		1	3	3
Total calls recorded	5	2	7	28	28

Anabat Data Analysis Summary

Client: RPS Cairns

Contact: Jeff Middleton

Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Table 1 (cont.)

Note: Both channels were used at the following turbine sites. **Left** channel microphone was placed at approximately 80m above ground level. **Right** channel microphone was placed at approximately 30m above ground level.

Detector Date Channel	Turbine #15						
	1/06/2011		2/06/2011		3/06/2011		Total Calls
	left	right	left	right	left	right	
Species							
<i>Austronomus australis</i>		3				3	6
<i>Chaerephon jobensis</i>							0
<i>Chalinolobus nigrogriseus</i> or <i>Scotorepens sanborni</i>		8				1	9
<i>Miniopterus australis</i>		4				1	5
<i>Miniopterus orianae oceanensis</i>		13		2		3	18
<i>Mormopterus ridei</i>						1	1
<i>Rhinolophus megaphyllus</i>							0
<i>Taphozous troughtoni</i> or <i>Saccolaimus</i> species							0
Unidentified bat calls		1		6			7
Total calls recorded	0	29	0	8	0	9	46

Detector Date Channel	Turbine #47								
	1/06/2011		2/06/2011		3/06/2011		4/06/2011		Total Calls
	left	right	left	right	left	right	left	right	
Species									
<i>Austronomus australis</i>	5		15	8	12	3	1	1	45
<i>Chaerephon jobensis</i>		3		1				1	5
<i>Chalinolobus nigrogriseus</i> or <i>Scotorepens sanborni</i>	2								2
<i>Miniopterus australis</i>									0
<i>Miniopterus orianae oceanensis</i>	1	1			1				3
<i>Mormopterus ridei</i>					1				1
<i>Rhinolophus megaphyllus</i>									0
<i>Taphozous troughtoni</i> or <i>Saccolaimus</i> species									0
Unidentified bat calls	9	8	17	4	20	1	7	1	67
Total calls recorded	17	12	32	13	34	4	8	3	123

Anabat Data Analysis Summary

Client: RPS Cairns

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Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Species nomenclature:

Species names used in this summary follow Churchill (2008).

Call identification & reporting standard:

Call identification for this data set was based on call descriptions and keys presented in Reinhold *et al.* (2001) and Milne (2002) as well as reference calls collected in eastern & northern Queensland and the Northern Territory.

Species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and van Dyck & Strahan (2008).

The format and content of this report complies with nationally accepted standards for the interpretation and reporting of Anabat data (Reardon 2003); latest version available from the Australasian Bat Society on-line at <http://www.ausbats.org.au/>.

Notes on species present and reliably of call identification

POSSIBLE OCCURRENCE OF THREATENED SPECIES - *SACCOLAIMUS SACCOLAIMUS*

Taphozous troughtoni or *Saccolaimus* species

The calls of these species are difficult to differentiate, as there is significant overlap in their characteristic frequency range and pulse shapes. Typical characteristics, extracted from available reference calls, are compared in Table 2.

A single call of fair quality, recorded on 9/6 by SM2BAT_005106, could have been from any of these three species.

A comparison of major call parameter means (t-test) between the Mt Emerald call and reference calls of these three species suggest it is significantly different from *S. saccolaimus* but that most parameters are not significantly different from either of the other species. It should be noted, however, that the Mt Emerald call only provided 10 pulses for this comparison. The P values for these t-tests are shown in Table 3.

Further analysis by plotting values for major parameters against one-another suggest the call is most similar to reference calls from *T. troughtoni*, although the spread of points for *S. saccolaimus* reference calls (D. Milne, NT specimens) further reduces the reliability of this analysis. See Figures 1-4 for this comparison.

TABLE 2 Typical call characteristics of *Taphozous troughtoni* and two *Saccolaimus* species

Species	Pulse shape	Characteristic freq.	Maximum frequency	Pulse duration
<i>T. troughtoni</i>	mostly curved; short initial sweep	21-23 kHz	24 kHz	3-10 ms
<i>S. flaviventris</i>	flat to curved; often steep initial sweep	18-21 kHz	28 kHz	5-15 ms
<i>S. saccolaimus</i>	flat to curved; no apparent steep initial sweep	20-23 kHz	27 kHz	10-25 ms

OTHER SPECIES IDENTIFIED IN THIS DATA SET

Austronomus australis

Calls are distinctive - lower frequency than most other species. Minor frequency overlap with *C. jobensis* (at ca. 14-17kHz), but calls from *A. australis* in overlap zone are 'approach-phase' with steep erratic pulses, cf. flat 'search phase' pulses from *C. jobensis*.

Chalinolobus nigrogriseus or *Scotorepens sanborni*

These two species produce very similar calls, with characteristic frequency around 36-40kHz, that are difficult to differentiate. Both species are likely to be present in the study area, so all relevant calls were considered to potentially represent either.

Chaerephon jobensis

Search phase calls have mainly flat pulses around 14-17kHz and are generally easy to identify. 'Approach phase' calls have steeper pulses that overlap in frequency with those of *Saccolaimus flaviventris* (around 17-21kHz), but which have erratic changes in pulse shape and frequency within the call sequence (cf. uniform pulses in *S. flaviventris*). All calls in the relevant frequency range were attributable to *C. jobensis* with no evidence of typical *S. flaviventris* calls.

Anabat Data Analysis Summary

Client: RPS Cairns

Contact: Jeff Middleton

Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Miniopterus australis

Highly distinctive calls with characteristic frequency 56-60kHz - not possible to confuse with any other species that would occur in the study area.

Miniopterus orianae oceanensis

Distinctive calls around 44-48kHz, which are not likely to be confused with any other species that would be present in the study area.

Mormopterus ridei

Calls are fairly distinctive, with flat pulses and frequency range around 30-35kHz. Frequency overlaps with several other species that may be present (e.g. *Scoteanax rueppellii*, *Scotorepens orion*), but those species almost always have steep, curved pulses, rather than the flat pulses typical of *Mormopterus* species.

Rhinolophus megaphyllus

Cannot confuse this species with any other that would be present in the study area. It produces long-duration, constant-frequency pulses around 65-70kHz.

Unidentified bat calls

These were calls that contained only one or two pulses, usually of indeterminate shape, or incompletely recorded, or confused amongst background noise. All such calls were within frequency ranges of species listed above and are unlikely to indicate additional species present in the survey area.

References:

Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.

Milne, D. (2002). *Key to the Bat Calls or the Top End of the Northern Territory*. Technical Report No. 71; Parks and Wildlife Commission of the Northern Territory; Darwin.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

van Dyck, S. and Strahan, R. (ed.) (2008). *The Mammals of Australia* (Third Edition); New Holland; Sydney.

Anabat Data Analysis Summary

Client: RPS Cairns

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Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Table 3 Results of t-tests for Mt Emerald suspect *Saccolaimus saccolaimus* call against reference calls for similar species.

	P values for call parameters										
	Dur	TBP	Fmax	Fmin	Fmean	Tk	Fk	Tc	Fc	S1	Sc
Mt Emerald & <i>S. saccolaimus</i> (NT)	0.1717	0.0000	0.0000	0.2127	0.1056	0.0099	0.1693	0.4254	0.5472	0.4233	0.0003
Mt Emerald & <i>T. trougtoni</i> (NW Qld)	0.0000	0.0000	0.0000	0.6402	0.0031	0.0576	0.0000	0.0000	0.1483	0.0000	0.0000
Mt Emerald & <i>S. flaviventris</i> (SEQld)	0.2233	0.0000	0.0000	0.0004	0.5600	0.0000	0.2290	0.1579	0.0006	0.0000	0.0000

Call parameter glossary:

Dur Pulse duration

Prev Time between pulses

Fmax Maximum frequency of pulses

Fmin Minimum frequency of pulses

Fmean Mean frequency of pulses

Tk Time to knee (from start of pulse to first significant change in slope)

Fk Frequency of knee (frequency at which pulse slope changes)

Tc Time from start of pulse to beginning of characteristic section ('body')

Fc Characteristic frequency (lowest frequency in the characteristic section)

S1 Slope of initial frequency sweep (before knee)

Sc Slope of characteristic frequency section

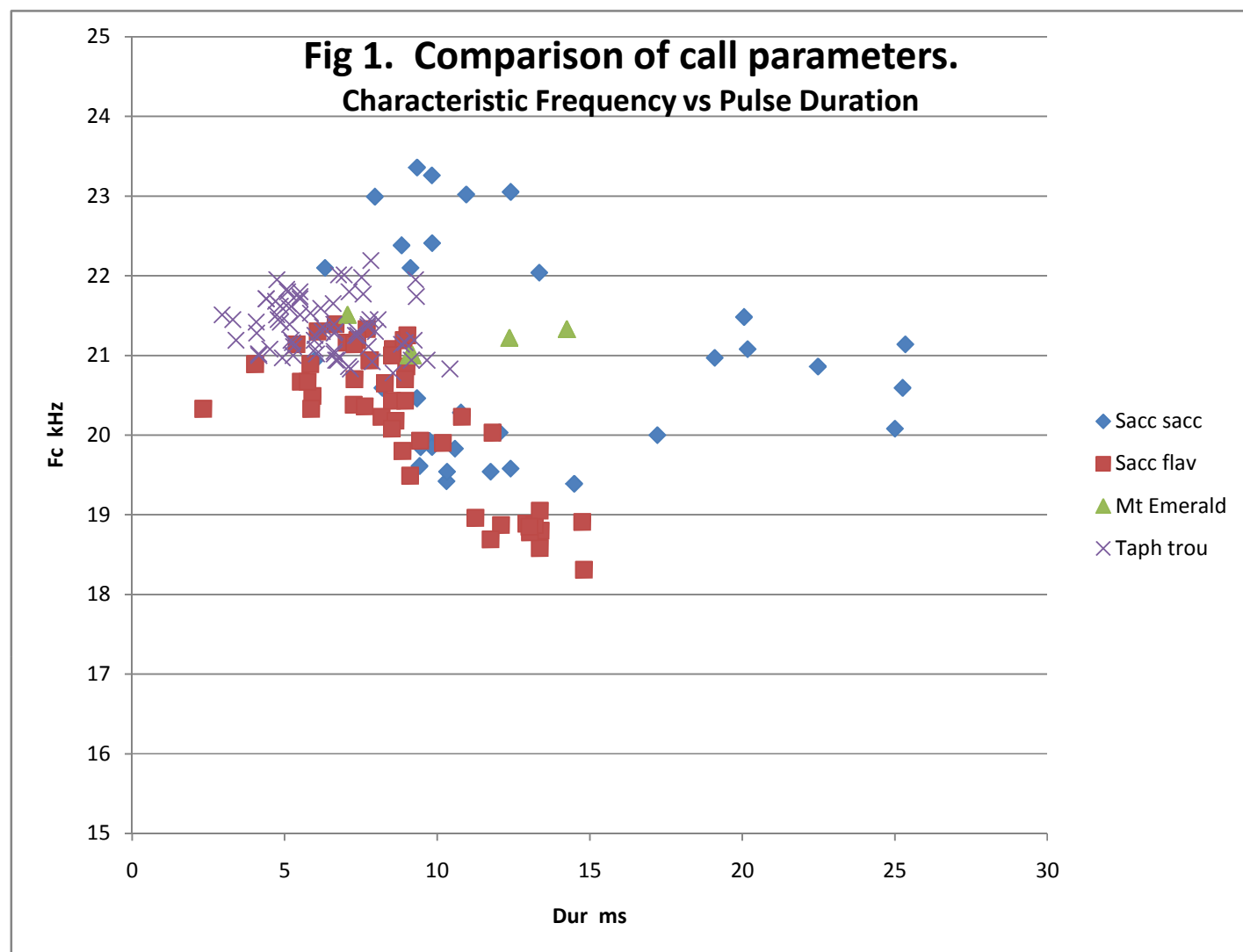
Anabat Data Analysis Summary

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Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011



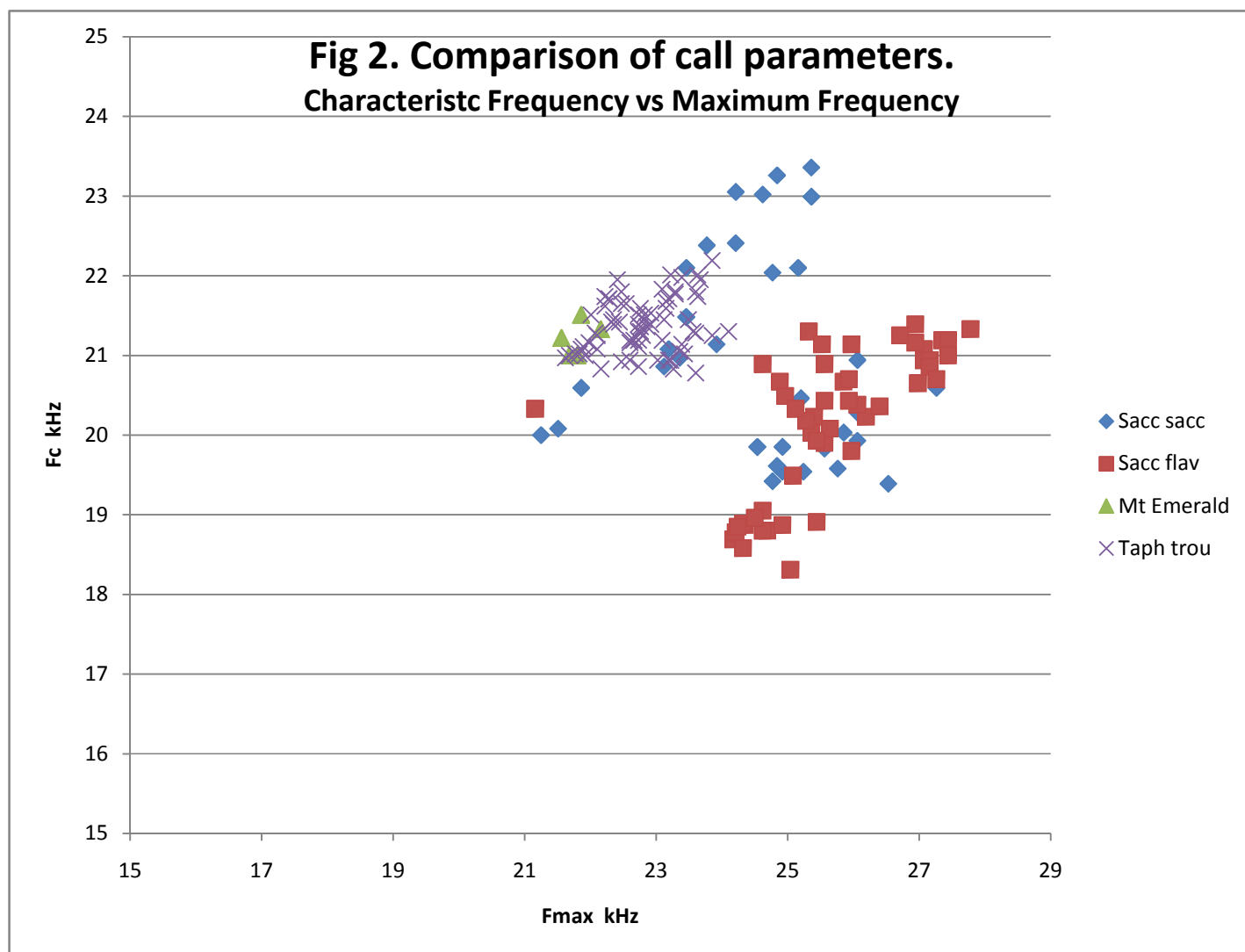
Anabat Data Analysis Summary

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Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011



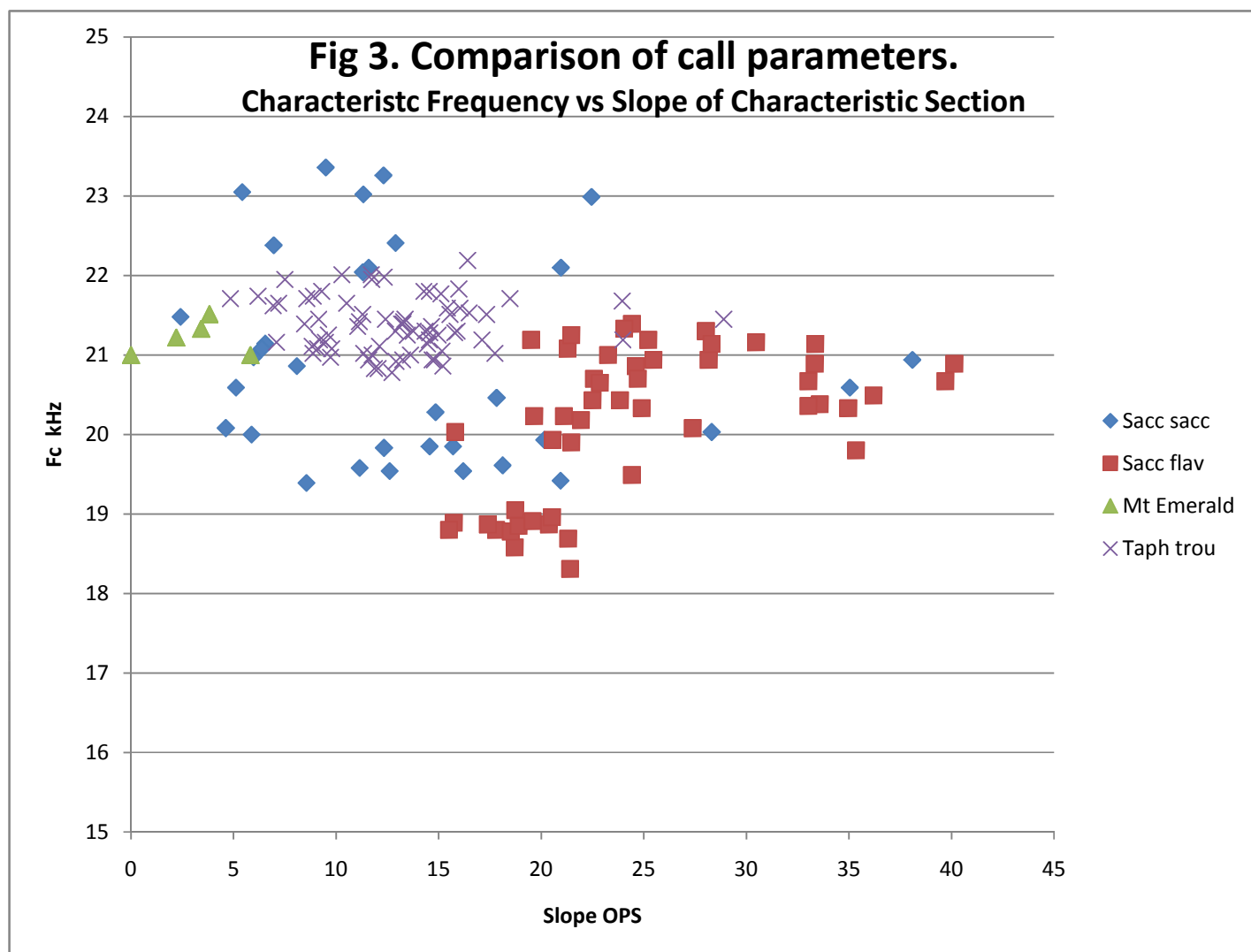
Anabat Data Analysis Summary

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Job no.: RPS-1106

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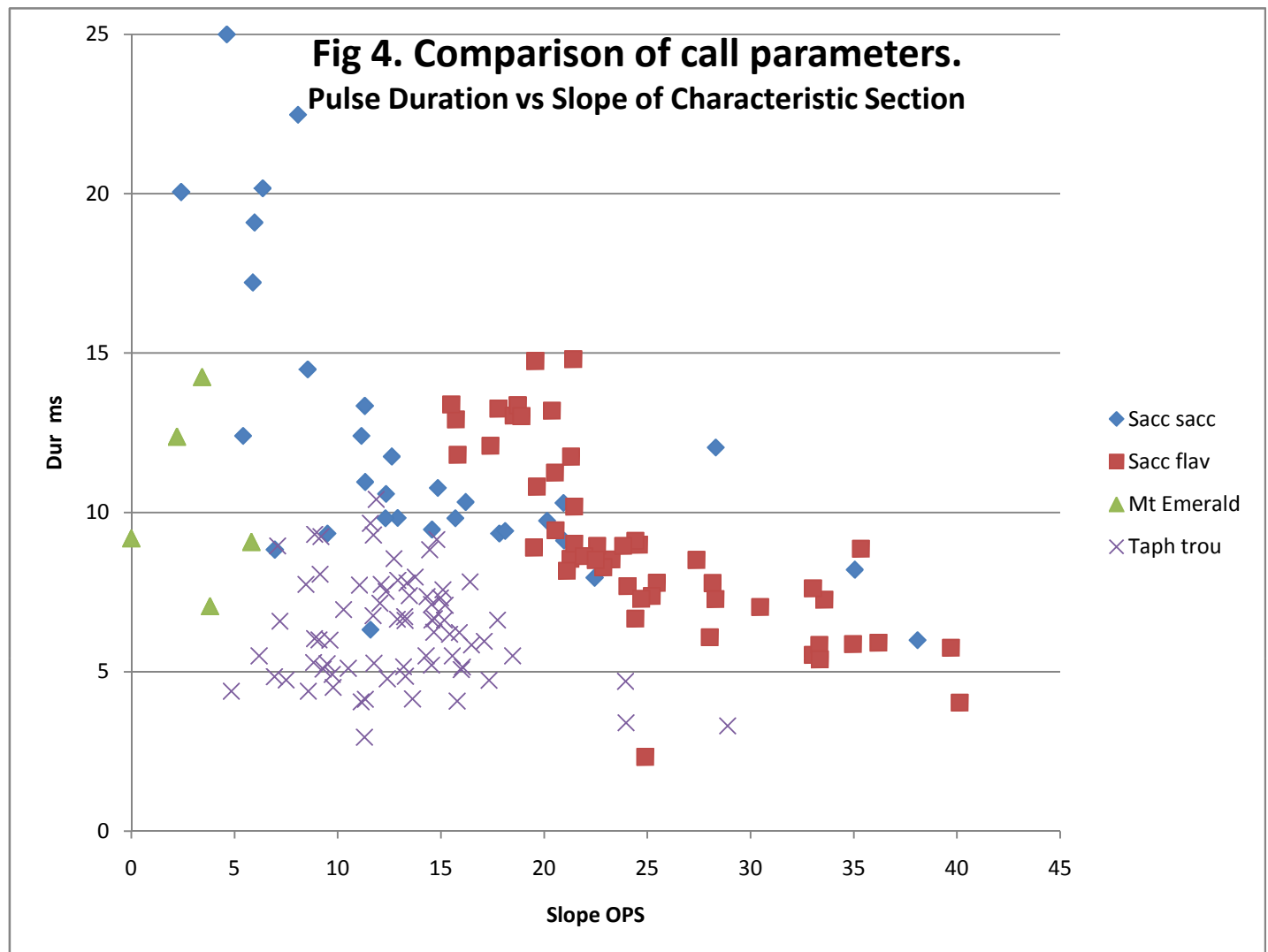
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Client: RPS Cairns

Contact: Jeff Middleton

Job no.: RPS-1106

Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011



Anabat Data Analysis Summary

Client: RPS Cairns

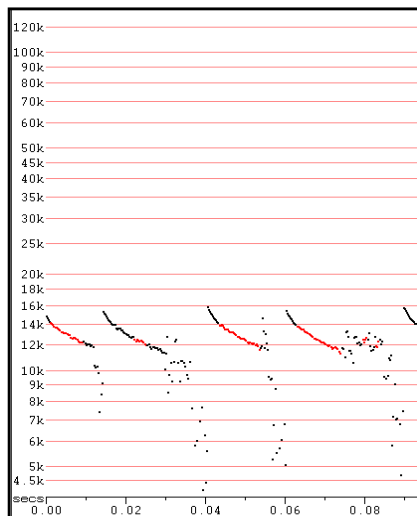
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Job no.: RPS-1106

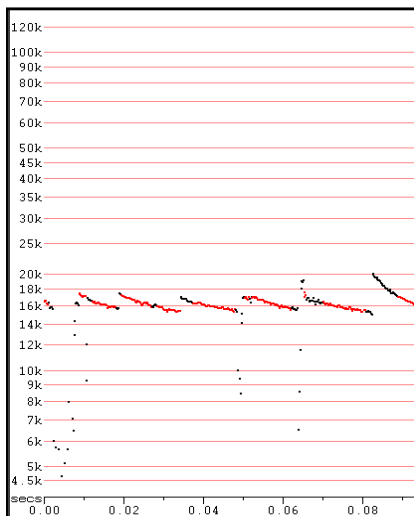
Survey Location & Period: Mt Emerald SM2BAT monitoring, June 2011

