Appendix 13

Fauna Survey Summary and Ecological Assessment Report (R67966)

Prepared by RPS

Ecological Assessment Report

Springmount Wind Farm, Arriga

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Report No: PR100246/R67966
Version/Date: Draft /July 2010

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Quality Assurance Statement

			Approved for Issue	
Revision No.	**Author**	**Reviewer**	**Signature**	**Date**
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Appendices

1 Introduction

RPS (Cairns) Australia East Pty Ltd (RPS) was engaged to undertake ecological studies for the proposed Springmount Wind farm to support regulatory approvals for the proposed project.

This report outlines the principal environmental characteristics of a number of sites on which a wind farm comprising 74 wind turbines is proposed to be established at Arriga, west of the township of Walkamin in north Queensland. The study area in which these sites are bounded is shown in **Appendix A**.

The report considers a range of environmental matters, primarily fauna, vegetation and flora, and species of conservation significance listed under State and Commonwealth environmental legislation. All the turbines are proposed to be located in remnant vegetation, as defined under the *Vegetation Management Act 1999*[1].

1.1 Scope of Work

The following scope of work was identified and forms the purpose of the field assessment and the broad content of this report.

Flora Assessment

- Identification of the common flora species that are representative at a range of sites within the study area;
- Classification of conservation significant species as identified under the *Nature Conservation Act 1992* (NC Act) and the *Environmental Protection and Biodiversity Act 1999* (EPBC Act);
- Preliminary significance assessment of the impact of the project on any endangered, vulnerable or rare flora species listed under the NC Act and EPBC Act which occur within the study area; and identification of mitigation measures;
- Review of regional ecosystem mapping and remnant vegetation classification for the project area, and its relevance in terms of the *Vegetation Management Act 1999:* and
- Presence and identification of any declared or environmental weeds within the study area.

Fauna Assessment

- Identification of the actual presence of the fauna species within the study area;
- Identification of fauna species likely to inhabit the study area;
- Classification of the species identified under the NC Act and the EPBC Act; and
- A preliminary significance assessment of the impact to any actual or potential fauna species that may occur within the study area; and identification of mitigation measures.

[1] Remnant vegetation refers to the definition for such as cited under Queensland's *Vegetation Management Act 1999*, which broadly describes plant communities in relation to their height, percentage canopy cover and underlying geology or soil formation.

1.2 Project Area Location and Description

Seventy-four wind turbines are proposed to be located in the rural area of Arriga, which is located in the northern portion of the Atherton Tablelands in north Queensland. A substation is proposed at the base of the eastern flank of the ranges, into which power generated by the wind farm will feed into the main electricity grid. The location (the study area) of the wind farm and the proposed position of wind turbines is shown in **Appendix A**.

The project area sits atop a series of dissected granitic and rhyolite ridges, rising 750 to 950 metres in elevation, culminating in Walsh's Bluff at the northern end of the site. The entire area where the wind farm is proposed to be established supports several types of remnant vegetation, with the greatest diversity in the southern end of the project area, where the Einasleigh Uplands and the Wet Tropics bioregions join. These vegetation types and the broader project area are considered to have high natural integrity with evidence of gross disturbance and modification.

Surrounding land outside of the project area and at lower elevations is characterised by intensive agricultural uses, including sugar cane production, grazing and a range of cropping enterprises. Turbines are not proposed to be located on any of these land use types.

The 74 wind turbine sites that have been identified on a preliminary basis will occupy small footprints of land connected by a network of underground cabling, the disturbance footprint of which will also serve as access tracks for construction and future maintenance.

Preliminary designs are for wind turbines with a total height (including the rotor) of 100 metres. Each turbine is estimated to occupy a cleared footprint of land of 20 x 40 metres where clearing is constrained and requires being limited in extent (i.e. adjacent to sensitive environments); or 30 x 40 metres where space allows (i.e. in less sensitive environments).

The preliminary road and underground cabling layout which connects each turbine and allows for access between sites will require a cleared width of approximately 10 metres for the construction stage, with an expected decrease in width through natural vegetation succession after construction is completed to 5 metres. These tracks will be required to be left clear of vegetation to allow for future maintenance of the project. The preliminary road and cabling network is shown in **Appendix A**.

Existing built infrastructure in the study area comprises a high voltage electrical transmission corridor that passes through the project area in an approximate southwest direction towards Oaky Creek. This corridor is maintained free of vegetation and forms the primary access route into the site.

2 Methods

The methods adopted for completing the study 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.

2.1 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™;
- *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 10km 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 known 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 Bioregions*. The 'Performance Requirements' of this code (as issued under the *Vegetation Management Act 1999*) were addressed and interpreted for their relevance to the project; and
- Other databases containing relevant species information, including Birdata (web version of Birds Australia's New Atlas of Australian Birds) and the International Union for the Conservation of Nature (IUCN) Red List

- Literature review. A range of scientific papers and other literature were reviewed for a number of related matters.

The pre-survey desktop study also allowed for a preliminary assessment of potential impacts on significant flora species and vertebrate fauna populations and habitats within the area, and the determination of appropriate survey sites based on available mapping, habitat types and other relevant information, which were later refined in the field.

A list of vertebrate fauna species previously recorded within the site, and those predicted to occur within the area, was also collated prior to the commencement of field work.

2.2 Field Survey

2.2.1 Survey Timing

The ecological assessment of the Springmount Wind farm (herein referred to as the survey) was undertaken over a five day period, including four night's nocturnal survey for fauna, and Anabat survey (bats), between 10th and 14th of May 2010, representing a late wet season survey. It should be noted that at the time of survey, most of the ephemeral and seasonal water courses were dry, with the exception of a small ephemeral creek located at the camp site (Granite Creek), which was found to contain some water at the time of the survey. Therefore, Granite Creek was considered an important survey site and habitat representation, signifying the only natural source of freshwater within the study area.

It should also be noted that this ecological assessment was carried out during only one season, and in one year. Complete ecological surveys often require multiple surveys, at different times of year, and over a period of a number of years, to enable full survey of all species present. However, the field survey has been complemented with information from other sources, as described in Section 2.1, and the area would not be expected to exhibit major variability from year to year.

2.2.2 Survey Methodology

The field assessment was undertaken by two ecologists to record the ecological character of the study area, and to search for conservation significant species (flora and fauna). Elements of this survey included:

- Establishing the relevance of the regional ecosystem (RE) mapping of 'remnant' vegetation communities, the associated description of these communities, and their positional accuracy in relation to the mapping and their context in the landscape;
- The compilation of a provisional floristic checklist of vascular plants occurring within the study area, with specific emphasis placed on the floristic composition of representative vegetation communities affected by the 'footprint' of the wind turbines;
- Trapping survey and random meander foot traverses to detect the presence of fauna through recording vocalisations, visual sightings, and interpretation of fauna signs such as scats, tracks and other presence indicators; and
- An appraisal of the habitat qualities for fauna as well as habitat suited to supporting plants. Emphasis was placed on specific habitat niches for conservation significant flora and fauna, focusing on microchiropteran bats and birds. The appraisal also extended to an intuitive and qualitative assessment of structural and ecological qualities of vegetation and other landscape features.

2.2.3 Fauna Survey Methods

Fauna searches were conducted at 24 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 1**). Terrestrial trapping stations were established at six sites, including pitfall traps, Elliott traps and hair tubes, targeting terrestrial fauna species potentially occurring in the area.

Across the site, a variety of survey techniques were used to provide as comprehensive a coverage of species as possible within the scope and timeframe of the project. 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).

Field surveys included:

- *Pitfall Trapping*

  - 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 drift fencing, also dug into the ground (400 mm high).
  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.

- *Elliott Trapping*:

  - 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 10m apart. These lines were installed approximately 20m 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 (3) consecutive days/nights, with the exception of Site 67. Elliott traps at this site were open for two (2) consecutive nights.

- *Funnel Trapping*:

  - 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.

- *Harp Trapping*:

  - 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.