Sample calls extracted from the survey data

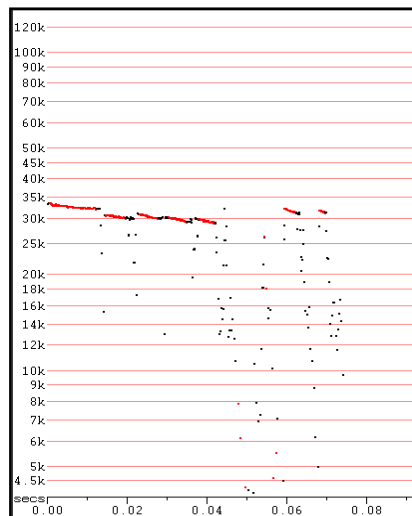
Scale: 10 msec per tick; time between pulses removed (AnalogW F7 compressed mode)



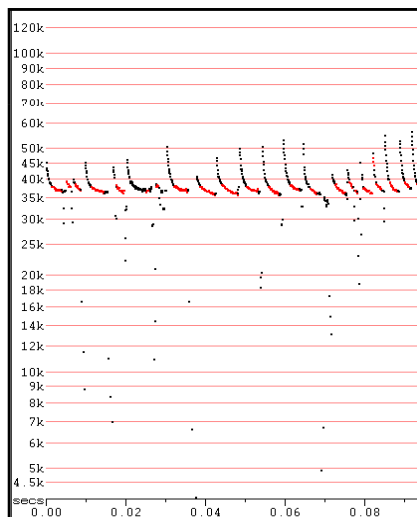
Austronomus australis



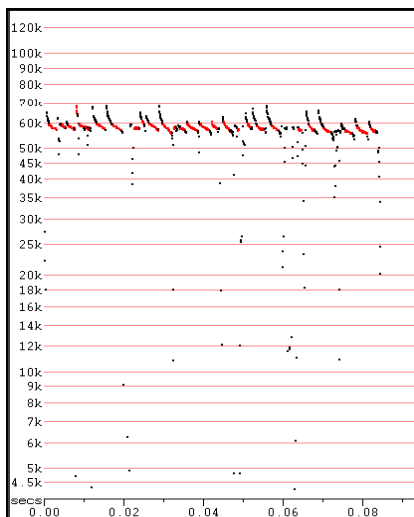
Chaerephon jobensis



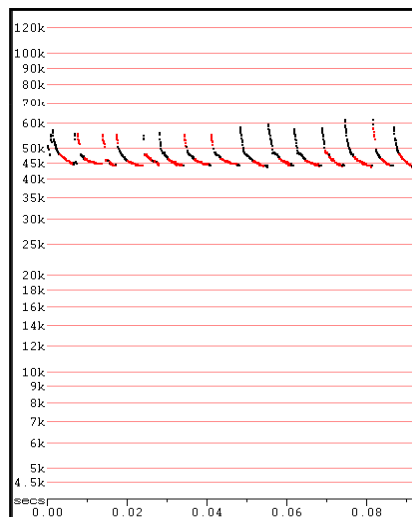
Mormopterus ridei



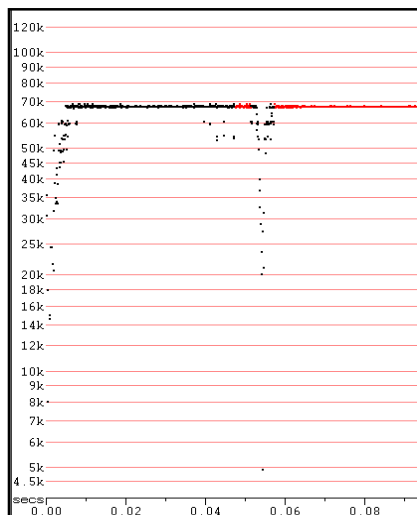
C. nigrogriseus or *S. sanborni*



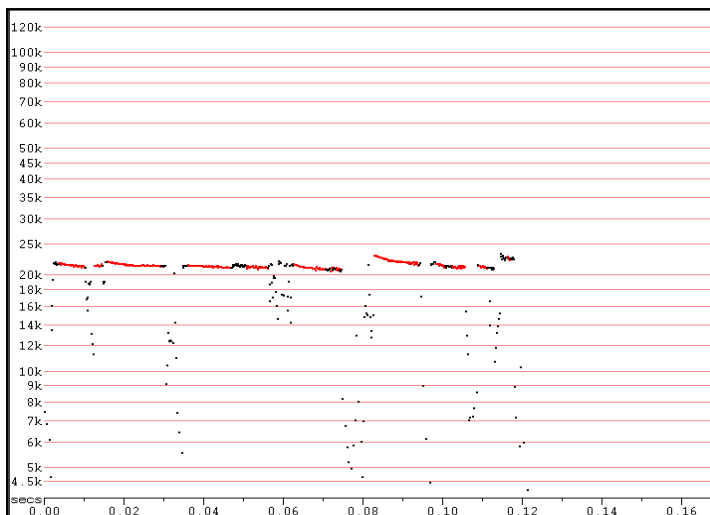
Miniopterus australis



Miniopterus orianae oceanensis



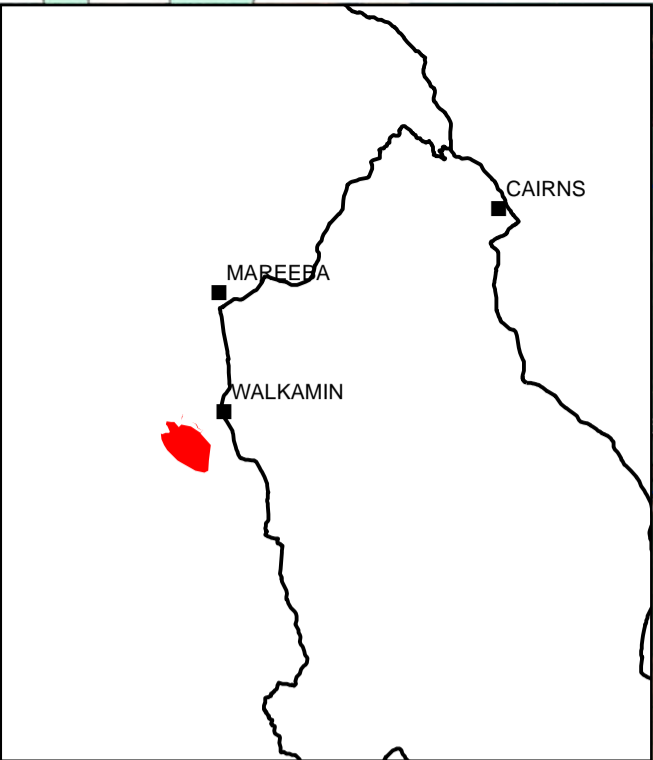
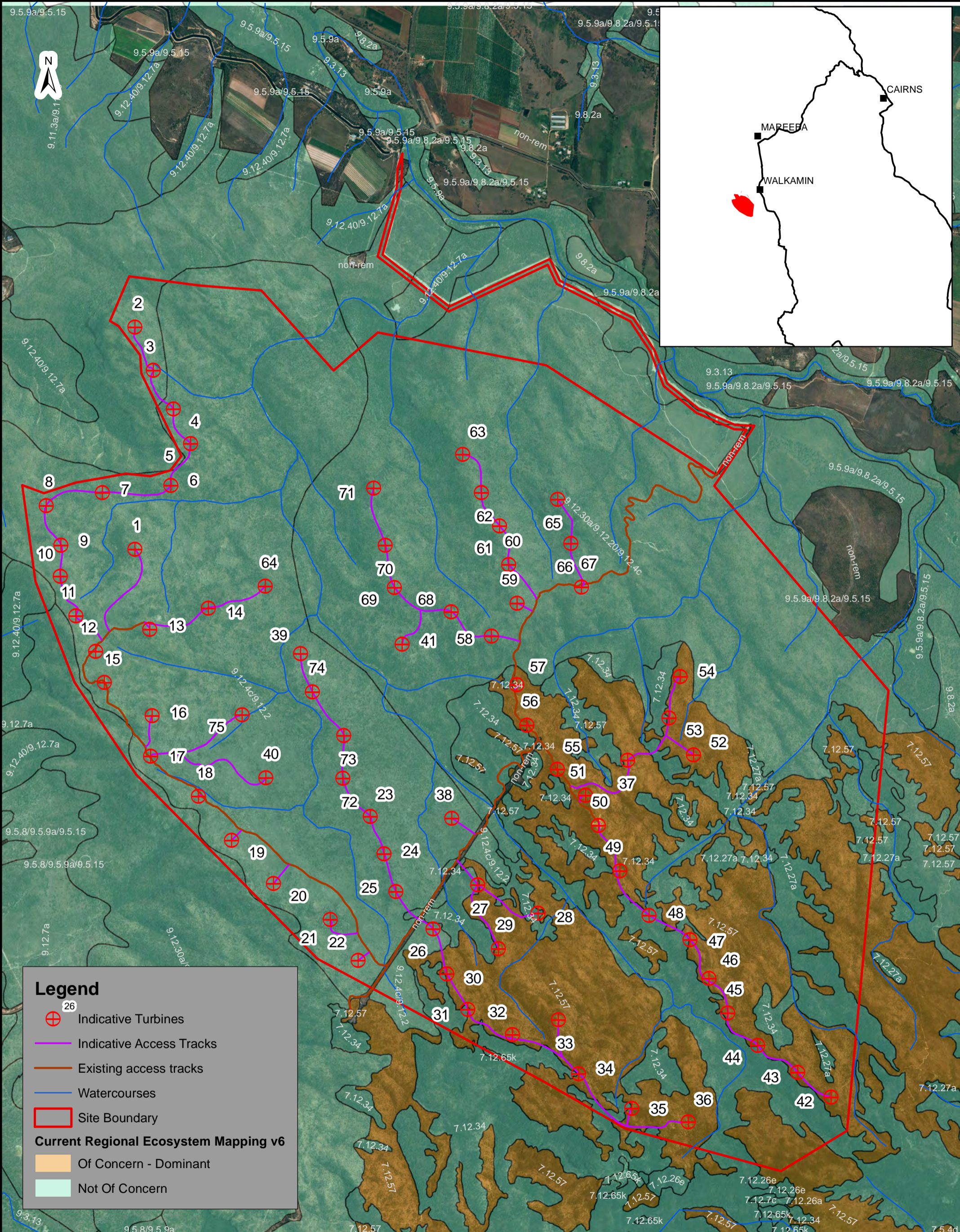
Rhinolophus megaphyllus



Tapozous troughtoni or *Saccolaimus* sp

Appendix A2. Vegetation Survey Sites

Appendix B2.



Legend

- Indicative Turbines
- Indicative Access Tracks
- Existing access tracks
- Watercourses
- Site Boundary

Current Regional Ecosystem Mapping v6

- Of Concern - Dominant
- Not Of Concern

<p>DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION</p> <p>REGIONAL ECOSYSTEM VERSION 6 DATA</p> <p>Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.</p> <p>Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.</p>	<p>D. FINNEY</p>	Client	<p>Transfield Services</p> <p>Mount Emerald Wind Farm</p>		<p>RPS Australia East Pty Ltd ACN 140 292 762</p> <p>135 Abbott St PO Box 1949 CAIRNS QLD 4870</p> <p>T +61 7 4031 1336 F +61 7 4031 2942 W rpsgroup.com.au</p>
	<p>Compiled by J. MIDDLETON</p>	Title	<p>Current Regional Ecosystem Mapping v6</p>		
	<p>Map Projection MGAz55</p>	<p>0 0.6 1.2 km</p>			
	<p>Map Datum GDA94</p>				
	<p>File Reference PR100246-84.mxd</p>				
<p>Sheet Number 1 of 1</p>	SCALE (A3) 1:24,000	DATE 10/08/2011	DRAWING NO. PR100246-84	ISSUE	

Appendix C2.

Regional Ecosystem Descriptions

Regional ecosystem 7.12.34

Vegetation Management Act class (November 2009) Least concern

Biodiversity status No concern at present

Subregion 5, 9.3, 6, 4, 7, 9.6, 9, (9.4) Estimated extent In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Extent in reserves High

Short description *Eucalyptus portuensis* and/or *E. drepanophylla*, +/- *C. intermedia* +/- *C. citriodora*, +/- *E. granitica* open-woodland to open-forest, on uplands on granite

Structure category Sparse

Description *Eucalyptus portuensis* (white mahogany) and/or *E. drepanophylla* (ironbark), +/- *C. intermedia* (pink bloodwood) +/- *C. citriodora* (lemon-scented gum), +/- *E. granitica* (granite ironbark) open-woodland to open-forest. Uplands on granite, of the dry rainfall zone.

Supplementary description Stanton and Stanton (2005), G16m, R16m; Tracey and Webb (1975), 16m

Protected areas Hann Tableland NP, Girringun NP, Paluma Range NP, Mount Windsor NP, Dinden NP, Herberton Range NP, Bare Hill CP, Mount Lewis FR, Davies Creek NP, Herberton Range CP, Mount Cook NP, Herberton Range NP (R), Kirrama NP, Danbulla NP, Dinden NP (R), Koombooloomba South FR, Mount Windsor NP (R), Dinden FR, Tully Falls NP, [Danbulla NP (R)].

Regional ecosystem 7.12.57

Vegetation Management Act class (November 2009) Of concern

Biodiversity status Of concern

Subregion 4, 6, 9.6, 5, (9), (7), (9.4), (9.3)

Estimated extent In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained

Extent in reserves Low

Short description Shrubland and low woodland mosaic with *Syncarpia glomulifera*, *Corymbia abergiana*, *Eucalyptus portuensis*, *Allocasuarina littoralis* and *Xanthorrhoea johnsonii*, on uplands and highlands on granite

Structure category Mid-dense

Description Shrubland and low woodland mosaic with *Syncarpia glomulifera* (turpentine), *Corymbia abergiana* (range bloodwood), *Eucalyptus portuensis* (white mahogany), *Allocasuarina littoralis* (black sheoak) and *Xanthorrhoea johnsonii* (grasstree). Uplands and highlands on granite and rhyolite, of the moist and dry rainfall zones.

Supplementary description Stanton and Stanton (2005), G55, R55

Protected areas Mount Lewis FR, [Herberton Range NP], [Koombooloomba South FR]

Regional Ecosystem Descriptions

Regional ecosystem 9.12.2

Vegetation Management Act class (November 2009) Least concern

Biodiversity status No concern at present

Subregion 6, 4, 3, (2), (7.6), (7.5)

Estimated extent In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Extent in reserves High

Short description *Eucalyptus portuensis*, *Corymbia citriodora*, *E. granitica* or *E. crebra*, *C. intermedia* or *C. clarksoniana* mixed open forest on steep hills and ranges on acid and intermediate volcanics close to Wet Tropics boundary

Structure category Mid-dense

Description Mixed open forest to occasionally low open woodland including combinations of the species *Eucalyptus portuensis* (white mahogany), *Corymbia citriodora* (lemon-scented gum), *E. granitica* (granite ironbark) or *E. crebra* (narrow-leaved ironbark), *C. intermedia* (pink bloodwood) or *C. clarksoniana* (Clarkson's bloodwood) +/- *E. cloeziana* (Gympie messmate) +/- *Corymbia* spp. There is often an open to mid-dense sub-canopy containing canopy species +/- *Melaleuca viridiflora* (broad-leaved paperbark) +/- *Lophostemon suaveolens* (swamp mahogany) +/- *C. leichhardtii* (yellowjacket) . The shrub layer varies from scattered shrubs to mid-dense and includes juvenile canopy species, *Acacia flavescens* (yellow wattle), *Callitris intratropica* (cypress pine), *L. suaveolens*, *Xanthorrhoea johnsonii* (grasstree) and *Petalostigma pubescens* (quinine). The dense grassy ground layer is generally dominated by *Themeda triandra* (kangaroo grass) +/- *Heteropogon triticeus* (giant speargrass) +/- *Mnesithea rottboellioides* (northern canegrass). In some areas, patches dominated by *E. moluccana* (gum-topped box) or *E. cloeziana* may occur. Occurs on rises, hill and ranges.

Protected areas Girringun NP, Paluma Range NP, Hann Tableland NP, Mount Windsor NP, Mount Lewis FR.

Regional ecosystem 9.12.4

Vegetation Management Act class (November 2009) Least concern

Biodiversity status No concern at present

Subregion 4, 2, (5)

Estimated extent In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained. Extent in reserves Low

Short description *Eucalyptus shirleyi* and/or *E. melanophloia* and/or *Corymbia peltata* and/or *Callitris intratropica* low open woodland on acid volcanic rocks

Structure category Very sparse

Description Low open woodland to woodland of *Eucalyptus shirleyi* (silver-leaved ironbark) and/or *E. melanophloia* (silver-leaved ironbark) +/- *Corymbia peltata* (rustyjacket) +/- *Callitris intratropica* (cypress pine). The mid layer varies from absent to a mid-dense sub canopy and/or shrub layer and the ground layer is dense and grassy. Occurs predominantly on sandy shallow soils derived from granite on rolling low hills to hills.

Major vegetation communities include:

9.12.4a: Low open woodland to occasionally a low open forest of *Eucalyptus shirleyi* (silver-leaved ironbark) or *E. melanophloia* (silver-leaved ironbark) and *Corymbia peltata* (rustyjacket) +/- *E. crebra*

Regional Ecosystem Descriptions

(narrow-leaved ironbark) (sens. lat.) +/- *Acacia leptostachya* (slender wattle). *E. crebra* may also occur as an emergent. A sub-canopy containing *E. shirleyi*, *Alphitonia excelsa*, *Acacia* spp. and *Persoonia falcata* can occur. *E. shirleyi* can occur as a dense sub-canopy under *C. peltata*. The shrub layer varies from absent to mid-dense with an extremely variable species mix including *Maytenus cunninghamii* (yellowberry bush), *Acacia leptostachya*, *Petalostigma banksii* (smooth-leaved quinine), *Persoonia falcata*, *Alphitonia* spp. and *Acacia* spp. *Xanthorrhoea johnsonii* (grass-tree) can also occur in a lower shrub layer. The dense grassy ground layer is dominated by *Heteropogon* spp., *Schizachyrium fragile* (firegrass) and *Themeda triandra* (kangaroo grass). Occurs predominantly on sandy shallow soils derived from granite on rolling low hills to hills.

9.12.4b: Low open woodland of *Eucalyptus shirleyi* (silver-leaved ironbark) and/or *Corymbia dallachiana* (Dallachy's gum) +/- *C. erythrophloia* (red bloodwood) +/- *Bursaria incana* (prickly pine). The mid-layer is generally absent but scattered *Maytenus* spp. can occur. The dense grassy ground layer is dominated by *Heteropogon contortus* (black speargrass). Occurs predominantly on sandy shallow soils derived from granite on rolling low hills to hills.

9.12.4c: Low woodland to low open woodland of *Callitris intratropica* (cypress pine) and *Eucalyptus shirleyi* (silver-leaved ironbark) and/or *E. melanophloia* (silver-leaved ironbark) +/- *Corymbia leichhardtii* (yellowjacket). The sparse mid layer can include juvenile canopy species, *Melaleuca monantha* (teatree), *Dolichandrone heterophylla* (lemonwood), *Alphitonia obtusifolia*, *Petalostigma pubescens* (quinine), *Acacia bidwillii* (corkwood wattle) and *Grevillea* spp. The dominants in the grassy ground can include *Schizachyrium fragile* (firegrass), *Heteropogon contortus* (black speargrass) or *Themeda triandra* (kangaroo grass). Occurs predominantly on sandy shallow soils derived from granite on rolling low hills to hills.

Supplementary description Godwin and Jago (1998): Bc23; Perry et al. (1964): Georgetown Unit 1; Perry et al. (1964): Kilbogie; Perry et al. (1964): Leichhardt Unit 1

Protected areas Blackbraes NP, Blackbraes RR, Dalrymple NP, Paluma Range NP

Regional ecosystem 9.12.20

Vegetation Management Act class (November 2009) Least concern

Biodiversity status No concern at present

Subregion 6, 3

Estimated extent In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Extent in reserves Low

Short description *Eucalyptus pachycalyx* +/- *E. cloeziana* +/- *Corymbia leichhardtii* woodland on steep granite hills

Structure category Sparse

Description Woodland to low woodland of *Eucalyptus pachycalyx* (pumpkin gum) +/- *E. cloeziana* (Gympie messmate) +/- *Corymbia leichhardtii* (yellowjacket) +/- *Callitris intratropica* (cypress pine) +/- *E. portuensis* (white mahogany) +/- *E. cullenii* (Cullen's ironbark) or *E. atrata*. The mid-dense shrub layer includes juvenile canopy species, *Grevillea glauca* (bushmans clothepeg), *Persoonia falcata* and *Xanthorrhoea johnsonii* (grass-tree). The medium to dense grassy ground layer is mostly dominated by *Themeda triandra* (kangaroo grass). Occurs on steep rugged hills on acid volcanics.

Protected areas Evelyn Creek CP

Regional Ecosystem Descriptions

Regional ecosystem 9.12.30

Vegetation Management Act class (November 2009) Least concern

Biodiversity status No concern at present

Subregion 6, (3)

Estimated extent In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Extent in reserves Low

Short description *Corymbia leichhardtii* and *Eucalyptus cloeziana* mixed woodland on rhyolite hills

Structure category Sparse

Description Mixed woodland to open forest of *Corymbia leichhardtii* (yellowjacket) and *Eucalyptus cloeziana* (Gympie messmate) +/- *Eucalyptus* spp. and *Corymbia* spp. as subdominants. The shrub layer is sparse to mid dense with an shrubland of *Acacia* spp. sometimes occurring. The ground layer is grassy. Occurs on rocky hills to steep hills on rhyolite geologies.

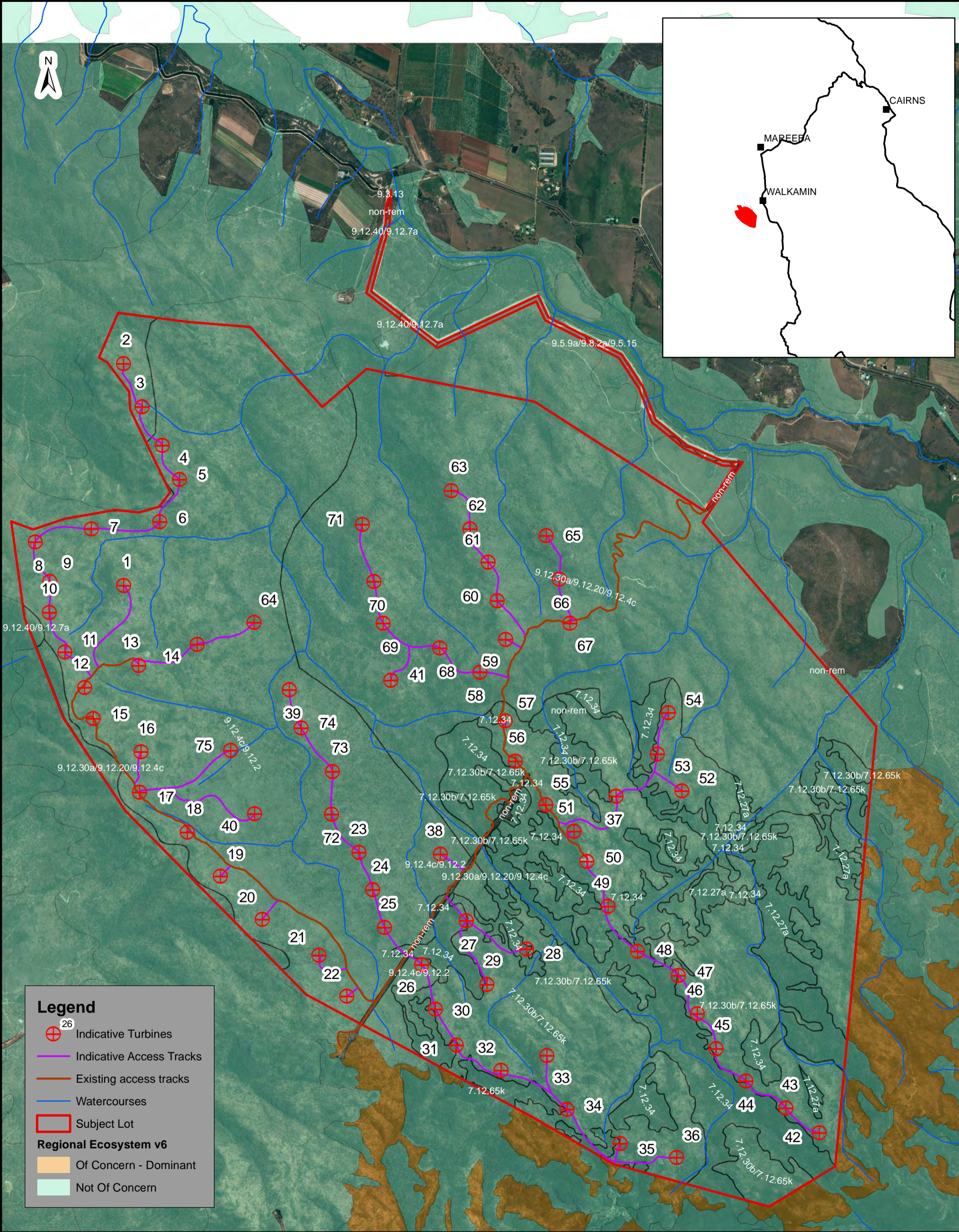
Major vegetation communities include:


9.12.30a: Woodland to open forest of *Corymbia leichhardtii* (yellowjacket) and *Eucalyptus cloeziana* (Gympie messmate) +/- *E. portuensis* (white mahogany) +/- *C. citriodora* (lemon-scented gum) +/- *E. cullenii* (Cullen's ironbark) +/- *Callitris intratropica* (cypress pine). Some canopy species can occur as emergents. The sparse to mid-dense shrub layer is dominated by juvenile canopy species, *Persoonia falcata*, *Grevillea glauca* (bushmans clothepeg) and *Allocasuarina inophloia* (stringybark sheoak) and a lower shrub with *Jacksonia thesioides* and *Xanthorrhoea johnsonii* (grass-tree) can occur. The sparse to mid-dense ground layer is dominated by *Themeda triandra* (kangaroo grass). Rocky rhyolite hills to steep hills.

9.12.30b: Shrubland of *Acacia leptostachya* (slender wattle) +/- *A. umbellata* shrubland +/- *Callitris intratropica* (cypress pine) emergents. There is no mid layer or ground layer. Occurs on shallow soils on rock pavements within 9.12.30a.

Protected areas Evelyn Creek CP

Appendix D2.



<p>DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.</p> <p>REGIONAL ECOSYSTEM VERSION 6 DATA</p> <p>Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.</p> <p>Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.</p>	<div>D. FINNEY</div>	<div>Client</div> <div>Transfield Services</div> <div>Mount Emerald Wind Farm</div> <div>Title</div> <div>Amended Regional Ecosystem Mapping</div> <div>00.61.2</div> <div>km</div>	<div></div> <div>© COPYRIGHT PROTECTS THIS PLAN</div> <div>Unauthorised reproduction or amendment not permitted.</div> <div>Please contact the author.</div>	<div>RPS Australia East Pty Ltd</div> <div>ACN 140 292 762</div> <div>135 Abbott St</div> <div>PO Box 1949</div> <div>CAIRNS QLD 4870</div> <div>T +61 7 4031 1336</div> <div>F +61 7 4031 2942</div> <div>W rpsgroup.com.au</div>		
	<div>Compiled by</div> <div>J. MIDDLETON</div>					
	<div>Map Projection</div> <div>MGAz55</div>					
	<div>Map Datum</div> <div>GDA94</div>					
	<div>File Reference</div> <div>PR100246-83.mxd</div>					
	<div>Sheet Number</div> <div>1 of 1</div>					
			<div>SCALE (A3)</div> <div>1:24,000</div>	<div>DATE</div> <div>25/7/2011</div>	<div>DRAWING NO.</div> <div>PR100246-83</div>	<div>ISSUE</div>

Appendix E2.

Wildlife Online Search – Flora Mt Emerald Wind Farm

Latitude: 17.1682
 Longitude: 145.3805
 Distance: 15 km

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 Presumed Extinct (PE), Endangered (E), Vulnerable (V), Rare (R), Common (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). The second number located after the / indicates the number of specimen records for the taxon.

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Basidiomycota	Amanita			C		5	5
Basidiomycota	Agaricus			C		1	1
Basidiomycota	Inonotus			C		1	1
Basidiomycota	Lactarius			C		1	1
Basidiomycota	Polyporus			C		1	1
Basidiomycota	Stephanospora flava			C		1	1
Basidiomycota	Osmoporus decipiens			C		1	1
Basidiomycota	Lepista sublilacina			C		1	1
Basidiomycota	Coriolus cingulatus			C		1	1
Basidiomycota	Coriolus elongatus			C		1	1
Basidiomycota	Trametes lactinea			C		1	1
Basidiomycota	Trametes flesii			C		1	1
Basidiomycota	Russula foetida			C		1	1
Basidiomycota	Daedalea tenuis			C		1	1
Basidiomycota	Corticium vagum			C		1	1
Basidiomycota	Stereum ostrea			C		2	2
Basidiomycota	Basidiomycota			C		7	7
Basidiomycota	Hymenogaster			C		2	2
Basidiomycota	Scleroderma			C		2	1
Basidiomycota	Psathyrella			C		1	1
Basidiomycota	Pisolithus			C		1	1
Basidiomycota	Microporus			C		2	2
Basidiomycota	Macowanites sp. (Mt Baldy J.Garbaye 1015)			C		1	1
Basidiomycota	Hygrocybe aurantiopallens			C		1	1
Basidiomycota	Armillaria luteobubalina			C		1	1
Basidiomycota	Phellinus rhabarbarinus			C		1	1
Basidiomycota	Hygrocybe chromolimonea			C		2	2
Basidiomycota	Ganoderma williamsianum			C		2	2
Basidiomycota	Ganoderma ochrolaccatum			C		1	1
Basidiomycota	Microporellus obovatus			C		1	1
Basidiomycota	Macrolepiota clelandii			C		1	1
Basidiomycota	Schizophyllum commune			C		1	1
Basidiomycota	Laetiporus sulphureus			C		1	1
Basidiomycota	Clavulinopsis miniata			C		1	1
Basidiomycota	Polyporus sulphureus			C		1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Basidiomycota	Panaeolus antillarum			C		1	1
Basidiomycota	Microporus xanthopus			C		1	1
Basidiomycota	Phellinus			C		3	3
Basidiomycota	Hygrocybe			C		2	2
Basidiomycota	Calvatia			C		1	1
Basidiomycota	Ramaria			C		1	1
Basidiomycota	Boletus			C		2	2
Basidiomycota	Lepista			C		1	1
Acarosporaceae	Acarospora			C		1	1
Arthoniaceae	Cryptothecia			C		1	1
Parmeliaceae	Parmotrema cooperi			C		1	1
Parmeliaceae	Parmotrema tinctorum			C		1	1
Pertusariaceae	Pertusaria subventosa var. subventosa			C		1	1
Physciaceae	Buellia			C		1	1
Physciaceae	Heterodermia diademata			C		1	1
Physciaceae	Pyxine plumea			C		1	1
Ramalinaceae	Ramalina peruviana			C		2	2
Teloschistaceae	Teloschistes flavicans			C		1	1
Usneaceae	Usnea nidifica			C		2	2
Usneaceae	Usnea rubicunda			C		1	1
Usneaceae	Eumitria pectinata			C		1	1
Ascomycota	Rosellinia			C		1	1
Ascomycota	Rosellinia arcuata			C		1	1
Ascomycota	Bisporella citrina			C		1	1
Glomeromycota	Glomus			C		1	1
Lycopodiaceae	Huperzia phlegmaria	coarse tassel fern		R		1	1
Lycopodiaceae	Lycopodiella cernua			C		1	1
Araucariaceae	Agathis robusta	kauri pine		C		2	2
Araucariaceae	Agathis atropurpurea	blue kauri pine		C		1	1
Araucariaceae	Agathis microstachya	bull kauri		R		2	2
Cupressaceae	Callitris macleayana	stringybark pine		C		2	1
Cupressaceae	Callitris intratropica	coast cypress pine		C		6	1
Podocarpaceae	Sundacarpus amarus			C		4	4
Cycadaceae	Cycas			C		2	0
Cycadaceae	Cycas media - C.platyphylla			C		1	1
Cycadaceae	Cycas media subsp. banksii			C		1	1
Cycadaceae	Cycas media subsp. banksii x C.platyphylla			C		1	1
Cycadaceae	Cycas media subsp. banksii - C.media subsp. media			C		2	2
Adiantaceae	Cheilanthes			C		5	0
Adiantaceae	Pellaea nana			C		3	3
Adiantaceae	Pellaea falcata			C		1	1
Adiantaceae	Cheilanthes nitida			C		2	2
Adiantaceae	Adiantum silvaticum			C		4	4
Adiantaceae	Pityrogramma calomelanos var. calomelanos		Y			1	1
Adiantaceae	Cheilanthes sieberi subsp. sieberi			C		1	1
Adiantaceae	Adiantum hispidulum var. minus			C		2	2
Adiantaceae	Cheilanthes tenuifolia	rock fern		C		1	1
Adiantaceae	Cheilanthes nudiuscula			C		1	1
Adiantaceae	Paraceterach muelleri			C		1	1
Adiantaceae	Doryopteris concolor			C		3	3
Adiantaceae	Adiantum philippense			C		1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Adiantaceae	Cheilanthes brownii			C		4	4
Adiantaceae	Adiantum atroviride			C		1	1
Adiantaceae	Pellaea paradoxa	heart fern		C		1	1
Aspleniaceae	Asplenium paleaceum	scaly asplenium		C		1	1
Aspleniaceae	Asplenium australasicum			C		1	1
Athyriaceae	Diplazium dilatatum			C		2	2
Athyriaceae	Callipteris prolifera			C		2	2
Azollaceae	Azolla pinnata	fern y azolla		C		1	1
Blechnaceae	Doodia aspera	prickly rasp fern		C		1	1
Blechnaceae	Blechnum cartilagineum	gristle fern		C		1	1
Blechnaceae	Pteridoblechnum neglectum			C		1	1
Blechnaceae	Blechnum wurunuran			C		2	2
Blechnaceae	Doodia caudata			C		2	2
Cyatheaceae	Cyathea celebica			R		2	2
Cyatheaceae	Cyathea baileyana	wig tree fern		R		1	1
Davalliaceae	Davallia pyxidata			C		1	1
Dicksoniaceae	Calochlaena dubia			C		1	1
Dicksoniaceae	Calochlaena villosa			R		1	1
Dicksoniaceae	Dicksonia herbertii			C		2	2
Dryopteridaceae	Lastreopsis tenera			C		1	1
Dryopteridaceae	Lastreopsis rufescens			C		2	2
Dryopteridaceae	Lastreopsis microsora subsp. microsora			C		2	2
Gleicheniaceae	Sticherus flabellatus var. flabellatus			C		1	1
Grammitidaceae	Grammitis wurunuran			C		1	1
Grammitidaceae	Prosaptia fuscopilosa			C		1	1
Hymenophyllaceae	Crepidomanes walleri			C		1	1
Hymenophyllaceae	Cephalomanes obscurum			C		1	1
Hymenophyllaceae	Crepidomanes bipunctatum			C		1	1
Hymenophyllaceae	Hymenophyllum samoense			C		1	1
Lindsaeaceae	Lindsaea brachypoda			C		1	1
Lomariopsidaceae	Teratophyllum brightiae			C		1	1
Lomariopsidaceae	Elaphoglossum callifolium			R		2	2
Lomariopsidaceae	Elaphoglossum queenslandicum	tounge fern		C		2	2
Marattiaceae	Marattia oreades	potato fern		C		1	1
Nephrolepidaceae	Arthropteris tenella	climbing fern		C		3	3
Ophioglossaceae	Ophioglossum gramineum			C		1	1
Platyzomataceae	Platyzoma microphyllum	braid fern		C		10	10
Polypodiaceae	Colysis sayeri			C		3	3
Polypodiaceae	Dictymia brownii	strap fern		C		1	1
Polypodiaceae	Pyrrosia confluens var. dielsii			C		1	1
Pteridaceae	Pteris tremula			C		1	1
Pteridaceae	Acrostichum aureum	golden mangrove fern		C		1	1
Pteridaceae	Pteris tripartita	lacy bracken		C		2	2
Thelypteridaceae	Christella dentata	creek fern		C		1	1
Thelypteridaceae	Christella hispidula			C		1	1
Thelypteridaceae	Cyclosorus interruptus			C		2	2
Thelypteridaceae	Pneumatopteris sogerensis			C		1	1
Thelypteridaceae	Sphaerostephanos unitus var. unitus			C		2	2
Vittariaceae	Monogramma acrocarpa			C		1	1
Acanthaceae	Thunbergia			C		1	1
Acanthaceae	Acanthaceae			C		3	0
Acanthaceae	Brunoniella australis	blue trumpet		C		1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Acanthaceae	Strobilanthes wallichii		Y			1	1
Acanthaceae	Rostellularia adscendens			C		6	3
Acanthaceae	Rostellularia adscendens subsp. glaucoviolacea			C		2	2
Acanthaceae	Asystasia sp. (Newcastle Bay L.J.Brass 18671)			C		1	1
Acanthaceae	Rostellularia adscendens var. hispida			C		2	2
Acanthaceae	Rostellularia adscendens var. juncea			C		1	1
Acanthaceae	Hypoestes floribunda var. floribunda			C		2	2
Acanthaceae	Stephanophysum longifolium		Y			1	1
Acanthaceae	Harnieria hygrophiloides	white karambal		C		1	1
Acanthaceae	Hypoestes phyllostachya		Y			2	2
Acanthaceae	Brunoniella acaulis			C		1	0
Amaranthaceae	Amaranthus spinosus	needle burr	Y			2	2
Amaranthaceae	Alternanthera ficoidea		Y			1	1
Amaranthaceae	Deeringia amaranthoides	redberry		C		1	1
Anacardiaceae	Euroschinus falcatus var. falcatus			C		1	1
Apiaceae	Platysace valida			C		1	1
Apiaceae	Actinotus gibbonsii	dwarf flannel flower		C		2	2
Apiaceae	Mackinlaya macrosciadea	mackinlaya		C		4	4
Apiaceae	Cyclospermum leptophyllum		Y			1	1
Apocynaceae	Parsonsia			C		1	0
Apocynaceae	Carissa lanceolata			C		3	3
Apocynaceae	Neisosperma poweri			C		4	4
Apocynaceae	Sarcostemma viminalis subsp. brunonianum			C		1	1
Apocynaceae	Hoya australis subsp. australis			C		1	1
Apocynaceae	Marsdenia longipedicellata			C		2	2
Apocynaceae	Marsdenia suborbicularis			C		1	1
Apocynaceae	Gomphocarpus physocarpus	balloon cottonbush	Y			3	3
Apocynaceae	Cryptostegia grandiflora	rubber vine	Y			1	0
Apocynaceae	Asclepias curassavica	red-head cottonbush	Y			3	3
Apocynaceae	Alstonia muelleriana	hard milkwood		C		1	1
Apocynaceae	Tylophora benthamii	coast tylophora		C		4	4
Apocynaceae	Parsonsia straminea	monkey rope		C		1	1
Apocynaceae	Melodinus australis	southern melodinus		C		1	1
Apocynaceae	Catharanthus roseus	pink periwinkle	Y			3	2
Apocynaceae	Tylophora colorata			C		3	3
Apocynaceae	Phyllanthera grayi			V		7	7
Apocynaceae	Cascabela thevetia	yellow oleander	Y			1	1
Apocynaceae	Alstonia scholaris	white cheesewood		C		3	2
Apocynaceae	Alyxia spicata			C		2	2
Apocynaceae	Wrightia saligna			C		2	2
Apocynaceae	Parsonsia grayana			C		1	1
Apocynaceae	Alyxia ilicifolia			C		1	1
Apocynaceae	Alyxia grandis			C		1	1
Aquifoliaceae	Ilex arnhemensis subsp. ferdinandi			C		1	1
Araliaceae	Hydrocotyle			C		1	1
Araliaceae	Trachymene montana			C		1	1
Araliaceae	Hydrocotyle acutiloba			C		2	2
Araliaceae	Astrotricha pterocarpa			C		1	1
Araliaceae	Hydrocotyle miranda			C		1	1
Asteraceae	Pterocaulon redolens			C		8	0

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Asteraceae	Synedrella nodiflora		Y			1	1
Asteraceae	Taraxacum officinale	dandelion	Y			1	1
Asteraceae	Podolepis arachnoidea	clustered copper-wire daisy		C		2	2
Asteraceae	Coronidium lanuginosum			C		1	1
Asteraceae	Ozothamnus cassinioides			C		1	1
Asteraceae	Coronidium newcastlianum			C		2	1
Asteraceae	Phacellothrix cladochaeta			C		2	2
Asteraceae	Helichrysum			C		2	0
Asteraceae	Asteraceae			C		1	0
Asteraceae	Centratherum punctatum subsp. punctatum		Y			2	2
Asteraceae	Acmella grandiflora var. brachyglossa			C		5	5
Asteraceae	Emilia sonchifolia var. sonchifolia		Y			1	1
Asteraceae	Conyza canadensis var. pusilla		Y			1	1
Asteraceae	Pseudognaphalium luteoalbum	Jersey cudweed		C		1	1
Asteraceae	Crassocephalum crepidioides	thickhead	Y			2	2
Asteraceae	Dichrocephala integrifolia		Y			1	1
Asteraceae	Peripleura diffusa			C		2	2
Asteraceae	Camptacra gracilis			C		3	3
Asteraceae	Tridax procumbens	tridax daisy	Y			1	0
Asteraceae	Eclipta prostrata	white eclipta		C		1	0
Asteraceae	Ageratina riparia	mistflower	Y			1	1
Asteraceae	Senecio tamoides		Y			2	2
Asteraceae	Cosmos caudatus		Y			2	2
Asteraceae	Cirsium vulgare	spear thistle	Y			2	2
Asteraceae	Bidens pilosa		Y			1	0
Asteraceae	Soliva anthemifolia	dwarf jo jo weed	Y			1	1
Asteraceae	Praxelis clematidea		Y			2	2
Asteraceae	Coronidium rupicola			C		2	2
Asteraceae	Ageratum conyzoides	billygoat weed	Y			1	0
Asteraceae	Parthenium hysterophorus	parthenium weed	Y			2	2
Asteraceae	Bidens alba var. radiata		Y			1	1
Asteraceae	Sigesbeckia orientalis	Indian weed		C		1	0
Asteraceae	Tithonia diversifolia	Japanese sunflower	Y			2	2
Asteraceae	Montanoa hibiscifolia		Y			2	2
Asteraceae	Cyanthillium cinereum			C		9	1
Asteraceae	Ageratum houstonianum	blue billygoat weed	Y			1	0
Balanopaceae	Balanops australiana			C		2	2
Basellaceae	Anredera cordifolia	Madeira vine	Y			1	1
Bignoniaceae	Macfadyena unguis-cati	cat's claw creeper	Y			1	1
Bignoniaceae	Spathodea campanulata subsp. nilotica		Y			1	1
Bignoniaceae	Dolichandrone heterophylla			C		4	1
Boraginaceae	Cordia dichotoma			C		1	0
Boraginaceae	Heliotropium peninsulare			C		1	1
Boraginaceae	Trichodesma zeylanicum			C		2	0
Boraginaceae	Heliotropium tabuliplagae			C		2	2
Boraginaceae	Trichodesma zeylanicum var. zeylanicum			C		1	1
Brassicaceae	Lepidium didymum		Y			1	1
Brassicaceae	Raphanus raphanistrum	wild radish	Y			1	1
Brassicaceae	Lepidium virginicum	Virginian peppergrass	Y			3	3
Burseraceae	Canarium australasicum	mango bark		C		2	1
Byttneriaceae	Rulingia dasyphylla	kerrawang		C		1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Byttneriaceae	Commersonia macrostipulata			C		1	1
Byttneriaceae	Keraudrenia lanceolata			C		1	1
Caesalpiniaceae	Cassia			C		7	0
Caesalpiniaceae	Senna hirsuta		Y			1	1
Caesalpiniaceae	Caesalpinia robusta	giant mother-in-law vine		R		1	1
Caesalpiniaceae	Chamaecrista mimosoides	dwarf cassia		C		3	3
Caesalpiniaceae	Senna pendula var. glabrata	Easter cassia	Y			1	1
Caesalpiniaceae	Chamaecrista rotundifolia var. rotundifolia		Y			1	1
Caesalpiniaceae	Chamaecrista exigua var. exigua			C		3	3
Caesalpiniaceae	Chamaecrista absus var. absus			C		1	1
Caesalpiniaceae	Erythrophleum chlorostachys			C		8	2
Caesalpiniaceae	Senna septemtrionalis		Y			1	1
Caesalpiniaceae	Labichea nitida			C		3	2
Campanulaceae	Lobelia			C		1	0
Campanulaceae	Wahlenbergia			C		2	0
Campanulaceae	Wahlenbergia gracilis	spreading bluebell		C		1	1
Campanulaceae	Lobelia gibbosa var. gibbosa			C		1	1
Campanulaceae	Wahlenbergia caryophylloides			C		1	1
Campanulaceae	Lobelia membranacea			C		1	1
Capparaceae	Capparis			C		3	0
Carpodetaceae	Abrophyllum ornans var. ornans			C		1	1
Caryophyllaceae	Polycarpaea corymbosa			C		3	0
Caryophyllaceae	Polycarpaea spirostylis subsp. spirostylis			C		2	2
Caryophyllaceae	Polycarpaea corymbosa var. corymbosa			C		2	2
Caryophyllaceae	Polycarpaea spirostylis			C		1	1
Caryophyllaceae	Drymaria cordata subsp. cordata		Y			3	3
Casuarinaceae	Allocasuarina torulosa			C		10	1
Casuarinaceae	Casuarina cunninghamiana			C		1	0
Casuarinaceae	Allocasuarina inophloia			C		2	2
Casuarinaceae	Allocasuarina littoralis			C		6	2
Celastraceae	Celastraceae			C		1	0
Celastraceae	Maytenus bilocularis			C		2	2
Celastraceae	Maytenus cunninghamii	yellow berry bush		C		8	0
Celastraceae	Elaeodendron melanocarpum			C		1	1
Celastraceae	Hedraianthera porphyropetala	hedrianthera		C		1	1
Celastraceae	Euonymus australiana			C		2	2
Celastraceae	Maytenus disperma	orange boxwood		C		4	4
Chrysobalanaceae	Parinari nonda			C		1	0
Clusiaceae	Mammea touriga	brown touriga		R		1	1
Clusiaceae	Hypericum gramineum			C		1	1
Combretaceae	Terminalia sericocarpa	damson		C		1	1
Combretaceae	Terminalia aridicola subsp. aridicola			C		1	1
Convolvulaceae	Ipomoea			C		2	2
Convolvulaceae	Ipomoea indica	blue morning-glory	Y			2	2
Convolvulaceae	Ipomoea polymorpha			C		2	2
Convolvulaceae	Ipomoea eriocarpa			C		2	2
Convolvulaceae	Ipomoea gracilis			C		1	1
Convolvulaceae	Ipomoea hederifolia		Y			1	0
Convolvulaceae	Xenostegia tridentata			C		2	2
Convolvulaceae	Evolvulus alsinoides var. decumbens			C		1	1
Convolvulaceae	Ipomoea polpha subsp. polpha			C		6	6