- *Microbat Call Recognition*:

  - Microbat calls were sampled using Anabat SD1 electronic bat detectors (Titley Electronics, Ballina, NSW). 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. Monitoring commenced at dusk (approximately 1830 hours) and continued until dawn (approximately 0545 hours).
  No caves were observed within the survey area; however, a number of significant hollows were identified, providing potential roost sites for microbats. As such, the Anabat was used for general recording throughout the survey area.

  Anabat recordings were analysed using Anabat software (CFCread and Analook) by Anabat Echolocation Call Analysis Specialist, Greg Ford of Balance Environmental in Toowoomba. Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present.

  The focus of the bat surveys was to assess the presence of bat species found within the allotment, and to assess the potential for rare and threatened species to occur.

- *Walk-through Transect Diurnal Bird Surveys:*

  - Walk-through diurnal bird surveys were conducted at 20 of the 24 sites. While it is recommended that bird surveys commence within 30 minutes of dawn, site accessibility, overall size of the property and logistical considerations necessitated an alternative bird survey method, comprising walk-through transect surveys at varying times during the day. All sites were surveyed for a minimum of 45 minutes, and any incidental records were also collected at all other times when on the property.
  Surveys were undertaken by walking slowly through each accessible turbine site. Birds were identified by sight with the aid of binoculars or by their characteristic calls.

- *Spotlighting:*

  - 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.
  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.

- Habitat Searches:

  - Habitat searches were undertaken at 18 of the 24 sites, 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 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, and the results are indicative of this climatic condition and do not account for seasonal variation of habitat qualities.

- *Opportunistic Records*:

  - 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

  The presence of all vertebrate species encountered while working and travelling within the study area during the day and night, and during trap line establishment was recorded as an incidental sighting.

  When moving to, from or between survey sites at night, roads were traversed in a vehicle at very low speed with any fauna detected within headlights recorded. Unconfirmed or suspected observations were also noted.

    » Secondary evidence

  The presence of evidence or activity, including tracks, scats, pellets, scratches, diggings, burrows, dens and nests were recorded wherever and whenever possible. Photographic records were taken where possible.

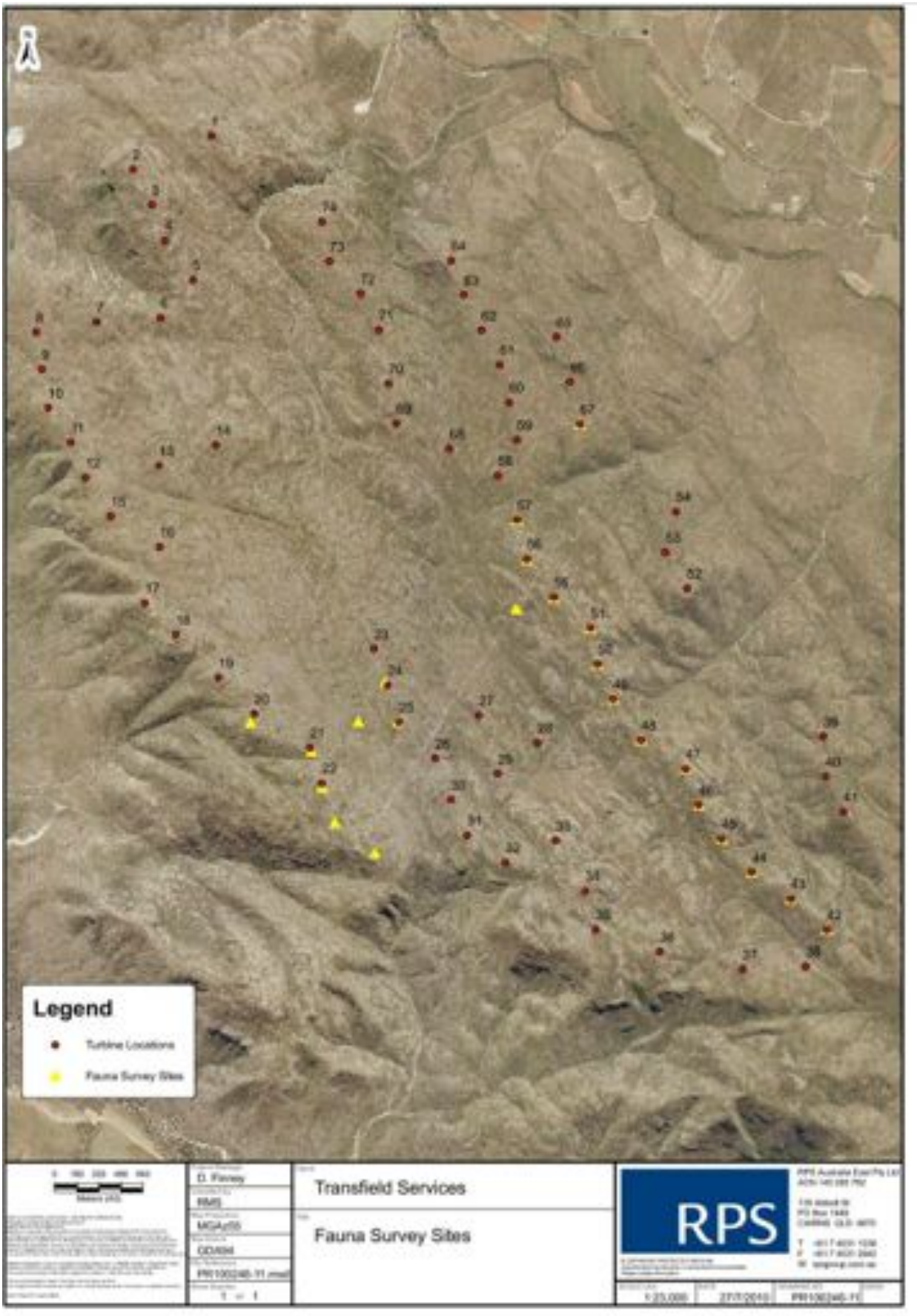

Figure 1 - Location of Fauna Survey Sites

2.2.4 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 (**Figure 2**).

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 m^2 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. A centreline of 50 m along the longest axis was used to visually estimate the structural class of the vegetation. The mean height of the vegetation was recorded.

Only vascular plant species were recorded including trees, shrubs, grasses, forbs and graminoids. A complete inventory of all species occurring within each plot 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.

Using the Queensland Herbarium's HERBRECS data as a basis for identifying relevant species, thorough ground searches were made for plants of conservation interest. Where possible, these searches extended beyond the bounds of the 500 m^2 vegetation survey plot, and often included the section of land between turbines (i.e. along ridges).

Access constraints and the limited time of the ground survey precluded the opportunity to survey all 74 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. Consideration was also made of landscape connectivity, refugial areas, and fireproof niches.

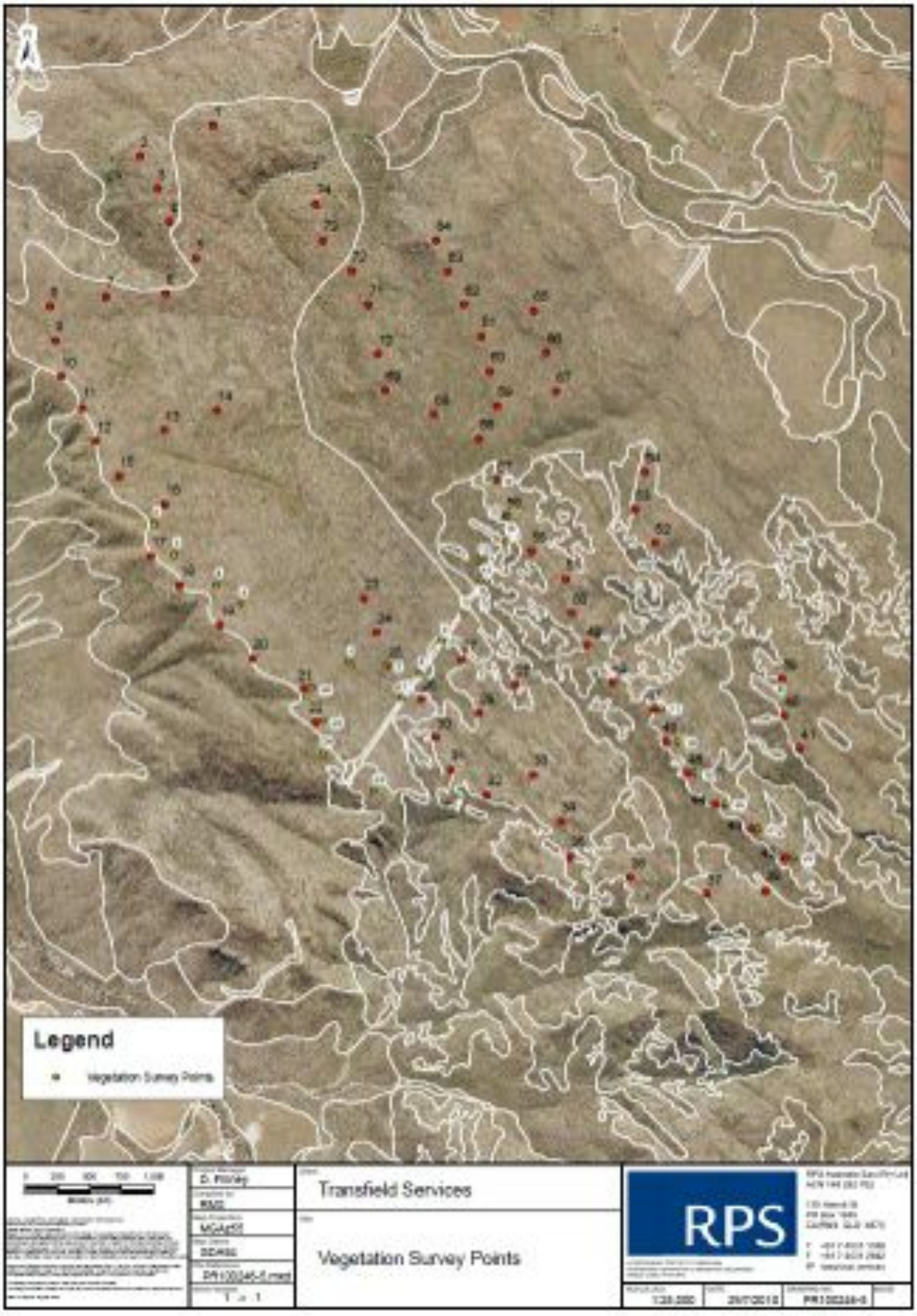

Figure 2 Location of Vegetation Survey Sites

2.2.5 Target Species

A search of the EPBC Protected Matters Search Tool predicted the potential occurrence of 15 threatened flora species and 22 vertebrate fauna species, listed as threatened under the EPBC Act. In addition, a search of the Wildlife Online database identified nine species of threatened or near threatened fauna and 24 threatened or near threatened flora species that have previously been recorded within 10 km of the site (Section 4).

These threatened species were considered during survey planning and design, and methods were employed to target these species in the field. An assessment of the likelihood of occurrence of each species was prepared following the field investigations, based on habitat type, availability and quality throughout the site, and the known distribution and ecological requirements of each species.

2.3 Taxonomy and Nomenclature

Nomenclature and taxonomy of vertebrate species generally follows that of the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA), and Queensland Museum.

Field identification was generally based on the following field guides:

- General
  - Tracks, Scats and Other Traces, Triggs (2006).
- Nomenclature for flora follows Bostock, and Holland (2007).
- Regional Ecosystem descriptions follow those given in the Regional Ecosystem Description Database (November 2007).
- Mammals
  - The Mammals of Australia, Strahan (2008).
  - A Field Guide to Mammals of Australia, Menkhorst and Knight (2001).
  - Australian Bats, Churchill (1998).
- Birds
  - Reader's Digest Photographic Field Guide to Birds of Australia, Flegg and Madge (1995).
  - Reader's Digest Complete Book of Australian Birds (1997).
  - The Slater Field Guide to Australian Birds, Slater (2003).
  - Field Guide to Australian Birds, Morcombe (2003).
- Amphibians and Reptiles
  - A Field Guide to Australian Frogs, Barker, Grigg and Tyler (1995).
  - A Photographic Guide to Snakes and Other Reptiles of Australia, Swan (1996).
  - A Field Guide to Reptiles of Queensland, Wilson (2005).
  - Complete Guide to the Reptiles of Australia, Wilson and Swan (2003).

2.4 Survey Limitations

The limitations associated with this Ecological Assessment Report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In instances where surveys were not able to reliably detect a particular species or guild, a precautionary approach has been adopted. As such 'assumed presence' of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

2.4.1 Site Access

The project area is located on elevated land of rugged, dissected topography. A number of wind turbines are proposed to be positioned along narrow ridgelines, of which the only access to some of these sites is by helicopter drop-in or by foot traverse. Consequently, several sites could not be ground surveyed because of access limitations. Descriptions of environmental conditions for these remote sites have therefore been extrapolated from surrogate sites where access could be made.

The ability to access all trapping sites in a reasonable timeframe to satisfy all animal ethics requirements also influenced the location of trapping survey sites. Areas with limited or restricted access were therefore investigated using alternative survey methods, such as walk-through transect surveys during which bird surveys, habitat searches and habitat assessments were undertaken. In addition, a number of incidental observations were recorded during the walk through transect surveys.

2.4.2 Survey Timing

As the presence and abundance of fauna within a particular area may be seasonal in response to the availability and quality of resources, or vary with environmental conditions, the timing of the survey can greatly influence the species which are recorded. Flowering and fruiting plant species, which attract local and some nomadic or migratory species, may fruit or flower during specific seasons or in response to environmental conditions, or in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources otherwise more accessible to threatened species fail. As a consequence threatened species may be absent from some areas even where potential habitat exists for extended periods.

Nevertheless, it is considered that the survey effort undertaken to date within the locality provides a baseline picture of the habitat values occurring within the site.

2.4.3 Significant Species

The presence and abundance of flora and fauna within a particular area is not static over time and may be seasonal in response to the availability of resources and climatic conditions. However, the field investigations provided an overview of habitat types and values occurring within the subject site, and this habitat assessment, combined with knowledge of each species ecological requirements, has been used to predict the likelihood of occurrence of threatened fauna species within the site (Section 4).

2.4.4 Fire

Despite the timing of the survey coinciding with the end of the wet season, severe bushfires had passed over the project area during the previous year (2009). The effects of these fires were pronounced along ridge topography of the eastern portion of the project area, rendering the identification of much of the ground flora and shrub layers difficult. Nevertheless, a representative account of the conspicuous flora is given in this report. Fires however, may have had bearing on the presence of fauna and their use of certain ecological niches, given that a number of habitats were modified.

2.4.5 Data Availability and Accuracy

The collated threatened fauna species records provided by the DERM Wildlife Online Database (2010) for the area are known to vary in accuracy and reliability. Traditionally this is due to the reliability of information provided to DERM for collation. During the review of threatened species records sourced from the Wildlife Online Database, consideration has been given to the accuracy of each threatened species record in addition to an assessment of habitat suitability within the site (Section 4.3). Similarly the EPBC Protected Matters Search Tool is a predictive model, which identifies all species that have previously been recorded, or for which suitable habitat exists or could potentially occur within the area. This database is subject to the same inherent inaccuracy issues as the Wildlife Online database.

In order to address these limitations in respect to data accuracy, threatened species records have been used to provide a guide only to the types of species which occur within the locality of the site. As a consequence habitat assessment and the results of surveys conducted within the site have been used to assess the likelihood of occurrence of threatened species within the site (Section 4).

3 Results of Desktop Review

Published scientific journal papers and other literature, as well as a range of databases provide a historical and scientific context from which ecological considerations can be made in relation to flora and fauna, particularly rare and threatened species, and the landscape importance of environmental features. The findings of this exercise are discussed in the following section.

3.1 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 REs intersected by turbines and the road and cabling network are summarised in **Table 1**. Descriptions of these REs are given in **Table 2** 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.