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Convolvulaceae	Evolvulus alsinoides			C		2	0
Cornaceae	Alangium villosum subsp. polyosmoides			C		3	3
Cucurbitaceae	Diplocyclos palmatus			C		1	1
Cucurbitaceae	Neoachmandra cunninghamii			C		1	1
Cucurbitaceae	Diplocyclos palmatus subsp. affinis			C		1	1
Cucurbitaceae	Cucumis maderaspatanus			C		1	1
Cucurbitaceae	Neosomitra clavigera			C		1	1
Cunoniaceae	Pullea stutzeri	hard alder		C		1	1
Cunoniaceae	Gillbeea adenopetala			C		1	1
Cunoniaceae	Geissois biagiana	northern brush mahogany		C		1	1
Dilleniaceae	Hibbertia			C		3	2
Dilleniaceae	Hibbertia melhanioides var. baileyana			C		1	1
Dilleniaceae	Hibbertia aspera subsp. pilosifolia			C		1	1
Dilleniaceae	Hibbertia longifolia			C		3	0
Dilleniaceae	Hibbertia scandens			C		3	2
Droseraceae	Drosera indica			C		1	1
Droseraceae	Drosera angustifolia			C		1	1
Ebenaceae	Diospyros australis	black plum		C		1	1
Ebenaceae	Diospyros pentamera	myrtle ebony		C		1	0
Ebenaceae	Diospyros sp. (Mt Lewis L.S.Smith 10107)			R		1	1
Elaeocarpaceae	Elaeocarpus eumundi	Eumundi quandong		C		2	2
Elaeocarpaceae	Elaeocarpus coorangooloo			R		13	12
Elaeocarpaceae	Elaeocarpus sericopetalus			C		1	1
Elaeocarpaceae	Sloanea australis subsp. parviflora			C		1	1
Elaeocarpaceae	Elaeocarpus largiflorens subsp. largiflorens			C		2	2
Elaeocarpaceae	Elaeocarpus foveolatus			C		1	1
Elaeocarpaceae	Elaeocarpus grandis	blue quandong		C		1	1
Ericaceae	Leucopogon			C		1	0
Ericaceae	Acrotriche baileyana			R		1	1
Ericaceae	Melichrus urceolatus	honey gorse		C		2	2
Ericaceae	Leucopogon ruscifolius			C		1	1
Ericaceae	Astroloma sp. (Baal Gammon B.P.Hyland 10341)			C		1	1
Ericaceae	Acrothamnus spathaceus			C		5	5
Ericaceae	Monotoca scoparia	prickly broom heath		C		2	2
Ericaceae	Acrotriche aggregata	red cluster heath		C		5	5
Erythroxylaceae	Erythroxylum ellipticum			C		1	0
Escalloniaceae	Polyosma hirsuta			C		1	1
Escalloniaceae	Polyosma rhytophloia			C		6	6
Euphorbiaceae	Euphorbia			C		4	0
Euphorbiaceae	Croton minimus			C		1	1
Euphorbiaceae	Bertya polystigma			C		2	2
Euphorbiaceae	Alchornea ilicifolia	native holly		C		3	3
Euphorbiaceae	Baloghia parviflora			C		2	2
Euphorbiaceae	Croton arnhemicus			C		2	0
Euphorbiaceae	Croton insularis	Queensland cascarilla		C		5	4
Euphorbiaceae	Euphorbia pulcherrima		Y			1	1
Euphorbiaceae	Pedilanthus tithymaloides subsp. smallii	zig zag plant	Y			1	1
Euphorbiaceae	Aleurites rockinghamensis			C		3	2
Euphorbiaceae	Chamaesyce hyssopifolia		Y			1	1
Euphorbiaceae	Mallotus philippensis	red kamala		C		2	0

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Fabaceae	Cajanus scarabaeoides var. scarabaeoides			C		3	3
Fabaceae	Austrodolichos errabundus var. (Davies Creek J.R.Clarkson+ 7886B)			C		2	2
Fabaceae	Pultenaea retusa			C		2	2
Fabaceae	Clitoria ternatea	butterfly pea	Y			1	1
Fabaceae	Lotononis bainesii	lotononis	Y			1	1
Fabaceae	Kennedia rubicunda	red Kennedy pea		C		1	1
Fabaceae	Indigofera linnaei	Birdsville indigo		C		1	1
Fabaceae	Indigofera hirsuta	hairy indigo		C		1	1
Fabaceae	Indigofera colutea	sticky indigo		C		1	1
Fabaceae	Hovea densivellosa			C		1	1
Fabaceae	Glycine tomentella	woolly glycine		C		4	2
Fabaceae	Desmodium pullenii			C		2	2
Fabaceae	Crotalaria montana			C		7	0
Fabaceae	Cajanus marmoratus			C		1	1
Fabaceae	Zornia stirlingii			C		1	1
Fabaceae	Tephrosia varians			C		1	1
Fabaceae	Rhynchosia minima			C		2	1
Fabaceae	Glycine syndetika			C		1	1
Fabaceae	Glycine cyrtoloba			C		1	1
Fabaceae	Galactia muelleri			C		2	0
Fabaceae	Crotalaria brevis			C		6	6
Fabaceae	Crotalaria verrucosa			C		1	1
Fabaceae	Crotalaria goreensis	gambia pea	Y			5	3
Fabaceae	Centrosema pascurorum		Y			1	1
Fabaceae	Desmodium triflorum		Y			1	1
Fabaceae	Desmodium filiforme			C		1	1
Fabaceae	Crotalaria humifusa			C		1	1
Fabaceae	Crotalaria calycina			C		5	4
Fabaceae	Cajanus mareebensis			E	E	1	1
Fabaceae	Cajanus acutifolius			C		1	1
Fabaceae	Aeschynomene micranthos			C		1	1
Fabaceae	Crotalaria medicaginea	trefoil rattlepod		C		1	0
Fabaceae	Cajanus confertiflorus			C		1	1
Fabaceae	Tephrosia savannicola			R		1	1
Fabaceae	Indigofera trifoliata			C		1	1
Fabaceae	Indigofera bancroftii			C		2	2
Fabaceae	Erythrina vespertilio			C		4	2
Fabaceae	Uraria lagopodioides			C		5	5
Fabaceae	Tephrosia noctiflora		Y			1	1
Fabaceae	Neonotonia wightii var. wightii		Y			2	2
Fabaceae	Rhynchosia minima var. minima			C		3	3
Fabaceae	Crotalaria retusa var. retusa		Y			1	1
Fabaceae	Vigna radiata var. sublobata			C		6	6
Fabaceae	Macroptilium atropurpureum	siratro	Y			1	1
Fabaceae	Alysicarpus bupleurifolius	sweet alys	Y			1	1
Fabaceae	Austrodolichos errabundus			C		6	6
Fabaceae	Aphyllodium biarticulatum			C		1	1
Fabaceae	Macroptilium lathyroides		Y			1	1
Fabaceae	Derris sp. (Daintree D.E.Boyland+ 469)			C		1	1
Fabaceae	Zornia muelleriana subsp. muelleriana			C		2	2
Fabaceae	Crotalaria incana subsp.		Y			1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
	purpurascens						
Fabaceae	Aeschynomene americana var. americana		Y			1	1
Fabaceae	Macrotyloma uniflorum var. uniflorum		Y			1	1
Fabaceae	Crotalaria montana var. angustifolia			C		2	2
Fabaceae	Cajanus reticulatus var. reticulatus			C		4	4
Fabaceae	Austrosteenisia blackii var. blackii			C		2	2
Fabaceae	Zornia muriculata subsp. muriculata			C		2	2
Fabaceae	Bossiaea armitii			C		2	1
Fabaceae	Glycine curvata			C		1	1
Fabaceae	Hovea longipes	brush hovea		C		1	1
Fabaceae	Cajanus cajan	pigeon pea	Y			1	1
Fabaceae	Uraria picta			C		3	3
Fabaceae	Stylosanthes			C		7	0
Fabaceae	Lamprolobium			C		1	0
Fabaceae	Hovea nana			C		2	2
Fabaceae	Tephrosia			C		1	1
Fabaceae	Desmodium			C		2	0
Fabaceae	Galactia			C		3	3
Fabaceae	Fabaceae			C		1	0
Fabaceae	Glycine			C		2	0
Fabaceae	Cajanus			C		1	0
Fabaceae	Zornia			C		2	1
Fabaceae	Vigna			C		1	1
Fabaceae	Crotalaria medicaginea var. medicaginea			C		2	2
Fabaceae	Crotalaria lanceolata subsp. lanceolata		Y			1	1
Fabaceae	Cajanus scarabaeoides var. pedunculatus			C		1	1
Fabaceae	Zornia muriculata subsp. angustata			C		2	2
Fabaceae	Mirbelia speciosa subsp. ringrosei			C		2	2
Fabaceae	Macrotyloma axillare var. axillare		Y			2	2
Fabaceae	Vigna vexillata var. angustifolia			C		1	1
Fabaceae	Galactia tenuiflora forma sericea			C		4	4
Fabaceae	Tephrosia filipes subsp. filipes			C		2	2
Fabaceae	Pultenaea millarii var. millarii			C		5	5
Fabaceae	Zornia prostrata var. prostrata			C		1	1
Fabaceae	Desmodium rhytidophyllum			C		13	9
Fabaceae	Alysicarpus schomburgkii			C		1	1
Fabaceae	Tephrosia astragaloides			C		1	1
Fabaceae	Stylosanthes guianensis		Y			4	1
Fabaceae	Lamprolobium fruticosum			C		6	3
Fabaceae	Indigofera suffruticosa		Y			1	1
Fabaceae	Castanospermum australe	black bean		C		1	1
Fabaceae	Aeschynomene paniculata		Y			1	1
Fabaceae	Tephrosia leptoclada			C		1	1
Fabaceae	Stylosanthes humilis	Townsville stylo	Y			1	1
Fabaceae	Pycnospora lutescens	pycnospora		C		3	3
Fabaceae	Jacksonia thesioides			C		3	1
Fabaceae	Indigofera pratensis			C		14	2
Fabaceae	Indigofera linifolia			C		5	4
Fabaceae	Gompholobium nitidum			C		1	1
Fabaceae	Flemingia parviflora	flemingia		C		13	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Fabaceae	Tephrosia juncea			C		9	7
Fabaceae	Mirbelia pungens			C		1	1
Fabaceae	Austrodolichos errabundus var. (Mareeba I.B.Staples 070572/9B)			C		1	1
Fabaceae	Derris sp. (Claudie River L.J.Webb+ 8348)			C		1	1
Flacourtiaceae	Casearia dallachii			C		1	1
Flacourtiaceae	Homalium brachybotrys			C		2	2
Flacourtiaceae	Casearia grayi			C		1	1
Flacourtiaceae	Casearia costulata			C		7	7
Gentianaceae	Fagraea fagraeacea			C		6	6
Goodeniaceae	Goodenia rosulata			C		1	1
Goodeniaceae	Scaevola enantophylla			C		1	1
Goodeniaceae	Velleia spathulata	wild pansies		C		1	1
Haloragaceae	Gonocarpus humilis			C		1	1
Haloragaceae	Haloragis heterophylla	rough raspweed		C		1	1
Lamiaceae	Hyptis capitata		Y			1	1
Lamiaceae	Pogostemon stellatus			C		1	1
Lamiaceae	Prostanthera sp. (Dinden P.I.Forster+ PIF17342)			E		1	1
Lamiaceae	Rothea myricoides cv. Ugandense		Y			1	1
Lamiaceae	Plectranthus scutellarioides			C		1	1
Lamiaceae	Plectranthus glabriflorus			C		1	1
Lamiaceae	Prostanthera clotteniana			E	EX	2	2
Lamiaceae	Clerodendrum floribundum			C		1	1
Lamiaceae	Plectranthus graveolens	flea bush		C		1	1
Lamiaceae	Callicarpa pedunculata	velvet leaf		C		2	2
Lamiaceae	Plectranthus diversus			C		1	1
Lamiaceae	Platostoma longicorne			C		1	1
Lamiaceae	Leucas lavandulifolia		Y			2	2
Lamiaceae	Callicarpa longifolia			C		1	1
Lamiaceae	Anisomeles malabarica			C		1	1
Lamiaceae	Ajuga australis	Australian bugle		C		1	0
Lamiaceae	Salvia misella		Y			3	3
Lamiaceae	Prostanthera			C		2	2
Lamiaceae	Plectranthus amoenus			V		7	7
Lamiaceae	Salvia coccinea	red salvia	Y			1	1
Lamiaceae	Premna acuminata			C		1	1
Lamiaceae	Hyptis suaveolens	hyptis	Y			3	2
Lamiaceae	Vitex queenslandica			C		1	1
Lamiaceae	Tectona grandis		Y			1	1
Lecythidaceae	Planchonia careya	cockatoo apple		C		9	0
Lentibulariaceae	Utricularia			C		1	0
Lentibulariaceae	Utricularia bifida			C		1	1
Leptaulaceae	Citronella smythii			C		1	1
Loganiaceae	Mitrasacme connata			C		2	2
Loranthaceae	Amyema miquelii			C		1	1
Loranthaceae	Amyema bifurcata			C		1	1
Loranthaceae	Dendrophthoe curvata			C		2	2
Loranthaceae	Decaisnina brittenii subsp. brittenii			C		1	1
Loranthaceae	Amylothea dictyophleba			C		4	4
Loranthaceae	Lysiana filifolia			R		1	1
Lythraceae	Rotala tripartita			C		1	1
Maesaceae	Maesa dependens var. pubescens			C		3	3

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Malvaceae	Sida			C		3	0
Malvaceae	Malvastrum			C		1	0
Malvaceae	Hibiscus meraukensis	Merauke hibiscus		C		1	0
Melastomataceae	Melastoma malabathricum subsp. malabathricum			C		2	2
Meliaceae	Toona ciliata	red cedar		C		1	1
Meliaceae	Dysoxylum mollissimum subsp. molle	miva mahogany		C		1	1
Meliaceae	Dysoxylum papuanum			C		1	1
Meliaceae	Dysoxylum rufum			C		1	1
Meliaceae	Dysoxylum klanderi			C		2	2
Meliaceae	Aglaia sapindina			C		1	1
Menyanthaceae	Nymphoides			C		2	0
Menyanthaceae	Nymphoides indica	water snowflake		C		3	3
Mimosaceae	Acacia			C		4	0
Mimosaceae	Acacia bidwillii			C		8	4
Mimosaceae	Acacia leptoloba			C		1	1
Mimosaceae	Albizia canescens			C		1	1
Mimosaceae	Acacia ulicifolia			C		1	1
Mimosaceae	Acacia leptocarpa	north coast wattle		C		5	1
Mimosaceae	Acacia hemignosta			C		3	2
Mimosaceae	Acacia flavescens	toothed wattle		C		1	1
Mimosaceae	Acacia cincinnata			C		1	1
Mimosaceae	Acacia calyculata			C		1	1
Mimosaceae	Acacia umbellata			C		1	1
Mimosaceae	Acacia nesophila			C		2	2
Mimosaceae	Acacia disparrima subsp. calidestris			C		2	2
Mimosaceae	Acacia holosericea var. holosericea			C		1	1
Mimosaceae	Acacia wickhamii subsp. cassitera			C		2	2
Mimosaceae	Pararchidendron pruinoseum			C		2	2
Mimosaceae	Acaciella angustissima		Y			1	1
Mimosaceae	Acacia purpureopetala			V	V	1	1
Mimosaceae	Acacia multisiliqua			C		3	2
Mimosaceae	Acacia polystachya			C		1	1
Mimosaceae	Acacia melanoxylon	blackwood		C		4	1
Mimosaceae	Acacia falciformis	broad-leaved hickory		C		2	2
Mimosaceae	Acacia crassicarpa			C		1	1
Mimosaceae	Acacia aulacocarpa			C		8	2
Mimosaceae	Acacia galioides			C		3	2
Mimosaceae	Acacia humifusa			C		1	1
Mimosaceae	Acacia simsii			C		1	1
Mimosaceae	Acacia whitei			C		4	3
Mimosaceae	Acacia guyeri			V	V	4	3
Mimosaceae	Acacia burrana			C		1	1
Mimosaceae	Acacia decora	pretty wattle		C		1	1
Moraceae	Ficus virens			C		2	2
Moraceae	Ficus rubiginosa forma rubiginosa			C		1	1
Moraceae	Trophis scandens subsp. scandens			C		3	3
Moraceae	Ficus septica var. cauliflora			C		1	1
Moraceae	Ficus congesta var. congesta			C		1	1
Moraceae	Ficus superba var. henneana			C		2	2
Moraceae	Ficus mollior var. mollior			C		2	2
Moraceae	Ficus hispida var. hispida			C		3	3

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Moraceae	Ficus destruens			C		1	1
Moraceae	Ficus leptoclada			C		2	2
Moraceae	Ficus pleurocarpa			C		3	3
Moraceae	Streblus brunonianus	whalebone tree		C		1	1
Moraceae	Ficus watkinsiana	green-leaved Moreton Bay fig		C		1	0
Moraceae	Ficus obliqua			C		7	7
Moraceae	Ficus fraseri	white sandpaper fig		C		2	1
Myodocarpaceae	Delarbrea michieana			C		2	2
Myoporaceae	Eremophila debilis	winter apple		C		1	1
Myrsinaceae	Myrsine achradiifolia			C		2	2
Myrsinaceae	Tapeinosperma pallidum			C		1	1
Myrsinaceae	Lysimachia arvensis		Y			1	1
Myrsinaceae	Myrsine subsessilis subsp. cryptostemon			C		1	1
Myrsinaceae	Myrsine variabilis			C		1	1
Myrsinaceae	Ardisia brevipedata			C		2	2
Myrsinaceae	Myrsine smithii			C		1	1
Myrtaceae	Eucalyptus leptophleba	Molloy red box		C		18	6
Myrtaceae	Eucalyptus melanoleuca	Nanango ironbark		C		1	0
Myrtaceae	Leptospermum neglectum			C		2	2
Myrtaceae	Lophostemon suaveolens	swamp box		C		5	0
Myrtaceae	Eucalyptus platyphylla	poplar gum		C		12	4
Myrtaceae	Eucalyptus ochrophloia	yapunyah		C		1	0
Myrtaceae	Melaleuca linariifolia	snow-in summer		C		1	0
Myrtaceae	Rhodamnia sessiliflora			C		2	2
Myrtaceae	Corymbia erythrophloia	variable-barked bloodwood		C		4	2
Myrtaceae	Corymbia confertiflora			C		1	0
Myrtaceae	Rhodomyrtus pervagata			C		2	2
Myrtaceae	Rhodomyrtus canescens			C		11	11
Myrtaceae	Melaleuca viridiflora			C		12	0
Myrtaceae	Melaleuca leucadendra	broad-leaved tea-tree		C		4	2
Myrtaceae	Lophostemon confertus	brush box		C		1	1
Myrtaceae	Eucalyptus tetrodonta	Darwin stringybark		C		2	2
Myrtaceae	Eucalyptus resinifera	red mahogany		C		3	2
Myrtaceae	Eucalyptus chartaboma			C		2	2
Myrtaceae	Eucalyptus acmenoides			C		2	0
Myrtaceae	Corymbia leichhardtii	rustyjacket		C		4	2
Myrtaceae	Corymbia clarksoniana			C		31	12
Myrtaceae	Syzygium cormiflorum	bumpy satinash		C		1	1
Myrtaceae	Eucalyptus granitica	granite ironbark		C		5	5
Myrtaceae	Eucalyptus cloeziana	Gympie messmate		C		1	0
Myrtaceae	Corymbia tessellaris	Moreton Bay ash		C		7	3
Myrtaceae	Corymbia ellipsoidea			C		1	1
Myrtaceae	Corymbia dallachiana			C		5	1
Myrtaceae	Syzygium luehmannii			C		2	2
Myrtaceae	Syzygium canicortex	yellow satinash		C		2	2
Myrtaceae	Melaleuca viminalis			C		3	2
Myrtaceae	Homoranthus porteri			V	V	3	3
Myrtaceae	Gossia myrsinocarpa			C		2	2
Myrtaceae	Eucalyptus shirleyi			C		1	0
Myrtaceae	Eucalyptus populnea	poplar box		C		3	0
Myrtaceae	Eucalyptus cullenii	Cullen's ironbark		C		10	4
Myrtaceae	Corymbia intermedia	pink bloodwood		C		10	2

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Myrtaceae	Lophostemon grandiflorus			C		1	1
Myrtaceae	Eucalyptus drepanophylla			C		1	1
Myrtaceae	Acmenosperma claviflorum	grey satinash		C		2	2
Myrtaceae	Waterhousea unipunctata			C		1	1
Myrtaceae	Melaleuca trichostachya			C		2	2
Myrtaceae	Leptospermum amboinense			C		1	1
Myrtaceae	Eucalyptus tereticornis			C		9	0
Myrtaceae	Syzygium trachyphloium			C		1	1
Myrtaceae	Rhodomyrtus macrocarpa	finger cherry		C		1	1
Myrtaceae	Gossia bidwillii			C		3	3
Myrtaceae	Acmena smithii	lillypilly satinash		C		2	2
Myrtaceae	Syzygium wesa			C		3	3
Myrtaceae	Gossia hillii			C		2	2
Myrtaceae	Leptospermum			C		2	0
Myrtaceae	Acmena resa	red Eungella satinash		C		1	1
Myrtaceae	Eucalyptus			C		6	0
Myrtaceae	Melaleuca			C		5	3
Myrtaceae	Melaleuca viridiflora var. viridiflora			C		3	3
Myrtaceae	Uromyrtus tenella			C		2	2
Myrtaceae	Syzygium australe	scrub cherry		C		4	4
Myrtaceae	Melaleuca recurva			C		1	1
Myrtaceae	Melaleuca nervosa			C		7	0
Myrtaceae	Gossia floribunda			C		1	1
Myrtaceae	Eucalyptus crebra	narrow-leaved red ironbark		C		8	1
Myrtaceae	Eucalyptus atrata	Herberton ironbark		C		1	1
Myrtaceae	Syzygium oleosum	blue cherry		C		8	8
Myrtaceae	Melaleuca uxorum			E		2	2
Myrtaceae	Corymbia citriodora	spotted gum		C		3	0
Myrtaceae	Syzygium johnsonii	Johnson's satinash		C		2	2
Myrtaceae	Melaleuca monantha			C		3	3
Myrtaceae	Gossia dallachiana			C		3	3
Myrtaceae	Eucalyptus reducta			C		6	2
Myrtaceae	Eucalyptus grandis	flooded gum		C		2	2
Myrtaceae	Eucalyptus exserta	Queensland peppermint		C		1	0
Myrtaceae	Decaspermum humile	silky myrtle		C		2	2
Myrtaceae	Corymbia abergiana	range bloodwood		C		2	2
Myrtaceae	Corymbia citriodora subsp. citriodora			C		3	3
Myrtaceae	Psidium cattleianum var. cattleianum		Y			1	1
Myrtaceae	Corymbia stockeri subsp. stockeri			C		5	4
Myrtaceae	Melaleuca nervosa subsp. nervosa			C		1	1
Myrtaceae	Leptospermum polygalifolium	tantoon		C		5	5
Myrtaceae	Archirhodomyrtus beckleri	rose myrtle		C		5	5
Myrtaceae	Tristaniopsis exiliflora	kanuka box		C		1	1
Myrtaceae	Thaleropia queenslandica	pink myrtle		R		4	4
Myrtaceae	Melaleuca sp. (Ropers Peak P.I.Forster PIF7208)			C		1	1
Myrtaceae	Eucalyptus tereticornis subsp. tereticornis			C		2	2
Myrtaceae	Syncarpia glomulifera subsp. glomulifera			C		5	1
Myrtaceae	Lophostemon grandiflorus subsp. riparius			C		2	2
Myrtaceae	Eucalyptus pachycalyx subsp. pachycalyx			C		1	1
Myrtaceae	Melaleuca stenostachya			C		8	3

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Nyctaginaceae	Mirabilis jalapa	four o'clock	Y			1	1
Nyctaginaceae	Pisonia aculeata	thorny Pisonia		C		1	1
Ochnaceae	Brackenridgea australiana			C		3	3
Oleaceae	Olea paniculata			C		1	1
Oleaceae	Ligustrum sinense	small-leaved privet	Y			1	1
Oleaceae	Ligustrum lucidum	large-leaved privet	Y			2	2
Oleaceae	Notelaea punctata			C		1	1
Oleaceae	Ligustrum australianum			C		1	1
Oleaceae	Notelaea sp. (Barakula A.R.Bean 7553)			C		1	1
Oleaceae	Jasminum didymum subsp. didymum			C		1	1
Oleaceae	Jasminum dallachii	soft jasmine		C		2	2
Onagraceae	Ludwigia octovalvis	willow primrose		C		3	1
Opiliaceae	Opilia amentacea			C		1	1
Oxalidaceae	Oxalis			C		1	1
Passifloraceae	Passiflora edulis		Y			1	1
Passifloraceae	Passiflora aurantia var. aurantia			C		1	1
Passifloraceae	Passiflora herbertiana subsp. herbertiana	native passionfruit		C		1	1
Pentaphylacaceae	Ternstroemia cherryi	cherry beech		C		1	1
Phyllanthaceae	Breynia			C		1	0
Phyllanthaceae	Phyllanthus			C		3	0
Phyllanthaceae	Breynia cernua			C		5	2
Phyllanthaceae	Antidesma bunius	currantwood		C		2	2
Phyllanthaceae	Antidesma erostre			C		1	1
Phyllanthaceae	Sauropus aphyllus			C		1	1
Phyllanthaceae	Glochidion hylandii			C		1	1
Phyllanthaceae	Sauropus macranthus			V	V	7	7
Phyllanthaceae	Phyllanthus virgatus			C		1	0
Phyllanthaceae	Antidesma parvifolium			C		1	1
Phyllanthaceae	Glochidion harveyanum			C		3	3
Phyllanthaceae	Glochidion sumatranum	umbrella cheese tree		C		1	1
Phyllanthaceae	Poranthera microphylla	small poranthera		C		3	2
Phyllanthaceae	Sauropus elachophyllus			C		1	1
Phyllanthaceae	Glochidion benthamianum			C		1	1
Phyllanthaceae	Phyllanthus carpentariae			C		1	1
Phyllanthaceae	Margaritaria dubium-traceyi			C		3	3
Phyllanthaceae	Flueggea virosa subsp. melanthesoides			C		1	1
Phyllanthaceae	Glochidion harveyanum var. harveyanum			C		2	2
Phytolaccaceae	Phytolacca octandra	inkweed	Y			1	1
Picrodendraceae	Petalostigma			C		1	0
Picrodendraceae	Petalostigma pubescens	quinine tree		C		10	0
Picrodendraceae	Pseudanthus ligulatus subsp. ligulatus			C		2	2
Picrodendraceae	Petalostigma banksii			C		4	2
Pittosporaceae	Bursaria incana			C		2	1
Pittosporaceae	Pittosporum wingii			C		1	1
Pittosporaceae	Bursaria tenuifolia			C		1	1
Pittosporaceae	Pittosporum revolutum	yellow pittosporum		C		1	1
Pittosporaceae	Pittosporum ferrugineum subsp. linifolium			C		2	2
Polygalaceae	Comesperma			C		2	2
Polygalaceae	Polygala persicariifolia			C		1	1
Polygalaceae	Polygala sp. (Portland Roads L.Pedley 2757)			C		1	1