Mapping showing the landscape position of remnant communities (REs) in relation to the study area and each turbine site is given in **Appendix B**. Descriptions of remnant vegetation are reproduced from the information and data held in the latest version of REDD updated in November 2007. Complete descriptions of REs are given in **Appendix C** (some information from the REDD description of less ecological relevance has been omitted for brevity).

Table 1 - Regional ecosystems intersected by wind turbines within the study area.

No. of turbines	Turbines numbers	Mapped RE	VMA status[1]
23 turbines	1, 5-16, 19-26, 73-74	9.12.4c / 9.12.2	LC / LC
20 turbines	2-4, 17-18, 58-72	9.12.30a / 9.12.20 / 9.12.4c	LC / LC / LC
5 turbines	27 - 28	7.12.34	LC
26 turbines	29 - 57	7.12.57	OC

[1] Conservation status under the *Vegetation Management Act 1999*: LC – Least Concern; OC – Of Concern

Table 2 - Description of regional ecosystems intersected within the project footprint.

RE	Description	Status[1]
7.12.34	*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.	LC
7.12.57	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.	OC
9.12.2	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.	LC
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.	LC
9.12.20	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* (bushman's 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.	LC
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* (bushman's 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.	LC

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

The position of turbines as shown on the mapping should be viewed as indicative and used as a guide because of the potential mapping error of ± 50 m (Wet Tropics bioregion) and ± 100 m (Einasleigh Uplands bioregion). For these situations, recommendations have been made to consider refining the position (micro-site location) of turbines if they intersect with an 'of concern' RE as it occurs on the ground, and possibly relocate them to a position in 'least concern' remnant vegetation. It is noted however, that this may not be possible for some turbines given the surrounding vegetation and its attendant conservation status (i.e. a least concern remnant community may not occur adjacent to the position of the proposed turbine).

Opportunities exist to undertake more detailed ground-truth work to delineate the boundaries between 'of concern' and 'least concern' communities in order to fine tune the position of each turbine to offset impacts to remnant vegetation listed as 'of concern' under the VMA. We note however, that due to the limitations of scale with RE mapping, that inconspicuous communities that occupy niches of land are not described under the RE classification, and hence difficulties are likely to be encountered in attributing a conservation status to a community that is not described in the Regional Ecosystem Description Database.

This is notably relevant for many proposed turbine sites, where 26 turbines are shown on mapping to occur within RE 7.12.57 – an 'of concern' remnant community. The reality of this situation is that the on-ground floristic account and the mapping description rarely match. For example, rock pavements are a common feature of the ridge country, and also coincide with the placement of a turbine. These features are poorly represented by woody vegetation, and even less so by trees; yet they exist as narrow, linear mosaics within broader areas of mappable vegetation characterised by trees. They are too small and narrow in area to be incorporated as separate units (polygons) in the mapping.

3.2 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 - Species shown to have essential habitat in the study area.

Scientific Name	Common Name	NCA[1]	EPBC[2]
Fauna			
Casuarius casuarius johnsonii	Southern cassowary (southern population)	E	E
Flora			
Acacia purpureopetala	A wattle (prostrate)	V	V
Grevillea glossadenia	A shrub	V	V
Homoranthus porteri	A shrub	V	V
Plectranthus amoenus	A herb	V	-

[1] Conservation status as listed under the *Nature Conservation Act 1992*:
E – Endangered, V – Vulnerable, LC – Least Concern

[2] Conservation status as listed under the *Environment Protection and Biodiversity Conservation Act 1999*:
E – Endangered, V - Vulnerable

The presence of the southern cassowary in habitat in deeply dissected and elevated rocky terrain is considered to be most unlikely. There is a remote possibility that this species may traverse more favourable habitat around the Oaky Creek area to the west of the wind farm, but again this is improbable given the separation of this region from favoured forested habitats (vine forest) located a considerable distance away. Land here is flatter and supports the necessary resources for the cassowary. The project footprint of the wind farm does not support any resources for the cassowary.

The four species of plants listed as having essential habitat in the south-western corner of the study area is more realistic than the likelihood of the cassowary being present. A small population of *Grevillea glossadenia* growing in association with *Homoranthus porteri* was found in precisely the area shown on the essential habitat mapping. Despite concerted ground searches though, 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. Similarly, *Plectranthus amoenus* was not found during ground searches; however, this species is relatively conspicuous and should be able to be identified if present. As such, 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 practicably undertaken.

We note that ground surveys of the proposed locations of the turbines shown to be in the essential habitat zone were unable to be undertaken during this survey. No plant species of conservation interest were recorded from turbine 22, which occurs just outside the essential habitat area. 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 RE shown here are present in study area).

Scientific Name	RE - Habitat
Fauna	
Casuarius casuarius johnsonii[1]	7.1.3, 7.2.1, 7.2.3, 7.2.4, 7.2.5, 7.2.6, 7.2.11, 7.3.1, 7.3.3, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.8, 7.3.10, 7.3.12, 7.3.17, 7.3.23, 7.3.25, 7.3.36, 7.3.37, 7.3.38, 7.8.1, 7.8.2, 7.8.3, 7.8.4, 7.8.7, 7.8.8, 7.8.14, 7.11.1, 7.11.2, 7.11.5, 7.11.6, 7.11.7, 7.11.10, 7.11.12, 7.11.13, 7.11.14, 7.11.18, 7.11.23, 7.11.24, 7.11.25, 7.11.28, 7.11.29, 7.11.30, 7.11.34, 7.12.1, 7.12.2, 7.12.4, 7.12.5, 7.12.7, 7.12.9, 7.12.13, 7.12.16, 7.12.17, 7.12.19, 7.12.20, 7.12.39, 7.12.40, 7.12.44, 7.12.47, 7.12.50, 7.12.68
Flora	
Acacia purpureopetala	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
Grevillea glossadenia	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
Homoranthus porteri	None listed, but mapping shows: 7.12.34, 7.12.57, 9.12.4c/9.12.2, 7.12.65k.
Plectranthus amoenus	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

[1] The REs shown here for essential habitat for *Casuarius casuarius johnsonii* do not all occur within the study area.

3.3 Wildlife Online Database Search

3.3.1 Flora and Vegetation

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 land forms 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. The complete Wildlife Online search results are given in **Appendix D**.

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]
Acacia purpureopetala	-	V	V
Goodenia stirlingii	-	V	-
Grevillea glossadenia	-	V	V
Homoranthus porteri	-	V	V
Melaleuca uxorum	-	E	-
Peripleura scabra	-	NT	-
Plectranthus amoenus	-	V	-

[1] Conservation status as listed under the *Nature Conservation Act 1992*:
E – Endangered, V – Vulnerable, NT – Near Threatened

[2] Conservation status as listed under the *Environment Protection and Biodiversity Conservation Act 1999*:
E – Endangered, V - Vulnerable

3.3.2 Fauna

Given that the presence and abundance of fauna within a particular area is not static over time, a search of the Wildlife Online database was expanded for the fauna assessment to include a search radius of 10 km from the study area. Within 10 km of the site, twelve threatened or near threatened fauna species listed under the NC Act have previously been recorded (**Table 6**).

Table 6 Conservation significant fauna as listed in the Wildlife Online database (search centred on coordinates: latitude 17.1676°, longitude 145.3814°).