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Polygalaceae	Polygala paniculata		Y			1	1
Polygalaceae	Salomonina ciliata			C		1	1
Polygonaceae	Persicaria			C		2	0
Polygonaceae	Persicaria barbata			C		2	2
Polygonaceae	Persicaria decipiens	slender knotweed		C		3	3
Polygonaceae	Muehlenbeckia zippellii			C		2	2
Proteaceae	Grevillea glauca	bushy's clothes peg		C		15	4
Proteaceae	Persoonia tropica			C		4	4
Proteaceae	Grevillea coriacea			C		3	1
Proteaceae	Grevillea dryandri subsp. dryandri			C		1	1
Proteaceae	Banksia spinulosa var. spinulosa			C		3	3
Proteaceae	Stenocarpus angustifolius			C		2	2
Proteaceae	Buckinghamia celsissima	spotted silky oak		C		1	1
Proteaceae	Grevillea pteridifolia	golden parrot tree		C		5	3
Proteaceae	Grevillea glossadenia			V	V	3	3
Proteaceae	Darlingia darlingiana			C		1	1
Proteaceae	Xylomelum scottianum			C		4	1
Proteaceae	Stenocarpus sinuatus	wheel of fire		C		2	2
Proteaceae	Lomatia fraxinifolia			C		3	3
Proteaceae	Helicia australasica			C		2	2
Proteaceae	Grevillea mimosoides			C		1	0
Proteaceae	Darlingia ferruginea			C		2	2
Proteaceae	Grevillea parallela			C		14	2
Proteaceae	Grevillea baileyana			C		1	1
Proteaceae	Cardwellia sublimis			C		1	1
Proteaceae	Alloxylon wickhamii			C		2	2
Proteaceae	Alloxylon flammeum			V	V	4	4
Proteaceae	Persoonia falcata			C		13	2
Proteaceae	Hakea persiehana			C		5	1
Proteaceae	Grevillea striata	beefwood		C		1	0
Proteaceae	Hakea plurinervia			C		3	2
Putranjivaceae	Drypetes acuminata			C		1	1
Putranjivaceae	Drypetes deplanchei	grey boxwood		C		2	2
Rhamnaceae	Alphitonia whitei	red ash		C		1	1
Rhamnaceae	Alphitonia			C		3	0
Rhamnaceae	Emmenosperma alphitonioides	yellow ash		C		1	1
Rhamnaceae	Alphitonia petriei	pink ash		C		1	1
Rhamnaceae	Cryptandra debilis			C		2	2
Rhamnaceae	Rhamnus nipalensis			C		1	1
Rhamnaceae	Alphitonia pomaderroides			C		13	4
Rhamnaceae	Pomaderris argyrophylla			C		1	1
Rhamnaceae	Alphitonia excelsa	soap tree		C		3	2
Rosaceae	Prunus turneriana	almondbark		C		1	1
Rosaceae	Rubus moluccanus var. trilobus			C		4	4
Rubiaceae	Rubiaceae			C		1	0
Rubiaceae	Coffea arabica	Arabian coffee	Y			1	1
Rubiaceae	Ixora oreogena			C		2	2
Rubiaceae	Morinda umbellata			C		1	1
Rubiaceae	Spermacoce remota		Y			1	1
Rubiaceae	Nauclea orientalis	Leichhardt tree		C		2	2
Rubiaceae	Randia tuberculosa			C		1	1
Rubiaceae	Gynochthodes oresbia			C		1	1
Rubiaceae	Spermacoce sp. (Lorim Point A.Morton AM1237)			C		1	1

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Rubiaceae	Atractocarpus fitzalanii subsp. fitzalanii			C		1	1
Rubiaceae	Psychotria sp. (Danbulla S.T.Blake 15262)			C		2	2
Rubiaceae	Timonius timon var. timon			C		1	1
Rubiaceae	Cyclophyllum multiflorum			C		1	1
Rubiaceae	Pogonolobus reticulatus			C		3	1
Rubiaceae	Hodgkinsonia frutescens			C	V	1	1
Rubiaceae	Richardia brasiliensis	white eye	Y			1	1
Rubiaceae	Psychotria dallachiana			C		1	1
Rubiaceae	Psychotria interstans			C		1	1
Rubiaceae	Opercularia diphylla			C		1	1
Rubiaceae	Larsenaikia ochreatea			C		2	2
Rubiaceae	Psydrax laxiflorens			C		2	2
Rubiaceae	Oldenlandia laceyi			C		1	1
Rubiaceae	Mitracarpus hirtus		Y			9	2
Rubiaceae	Psydrax attenuata			C		2	2
Rubiaceae	Ixora timorensis			C		1	1
Rubiaceae	Spermacoce			C		5	0
Rutaceae	Zieria			C		1	1
Rutaceae	Zieria cytisoides	downy Zieria		C		1	1
Rutaceae	Sarcomelicope simplicifolia subsp. simplicifolia	yellow aspen		C		2	2
Rutaceae	Zieria minutiflora subsp. trichocarpa			C		1	1
Rutaceae	Phebalium longifolium			C		3	3
Rutaceae	Flindersia schottiana	bumpy ash		C		5	5
Rutaceae	Flindersia brayleyana	Queensland maple		C		1	1
Rutaceae	Acronychia pauciflora	soft acronychia		C		1	1
Rutaceae	Micromelum minutum	clusterberry		C		1	1
Rutaceae	Melicope vitiflora	northern evodia		C		1	1
Rutaceae	Melicope elleryana			C		2	1
Rutaceae	Melicope bonwickii			C		1	1
Rutaceae	Acronychia vestita			C		1	1
Rutaceae	Clausena brevistyla var. brevistyla			C		1	1
Rutaceae	Acronychia acronychioides			C		1	1
Rutaceae	Pitaviaster haplophyllus			C		6	6
Rutaceae	Zanthoxylum ovalifolium			C		3	3
Rutaceae	Flindersia pimenteliana	maple silkwood		C		1	1
Rutaceae	Acronychia crassipetala			C		2	2
Rutaceae	Melicope broadbentiana			C		5	5
Rutaceae	Flindersia bourjotiana			C		3	3
Rutaceae	Zanthoxylum veneficum			C		3	3
Rutaceae	Halfordia kendack	saffron heart		C		2	2
Rutaceae	Zieria whitei			C		4	4
Rutaceae	Zieria smithii			C		3	3
Rutaceae	Acronychia laevis	glossy acronychia		C		4	4
Rutaceae	Boronia bipinnata	rock boronia		C		1	1
Rutaceae	Melicope rubra			C		2	2
Sambucaceae	Sambucus australasica	native elderberry		C		1	1
Santalaceae	Exocarpos latifolius			C		2	2
Santalaceae	Santalum lanceolatum			C		3	1
Sapindaceae	Dodoneaea			C		1	0
Sapindaceae	Arytera divaricata	coogera		C		5	5
Sapindaceae	Synima cordierorum			C		1	1

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Sapindaceae	Alectryon coriaceus	beach alectryon		C		2	2
Sapindaceae	Alectryon tomentosus			C		4	4
Sapindaceae	Alectryon semicinerus			R		2	2
Sapindaceae	Diploglottis bernieana			C		1	1
Sapindaceae	Dodonaea lanceolata var. subsessilifolia			C		2	2
Sapindaceae	Diploglottis diphylostegia			C		1	1
Sapindaceae	Distichostemon dodecandrus			C		5	2
Sapindaceae	Cardiospermum grandiflorum	heart seed vine	Y			1	1
Sapindaceae	Mischocarpus grandissimus			C		1	1
Sapindaceae	Mischarytera lautereriana	corduroy tamarind		C		4	4
Sapindaceae	Mischocarpus macrocarpus			C		1	1
Sapindaceae	Mischocarpus stipitatus			C		1	1
Sapindaceae	Toechima erythrocarpum			C		1	1
Sapindaceae	Castanopora alaphandii	brown tamarind		C		1	1
Sapindaceae	Cupaniopsis foveolata	narrow-leaved tuckeroo		C		2	2
Sapindaceae	Dodonaea tenuifolia			C		2	2
Sapindaceae	Synima reynoldsiae			C		3	3
Sapindaceae	Atalaya variifolia			C		2	1
Sapindaceae	Guioa montana			C		3	3
Sapindaceae	Guioa acutifolia	northern guioa		C		5	5
Sapotaceae	Pouteria papyracea			C		2	2
Sapotaceae	Niemeyera prunifera			C		1	1
Sapotaceae	Vanroyena castanosperma			C		1	1
Sapotaceae	Planchonella asterocarpon			C		5	5
Sapotaceae	Sersalisia sericea			C		3	2
Sapotaceae	Pouteria xerocarpa			C		1	1
Scrophulariaceae	Orobanche minor	lesser broomrape	Y			1	1
Scrophulariaceae	Rhamphicarpa australiensis			R		1	1
Scrophulariaceae	Buchnera linearis			C		1	1
Scrophulariaceae	Limnophila brownii			C		1	1
Scrophulariaceae	Limnophila fragrans			C		1	1
Scrophulariaceae	Limnophila aromatica			C		2	2
Scrophulariaceae	Striga parviflora			C		3	3
Scrophulariaceae	Veronica plebeia	trailing speedwell		C		1	1
Solanaceae	Datura inoxia		Y			1	1
Solanaceae	Solanum parvifolium subsp. tropicum			C		1	1
Solanaceae	Solanum pseudocapsicum	Madeira winter cherry	Y			1	1
Solanaceae	Solanum seaforthianum	Brazilian nightshade	Y			3	3
Solanaceae	Solanum viridifolium			C		5	5
Solanaceae	Solanum mauritianum	wild tobacco	Y			1	1
Solanaceae	Solanum capsicoides	devil's apple	Y			1	1
Solanaceae	Nicandra physalodes	apple of Peru	Y			5	5
Solanaceae	Solanum villosum		Y			1	1
Solanaceae	Cestrum nocturnum		Y			4	4
Solanaceae	Nicotiana tabacum		Y			2	2
Solanaceae	Solanum nodiflorum		Y			6	6
Solanaceae	Physalis peruviana		Y			1	1
Solanaceae	Solanum macoorai			C		5	5
Solanaceae	Solanum torvum	devil's fig	Y			1	1
Sparrmanniaceae	Grewia			C		1	0
Sparrmanniaceae	Grewia latifolia	dysentery plant		C		1	0
Sparrmanniaceae	Grewia retusifolia			C		17	3

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Sparrmanniaceae	Triumfetta rhomboidea	chinese burr	Y			1	1
Sparrmanniaceae	Trichospermum pleiostigma			C		1	1
Sparrmanniaceae	Triumfetta pilosa		Y			1	1
Sphenostemonaceae	Sphenostemon lobosporus			C		1	1
Stackhousiaceae	Stackhousia intermedia			C		1	1
Sterculiaceae	Brachychiton			C		4	0
Sterculiaceae	Brachychiton diversifolius subsp. orientalis			C		1	1
Sterculiaceae	Franciscodendron laurifolium			C		1	1
Sterculiaceae	Firmiana papuana	lacewood		R		1	1
Sterculiaceae	Argyrodendron peralatum	red tulip oak		C		2	2
Stylidiaceae	Stylidium			C		1	0
Stylidiaceae	Stylidium cordifolium			C		2	2
Stylidiaceae	Stylidium eriorhizum			C		1	1
Surianaceae	Guilfoylia monostylis	guilfoylia		C		3	3
Symplocaceae	Symplocos cochinchinensis var. pilosiuscula			C		3	3
Thymelaeaceae	Pimelea			C		1	0
Thymelaeaceae	Pimelea linifolia			C		1	1
Thymelaeaceae	Wikstroemia indica	tie bush		C		8	3
Thymelaeaceae	Phaleria clerodendron	scented daphne		C		1	1
Thymelaeaceae	Thecanthes cornucopiae			C		1	1
Thymelaeaceae	Pimelea sericostachya subsp. sericostachya			C		2	2
Thymelaeaceae	Pimelea trichostachya	flaxweed		C		1	0
Thymelaeaceae	Phaleria chermsideana	scrub daphne		C		1	1
Thymelaeaceae	Phaleria octandra	phaleria		C		1	1
Ulmaceae	Trema			C		2	0
Ulmaceae	Aphananthe philippinensis			C		1	0
Urticaceae	Urtica incisa	stinging nettle		C		1	1
Urticaceae	Dendrocnide photinophylla	shiny-leaved stinging tree		C		2	1
Verbenaceae	Lantana camara		Y			1	1
Verbenaceae	Lantana camara cv. Gol Gol		Y			3	0
Violaceae	Hybanthus enneaspermus			C		5	1
Violaceae	Hybanthus stellarioides			C		1	1
Viscaceae	Viscum articulatum	flat mistletoe		C		1	1
Viscaceae	Notothixos subaureus	golden mistletoe		C		1	1
Vitaceae	Cissus			C		1	0
Vitaceae	Cissus vinosa			C		1	1
Vitaceae	Cayratia trifolia			C		7	2
Vitaceae	Cissus penninervis			C		1	1
Vitaceae	Clematicissus opaca			C		4	4
Vitaceae	Tetrastigma petraeum			C		3	3
Vitaceae	Cissus cardiophylla			C		1	1
Vitaceae	Cissus hypoglauca			C		2	2
Vitaceae	Cayratia japonica			C		1	1
Vitaceae	Cissus adnata			C		1	1
Zygophyllaceae	Tribulus terrestris	caltrop		C		1	1
Annonaceae	Cananga odorata	Ylang-ylang		C		1	1
Annonaceae	Desmos gozeanus			C		1	1
Annonaceae	Polyalthia nitidissima	polyalthia		C		2	2
Aristolochiaceae	Aristolochia holtzei			C		1	1
Aristolochiaceae	Pararistolochia deltantha			C		1	1
Aristolochiaceae	Aristolochia thozetii			C		1	1

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Aristolochiaceae	Aristolochia pubera var. pubera			C		1	1
Cabombaceae	Brasenia schreberi			R		2	2
Hernandiaceae	Gyrocarpus americanus subsp. americanus			C		1	1
Himantandraceae	Galbulimima baccata			C		4	4
Lauraceae	Litsea leefeana			C		3	3
Lauraceae	Endiandra insignis			C		1	1
Lauraceae	Cryptocarya cocosoides			C		9	9
Lauraceae	Cryptocarya corrugata			C		2	2
Lauraceae	Cinnamomum baileyianum	candlewood		C		1	1
Lauraceae	Beilschmiedia recurva			C		1	1
Lauraceae	Beilschmiedia collina			C		3	3
Lauraceae	Beilschmiedia brunnea			C		5	5
Lauraceae	Endiandra bessaphila			C		5	5
Lauraceae	Cryptocarya angulata	ivory laurel		C		2	2
Lauraceae	Endiandra sankeyana	Sankey's walnut		C		2	2
Lauraceae	Endiandra monothyra subsp. monothyra			C		1	1
Lauraceae	Cryptocarya triplinervis var. pubens			C		2	2
Lauraceae	Cryptocarya onoprienkoana			C		2	2
Lauraceae	Cryptocarya triplinervis			C		3	3
Lauraceae	Cryptocarya saccharata			C		1	1
Lauraceae	Cryptocarya hypospodia	north Queensland purple laurel		C		3	3
Lauraceae	Cryptocarya densiflora			C		4	4
Lauraceae	Endiandra monothyra			C		1	1
Lauraceae	Endiandra dielsiana			C		1	1
Lauraceae	Cryptocarya grandis			C		1	1
Lauraceae	Cinnamomum laubatii			C		2	2
Lauraceae	Cinnamomum camphora	camphor laurel	Y			2	2
Lauraceae	Cassytha filiformis	dodder laurel		C		5	5
Lauraceae	Neolitsea dealbata	white bolly gum		C		1	1
Lauraceae	Litsea fawcettiana			C		9	9
Lauraceae	Cryptocarya putida			C		1	1
Lauraceae	Litsea connorsii			C		2	2
Lauraceae	Neolitsea brassii			C		3	3
Menispermaceae	Legnephora moorei			C		1	1
Menispermaceae	Hypserpa smilacifolia			R		1	1
Monimiaceae	Wilkiea pubescens			C		1	1
Monimiaceae	Levieria acuminata			C		1	1
Monimiaceae	Hedycarya loxocarya			C		1	1
Monimiaceae	Steganthera macooraia			C		2	2
Monimiaceae	Wilkiea angustifolia			C		3	3
Myristicaceae	Myristica globosa subsp. muelleri	native nutmeg		C		1	1
Nymphaeaceae	Nymphaea			C		1	0
Nymphaeaceae	Nymphaea immutabilis subsp. immutabilis			C		1	1
Piperaceae	Peperomia enervis			C		1	1
Ranunculaceae	Clematis pickeringii			C		2	2
Winteraceae	Tasmania membranea			C		4	4
Winteraceae	Bubbia semecarpoides			C		1	1
Alismataceae	Caldesia parnassifolia			C		1	1
Araceae	Spirodela punctata	thin duckweed		C		3	3
Arecaceae	Calamus australis	hairy mary		C		1	1
Arecaceae	Laccospadix australasica	Atherton palm		C		2	2

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Asparagaceae	Asparagus racemosus	native asparagus		C		1	1
Boryaceae	Borya septentrionalis			C		1	1
Colchicaceae	Iphigenia indica			C		1	1
Colchicaceae	Kuntheria pedunculata			C		1	1
Colchicaceae	Schelhammera multiflora			C		3	2
Commelinaceae	Commelina			C		1	0
Commelinaceae	Cartonema spicatum var. humile			C		2	2
Commelinaceae	Murdannia graminea	murdannia		C		1	1
Commelinaceae	Murdannia vaginata		Y			2	2
Commelinaceae	Tradescantia fluminensis		Y			1	1
Commelinaceae	Cartonema spicatum			C		3	3
Cyperaceae	Tetraria capillaris			C		1	1
Cyperaceae	Fimbristylis macrantha			C		1	1
Cyperaceae	Fimbristylis dichotoma	common fringe-rush		C		1	1
Cyperaceae	Schoenoplectus laevis			C		1	1
Cyperaceae	Lepidosperma laterale			C		1	0
Cyperaceae	Eleocharis geniculata			C		2	2
Cyperaceae	Eleocharis equisetina			C		1	1
Cyperaceae	Lipocarpha chinensis			C		2	2
Cyperaceae	Lepironia articulata			C		3	1
Cyperaceae	Cyperus tetraphyllus			C		2	2
Cyperaceae	Cyperus polystachyos var. polystachyos			C		1	1
Cyperaceae	Cyperus nutans var. eleusinoides	flatsedge		C		1	1
Cyperaceae	Cyperus haspan subsp. haspan			C		1	1
Cyperaceae	Cyperus conicus var. conicus			C		1	1
Cyperaceae	Rhynchospora subtenuifolia			C		1	1
Cyperaceae	Schoenoplectus mucronatus			C		6	4
Cyperaceae	Eleocharis atropurpurea			C		2	2
Cyperaceae	Cyperus holoschoenus			C		1	1
Cyperaceae	Fimbristylis nutans			C		1	1
Cyperaceae	Fimbristylis cymosa			C		1	1
Cyperaceae	Exocarya scleroides			C		2	2
Cyperaceae	Bulbostylis barbata			C		1	1
Cyperaceae	Cyperus unioides			C		1	1
Cyperaceae	Schoenus falcatus			C		1	1
Cyperaceae	Fuirena umbellata			C		1	1
Cyperaceae	Eleocharis minuta		Y			1	1
Cyperaceae	Eleocharis dulcis			C		1	1
Cyperaceae	Cyperus trinervis			C		1	1
Cyperaceae	Cyperus aquatilis			C		3	3
Cyperaceae	Carex breviculmis			C		1	1
Cyperaceae	Fuirena ciliaris			C		1	1
Cyperaceae	Cyperus flavidus			C		1	1
Cyperaceae	Scleria brownii			C		2	2
Cyperaceae	Cyperus enervis			C		1	1
Cyperaceae	Cyperus distans			C		1	1
Cyperaceae	Cyperus fulvus			C		2	2
Cyperaceae	Gahnia aspera			C		3	2
Cyperaceae	Eleocharis			C		3	0
Cyperaceae	Scleria			C		5	0
Cyperaceae	Cyperus			C		3	0
Cyperaceae	Cyperus polystachyos			C		2	2
Cyperaceae	Cyperus involucratus		Y			3	3

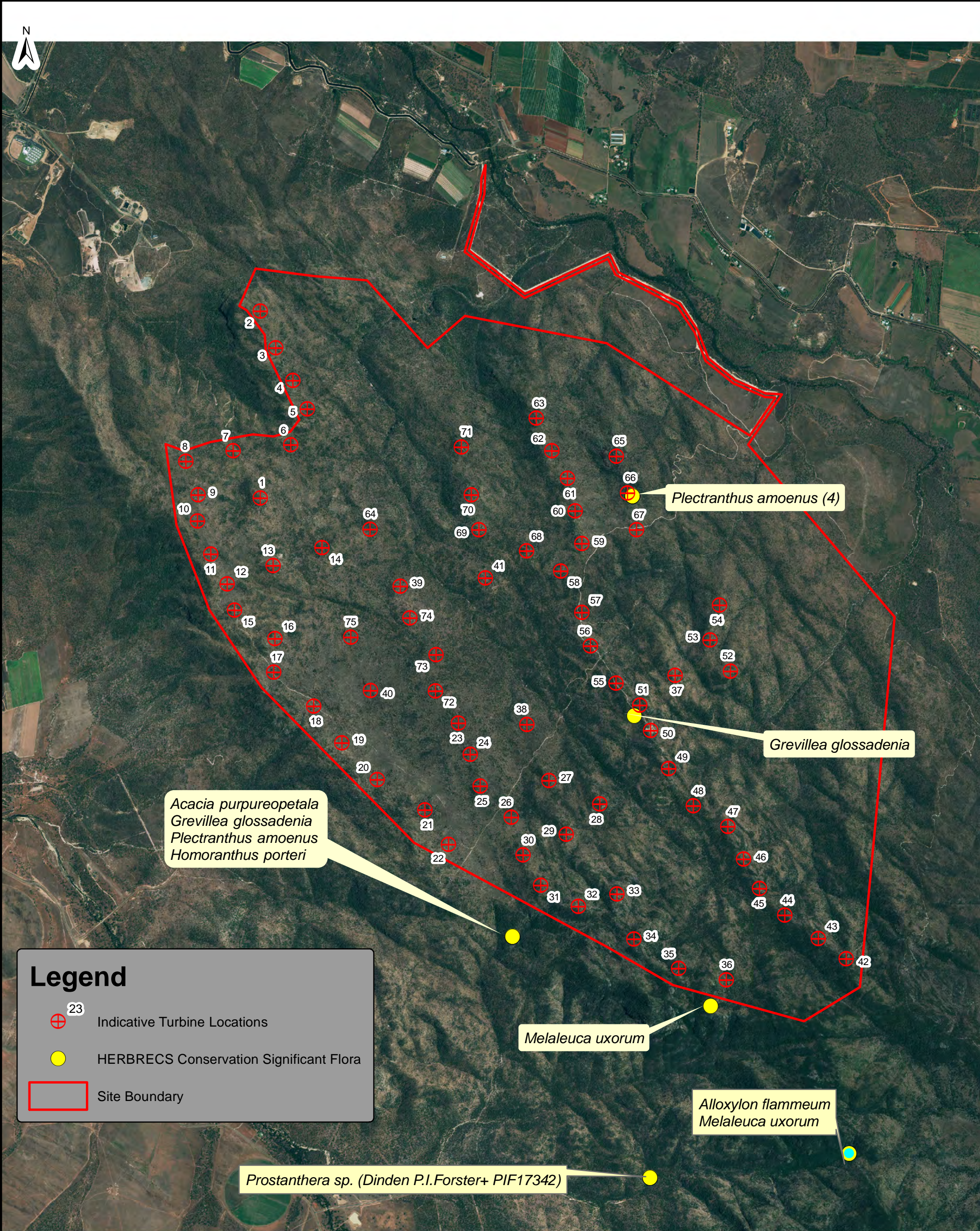
Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Dioscoreaceae	Dioscorea bulbifera var. bulbifera			C		1	1
Eriocaulaceae	Eriocaulaceae			C		1	0
Eriocaulaceae	Eriocaulon nanum			C		1	1
Eriocaulaceae	Eriocaulon scariosum			C		1	1
Eriocaulaceae	Eriocaulon australe			C		1	1
Haemodoraceae	Haemodorum coccineum			C		2	0
Hemerocallidaceae	Dianella			C		6	0
Hemerocallidaceae	Dianella atraxis			C		1	1
Hemerocallidaceae	Dianella caerulea var. vannata			C		3	2
Hydrocharitaceae	Ottelia alismoides			C		1	1
Hypoxidaceae	Molineria capitulata			C		1	1
Hypoxidaceae	Curculigo ensifolia var. ensifolia			C		1	1
Johnsoniaceae	Tricoryne anceps			C		3	0
Johnsoniaceae	Tricoryne elatior	yellow autumn lily		C		1	1
Johnsoniaceae	Tricoryne anceps subsp. anceps			C		2	1
Juncaceae	Juncus usitatus			C		2	2
Laxmanniaceae	Lomandra			C		9	2
Laxmanniaceae	Lomandra filiformis subsp. filiformis			C		1	1
Laxmanniaceae	Thysanotus tuberosus subsp. tuberosus			C		1	1
Laxmanniaceae	Lomandra multiflora subsp. multiflora			C		1	1
Laxmanniaceae	Lomandra filiformis			C		1	1
Orchidaceae	Diuris oporina	northern white donkeys tails		R		1	1
Orchidaceae	Cheirostylis ovata	caterpillar orchid		C		1	1
Orchidaceae	Cymbidium canaliculatum			C		1	0
Orchidaceae	Arthrochilus oreophilus			C		1	1
Orchidaceae	Spathoglottis paulinae			R		1	1
Orchidaceae	Pterostylis parviflora	tiny greenhood		C		1	1
Orchidaceae	Bulbophyllum johnsonii			C		1	1
Orchidaceae	Peristylus banfieldii			R		1	1
Orchidaceae	Corybas aconitiflorus			C		1	1
Orchidaceae	Sarcochilus falcatus	orange blossom orchid		C		1	1
Orchidaceae	Dipodium elegantulum			C		1	1
Orchidaceae	Thelymitra sp. (Toy Creek P.I.Forster+ PIF21217)			C		1	1
Orchidaceae	Caladenia carnea var. carnea			C		1	1
Orchidaceae	Dendrobium canaliculatum			C		1	0
Orchidaceae	Arthrochilus irritabilis	leafy elbow orchid		C		1	1
Orchidaceae	Pterostylis depauperata			C		1	1
Orchidaceae	Dendrobium gracilicaule	slender orchid		C		1	1
Orchidaceae	Acianthus fornicatus	pixie caps		C		1	1
Orchidaceae	Pterostylis stricta			C		3	3
Orchidaceae	Drymoanthus minutus			C		1	1
Orchidaceae	Dipodium ensifolium	leafy hyacinth orchid		C		1	1
Orchidaceae	Calochilus ammobius			C		1	1
Orchidaceae	Octarrhena pusilla			C		1	1
Orchidaceae	Dendrobium aemulum	ironbark orchid		C		1	1
Orchidaceae	Corybas fimbriatus	fringed helmet orchid		C		1	1
Orchidaceae	Acianthus borealis			C		1	1
Orchidaceae	Nervilia plicata			C		2	2
Orchidaceae	Corybas cerasinus			R		1	1
Orchidaceae	Cymbidium madidum			C		1	0
Orchidaceae	Empusa habenarina			C		1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Orchidaceae	Phaius australis			E	E	1	1
Orchidaceae	Zeuxine oblonga	hairy jewel orchid		C		1	1
Pandanaceae	Pandanus			C		5	0
Pandanaceae	Freycinetia excelsa	climbing pandanus		C		1	1
Pandanaceae	Pandanus cookii			C		1	1
Philydraceae	Philydrum lanuginosum	frogsmouth		C		1	1
Poaceae	Panicum mitchellii			C		1	1
Poaceae	Aristida pernicioso			C		1	1
Poaceae	Eragrostis cumingii			C		1	1
Poaceae	Megathyrsus maximus		Y			2	2
Poaceae	Paspalum conjugatum	sourgrass	Y			1	1
Poaceae	Oplismenus compositus			C		1	1
Poaceae	Heteropogon triticeus	giant speargrass		C		19	3
Poaceae	Heteropogon contortus	black speargrass		C		19	2
Poaceae	Eremochloa bimaculata	poverty grass		C		1	0
Poaceae	Echinochloa oryzoides		Y			1	1
Poaceae	Cymbopogon bombycinus	silky oilgrass		C		2	1
Poaceae	Aristida superpendens			C		1	1
Poaceae	Whiteochloa airoides			C		2	2
Poaceae	Tripogon loliiformis	five minute grass		C		1	1
Poaceae	Digitaria nematostachya			C		1	1
Poaceae	Urochloa subquadripa		Y			2	2
Poaceae	Enneapogon lindleyanus			C		1	1
Poaceae	Cyrtococcum deltoideum		Y			1	1
Poaceae	Cleistochloa subjuncea			C		1	0
Poaceae	Bothriochloa ewartiana	desert bluegrass		C		1	1
Poaceae	Alloteropsis semialata	cockatoo grass		C		1	0
Poaceae	Schizachyrium fragile	firegrass		C		8	2
Poaceae	Panicum lachnophyllum	don't panic		C		1	1
Poaceae	Cymbopogon queenslandicus			C		1	1
Poaceae	Capillipedium parviflorum	scented top		C		2	2
Poaceae	Thaumastochloa pubescens			C		1	1
Poaceae	Echinochloa dietrichiana			C		1	1
Poaceae	Dactyloctenium aegyptium	coast button grass	Y			2	2
Poaceae	Capillipedium spicigerum	spicytop		C		1	1
Poaceae	Stenotaphrum secundatum	buffalo grass	Y			1	1
Poaceae	Sporobolus jacquemontii		Y			2	2
Poaceae	Pseudoraphis spinescens	spiny mudgrass		C		1	0
Poaceae	Dichanthium sericeum subsp. polystachyum			C		1	1
Poaceae	Urochloa holosericea subsp. holosericea			C		2	2
Poaceae	Bothriochloa bladhii subsp. bladhii			C		1	1
Poaceae	Setaria pumila subsp. pallidifusca		Y			2	2
Poaceae	Panicum seminudum var. cairnsianum			C		2	2
Poaceae	Chloris divaricata var. divaricata	slender chloris		C		1	1
Poaceae	Megathyrsus maximus var. maximus		Y			2	2
Poaceae	Ischaemum australe var. australe			C		1	1
Poaceae	Sorghum nitidum forma aristatum			C		2	2
Poaceae	Aristida calycina var. calycina			C		1	1
Poaceae	Ischaemum rugosum var. segetum			C		1	1
Poaceae	Cynodon dactylon var. dactylon		Y			1	1
Poaceae	Setaria pumila subsp. pumila		Y			1	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Poaceae	Pseudopogonatherum contortum			C		1	0
Poaceae	Aristida utilis var. utilis			C		1	1
Poaceae	Mnesithea rottboellioides			C		9	1
Poaceae	Melinis repens	red natal grass	Y			4	0
Poaceae	Chloris gayana	rhodes grass	Y			1	1
Poaceae	Eriachne rara			C		2	2
Poaceae	Eragrostiella			C		1	0
Poaceae	Arundinella			C		3	0
Poaceae	Digitaria			C		1	0
Poaceae	Aristida			C		17	0
Poaceae	Poaceae			C		3	0
Poaceae	Panicum			C		8	0
Poaceae	Panicum incomtum			C		1	1
Poaceae	Leersia hexandra	swamp rice grass		C		4	1
Poaceae	Eriachne trisetia			C		1	1
Poaceae	Urochloa mutica		Y			2	0
Poaceae	Themeda arguens			C		1	1
Poaceae	Sorghum bicolor	forage sorghum	Y			1	1
Poaceae	Setaria surgens			C		1	1
Poaceae	Sehima nervosum			C		1	1
Poaceae	Panicum effusum			C		1	1
Poaceae	Panicum antidotale	giant panic	Y			1	1
Poaceae	Oryza meridionalis			C		1	1
Poaceae	Digitaria bicornis			C		2	2
Poaceae	Chrysopogon fallax			C		1	0
Poaceae	Arundinella setosa			C		9	2
Poaceae	Aristida warburgii			C		3	2
Poaceae	Urochloa pubigera			C		4	4
Poaceae	Urochloa piligera			C		1	1
Poaceae	Setaria apiculata			C		1	0
Poaceae	Panicum coloratum		Y			1	1
Poaceae	Mnesithea formosa			C		1	1
Poaceae	Ectrosia leporina			C		3	2
Poaceae	Themeda triandra	kangaroo grass		C		25	1
Poaceae	Paspalum notatum	bahia grass	Y			1	1
Poaceae	Hordeum vulgare		Y			1	1
Poaceae	Eriachne obtusa			C		1	1
Poaceae	Eleusine indica	crowsfoot grass	Y			1	1
Poaceae	Chloris virgata	feathertop rhodes grass	Y			1	1
Poaceae	Bambusa balcooa		Y			1	1
Poaceae	Thaumastochloa			C		1	0
Poaceae	Sarga plumosum			C		11	2
Poaceae	Panicum simile			C		1	1
Poaceae	Themeda quadrivalvis	grader grass	Y			4	2
Poaceae	Paspalum paniculatum	Russell River grass	Y			3	3
Poaceae	Eragrostis pubescens			C		2	2
Poaceae	Echinochloa inundata	marsh millet		C		1	1
Poaceae	Cymbopogon refractus	barbed-wire grass		C		5	1
Poaceae	Cenchrus caliculatus	hillside burrgrass		C		1	1
Poaceae	Urochloa polyphylla			C		1	1
Poaceae	Paspalum plicatulum	plicatulum	Y			1	1
Poaceae	Melinis minutiflora	molasses grass	Y			3	1
Poaceae	Imperata cylindrica	blady grass		C		3	1

Family	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
Poaceae	Cymbopogon ambiguus	lemon grass		C		3	2
Poaceae	Urochloa distachya		Y			1	1
Poaceae	Setaria sphacelata		Y			3	1
Poaceae	Urochloa decumbens		Y			2	2
Poaceae	Urochloa brizantha		Y			2	2
Pontederiaceae	Monochoria cyanea			C		1	1
Potamogetonaceae	Potamogeton			C		1	1
Potamogetonaceae	Potamogeton crispus	curly pondweed		C		1	1
Smilacaceae	Smilax			C		1	0
Smilacaceae	Smilax glycyphylla	sweet sarsaparilla		C		2	2
Typhaceae	Typha domingensis			C		1	1
Xanthorrhoeaceae	Xanthorrhoea			C		1	0
Xanthorrhoeaceae	Xanthorrhoea johnsonii			C		3	0
Xyridaceae	Xyris complanata	yellow-eye		C		9	8
Xyridaceae	Xyris pauciflora			C		1	1
Zingiberaceae	Alpinia caerulea	wild ginger		C		1	1
Zingiberaceae	Alpinia arctiflora			C		1	1
Amblystegiaceae	Leptodictyum riparium			C		1	1
Bryaceae	Bryum argenteum			C		2	2
Bryaceae	Brachymenium nepalense			C		1	1
Dicnemonaceae	Eucamptodon muelleri			C		1	1
Dicranaceae	Campylopus robillardii			C		1	1
Hypnaceae	Taxiphyllum taxirameum			C		1	1
Leucomiaceae	Leucomium strumosum			C		2	2
Meteoriaceae	Aerobryopsis longissima			C		1	1
Orthotrichaceae	Macromitrium aurescens			C		1	1
Polytrichaceae	Pogonatum			C		1	1
Sematophyllaceae	Sematophyllum subpinnatum			C		2	2
Indet.	Indet.			C		10	0
Psilotaceae	Psilotum nudum	skeleton fork fern		C		2	2
Atherospermataceae	Doryphora aromatica			C		2	2
Atherospermataceae	Daphnandra repandula			C		1	1

Appendix F2.



<div><div><div>02505007501,000</div><div>Meters (A3)</div></div><div><div>DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.</div><div>REGIONAL ECOSYSTEM VERSION 6 DATA</div><div>DERM AERIAL PHOTOGRAPHY.</div><div>Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.</div><div>Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.</div><div>The aerial photography used in this plan has not been rectified. The image has been overlaid as a best fit on the boundaries shown and position is approximate only.</div><div>Date of Capture: August 2006.</div></div></div> <td><div>Project Manager</div><div>D. Finney</div></td> <td rowspan="2">Client</td> <td rowspan="2">Transfield Services</td>	<div>Project Manager</div> <div>D. Finney</div>	Client	Transfield Services	
	<div>Compiled by</div> <div>Jeff Middleton</div>			
	<div>Map Projection</div> <div>MGAz55</div>	Title	HERBRECS Conservation Significant Flora	
	<div>Map Datum</div> <div>GDA94</div>			
	<div>File Reference</div> <div>PR100246-7.mxd</div>			
<div>Sheet Number</div> <div>1 of 1</div>	<div><div><div><div>RPS</div><div>© COPYRIGHT PROTECTS THIS PLAN</div><div>Unauthorised reproduction or amendment not permitted</div><div>Please contact the author.</div></div></div><div><div>RPS Australia East Pty Ltd</div><div>ACN 140 292 762</div><div>135 Abbott St</div><div>PO Box 1949</div><div>CAIRNS QLD 4870</div><div>T +61 7 4031 1336</div><div>F +61 7 4031 2942</div><div>W rpsgroup.com.au</div></div></div>			
SCALE (A3)		DATE		DRAWING NO.
1:29,112		12/8/2010	PR100246-7	

Appendix G2.

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

Part P: Requirements for clearing for public safety and infrastructure

Public safety and infrastructure includes clearing that is:

- a) for establishing a necessary fence, firebreak, road or vehicular track, or for constructing necessary built infrastructure, if there is no suitable alternative site for the fence, firebreak, road, track or infrastructure; or
- b) a natural and ordinary consequence of other assessable development for which a development approval as defined under the *Integrated Planning Act 1997* (IPA) was given, or a development application as defined under IPA was made, before 16 May 2003; or
- c) to ensure public safety.

Performance Requirement

PR P.1: Limits to clearing for public safety and infrastructure

To regulate the clearing of vegetation in a way that conserves remnant vegetation that are regional ecosystems, does not cause land degradation, prevents the loss of biodiversity and maintains ecological processes—subject to the limitations required to meet PR P.2 to PR P.10—clearing is limited to the extent that is necessary—

- a) for establishing a necessary fence, firebreak, road or vehicular track, or for constructing necessary built infrastructure, if there is no suitable alternative site for the fence, firebreak, road, track or infrastructure; or
- b) as a natural and ordinary consequence of other assessable development for which a development approval as defined under the IPA was given, or a development application as defined under IPA was made, before 16 May 2003; or
- c) to ensure public safety.

Comment

The application is relevant to Item a of the Performance Requirement as the clearing will be required to establish access track and associated infrastructure, such as wind turbines, associated cabling and substation as shown on **Appendix A1** attached to this report.

- a) for establishing a necessary fence, firebreak, road or vehicular track, or for constructing necessary built infrastructure, if there is no suitable alternative site for the fence, firebreak, road, track or infrastructure;

Performance Requirement	Acceptable Solution
<p>PR P.2: Wetlands</p> <p>To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes—assessable vegetation associated with any natural significant wetland and/or natural wetland is protected to maintain—</p> <ul style="list-style-type: none"> a) water quality by filtering sediments, nutrients and other pollutants; and b) aquatic habitat; and c) terrestrial habitat. 	<p>AS P.2</p> <p>Clearing does not occur—</p> <ul style="list-style-type: none"> a) in any natural wetland; and b) within 100 metres from any natural wetland; and c) in any natural significant wetland; and d) within 200 metres from any natural significant wetland. <p>AND</p> <p>P.2.2</p> <p>Where clearing is for a significant community project, maintain the current extent of assessable vegetation associated with any natural significant wetland and/or natural wetland to provide—</p> <ul style="list-style-type: none"> a) water quality by filtering sediments, nutrients and other pollutants; and b) aquatic habitat; and c) terrestrial habitat.
<p>Comment</p> <p>Granite Creek, which occurs adjacent to the site and generally parallel to the access leg of Lot 7 on SP235244 is</p>	

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

mapped as a Wetland Management Area. However, no wetlands occur (or are shown on mapping) within the project area. The project area is characterised by ridges, and the land's topography is not conducive to supporting wetland environments. As such, compliance is achieved as no clearing is proposed within or adjacent to any mapped wetland.

Performance Requirement	Acceptable Solution
<p>PR P.3: Watercourses</p> <p>To regulate the clearing of vegetation in a way that does not cause land degradation, prevents the loss of biodiversity and maintains ecological processes—assessable vegetation associated with any watercourse is protected to maintain—</p> <ul style="list-style-type: none"> a) bank stability by protecting against bank erosion; and b) water quality by filtering sediments, nutrients and other pollutants; and c) aquatic habitat; and d) terrestrial habitat. 	<p>AS P.3</p> <p>P.3.1</p> <p>Clearing does not occur—</p> <ul style="list-style-type: none"> a) in any watercourse; and b) within the relevant distance stipulated in Table 1, of each high bank of each watercourse. <p>AND</p> <p>P.3.2</p> <p>Where clearing is for a significant community project, maintain the current extent of assessable vegetation associated with any watercourse to provide—</p> <ul style="list-style-type: none"> a) bank stability by protecting against bank erosion; and b) water quality by filtering sediments, nutrients and other pollutants; and c) aquatic habitat; and d) terrestrial habitat.
<p>Comment</p> <p>A number of lower order seasonally flowing stream features will be traversed, as shown on Appendix H2 attached to this report.. The existing powerline service track already crosses the most significant of these features, and therefore no further clearing is required at these points. The creation of new stream crossings has therefore been avoided.</p> <p>In other areas of the project, the road and cabling network is configured so that it follows ridgelines or high ground above watercourses.</p> <p>If other stream features are encountered (these are expected to be intermittently flowing drainage lines with no defined riparian vegetation), clearing is expected to be minor (maximum 10 m wide) and appropriate erosion and sediment control measures will be designed and implemented.</p>	

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

Performance Requirement	Acceptable Solution
<p>PR P.4: Connectivity</p> <p>To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes—areas of mapped remnant vegetation are retained that are—</p> <ul style="list-style-type: none"> a) of sufficient size and configured in a way to maintain ecosystem functioning; and b) of sufficient size and configured in a way to remain in the landscape in spite of any threatening processes; and c) located on the lot(s) that are the subject of the application to maintain connectivity to mapped remnant vegetation on adjacent properties. 	<p><i>AS P.4</i></p> <p>P.4.1</p> <p>Where clearing is less than—</p> <ul style="list-style-type: none"> a) 10 metres wide; or b) 2 hectares; <p>clearing does not—</p> <ul style="list-style-type: none"> i)) reduce the width of mapped remnant vegetation to less than 200 metres; and ii) occur where the width of mapped remnant vegetation is less than 200 metres; <p>AND</p> <p>P.4.2</p> <p>Clearing does not—</p> <ul style="list-style-type: none"> a) reduce areas of contiguous mapped remnant vegetation to less than 10 hectares; and b) occur in areas of contiguous mapped remnant vegetation that are less than 10 hectares; and c) reduce the width of mapped remnant vegetation to less than 200 metres; and d) occur where the width of mapped remnant vegetation is less than 200 metres; and e) reduce the total extent of mapped remnant vegetation to less than 30%; and f) occur where the total extent of mapped remnant vegetation is less than 30%. <p>AND</p> <p>P.4.3</p> <p>Where clearing is for a significant community project, maintain the current extent of mapped remnant vegetation where the vegetation is—</p> <ul style="list-style-type: none"> a) of sufficient size and configured in a way to maintain ecosystem functioning; and b) of sufficient size and configured in a way to remain in the landscape in spite of any threatening processes; and c) located on the lot(s) that are the subject of the application to maintain connectivity to mapped remnant vegetation on adjacent properties.
<p>Comment</p> <p>Initial clearing for the road and cabling network will be limited to a width of 10 metres or less. Following the construction phase, these tracks will be allowed to regenerate naturally to a reduced width of 5 m.</p> <p>The clearing required for each wind turbine construction site will not exceed 2 hectares and is generally expected to be an area of 40 m x 40 m.</p> <p>Each turbine site stands in isolation from others and therefore vegetation connectivity will not be affected. Allowing the initial construction tracks to regenerate to 5 m width will also reinstate connectivity between sites. No clearing will occur that will isolate remnant vegetation strips less than 200 m wide. Vegetation contiguity will be maintained due to the small footprint of each turbine.</p>	

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

Performance Requirement	Acceptable Solution
PR P.5: Soil erosion To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes—the effect of clearing does not result in— <ul style="list-style-type: none"> a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scalding; and b) any associated loss of chemical, physical or biological fertility—including, but not limited to water holding capacity, soil structure, organic matter, soil biology, and nutrients, within and/or outside the lot(s) that are the subject of the application. 	<i>AS P.5</i> P.5.1 Mechanical clearing only occurs on— <ul style="list-style-type: none"> a) stable soils on a slope less than 30%; and b) unstable soils on a slope less than 10%; and c) very unstable soils on a slope less than 1%.
Comment Mechanical clearing for the purposes of track establishment and construction pads for wind turbine sites will be on stable soils and generally following ridge topography, subject to geo-technical investigations prior to construction. Field investigations of the project area did not detect any unstable soils that could be evidenced by slumps, erosion gullies or tunnel and rill erosion. No evidence was seen of mass soil movement even on sloping land with slopes greater than 30%. The PR can be adequately met by implementing a range of erosion and sediment control measures as well as by selective routing of the road and cable network to take advantage of least sloping land.	

Performance Requirement	Acceptable Solution
PR P.6: Salinity To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes—clearing does not contribute to— <ul style="list-style-type: none"> a) waterlogging; or b) the salinisation of groundwater, surface water or soil. 	<i>AS P.6</i> P.6.1 Where clearing is less than— <ul style="list-style-type: none"> a) 2 hectares; or b) 10 metres wide; clearing does not occur in any discharge area. AND P.6.2 Where clearing is less than— <ul style="list-style-type: none"> a) 5 hectares; or b) 50 metres wide— clearing does not occur— <ul style="list-style-type: none"> i) in any discharge area; and ii) within 200 metres of any discharge area. AND P.6.3 Clearing does not occur in areas greater than 5 hectares
Comment The project area is not identified as a region of salinity hazard. Further, given the elevation above sea level and the hilly topography it is unlikely that salinity in any form will be an issue. Clearing will not occur in any discharge area, or within 200 m of a discharge area.	