Species	Common Name	Conservation Status		Previously recorded within 10km	Previously recorded within 5km	Likelihood of Occurrence
		NCA[1]	EPBC[2]			
Erythrotriorchis radiatus	Red Goshawk	E	V	Yes (1)	Yes (1)	**Possible** - occurs across northern Australia and south through to eastern Queensland and far north eastern NSW. Reported to be rare in NSW, with most records in NSW from around the Clarence River Catchment (DECC, 2008). Within its range, the Red Goshawk occurs sparsely in a wide range of open forests and woodlands, especially near rivers, wetlands and rainforest fringes (Pizzey and Knight, 1997). No potential nests or other evidence was observed during the survey.
Accipiter novaehollandiae	Grey Goshawk	NT	-	Yes (2)	No	**Possible** - this species has been recorded in rainforests, forests, forest gullies and valleys, taller woodlands and timbered water courses (Pizzey and Knight 2003). Widespread in the Greater Brisbane region in South-east Queensland, but less common in dense urban settings. No Grey Goshawks or their nesting sites were observed during the survey.
Lophoictinia isura	Square-tailed Kite	NT	-	Yes (2)	No	**Possible** - however, no nests or evidence of this species were observed. Square-tailed Kites occur in open eucalypt forest, woodlands and sand plains of coastal and sub-coastal mainland Australia. This species is sparsely distributed through even preferred habitat and breeding pairs are known to occupy very large home ranges of at least 100 km2 (Schodde and Tidemann, 1993; NPWS, 2000). Nests are a pile of sticks approximately 0.6 – 1 m in diameter, and are usually located in tall or emergent living trees that are near watercourses (NPWS, 2000; Schodde and Tidemann, 1993).
Erythrura gouldiae	Gouldian Finch	E	E	Yes (3)	Yes (1)	**Possible** - however, unlikely to breed within the site as there are no permanent sources of fresh water. The critical components of suitable core habitat for the Gouldian Finch appear to be the presence of favoured annual and perennial grasses (especially Sorghum), a nearby source of surface water and, in the breeding season, unburnt hollow-bearing Eucalyptus trees (especially E. tintinnans, E. brevifolia and E. leucophloia). Its breeding habitat is usually confined to ridges and rocky foothills, but the tendency to nest in these upland areas is probably due to the presence of Sorghum grasses rather than to the actual topography of the landscape.
Cyclopsitta diophthalma macleayana	Macleay's Fig-parrot	-	V	Yes (1)	No	**Unlikely** - due to a lack of appropriate habitat within the site. This species prefers lowland rainforests, adjacent eucalypt woodlands, coastal scrub and timbered watercourses where it feeds on figs, loquats and other fruit trees.
Nettapus coromandelianus	Australian Cotton Pygmy-goose	NT	-	Yes (1)	No	**Unlikely** to occur - due to a lack of essential habitat characteristics required by this species. The Australian Cotton Pygmy-goose prefers deeper freshwater swamps, lagoons, dams and water impoundments with waterlilies and other semi-emergent plants (Pizzey and Knight 2007). This species congregates in flocks on permanent water bodies during the dry season.
Dasyurus hallucatus	Northern Quoll	-	E	Yes (1)	No	**Possible** - this species commonly occur where rocky escarpments occur within or adjoining eucalypt forest and woodland, around human settlements and in rainforest patches or on beaches. Northern Quolls are scansorial, using a variety of den sites including rock crevices, tree hollows, logs, termite mounds, roofs of houses and

Species	Common Name	Conservation Status		Previously recorded within 10km	Previously recorded within 5km	Likelihood of Occurrence
		NCA[1]	EPBC[2]			
						goanna burrows (Van Dyke & Strahan, 2008). No evidence of northern quoll was recorded during the survey
Petrogale mareeba	Mareeba Rock-wallaby	NT	-	Yes (3)	No	**Probable** - this species is quite restricted in distribution, being found only in the Mareeba area, just west of Cairns, north to Mt. Carbine and south to Mt. Garnet. They are found in rocky habitats, which tend to be granite boulders found in tropical open woodland, consistent with the habitat of the site. This species has been recorded within 10km of the study site, and evidence of rock-wallaby habitation was prolific throughout the site, with scats observed and collected from most rocky ridge tops.
Pseudochirops archeri	Green Ringtail possum	NT	-	Yes (2)	No	**Unlikely** to occur - this species tends to favour rainforests habitats with tangled thornless vines. This habitat is lacking within the study site.
Pteropus conspicillatus	Spectacled Flying-fox	-	V	Yes (11)	No	**Unlikely** to occur - this species is chiefly found in rainforest areas where it feeds on blossoms and fruit, but also visits eucalypts for nectar and pollen. They prefer to roost in the middle and upper canopies of rainforest in the full sun. Colonies of the Spectacled Flying-fox can also be found in mangroves, paperbark and eucalypt forests. No colony is known to be found more than 7 km from a rainforest (WIKI). No flying fox roosts were identified during the survey.
Acanthophis antarcticus	Common Death Adder	NT	-	Yes (1)	No	**Possible** - this species is found in a wide variety of habitats amongst leaf litter and debris often at the bases of shrubs or small trees (Cogger 2000).
Melanotaenia eachamensis	Lake Eacham Rainbowfish	-	E	Yes (1)	Yes (1)	**Unlikely** to occur - as no permanent water courses occur within the site. This species occurs in slow to moderately-flowing streams, especially smaller tributaries. It is also found around the vegetated margins of lakes and reservoirs. The species prefers sunlit margins of streams with abundant cover such as log snags and aquatic plants and also forms schools near the surface of rocky pools.

[1] Conservation Status as listed under the *Nature Conservation Act 1992*: E – Endangered; V – Vulnerable; NT: Near Threatened

[2] Conservation Status as listed under the *Environmental Protection and Biodiversity Conservation Act 1999*: CE - Critically Endangered; E – Endangered; V - Vulnerable

3.4 Protected Matters Database Search

3.4.1 Flora and Vegetation

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 7**. The complete Protected Matters report is given in **Appendix E**.

Information contained in Table 6 under the column *Presence in Study Area* is derived from a range of sources and intuitive field knowledge of particular species. 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 marsupiiformis* 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 7 - Conservation significant flora as listed in the EPBC Act's Protected Matters database.

Scientific Name	Common Name	Status[1]	Presence in Study Area
Acacia guymeri	-	V	Possible
Acacia ramiflora	-	V	Possible
Chamaesyce carissoides	-	V	Possible
Dendrobium superbiens	Curly Pinks	V	Unlikely – sub-optimal habitat.
Huperzia marsupiiformis	Water Tassel-fern	V	Unlikely due to absence of well-developed vine forest habitat.
Phalaenopsis rosenstromii	An orchid	E	Unlikely due to altitude above sea level. Generally occurs at lower elevation in well-developed rainforest.
Taeniophyllum muelleri	Minute Orchid, Ribbon-root Orchid	V	Unlikely due to sub-optimal habitat.
Tropilis callitrophilis	Thin Feather Orchid	V	Possible, but not sighted in range of habitats.

[1] Conservation status as listed under the *Environment protection and Biodiversity Conservation Act 19999*: CE – Critically Endangered, E – Endangered, V – Vulnerable, X – Extinct.

3.4.2 Fauna

Given that the presence and abundance of fauna within a particular area is not static over time, a search of the EPBC Act's Protected Matters database for 'matters of national environmental significance' was also expanded to include a search radius of 10km from the study area.

Twenty-two threatened fauna species were identified as having the potential to occur within this search area (**Table 8**). Seventeen migratory species were also identified through this search as having the potential to occur (**Table 9**). An assessment of the likelihood of occurrence of these species was prepared following the field investigations, based on habitat type, availability and quality throughout the site, and the known distribution and ecological requirements of each species. Some species are considered more likely to occur on the site than others. In addition, an assessment of the likelihood of occurrence of listed migratory species was also undertaken.

Table 8 - Conservation significant fauna as listed in the EPBC Act's Protected Matters database.