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

Performance Requirement	Acceptable Solution
<p>PR P.7: Conserving remnant vegetation that are <i>endangered</i> regional ecosystems and of <i>concern</i> regional ecosystems</p> <p>To regulate the clearing of vegetation in a way that conserves remnant vegetation that are <i>endangered</i> regional ecosystems and of <i>concern</i> regional ecosystems—maintain the current extent of <i>endangered</i> regional ecosystems and of <i>concern</i> regional ecosystems.</p>	<p>AS P.7</p> <p>P.7.1</p> <p>Clearing—</p> <ul style="list-style-type: none"> a) does not occur in an <i>endangered</i> regional ecosystem or an <i>of concern</i> regional ecosystem that is listed in Table 2; and b) in an <i>endangered</i> regional ecosystem or an <i>of concern</i> regional ecosystem that is not listed in Table 2 only occurs where the clearing is less than 10 metres wide or 0.5 hectares.
<p>Comment</p> <p>No <i>endangered</i> remnant regional ecosystems occur in the study area where the wind turbines are to be located. Further, no regional ecosystems listed in Table 2 of the Code will be cleared or affected by the project.</p> <p>Wind turbines are proposed to be located in zones of greatest wind capture capability. This position coincides with the currently mapped <i>of concern</i> vegetation community RE 7.12.57 and is characterised by its landscape occurrence along ridge topography. RE 7.12.57 is not listed in Table 2 of the Code and the clearing will comply with AS S.7.</p> <p>In regard to the conservation status of remnant vegetation however, the current RE mapping incorrectly indicates that RE 7.12.57 (Of Concern) is present along a majority of the ridges south of the existing powerline, and where a number of turbines are proposed to be located. Field surveys identified that RE 7.12.57 is not present in any of the areas mapped. Amended mapping showing the presence of a heterogeneous polygons of RE 7.12.30b/ 7.12.65k (Least Concern) is provided with this report (see attached Appendix D2). Polygons containing the RE 7.12.57 label will therefore be relabelled as RE 7.12.30b / 7.12.65k with a respective proportional representation of each community of 80 / 20 percent.</p> <p>As a result, the proposed clearing complies with relevant outcomes by ensuring that no endangered or of concern regional ecosystems are cleared as a result of the proposal.</p>	

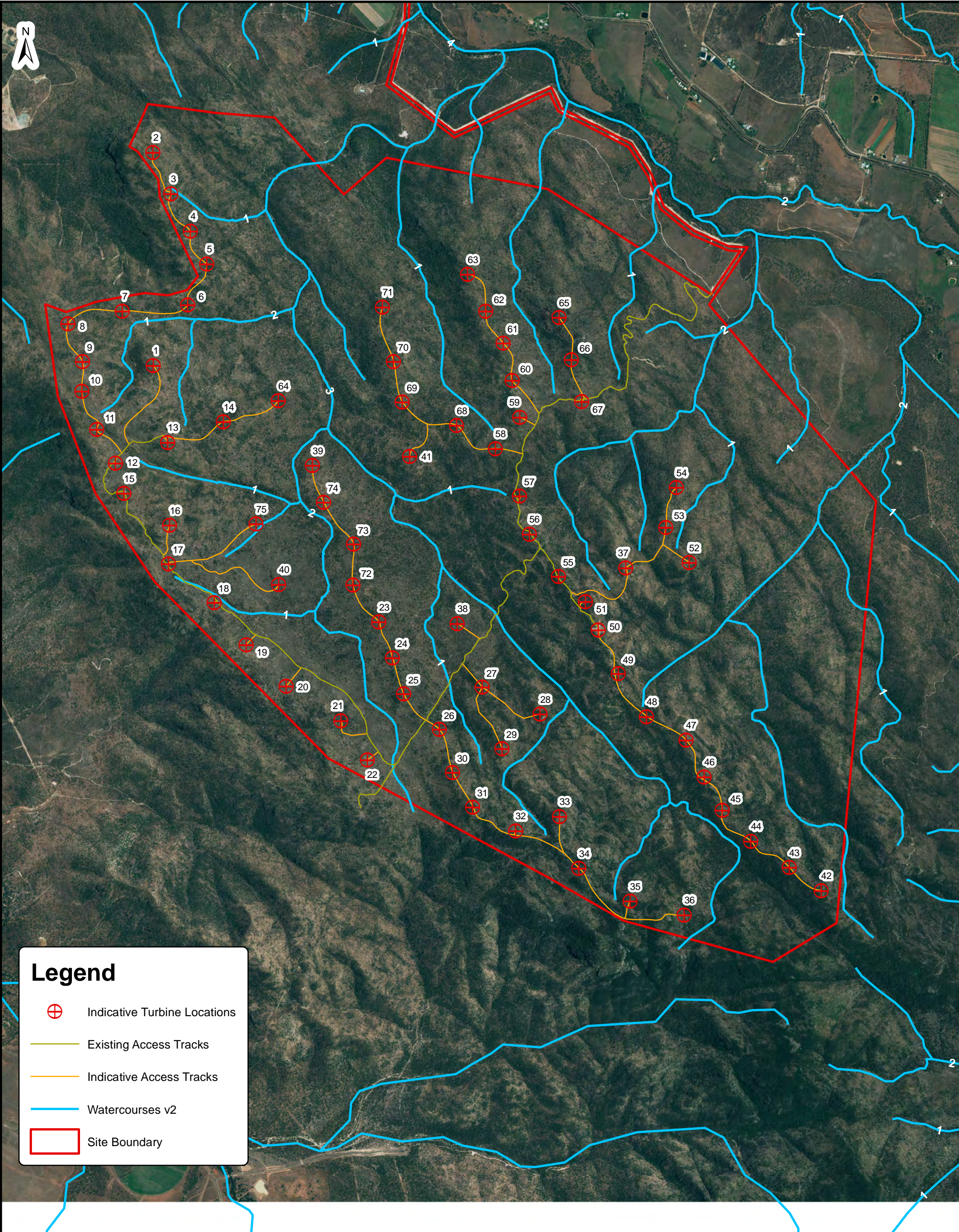
Performance Requirement	Acceptable Solution
<p>PR P.8: Essential habitat</p> <p>To regulate the clearing of vegetation in a way that prevents the loss of biodiversity—maintain the current extent of essential habitat.</p>	<p>AS P.8</p> <p>P.8.1</p> <p>Clearing does not occur in an area shown as essential habitat on the essential habitat map.</p>
<p>Comment</p> <p>Essential habitat for the southern cassowary (<i>Casuarius casuarius johnsonii</i>), and four species of plants is mapped for an area within the southern portion of the project area. Nine turbines are proposed to be established in this habitat zone. Although the habitat zoning for the southern cassowary in this particular area is an ecological anomaly, there is reasonable probability that the four species of plants could occur. It is therefore recommended, that intensive ground searches are made of the proposed turbine sites in this area to detect the presence of conservation significant plants. There may be options to micro-site the turbines in question to similar landscape situations just outside of the area mapped as essential habitat.</p>	

**Compliance Address to Regional Vegetation Management Code for Coastal & Western Bioregions
(Version 2, 6 November 2009)**

Performance Requirement	Acceptable Solution
PR P.9: Conservation status thresholds To regulate the clearing of vegetation in a way that conserves remnant vegetation that are regional ecosystems and prevents the loss of biodiversity—maintain the current extent of regional ecosystems listed in Table 3.	AS P.9 P.9.1 Clearing in a regional ecosystem listed in Table 3, does not occur unless the clearing is less than— a) 10 metres wide; or b) 2 hectares.
Comment No regional ecosystems listed in Table 3 of the Code occur in the project area.	

Performance Requirement	Acceptable Solution
PR P.10: Acid sulfate soils To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes—clearing activities do not result in disturbance of acid sulfate soils or changes to the hydrology of the location that will either— a) aerate horizons containing iron sulfides; or b) mobilise acid and/or metals.	AS P.10 P.10.1 Clearing in land zone 1, land zone 2 or land zone 3 in areas below 5 metre Australian Height Datum— a) is carried out in accordance with an acid sulfate soils environmental management plan as outlined in the <i>State Planning Policy 2/02 Guideline: Planning and Managing Development involving Acid Sulfate Soils</i> ; and b) follows management principles in accordance with the Soil Management Guidelines in the <i>Queensland Acid Sulfate Soil Technical Manual</i> .
Comment Acid Sulfate Soils do not occur in the project area, as the region is at an elevation above sea level of greater than 800 m. The ridge topography and granite / rhyolite geology is not conducive to the development of Acid Sulphate Soils.	

Appendix H2.



Legend

- Indicative Turbine Locations
- Existing Access Tracks
- Indicative Access Tracks
- Watercourses v2
- Site Boundary

<div><div><div>02505007501,000</div><div>Meters (A3)</div></div><div><div>DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.</div><div>REGIONAL ECOSYSTEM VERSION 6 DATA</div><div>DERIVED AERIAL PHOTOGRAPHY.</div><div>Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.</div><div>Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.</div><div>The aerial photography used in this plan has not been rectified. The image has been overlaid as a best fit on the boundaries shown and position is approximate only. Date of Capture: August 2006.</div></div></div>		<div><div>Project Manager</div><div>D. Finney</div><div>Compiled by</div><div>Jeff Middleton</div><div>Map Projection</div><div>MGAz55</div><div>Map Datum</div><div>GDA94</div><div>File Reference</div><div>PR100246-10.mxd</div><div>Sheet Number</div><div>1 of 1</div></div>	<div><div>Client</div><div>Transfield Services</div><div>Title</div><div>Watercourses</div></div>	<div><div><div><div>RPS</div><div>© COPYRIGHT PROTECTS THIS PLAN</div><div>Unauthorised reproduction or amendment not permitted</div><div>Please contact the author.</div></div><div><div>SCALE (A3)</div><div>1:25,000</div></div><div><div>DATE</div><div>10/08/2011</div></div><div><div>DRAWING NO.</div><div>PR100246-9</div></div><div><div>ISSUE</div><div></div></div></div><div><div>RPS Australia East Pty Ltd</div><div>ACN 140 292 762</div><div>135 Abbott St</div><div>PO Box 1949</div><div>CAIRNS QLD 4870</div><div>T +61 7 4031 1336</div><div>F +61 7 4031 2942</div><div>W rpsgroup.com.au</div></div></div>
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Appendix I2.

Provisional Checklist of Flora – Mt Emerald Wind Farm

Scientific Name	Common Name	Form	NCA ¹	EPBC ²
ADIANTACEAE				
<i>Cheilanthes</i> sp. (grey, hirsute pinnae)	Rock Fern	Fern	-	-
<i>Cheilanthes tenuifolia</i>	Rock Fern	Fern	-	-
APOCYNACEAE				
<i>Alyxia spicata</i>	Chain Fruit Vine	Vine	-	-
<i>Hoya australis</i>	Wax Flower	Vine	-	-
ASPARAGACEAE				
<i>Asparagus racemosus</i>	Asparagus Vine	Vine	-	-
ASTERACEAE				
<i>Helichrysum</i> sp.	Bright yellow waxy flowers	Forb	-	-
* <i>Ageratum conyzoides</i>	Bluetop	Forb	-	-
* <i>Crassocephalum crepidioides</i>	Thickhead	Forb	-	-
<i>Cyanthillium cinereum</i>	In report as <i>Vernonia cinerea</i>	Forb		
<i>Glossocardia bidens</i>	Native Cobblers Pegs	Forb	-	-
<i>Helichrysum newcastlianum</i>	Strawflower	Forb	-	-
* <i>Praxelis clematidea</i>	Praxelis	Forb	-	-
<i>Pterocaulon sphacelatum</i>	Ragweed	Forb	-	-
BIGNONIACEAE				
<i>Dolichandrone heterophylla</i>	Lemon Wood	Shrub	-	-
<i>Pandorea pandorana</i>	Wonga Wonga Vine	Vine	-	-
BORYACEAE				
<i>Borya septentrionalis</i>	Resurrection Plant	Forb	-	-
CAPPARACEAE				
<i>Capparis canescens</i>	Wild Orange	Vine	-	-
CARYOPHYLLACEAE				
<i>Polycarpha spirostylis</i>	Copper Plant	Forb	-	-
CASUARINACEAE				
<i>Allocasuarina inophloia</i>	Woolly-barked Oak	Tree	-	-
<i>Allocasuarina littoralis</i>	Black She-oak	Tree	-	-
CELASTRACEAE				
<i>Maytenus cunninghamii</i>	Yellow-berry Bush	Shrub	-	-
<i>Maytenus disperma</i>		Tree	-	-
COMMELINACEAE				
<i>Cartonema spicatum</i>	-	Forb	-	-
<i>Commelina ensifolia</i>	Wandering Jew	Forb	-	-
CONVOLVULACEAE				
<i>Evolvulus alsinoides</i>	Tropical Speedwell	Vine	-	-
<i>Polymeria ambigua</i>	Creeping Polymeria	Vine	-	-
CUPRESSACEAE				
<i>Callitris intratropica</i>	Cypress Pine	Tree	-	-
CYPERACEAE				
<i>Rhynchospora subtenuifolia</i>	Beak Rush	Sedge	-	-

Provisional Checklist of Flora – Mt Emerald Wind Farm

Scientific Name	Common Name	Form	NCA ¹	EPBC ²
<i>Gahnia aspera</i>	Saw Sedge	Sedge	-	-
<i>Scleria brownii</i>	Sedge	Sedge	-	-
DILLENIACEAE				
<i>Hibbertia stirlingii</i>	Guinea Flower	Subshrub	-	-
ERICACEAE				
<i>Monotoca scoparia</i>	Prickly Broom-heath	Shrub	-	-
ERYTHROXYLACEAE				
<i>Erythroxylon ellipticum</i>	Brown Plum	Shrub	-	-
FABACEAE				
<i>Aeschynomene micranthos</i>	-	Forb	-	-
<i>Crotalaria brevis</i>	Rattlepod	Forb	-	-
<i>Crotalaria medicaginea</i>	Trefoil rattlepod	Forb	-	-
<i>Hovea nana</i>	Hovea	Forb	-	-
<i>Indigofera pratensis</i>	Forest Indigo	Subshrub	-	-
<i>Jacksonia thesioides</i>	Dogwood	Shrub	-	-
<i>*Stylosanthes scabra</i>	Stylo	Shrub	-	-
<i>Tephrosia juncea</i>	-	Subshrub	-	-
<i>Tephrosia</i> sp.	-	Subshrub	-	-
HAEMODORACEAE				
<i>Haemodorum coccineum</i>	Blood Root	Forb	-	-
JOHNSONIACEAE				
<i>Tricoryne anceps</i>	Yellow Rush Lily	Forb	-	-
LAMIACEAE				
<i>Clerodendrum floribundum</i>	Lolly Bush	Shrub	-	-
<i>Plectranthus amoenus</i>	-	Forb	V	-
<i>Plectranthus</i> sp.	-	Forb	-	-
LAURACEAE				
<i>Cassytha filiformis</i>	Dodder Laurel	Vine	-	-
LAXMANNIACEAE				
<i>Eustrephus latifolius</i>	Wombat Berry	Vine	-	-
<i>Lomandra filiformis</i>	Mat Rush	Graminoid	-	-
<i>Lomandra</i> sp.	Mat Rush	Graminoid	-	-
<i>Thysanotus tuberosus</i>	Fringe Lily	Forb	-	-
LECYTHIDACEAE				
<i>Planchonia careya</i>	Cocky Apple	Tree	-	-
MALVACEAE				
<i>Hibiscus meraukensis</i>	Wild Rosella	Shrub	-	-
MIMOSACEAE				
<i>Acacia calyculata</i>	Wattle	Shrub	-	-
<i>Acacia flavescens</i>	Red Wattle	Shrub	-	-
<i>Acacia humifusa</i>	Wattle	Shrub	-	-
<i>Acacia leptostachya</i>	Townsville Wattle	Shrub	-	-
<i>Acacia simsii</i>	Sim's Wattle	Shrub	-	-

Provisional Checklist of Flora – Mt Emerald Wind Farm

Scientific Name	Common Name	Form	NCA ¹	EPBC ²
<i>Acacia umbellata</i>	Umbellata wattle	Shrub	-	-
MORACEAE				
<i>Ficus opposita</i>	Sandpaper Fig	Tree	-	-
MYRTACEAE				
<i>Corymbia abergiana</i>	Range Bloodwood	Tree	-	-
<i>Corymbia citriodora</i>	Lemon-scented Gum	Tree	-	-
<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood	Tree	-	-
<i>Corymbia leichhardtii</i>	Leichhardt's Rusty Jacket	Tree	-	-
<i>Eucalyptus cloeziana</i>	Dead Finish	Tree	-	-
<i>Eucalyptus crebra</i>	Narrow-leaf ironbark	Tree	-	-
<i>Eucalyptus granitica</i>	Granite Ironbark	Tree	-	-
<i>Eucalyptus leptophleba</i>	Molly Box	Tree	-	-
<i>Eucalyptus lockyeri</i> subsp. <i>lockyeri</i>	-	Tree	-	-
<i>Eucalyptus pachycalyx</i>	Pumpkin Gum	Tree	-	-
<i>Eucalyptus portuensis</i>	Yellow Stringybark	Tree	-	-
<i>Eucalyptus reducta</i>	Grey Stringybark	Tree	-	-
<i>Eucalyptus shirleyi</i>	Shirley's Silver-leafed Ironbark	Tree	-	-
<i>Homoranthus porteri</i>	-	Shrub	V	V
<i>Lophostemon grandiflorus</i> var. <i>riparia</i>	Northern Swamp Box	Tree	-	-
<i>Melaleuca monantha</i>	Small-leaved Tea Tree	Tree	-	-
<i>Melaleuca nervosa</i>	Paperbark	Tree	-	-
<i>Melaleuca</i> sp.	Hirsute, narrow leaves.	Shrub	-	-
<i>Melaleuca viridiflora</i>	Broad-leaved Paperbark	Tree	-	-
NYMPHAEACEAE				
<i>Nymphoides crenata</i>	Wavy Marshwort	Aquatic	-	-
ORCHIDACEAE				
<i>Dendrobium canaliculatum</i>	Onion Orchid	Orchid	-	-
<i>Thelymitra fragrans</i>	Sun Orchid	Orchid	-	-
PHYLLANTHACEAE				
<i>Breynia oblongifolia</i>	Coffee Bush	Shrub	-	-
<i>Euphorbia mitchellii</i>	-	Forb	-	-
PICRODENDRACEAE				
<i>Petalostigma pubescens</i>	Quinine Bush	Tree	-	-
PITOSPORACEAE				
<i>Bursaria incana</i>	Australian Blackthorn	Shrub	-	-
POACEAE				
<i>Aristida</i> sp.	Wire Grass	Grass	-	-
<i>Aristida utilis</i>	Wire Grass	Grass	-	-
<i>Arundinella setosa</i>		Grass	-	-
* <i>Chloris virgata</i>	Feathertop Rhodes Grass	Grass	-	-
<i>Cymbopogon bombycinus</i>	Silky Oilgrass	Grass	-	-
<i>Dichanthium sericeum</i>	Queensland Bluegrass	Grass	-	-
<i>Eragrostis schultzei</i>	-	Grass	-	-

Provisional Checklist of Flora – Mt Emerald Wind Farm

Scientific Name	Common Name	Form	NCA ¹	EPBC ²
<i>Eragrostis</i> sp.	-	Grass	-	-
<i>Eriachne obtusa</i>	Northern Wanderrie Grass	Grass	-	-
<i>Eriachne rara</i>	Wanderrie Grass	Grass	-	-
<i>Heteropogon contortus</i>	Black Speargrass	Grass	-	-
<i>Heteropogon triticeus</i>	Giant Speargrass	Grass	-	-
* <i>Hyparrhenia rufa</i>	Thatch Grass	Grass		
* <i>Melinis minutiflora</i>	Molasses Grass	Grass		
* <i>Melinis repens</i>	Red Natal Grass	Grass	-	-
<i>Panicum effusum</i>	Hairy Panic	Grass	-	-
<i>Panicum seminudum</i> var. <i>caimsianum</i>	Panic	Grass	-	-
<i>Panicum trichoides</i>	Tropical Panic Grass	Grass	-	-
<i>Perotis rara</i>	Comet Grass	Grass	-	-
Poaceae sp. (similar to <i>Sarga</i>)	-	Grass	-	-
<i>Pseudopogonatherum contortum</i>	-	Grass	-	-
* <i>Setaria</i> sp. (<i>pumila</i> ?)	Pigeon Grass	Grass	-	-
<i>Setaria surgens</i>	Pigeon Grass	Grass	-	-
<i>Schizachyrium pseudeulalia</i>	Firegrass	Grass	-	-
<i>Schizachyrium</i> sp. (10 cm)	Firegrass	Grass	-	-
* <i>Themeda quadrivalvis</i>	Grader Grass	Grass	-	-
<i>Themeda triandra</i>	Kangaroo Grass	Grass	-	-
POLYPODIACEAE				
<i>Drynaria rigidula</i>	Basket Fern	Fern	-	-
PROTEACEAE				
<i>Grevillea dryandri</i>	Dryander's Grevillea	Shrub	-	-
<i>Grevillea glauca</i>	Bushman's clothes-peg	Tree	-	-
<i>Grevillea glossadenia</i>	-	Shrub	V	V
<i>Grevillea mimosoides</i>	Grevillea	Shrub	-	-
<i>Grevillea parallela</i>	Beefwood	Tree	-	-
<i>Hakea lorea</i>	Bootlace Hakea	Tree	-	-
<i>Persoonia falcata</i>	Geebung	Shrub	-	-
<i>Xylomelum scottianum</i>	Woody Pear	Tree	-	-
RHAMNACEAE				
<i>Alphitonia excelsa</i>	Red Ash	Tree	-	-
RUBIACEAE				
<i>Larsenaikia ochreatea</i>	Native Gardenia	Shrub	-	-
<i>Pogonolobus reticulatus</i>	Medicine Bush	Shrub	-	-
SAPINDACEAE				
<i>Dodonaea lanceolata</i>	Hop Bush	Shrub	-	-
<i>Dodonaea</i> sp. (hirsute leaves)	Hop Bush	Shrub	-	-
SCROPHULARIACEAE				
<i>Lindernia</i> sp.	-	Forb	-	-
SPARRMANNIACEAE				
<i>Grewia retusifolia</i>	Dog's Balls	Shrub	-	-

Provisional Checklist of Flora – Mt Emerald Wind Farm

Scientific Name	Common Name	Form	NCA ¹	EPBC ²
TACCACEAE				
<i>Tacca leontopetaloides</i>	Arrowroot		-	-
THYMELAEACEAE				
<i>Wikstroemia indica</i>	Tie Bush	Shrub	-	-
VERBENACEAE				
* <i>Lantana camara</i>	Lantana (Class 3 weed)	Shrub	-	-
XANTHORRHOEACEAE				
<i>Xanthorrhoea johnsonii</i>	Grass Tree		-	-
¹ Conservation status as listed under the <i>Nature Conservation Act 1992</i> : E – Endangered, V – Vulnerable, R – Rare, LC – Least Concern, NT – Near Threatened				
² Conservation status as listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> : E – Endangered, V – Vulnerable				

Appendix J2.

Summary of Vegetation Survey Sites – Mt Emerald Wind Farm

Site	X	Y	Structural Description (field)
1	327347	8099806	Open woodland to woodland 8-15 m of <i>Callitris intratropica</i> and <i>Corymbia leichhardtii</i> interspersed with ± bare rock pavements.
2	327647	8099786	Woodland to open woodland 8-12 m of <i>Eucalyptus shirleyi</i> and <i>Callitris intratropica</i> with <i>E. cloeziana</i> on rolling hills.
3	326509	8100269	Woodland of <i>Eucalyptus crebra</i> and <i>Corymbia citriodora</i> to 10 – 12 m on relatively uniform surface.
4	326318	8100418	Low woodland to open woodland of <i>Eucalyptus shirleyi</i> to 4 – 5 m on stony rises.
5	325995	8100652	Woodland of <i>Eucalyptus crebra</i> to 8 – 10 m on rocky surfaces of brow of hill.
6	325837	8100892	Woodland of <i>Eucalyptus cloeziana</i> and <i>Corymbia citriodora</i> to 8 – 10 m on uneven ground with rocky soils.
7	327767	8099522	Low woodland of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> to 5 m on rocky, uneven surfaces.
8	327898	8099717	Woodland of <i>Callitris intratropica</i> to 8 m on stony and rocky soils.
9	328075	8099984	Woodland of <i>Corymbia leichhardtii</i> and <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> to 10 m on very rocky surfaces.
10	328242	8100193	Woodland of <i>Eucalyptus shirleyi</i> to 5 m on rocky surfaces.
11	328302	8100280	Woodland of <i>Eucalyptus crebra</i> to 12 m on sloping ground.
12	328385	8100444	Woodland of <i>Corymbia leichhardtii</i> and <i>Eucalyptus granitica</i> to 10 – 12 m on sloping ground with rocky surfaces.
13	328370	8100603	Woodland to open forest of <i>Eucalyptus cloeziana</i> and <i>Corymbia citriodora</i> to 15 m on side of rocky hill.
14	328570	8100763	Woodland of <i>Eucalyptus portuensis</i> to 8 m on rocky hill slope approaching ridge.
15	328589	8100961	Mixed woodland of <i>Corymbia abergiana</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Corymbia citriodora</i> and <i>Eucalyptus shirleyi</i> on ridge with pale soils and scattered surface rocks (with small areas of rock pavement).
16	328478	8101240	Woodland of <i>Eucalyptus cloeziana</i> and <i>E. portuensis</i> with <i>Callitris intratropica</i> to 8 m on ridge with pale, rocky soils.
17	329787	8099439	Low open woodland to woodland of <i>Eucalyptus portuensis</i> and <i>Allocasuarina littoralis</i> to 4 m.
18	329906	8099181	Low woodland of <i>Corymbia abergiana</i> and <i>Eucalyptus portuensis</i> to 5-6 m on broad ridge with pale, sandy soil.
19	330038	8098936	Low woodland of <i>Corymbia abergiana</i> and <i>Eucalyptus portuensis</i> to 4-5 m on broad ridge.
20	330283	8098692	Open forest of <i>Callitris intratropica</i> to 8 – 10 m on ridge.
21	330541	8098500	Woodland to open forest to 14 m of <i>Eucalyptus reducta</i> and <i>Corymbia citriodora</i> on flat top ridge.
22	330819	8098275	Rock pavement at terminus of ridge with sparse vegetation cover limited to scattered trees of <i>Corymbia citriodora</i> and single <i>Eucalyptus</i> sp. to 4 m.
23	327477	8098833	Shrubland to low woodland 4-8 m of <i>Acacia leptostachya</i> (thickets), <i>Eucalyptus portuensis</i> and <i>E. cloeziana</i> on western edge of ridge.
24	327148	8099089	Open woodland to 8 m of <i>Eucalyptus portuensis</i> with <i>Allocasuarina inophloia</i> on colluvial slope.
25	327148	8099347	Small rock pavement surrounded by low woodland of <i>Eucalyptus portuensis</i> to 6 m.
26	327062	8099605	Rock pavement fringed by shrubland of <i>Acacia leptostachya</i> to 4-5 m.
27	328342	8100388	Woodland 12 m of <i>Eucalyptus portuensis</i> , <i>Callitris intratropica</i> adjacent to ephemeral watercourse.
28	327968	8099949	Open woodland 6 m of <i>Lophostemon grandiflorus</i> , <i>Callitris intratropica</i> with grassy understorey on rocky, ephemeral stream.