Species	Common Name	Conservation Status		Previously recorded within 10km	Likelihood of Occurrence
		EPBC	NCA		
Casuarius casuarius johnsonii	Southern Cassowary	E	E	No	**Unlikely** to occur - based on the available habitat within the study area. Cassowaries require a high diversity of fruiting trees to provide a year-round supply of fleshy fruits. Although occurring primarily in rainforest, they also use woodlands, melaleuca swamps, mangroves and even beaches, both as intermittent food sources and as connecting habitat between more suitable sites.
Erythrotriorchis radiatus	Red Goshawk	V	E	Yes	**Possible** - occurs across northern Australia and south through to eastern Queensland and far north eastern NSW. Reported to be rare in NSW, with most records in NSW from around the Clarence River Catchment (DECC, 2008). Within its range, the Red Goshawk occurs sparsely in a wide range of open forests and woodlands, especially near rivers, wetlands and rainforest fringes (Pizzey and Knight, 1997). No potential nests or other evidence was observed during the survey.
Accipiter novaehollandiae	Grey Goshawk	-	NT	Yes	**Possible** - this species has been recorded in rainforests, forests, forest gullies and valleys, taller woodlands and timbered water courses (Pizzey and Knight 2003). Widespread in the Greater Brisbane region in South-east Queensland, but less common in dense urban settings. No Grey Goshawks or their nesting sites were observed during the survey.
Lophoictinia isura	Square-tailed Kite	-	NT	Yes	**Possible** - however, no nests or evidence of this species were observed. Square-tailed Kites occur in open eucalypt forest, woodlands and sand plains of coastal and sub-coastal mainland Australia. This species is sparsely distributed through even preferred habitat and breeding pairs are known to occupy very large home ranges of at least 100 km2 (Schodde and Tidemann, 1993; NPWS, 2000). Nests are a pile of sticks approximately 0.6 – 1 m in diameter, and are usually located in tall or emergent living trees that are near watercourses (NPWS, 2000; Schodde and Tidemann, 1993).
Erythrura gouldiae	Gouldian Finch	E	E	Yes	**Possible** occurrence - however, unlikely to breed within the site as there are no permanent sources of fresh water within the site. The Gouldian Finch inhabits open woodlands that are dominated by Eucalyptus trees and support a ground cover of Sorghum and other grasses. It has also been recorded in undescribed thickets of vegetation along streams and gorges, and at the margins of stands of mangroves. The Gouldian Finch drinks regularly and thus is often seen at watering points and associated habitat such as beds of grass and grass-covered banks around shallow waterholes, watercourses, soaks and springs. The critical components of suitable core habitat for the Gouldian Finch appear to be the presence of favoured annual and perennial grasses (especially Sorghum), a nearby source of surface water and, in the breeding season, unburnt hollow-bearing Eucalyptus trees (especially *E. tintinnans*, *E. brevifolia* and *E. leucophloia*). Its breeding habitat is usually confined to ridges and rocky foothills, but the tendency to nest in these upland areas is probably due to the presence of Sorghum grasses rather than to the actual topography of the landscape.
Neochmia ruficauda ruficauda	Star Finch (eastern), Star Finch (southern)	E	E	No	**Unlikely** to occur - due to the lack of essential habitat characteristics required by this species. The Star Finch favours swamp vegetation, open grassland with sparse vegetation and cultivated land close to a permanent source of freshwater, and is believed to have a distribution extending north to Bowen, several hundred kilometres south of the survey site.
Cyclopsitta diophthalma macleayana	Macleay's Fig-parrot	-	V	Yes	**Unlikely** - due to a lack of appropriate habitat within the site. This species prefers lowland rainforests, adjacent eucalypt woodlands, coastal scrub and timbered watercourses where it feeds on figs, loquats and other fruit trees.
Nettapus coromandelianus	Australian Cotton Pygmy-goose	-	NT	Yes	**Unlikely** to occur - due to a lack of essential habitat characteristics required by this species. The Australian Cotton Pygmy-goose prefers deeper freshwater swamps, lagoons, dams and water impoundments with waterlilies and other semi-emergent plants (Pizzey and Knight 2007). This species congregates in flocks on permanent water bodies during the dry season.

Species	Common Name	Conservation Status		Previously recorded within 10km	Likelihood of Occurrence
		EPBC	NCA		
Rostratula australis	Australian Painted Snipe	V	V	No	**Unlikely** to occur - due to a lack of essential habitat characteristics required by this species. The Australian painted Snipe prefers well vegetated shallows and margins of wetlands, dams, sewage ponds; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, open timber (Prizzey and Knight 2007)
Litoria nannotis	Waterfall Frog, Torrent Tree Frog	E	E	No	**Unlikely** - due to a lack of essential habitat characteristics available within the site. This species is a rainforest specialist. It has been recorded in rainforests and wet sclerophyll forests near waterfalls and cascades. They are commonly seen on boulders beside or behind waterfalls.
Litoria nyakalensis	Mountain Mistfrog	CE	E	No	**Unlikely** - due to a lack of essential habitat characteristics available within the site. This species is a rainforest specialist, closely associated with streams in rainforest and wet sclerophyll forest. Frogs have been found on emergent rocks and boulders (Barker et al. 1995).
Litoria rheocola	Common Mistfrog	E	E	No	**Unlikely** - due to a lack of essential habitat characteristics available within the site. This species is a rainforest specialist that lives in rainforests and wet sclerophyll forests. It is often found near fast flowing mountain streams and waterfalls.
Nyctimystes dayi	Lace-eyed Tree Frog, Australian Lacelid	E	E	No	**Unlikely** - due to a lack of essential habitat characteristics available within the site. This species lives in montane areas often near fast flowing rocky streams. They are often seen on rocks and plants at the side of these streams.
Pseudophryne covacevichae	Magnificent Brood Frog	V	V	No	Unlikely to occur - this species appears to be restricted to specific habitats with all records being from a small area near Ravenshoe, within the rhyolites of the Glen Gorden Volcanics.
Taudactylus acutirostris	Sharp-snouted Day Frog, Sharp-snouted Torrent Frog	EX	E	No	**Highly unlikely** - this species is believed to be extinct in the wild. It was known to inhabit montane forests in north-east Queensland, where it was found amongst rocks and plants beside small mountain streams. This habitat is lacking from the study site.
Dasyurus hallucatus	Northern Quoll	E	-	Yes	**Possible** - this species commonly occurs where rocky escarpments occur within or adjoining eucalypt forest and woodland, around human settlements and in rainforest patches or on beaches. Northern Quolls are scansorial, using a variety of den sites including rock crevices, tree hollows, logs, termite mounds, roofs of houses and goanna burrows (Van Dyke & Strahan, 2008). No evidence of northern quoll was recorded during the survey.
Dasyurus maculatus gracilis	Spotted-tailed Quoll or Yarri (North Queensland subspecies)	E	E	No	**Possible** - this species occurs along the east coast of Australia from south east Queensland to South Australia and Tasmania. It has been recorded in a wide range of habitat types including dry and moist sclerophyll forests and woodlands, rainforest, coastal heathland, and riparian forest. This species been occasionally sighted in treeless areas, rocky outcrops and grazing lands (NPWS, 1999; NPWS, 2000; Strahan, 1998). The Spotted-tailed Quoll shelters and dens in small caves, fallen logs with large hollows and tree hollows and may utilise numerous dens within its home range which has been estimated to be between 800 ha to 20 km2 (NPWS, 2000; NPWS in prep, 1999). No evidence of the Spotted-tailed Quoll was observed during the survey.
Petrogale mareeba	Mareeba Rock-wallaby	-	NT	Yes	**Probable** - this species is quite restricted in distribution, being found only in the Mareeba area, just west of Cairns, north to Mt. Carbine and south to Mt. Garnet. They are found in rocky habitats, which tend to be granite boulders found in tropical open woodland, consistent with the habitat of the site. This species has been recorded within 10km of the study site, and evidence of rock-wallaby habitation was prolific throughout the site, with scats observed and collected from most rocky ridge tops.
Pseudochirops archeri	Green Ringtail possum	-	NT	Yes	**Unlikely** to occur - this species tends to favour rainforests habitats with tangled thornless vines. This habitat is lacking within the study site.
Hipposideros semoni	Semon's Leaf-nosed Bat, Greater Wart-nosed	E	E	No	**Unlikely** to occur - this species favours rainforest, forest, open woodland, vine thickets for foraging. However, it roosts alone in small limestone and sandstone caves which are absent from the study site and surrounding area.