Site	X	Y	Structural Description (field)
29	330878	8099138	Open woodland to 4 m of <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>E. lockyeri</i> subsp. <i>exuta</i> on outcropping rhyolite – many bare rock areas and fissures.
30	330732	8099400	Woodland to 6 m of <i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> , <i>C. abergiana</i> .
31	330708	8099679	Woodland to 14 m of <i>Eucalyptus portuensis</i> , <i>E. crebra</i> (sens. lat.), <i>Corymbia citriodora</i> .
32	330302	8099941	Fringing open woodland to 14 m of <i>Lophostemon grandiflorus</i> , <i>Callitris intratropica</i> , (<i>Corymbia dallachiana</i>) along rocky ephemeral creek in ravine.
33	330362	8099490	Fringing open woodland to 10 m of <i>Lophostemon grandiflorus</i> , <i>Callitris intratropica</i> along rocky ephemeral creek at upper reaches of ravine.
34	330476	8098995	Woodland to 15 m of <i>Callitris intratropica</i> with <i>Lophostemon grandiflorus</i> lining rocky banks of ephemeral creek in ravine.
35	327680	8099056	Sparse, open woodland to 5 m of <i>Lophostemon grandiflorus</i> , <i>Eucalyptus shirleyi</i> along shallow, rocky ephemeral stream.
36	329980	8098454	Open woodland to 10 m of <i>Lophostemon grandiflorus</i> , <i>Melaleuca viridiflora</i> , <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , (<i>E. portuensis</i>), <i>E. cloeziana</i> lining rocky, lower order ephemeral stream.
37	330738	8098294	Very sparse, low open woodland (scattered trees) to 4 m of <i>Corymbia citriodora</i> , (<i>C. abergiana</i>), <i>Eucalyptus granitica</i> , <i>E. lockyeri</i> subsp. <i>exuta</i> on rock pavement.
38	330492	8098502	Woodland to 12 m of <i>Eucalyptus reducta</i> and <i>E. portuensis</i> on narrow ridge.
39	330212	8098691	Woodland to 12 m of <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> , <i>Eucalyptus granitica</i> on rounded (broad) ridge.
40	329982	8098921	Sparse low open woodland to 5 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>E. portuensis</i> , <i>Callitris intratropica</i> on skeletal soils in mosaic of rock pavements and outcropping rhyolite.
41	329821	8099168	Low woodland to 5 m of <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> on rocky ridge.
42	329730	8099436	Low woodland to 3.5 m of <i>Corymbia abergiana</i> , <i>Allocasuarina littoralis</i> on outcropping rhyolite on narrow ridge.
43	329402	8099648	Woodland to 10 m of <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> , <i>E. portuensis</i> on broad ridge.
44	329199	8099948	Low open woodland to 4 m of <i>Corymbia abergiana</i> , <i>Eucalyptus portuensis</i> , <i>E. shirleyi</i> , <i>E. granitica</i> on skeletal soil with much surface rock with small areas of rock pavement.
45	328958	8101923	Open woodland to 6 m of <i>Corymbia citriodora</i> , <i>Corymbia leichhardtii</i> , <i>Eucalyptus portuensis</i> , (<i>E. shirleyi</i>) on stony soil.
46	329250	8102478	Woodland to 12 m of <i>Eucalyptus portuensis</i> around outcropping rhyolite on rocky soils.
47	329481	8102556	Woodland to 10 m of <i>Eucalyptus portuensis</i> , <i>E. granitica</i> , <i>E. crebra</i> (sens lat.) around outcropping rhyolite.
48	328888	8102236	Rock pavement fringed by low woodland to 4-5 m. <i>Eucalyptus portuensis</i> , (<i>Callitris intratropica</i> : 6-8 m), <i>Jacksonia thesioides</i> , <i>Acacia flavescens</i> , <i>Xanthorrhoea johnsonii</i> , <i>Allocasuarina littoralis</i> .
49	328495	8101250	Woodland 6-10 m, <i>Eucalyptus portuensis</i> , <i>Callitris intratropica</i> , <i>Xanthorrhoea johnsonii</i> , <i>Themeda triandra</i> , <i>Jacksonia thesioides</i> , <i>Grevillea glauca</i> , <i>Eucalyptus shirleyi</i> , <i>Grevillea glossadenia</i> (1 specimen), <i>Corymbia abergiana</i> .
50	328574	8100955	Sparse low woodland/rock pavement. <i>Callitris intratropica</i> to 5 m, (<i>Corymbia leichhardtii</i>), <i>Xanthorrhoea johnsonii</i> , <i>Acacia umbellata</i> , <i>Grevillea glossadenia</i> alongside track, <i>E. shirleyi</i> , <i>Grevillea striata</i> , <i>Melaleuca viridiflora</i> (narrow leaf).
51	328775	8100683	Woodland 6-8 m. <i>Eucalyptus portuensis</i> , <i>Corymbia abergiana</i> , <i>C. citriodora</i> , <i>Xanthorrhoea johnsonii</i> , <i>Jacksonia thesioides</i> , <i>Persoonia falcata</i> , <i>Themeda triandra</i> , <i>Capparis</i> sp., <i>Acacia calyculata</i> , <i>Grevillea glossadenia</i> (several specimens on edge of track).
52	329045	8100451	Woodland 6-8m (10m max <i>Corymbia citriodora</i>), <i>Eucalyptus portuensis</i> , <i>Heteropogon triticeus</i> , <i>Arundinella setosa</i> , <i>Themeda triandra</i> , <i>Persoonia falcata</i> , <i>Grevillea glossadenia</i> (nearby), <i>Xanthorrhoea johnsonii</i> , (<i>Corymbia abergiana</i>), <i>Mnesithea rottboellioides</i> .
53	329102	8100252	<i>Grevillia glossadenia</i> seedlings responding to disturbance at cleared pad for wind monitoring tower. Surrounding low, open woodland of <i>Eucalyptus portuensis</i> to 3 m.

Site	X	Y	Structural Description (field)
54	328548	8101660	Woodland 10-12 m. <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> sub-dominant, <i>Heteropogon triticeus</i> , <i>Arundinella setosa</i> , <i>Themeda triandra</i> . Shrub layer very sparse to absent.
55	328512	8101484	Woodland 8-12 m. <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> , <i>E. portuensis</i> , (<i>Callitris intratropica</i>), <i>Xanthorrhoea johnsonii</i> , <i>Grevillea dryandri</i> , <i>Themeda triandra</i> , (<i>E. shirleyi</i>) - near ecotone of previous survey, <i>Persoonia falcata</i> , <i>Jacksonia thesioides</i> .
56	328449	8101263	Woodland 10-12 m. <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> , <i>Heteropogon triticeus</i> , <i>Arundinella setosa</i> , <i>Themeda triandra</i> . Shrub layer very sparse to absent.
57	329076	8100278	Cleared wind monitoring tower with two species of introduced <i>Senna</i> at cleared pad for wind monitoring tower near turbine 50. Other species of weeds recently introduced and forming dominant ground cover.
58	328385	8100606	Woodland 10-14 m on brow of steep slope. <i>Corymbia citriodora</i> , (<i>Eucalyptus granitica</i>), <i>Eucalyptus cloeziana</i> , <i>Corymbia</i> sp. (<i>clarksoniana</i> ?), (<i>C. abergiana</i>), <i>Xanthorrhoea johnsonii</i> , <i>Themeda triandra</i> , <i>Panicum</i> sp. <i>Eucalyptus portuensis</i> .
59	328267	8100215	Open woodland to 6m with emergent <i>Callitris intratropica</i> 8-10 m. Sparse <i>Eucalyptus shirleyi</i> , <i>Callitris intratropica</i> , <i>Xanthorrhoea johnsonii</i> , <i>Corymbia leichhardtii</i> , <i>Persoonia falcata</i> .
60	328142	8100081	Woodland to 6 m. <i>Eucalyptus shirleyi</i> , <i>Corymbia leichhardtii</i> , (<i>E. lockyeri</i> subsp. <i>exuta</i>), <i>Acacia umbellata</i> forming dominant shrub layer/thicket to 1.5 m - thicket dead. Rat's Tail Grass (<i>Sporobolus</i> sp.) - 1.8 m tall ~12 individuals on edge of track.
61	327931	8099910	Low open woodland to 2-4 m. (<i>Callitris intratropica</i>), <i>Eucalyptus shirleyi</i> , <i>Acacia umbellata</i> (dead), <i>Melaleuca monantha</i> , <i>Xanthorrhoea johnsonii</i> , <i>Corymbia leichhardtii</i> , <i>Themeda triandra</i> , <i>Schizachyrium</i> sp., mosaic of rock pavement.
62	329524	8098132	Rock pavement with low shrubland to 1.5-2 m of \pm <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , \pm <i>E. portuensis</i> , \pm <i>Corymbia abergiana</i> .
63	329486	8098125	Woodland to 15-18 m of <i>Eucalyptus portuensis</i> , <i>E. granitica</i> .
64	329079	8098280	Broad drainage depression with open forest to 15-18 m of <i>Corymbia intermedia</i> , <i>Eucalyptus portuensis</i> , +/- <i>Allocasuarina littoralis</i> , +/- <i>E. drepanophylla</i> .
65	329121	8098281	Thicket of <i>Homoranthus porteri</i> (in flower) on areas of bare rock. Scattered <i>Grevillea glossadenia</i> .
66	329104	8098298	Rock pavement in shallow saddle of relatively narrow ridge. <i>Homoranthus porteri</i> and <i>Grevillea glossadenia</i> nearby. Precipitous near vertical drop off immediately to north. Low shrubland to 1.8m. The vegetation on the south side of saddle grades into shallow valley.
67	328972	8098531	Woodland to open forest to 10-15 m on sheltered side of large rocky knoll of <i>Eucalyptus portuensis</i> , <i>Allocasuarina littoralis</i> , +/- <i>Corymbia abergiana</i> .
68	328990	8098552	Rocky knoll of outcropping rhyolite with shrubland to 2 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>E. granitica</i> .
69	330870	8099131	Low woodland to 5 m on ridge <i>Eucalyptus portuensis</i> , <i>Corymbia abergiana</i> , <i>Acacia calyculata</i> , <i>Allocasuarina littoralis</i> , +/- <i>Eucalyptus granitica</i> , +/- <i>Corymbia citriodora</i> .
70	330821	8099124	Woodland to open forest on sheltered western side of ridge to 15 m of <i>Corymbia citriodora</i> , <i>Eucalyptus cloeziana</i> .
71	330741	8099385	Ridge approximately 20-30 m wide. Woodland to 8-10 m of <i>Corymbia citriodora</i> , <i>Eucalyptus portuensis</i> , <i>E. shirleyi</i> , <i>Lophostemon suaveolens</i> , <i>E. granitica</i> , <i>C. abergiana</i> , <i>E. drepanophylla</i> .
72	330723	8099676	Sloping rock pavement with short grasses. Broad ridge half way up the hill. Northerly aspect. Outside of pad - surrounding woodland to 8 m of <i>E. drepanophylla</i> , <i>Corymbia leichhardtii</i> , <i>E. shirleyi</i> , <i>C. intermedia</i> , <i>C. citriodora</i> , <i>E. granitica</i> , <i>E. lockyeri</i> subsp. <i>exuta</i> .
73	329659	8101299	Outcropping rhyolite with surrounding low open woodland to 4-6 m of <i>E. portuensis</i> , <i>E. shirleyi</i> , <i>Corymbia leichhardtii</i> , <i>Melaleuca monantha</i> (poorly defined fringe around outer edge of knoll), +/- <i>E. lockyeri</i> subsp. <i>exuta</i> .
74	329619	8101299	<i>Pouteria sericea</i> , <i>Alyxia spicata</i> , <i>Antidesma</i> sp. <i>Asparagus racemosus</i> , <i>Scleria brownii</i> . <i>Hibiscus meraukensis</i> , * <i>Melinis repens</i> , <i>Euroschinus falcata</i> , <i>Larsenaikia ochreatea</i> , <i>Callitris intratropica</i> .
75	329657	8101352	Cleared open area surrounded by open woodland to woodland to 8 m of <i>Callitris</i>

Site	X	Y	Structural Description (field)
			<i>intratropica</i> , <i>Corymbia leichhardtii</i> , <i>Melaleuca monantha</i> .
76	329581	8101006	Open woodland to 5-8 m of <i>E. cloeziana</i> , <i>Callitris intratropica</i> , <i>Corymbia leichhardtii</i> , <i>C. abergiana</i> , <i>E. shirleyi</i> .
77	329738	8100745	Rock pavement with knoll with surrounding low woodland to 4-5 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Corymbia abergiana</i> , <i>Callitris intratropica</i> , <i>C. leichhardtii</i> , <i>E. shirleyi</i> , <i>E. portuensis</i> , <i>Alphitonia excelsa</i> .
78	328964	8101930	Woodland to 4-5 m of <i>Corymbia leichhardtii</i> in mosaic of rhyolite rock pavements and exposed rock. (<i>Corymbia citriodora</i>), <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> . T2 (<i>Callitris intratropica</i>), <i>Corymbia leichhardtii</i> .
79	328506	8101239	Woodland to 6 m of <i>Eucalyptus portuensis</i> . T2 (<i>Callitris intratropica</i>), <i>E. portuensis</i> , <i>Corymbia abergiana</i> , (<i>Petalostigma pubescens</i>), (<i>E. lockyeri</i> subsp. <i>exuta</i>).
80	328773	8100681	Low woodland to 4-6 m of <i>Corymbia abergiana</i> (50% PFC). S1 <i>Xanthorrhoea johnsonii</i> . G: <i>Grevillea glossadenia</i> , <i>Jacksonia thesioides</i> .
81	328507	8101817	Open woodland to 4-5 m of <i>Eucalyptus granitica</i> , <i>Corymbia leichhardtii</i> . T2 <i>C. leichhardtii</i> , <i>Callitris intratropica</i> , <i>Allocasuarina littoralis</i> , <i>Grevillea glauca</i> , <i>Maytenus disperma</i> .
82	328492	8101845	Woodland to 8 m of <i>Callitris intratropica</i> on rock pavement. S1 & G not recorded.
83	327600	8099074	Low open woodland to 3 m of <i>Eucalyptus shirleyi</i> on uniform surface with patchy rock pavements. (<i>Callitris intratropica</i>), (<i>Corymbia leichhardtii</i>)
84	327915	8099518	Low open woodland to 5 m on rhyolite rock pavement of <i>Callitris intratropica</i> . T1 <i>Callitris intratropica</i> , <i>Corymbia leichhardtii</i> , (<i>Eucalyptus lockyeri</i> subsp. <i>exuta</i>), (<i>E. granitica</i>).
85	328029	8099220	Low woodland to 3-4 m of <i>Eucalyptus portuensis</i> , (<i>Corymbia abergiana</i>), <i>Eucalyptus granitica</i> , <i>E. lockyeri</i> subsp. <i>exuta</i> , <i>E. shirleyi</i> .
86	328146	8098962	Low woodland to 4-5 m of <i>Eucalyptus portuensis</i> and <i>Corymbia abergiana</i> on rollover of broad ridge with stony soils.
87	328166	8098970	Low sparse shrubland/scattered trees to 2.5 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Melaleuca</i> sp. (fine leaves), <i>Acacia calyculata</i> , <i>Xanthorrhoea johnsonii</i> . <i>Homoranthus porteri</i> and <i>Grevillea glossadenia</i> (poss. eastern limit of <i>H. porteri</i>).
88	328247	8098844	Woodland to 15 m of <i>Eucalyptus cloeziana</i> in west running broad gully.
89	328425	8098766	Low open woodland to 3-4 m of <i>Eucalyptus portuensis</i> , (<i>Corymbia abergiana</i>) on ridge with outcropping rhyolite.
90	328562	8098721	Woodland to open forest to 14 m of <i>Eucalyptus reducta</i> on wide ridge.
91	328450	8102087	Open woodland to 6-8 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Corymbia abergiana</i> , <i>C. citriodora</i> , (<i>Callitris intratropica</i>). T2 <i>E. granitica</i> , <i>Allocasuarina littoralis</i> , <i>Grevillea glauca</i> , <i>Callitris intratropica</i> , (<i>E. shirleyi</i>).
92	328367	8102383	Rock pavement with fringing woodland to 10 m of <i>Callitris intratropica</i> .
93	328384	8102361	Low open woodland to 5-6 m of <i>Corymbia leichhardtii</i> and <i>Callitris intratropica</i> on pale rocky soil. G: <i>Acacia calyculata</i> .
94	328250	8102610	Rock pavement with surrounding open woodland to 6-8 m of <i>Callitris intratropica</i> , <i>Corymbia leichhardtii</i> , (<i>Eucalyptus lockyeri</i> subsp. <i>exuta</i>).
95	328123	8102866	Woodland to 8-10 m of <i>Eucalyptus portuensis</i> , <i>Corymbia leichhardtii</i> and <i>Callitris intratropica</i> on saddle.
96	326730	8101936	Woodland to 15 m of <i>Eucalyptus portuensis</i> and <i>Corymbia citriodora</i> , (<i>E. cloeziana</i>). T2: <i>E. granitica</i> , <i>Hakea lorea</i> , <i>Callitris intratropica</i> , <i>Cycas media</i> , <i>E. portuensis</i> .
97	328030	8103067	Rock pavement with very sparse low woodland to 3-4 m of <i>Eucalyptus shirleyi</i> , <i>Callitris intratropica</i> , <i>Maytenus disperma</i> , <i>Larsenaikia ochreata</i> , <i>Eucalyptus portuensis</i> . G: <i>Arundinella setosa</i> , <i>Themeda triandra</i> , <i>Jacksonia thesioides</i> .
98	328501	8101480	Woodland to 15 m of <i>Eucalyptus cloeziana</i> and <i>Corymbia citriodora</i> , (<i>Eucalyptus portuensis</i>), (<i>Callitris intratropica</i>).
99	328368	8101559	Woodland to 10-12 m of <i>Eucalyptus cloeziana</i> , <i>E. crebra</i> , <i>E. granitica</i> , <i>E. reducta</i> , <i>Corymbia leichhardtii</i> , (<i>Callitris intratropica</i>).

Site	X	Y	Structural Description (field)
100	328383	8101589	Rock pavement with very sparse woodland to 8 m of <i>Eucalyptus crebra</i> , <i>E. granitica</i> and <i>Corymbia citriodora</i> .
101	328335	8101612	Rock pavement with sparse woodland to 7 m of <i>Callitris intratropica</i> .
102	328019	8101756	Series of elevated rock pavements with isolated trees to 2-3 m of <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> , <i>Callitris intratropica</i> and thickets of <i>Homoranthus porteri</i> .
103	327829	8101815	Woodland to 15-18 m of <i>Eucalyptus cloeziana</i> and <i>Corymbia citriodora</i> . Low shrublayer of <i>Jacksonia thesioides</i> .
104	327636	8101937	Woodland to 8-10 m of <i>Eucalyptus cloeziana</i> , <i>Corymbia leichhardtii</i> , <i>E. portuensis</i> , <i>Callitris intratropica</i> , (<i>E. crebra</i>), (<i>C. intermedia</i>)
105	327628	8101956	Rock pavement with possible <i>Plectranthus amoenus</i> . Trees more or less absent.
106	327578	8102225	Rock pavement mosaic with isolated and widely scattered trees of <i>Callitris intratropica</i> .
107	327508	8102611	Rhyolite monolith with no woody vegetation community. Scattered occurrences of <i>Arundinella setosa</i> , <i>Themeda triandra</i> and stunted <i>Callitris intratropica</i> in cracks and on small ledges.
108	327374	8102874	Open woodland to 6 m of <i>Eucalyptus shirleyi</i> , <i>Callitris intratropica</i> , <i>E. portuensis</i> , <i>Corymbia leichhardtii</i> , <i>E. granitica</i> .
109	327150	8103108	Open woodland to 10-12 m of <i>Callitris intratropica</i> , <i>Corymbia leichhardtii</i> , <i>Eucalyptus crebra</i> , <i>E. shirleyi</i> .
110	327096	8103393	Woodland to 12 m of <i>Callitris intratropica</i> , <i>Eucalyptus crebra</i> , (<i>E. portuensis</i>).
111	328773	8100681	Woodland to 4-6 m of <i>Corymbia abergiana</i> , (<i>C. citriodora</i>), <i>Eucalyptus granitica</i> , <i>E. portuensis</i> .
112	328841	8100679	Rock pavement with isolated low shrubs to 1.2 m of <i>Eucalyptus granitica</i> and <i>Acacia umbellata</i> .
113	329015	8100299	Woodland to open forest to 18-20 m of <i>Eucalyptus reducta</i> and <i>Corymbia citriodora</i> .
114	329036	8100415	Woodland to open forest to 18-20 m of <i>Eucalyptus reducta</i> and <i>Corymbia citriodora</i> .
115	329040	8100460	Woodland to 6-8 m of <i>Eucalyptus portuensis</i> , (<i>E. reducta</i>), (<i>Corymbia citriodora</i>).
116	329091	8100198	Rock pavement with scattered low shrubs to 1.8 m and surrounded by woodland of <i>Eucalyptus reducta</i> to 12 m.
117	329091	8100198	Rock pavement mosaic and outcropping rhyolite with very sparse, low woodland to 3 m of scattered trees of <i>Eucalyptus shirleyi</i> , <i>Corymbia abergiana</i> , <i>E. portuensis</i> , <i>E. granitica</i> , <i>Maytenus disperma</i> . S1: <i>Grevillea glossadenia</i> , <i>Xanthorrhoea johnsonii</i> .
118	329182	8099995	Rock pavement with very sparse, low shrubland of scattered shrubs of <i>Eucalyptus portuensis</i> , <i>Acacia calyculata</i> , <i>Grevillea glossadenia</i> , <i>E. shirleyi</i> , <i>Xanthorrhoea johnsonii</i> , <i>Persoonia falcata</i> .
119	325803	8103785	Low woodland to 5 m of <i>Corymbia citriodora</i> and <i>Eucalyptus reducta</i> . S1: <i>Xanthorrhoea johnsonii</i> , <i>Eucalyptus reducta</i> , <i>E. shirleyi</i> . G: <i>Themeda triandra</i> .
120	325956	8103457	Low shrubland to 1.2 m of <i>Eucalyptus reducta</i> with <i>Xanthorrhoea johnsonii</i> . Scattered juvenile regrowth of <i>E. shirleyi</i> on ridge. Adjacent slopes with woodland to 6 m of <i>E. crebra</i> , <i>Corymbia citriodora</i> . Scattered <i>Xanthorrhoea johnsonii</i> . G: <i>Themeda triandra</i> .