Species	Common Name	Conservation Status		Previously recorded within 10km	Likelihood of Occurrence
		EPBC	NCA		
	Horseshoe-bat				
Petaurus australis unnamed subsp.	Fluffy Glider, Yellow-bellied Glider (Wet Tropics)	V	V	No	**Unlikely** to occur - this species inhabits tall open forest on the western fringe of the Wet Tropics Heritage Area. Floristics of the forest may vary from one location to another but the presence of two eucalypt species, *Eucalyptus resinifera* and *Eucalyptus grandis*, is essential. The first is used for sap-feeding (Quin et al. 1996; Russell 1984) and the second as a den tree (Bradford & Harrington 1999; Russell 1984). Both of these essential species are absent from the study site.
Pteropus conspicillatus	Spectacled Flying-fox	V	-	Yes	**Unlikely** to occur - this species is chiefly found in rainforest areas where it feeds on blossoms and fruit, but also visits eucalypts for nectar and pollen. They prefer to roost in the middle and upper canopies of rainforest in the full sun. Colonies of the Spectacled Flying-fox can also be found in mangroves, paperbark and eucalypt forests. No colony is known to be found more than 7 km from a rainforest (WIKI). No flying fox roosts were identified during the survey.
Pteropus poliocephalus	Grey-headed Flying-fox	V	-	No	**Unlikely** to occur - the Grey-headed Flying-fox occurs in a range of habitats including subtropical and temperate rainforests, dry and wet sclerophyll forests, Banksia woodland, heaths and Melaleuca swamps (Duncan et al, 1999; NPWS, 2001). No flying fox roosts were observed during the survey.
Rhinolophus philippinensis (large form)	Greater Large-eared Horseshoe Bat	E	E	No	**Unlikely** to occur - this species is believed to be an obligate cave dweller, although other man-made structures such as abandoned mines, tunnels, houses and culverts have also been recorded. Maternity sites have not been documented but are thought to be limited to caves and abandoned mines where micro-climatic factors are suitable. Forage in the surrounding environments at night and employ a range of foraging strategies (DEWHA, 2008)
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	CE	E	No	**Unlikely** to occur - there are two distinct populations of this species, one in the Top End of the Northern Territory, and the other in north-eastern Queensland, in coastal areas form Bowen to Cape York Peninsula. They occur in tropical woodland and tall open forests, usually within 40km of the coast. They are most commonly found in poplar gum woodland (Churchill 1998).
Egernia rugosa	Yakka Skink	V	V	No	**Possible** - this species usually takes refuge under dense vegetation, hollow logs, in cavities in soil-bound root systems of fallen trees and beneath rocks in open dry sclerophyll forest or woodland throughout its range.
Acanthophis antarcticus	Common Death Adder	-	NT	Yes	Possible - this species is found in a wide variety of habitats amongst leaf litter and debris often at the bases of shrubs or small trees (Cogger 2000).
Melanotaenia eachamensis	Lake Eacham Rainbowfish	E	E	Yes	**Unlikely** to occur - as no permanent water courses occur within the site. This species occurs in slow to moderately-flowing streams, especially smaller tributaries. It is also found around the vegetated margins of lakes and reservoirs. The species prefers sunlit margins of streams with abundant cover such as log snags and aquatic plants and also forms schools near the surface of rocky pools. Larger, more permanent pools in the lower reaches of Granite Creek (outside of the project footprint) may provide more favourable habitat.
Pristis microdon	Freshwater Sawfish	V	-	No	**Very unlikely** to occur - due to a lack of appropriate habitat. Juveniles and sub-adult Freshwater Sawfish predominantly occur in rivers and estuaries, while large mature animals tend to occur more often in coastal and offshore waters up to 25m depth.

[1] Conservation status as listed under the *Nature Conservation Act 1992*: E – Endangered; V – Vulnerable; NT – Near Threatened

[2] Conservation status as listed under the *Environmental Protection and Biodiversity Conservation Act 1999*: CE – Critically Endangered; E – Endangered; V - Vulnerable

Table 9 - Migratory fauna species as listed in the EPBC Act's Protected Matters database

Group	Species	Common Name	Likelihood of Occurrence	Previously recorded within 10km
Migratory Terrestrial Species	*Erythrura gouldiae*	Gouldian Finch	**Possible** - however, unlikely to breed within the site as there are no permanent sources of fresh water within the site.	Yes
	Haliaeetus leucogaster	White-bellied Sea-Eagle	Possible - while it prefers coastal habitats and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands, this species is widespread and occupies a variety of habitat types.	Yes
	Hirundapus caudacutus	White-throated Needletail	**Possible** - this species occupies airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns, frequently foraging over hilltops and timbered areas (Pizzey and Knight 2007).	No
	Hirundo rustica	Barn Swallow	**Possible** - however, this species is usually found near water.	No
	Merops ornatus	Rainbow Bee-eater	**Occurs** - recorded during the survey.	Yes
	Monarcha melanopsis	Black-faced Monarch	**Possible** - however, this species prefers rainforests, eucalypt woodlands, coastal scrub, damp gullies, occupying more open forests when migrating (Pizzey and Knight 2007).	Yes
	Monarcha trivirgatus	Spectacled Monarch	**Unlikely** to occur - due to a lack of suitable habitat within the site. This species prefers understorey of mountain / lowland rainforest, thickly wooded gullies and waterside vegetation including mangroves, usually occurring well below the canopy (Pizzey and Knight 2007).	Yes
	Myiagra cyanoleuca	Satin Flycatcher	**Possible** - however, this species prefers heavily vegetated gullies in rainforest and taller woodlands, usually above the shrub layer. During migration, they are found in coastal forests, woodlands, mangroves and trees in open country and gardens (Pizzey and Knight 2007).	Yes
	Rhipidura rufifrons	Rufous Fantail	**Likely** to occur - this species has previously been recorded within 10km of the site, and suitable habitat exists within the study area to support this species.	Yes
Migratory Wetland Birds	*Ardea alba*	Great Egret, White Egret	**Unlikely** to occur - due to a lack of suitable habitat within the study site. This species occurs along the shallows of rivers, estuaries, tidal mudflats, freshwater wetlands, irrigation areas and larger dams (Pizzey and Knight 2007).	No
	Ardea ibis	Cattle Egret	**Unlikely** to occur - based on a lack of suitable habitat within the study site. This species occurs in stock paddocks, croplands, pastures, garbage tips, wetlands, tidal mudflats and drains (Pizzey and Knight 2007).	No
	Gallinago hardwickii	Latham's Snipe, Japanese Snipe	**Unlikely** to occur - based on a lack of suitable habitat within the site. This species prefers soft, wet ground or shallow water with tussocks or other green or dead growth, samphire on saltmarshes and mangrove fringes. It also favours wet parts of paddocks, seepage below dams, irrigated areas, scrub or open woodland from sea level to alpine bogs over 2000m (Pizzey and Knight 2007).	No
	Grus antigone	Sarus Crane	**Unlikely** to occur - based on a lack of suitable habitat within the site. This species prefers well-vegetated, shallow wetlands and swamps, habitat which is absent from the site.	Yes
	Nettapus coromandelianus albipennis	Australian Cotton Pygmy-goose	**Unlikely** to occur - based on a lack of suitable habitat within the study site. This species prefers deeper freshwater swamps, lagoons, dams with water lilies and other semi-emergent water plants (Pizzey and Knight 2007).	Yes
	Rostratula benghalensis s. lat.	Painted Snipe	**Unlikely** to occur - based on a lack of suitable habitat within the site. The Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent	No

Group	Species	Common Name	Likelihood of Occurrence	Previously recorded within 10km
			lakes, swamps and claypans. They also utilise inundated or waterlogged grassland or saltmarsh, dams, sewage ponds and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (DEWHA 2010b).	
Migratory Marine Birds	*Apus pacificus*	Fork-tailed Swift	**Possible** - the Fork-tailed Swift Breeds in the north-east and mid-east Asia and winters in Australia and southern New Guinea. It is generally found in flocks, hawking insects in low to very high airspace over varied habitat, from rainforest to semi-desert (Logan City Council 2010).	No
Migratory Marine Reptiles	*Crocodylus porosus*	Salt-water Crocodile, Estuarine Crocodile	**Highly unlikely** to occur - based on a lack of suitable habitat within the site. This species requires coastal rivers and swamps though often seen in open sea. Also extends well inland via major drainage systems and the billabongs in the river floodplains (Cogger, 2000).	No

3.5 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 10**. The location of these species in relation to the study area is shown in **Appendix F**.

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 many

Table 10 - Summary of HERBRECS data for conservation significant flora.

Name	NCA[1]	EPBC[1]	No. Collections	Comments
Acacia longipedunculata	NT	-	3	Outside project area. Stannary Hills.
Acacia purpureopetala	V	V	2	Specimens collected from south of turbine 31. Also from Stannary Hills.
Agathis microstachya	NT	-	4	Significantly outside project area. Associated with poor rainforest.
Alloxylon flammeum	V	V	1	Outside project area. Rocky Creek.
Archidendropsis xanthoxylon	NT	-	1	Outside project area. Atherton district.
Brasenia schreberi	NT	-	1	Outside project area. Nardello's lagoon.
Cajanus mareebensis	E	E	2	Outside project area. Near Dimbulah, and Gorge Creek west of Mareeba.
Chamaesyce carissoides	V	V	1	Outside project area. Stannary Hills.
Elaeocarpus coorangooloo	NT	-	2	Outside project area. Atherton district and Tolga.
Glossocardia orthochaeta	E	-	1	Outside project area. Stannary Hills.
Grevillea glossadenia	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.
Homoranthus porteri	V	V	3	Specimens collected from south of turbine 31. Confirmed sightings during this survey 500 m SE of turbine 22.
Lysiana filifolia	NT	-	1	Significantly outside project area. Stannary Hills.
Melaleuca uxorum	E	-	2	Specimen collected from rocky country just south of turbine 36.
Peripleura scabra	NT	-	2	Outside project area. Stannary Hills.
Peripleura sericea	NT	-	2	Outside project area. Stannary Hills.
Plectranthus amoenus	V	-	5	Specimens collected from near turbine 66. Other specimens collected outside of study area south of turbine 31.

Name	NCA[1]	EPBC[1]	No. Collections	Comments
Prostanthera sp. (Dinden P.I.Forster+ PIF17342)	E	-	1	South of project area near Oaky Creek.
Rhamphicarpa australiensis	NT	-	1	Outside project area. Nardello's Lagoon.
Tephrosia savannicola	R	-	1	Outside project area. Stannary Hills. Note, this species is no longer listed under the NCA.
Thaleropia queenslandica	NT	-	3	Significantly outside project area. In rainforest.
Zieria obovata	V	V	1	Outside project area. Stannary Hills.

[1] The conservation status codes under the *Nature Conservation Act 1992* and the *Environment Protection and Biodiversity Conservation Act 1999* as follows: E – Endangered, V – Vulnerable, R – Rare (former status), NT – Near Threatened.

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 **Table 4** could occur in the project area.

3.6 Queensland Museum Biodiversity Database

No threatened or near threatened fauna species were identified through a search of the Queensland Museum Biodiversity database in the immediate vicinity of the study area.

3.7 Regional Vegetation Management Codes

A review was made of the Regional Vegetation Management Codes as issued under the *Vegetation Management Act 1999*. The two codes are relevant given that 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 G**. We note that a total of 26 turbines (29 – 57) are proposed to be located in remnant vegetation communities listed as 'of concern' under the *Vegetation Management Act 1999*.

3.8 Watercourses

Watercourses occurring in the study area were mapped using the Department of Environment and Resource Management's (DERM) Regrowth Watercourses data (version 1.0, 2010). These features are shown on the mapping given in **Appendix H**. 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.

A comprehensive survey of watercourses was not undertaken in the field, although detailed floristic investigations were undertaken of a reach of Granite Creek more or less 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 a good indicator of seasonal flows and relatively dry bank conditions.

4 Results of Field Investigation

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. Weather conditions experienced during the survey period were generally fine. Days were hot, dry and excessively windy, with the greatest wind speeds experienced between mid morning and early evening, and also over night. Mornings were generally fine, with some cloud developing later in the day. Some very light rain fell across the site on Wednesday 12th May and a localised, light shower occurred on the afternoon of Thursday 13th May. A summary of weather conditions during the survey has been provided in **Appendix I.**

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).

Tertiary 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.

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

The findings of the field investigations of vegetation, fauna and habitats are presented in the following sections.

4.1 Flora and Vegetation Assessment

4.1.1 Flowering and Fruiting Phenology

No trees were observed to be flowering or fruiting at the time of the survey. The vestiges of capsules of *Corymbia abergiana* (rarely), *C. leichhardtii*, *Eucalyptus cloeziana*, *E. lockyeri* 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. aulacocarpa* along fire-affected ridges. The latter species was sterile at the time of the survey, and regenerating from basal coppice shoots. The scorched remnants of *A. umbellata* fruits were evident in many places. This species 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 and granite.

The ground layer was observed to be relatively productive in terms of flowering and fruiting. Herbaceous legumes are relatively uncommon in 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.

4.1.2 Effects of Fire

Extensive fires had passed over the eastern ridge sections of the study area. These fires are estimated to have occurred in approximately October 2009 and possibly progressed across the landscape in a north-westerly direction and carried by the prevailing winds. 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 metres 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 aulacocarpa*) 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 fires described above have not affected the whole project area. For example, the flat-bottomed valley in the interior and the western ridgeline, although burnt during prior years, have remained relatively intact and show fewer signs of severe fire events. In this sense, it is believed that fire passes through the project area on a period 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 crebra* and *E. granitica*) are poorly represented in these vegetation communities.

4.1.3 Vegetation Description

The condition of the vegetation within the study area is considered to be in sound ecological condition with commensurately high levels of floristic integrity. Disturbance and landscape modification are limited to the edges of the unsealed access track that enters the study area from its northern end, east of the base of Walsh Bluff; and the cleared corridor necessary for the maintenance of the existing power line that passes through the site. Aside from the vegetation that was cleared for the access track and the power line corridor, and disjunct patches of the introduced grader grass (*Themeda quadrivalvis*) adjacent to these clearings, no other salient detractors from the level of naturalness are apparent.

The mapping and description of each vegetation community and classification as defined under Queensland's regional ecosystem concept (original work published as Sattler and Williams, 1999, with mapping and description amendments presented in version 6 RE data) is provided in **Appendix B** and **C** respectively.

Remnant vegetation communities (REs) which are mapped within and immediately around the study area and those communities in which wind turbines are proposed to be sited are listed earlier in this report in **Tables 1** and **2**.

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 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

Upland bioregion. Mapping for this region was prepared at a scale of 1:100,000 and the application of heterogeneous polygons are more frequent.

The project area is in good ecological condition, which is evidenced by very low levels of disturbance and the broad coverage of remnant vegetation. Consequently, vegetation integrity is high, with areas of physical disturbance limited to the existing power line easement and access roads that link the tower infrastructure for this power line. Small populations of grader grass (*Themeda quadrivalvis*) are the only weed of significance observed in the project area. Outside of the disturbance footprint of the power line infrastructure, vegetation integrity is at its highest, with no signs of physical modification, and only marginal incursions of weeds, of which Praxelis (*Praxelis clematidea*) is the only noteworthy species. This herbaceous plant 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).

Several 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 established on land such as ridge tops or in the limited growing environment afforded by accumulated organic material amongst rock fissures.

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 reducta*, *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.

A population of plants of conservation interest was found at the former proposed turbine 24 (we note that since the time of the field survey this turbine has been repositioned). Two species are common here: *Grevillea glossadenia* and *Homoranthus porteri*. The latter forms thickets and is well-represented by numerous individuals. *G. glossadenia* is less prevalent, although it is still common – both grow in association. There is also an association with the wattle *Acacia leptostachya* at this site. It was expected that the conservation significant prostrate wattle *A. purpureopetala* would be found at this location; however, it was not detected, but we cannot discount its possible presence at a range of sites south of the existing power line, and to a lesser extent, at sites on rocky and dissected country to the north of the power line – possibly around Walsh's Bluff.

4.1.4 Description of Vegetation Survey Sites

A ground survey was undertaken to sample as widely as possible, a range of vegetation communities within the five-day timeframe of the fieldwork. Emphasis on the field investigation was made to sample representative vegetation communities in which turbines are proposed to be established. Given the scale of the project (74 wind turbines) it was not possible to sample all the vegetation units likely to be impacted. 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.

Emphasis was placed on surveying sites for flora where a wind turbine is proposed to be located. Given the rugged terrain and difficulty in accessing some of the proposed sites (notably in the southern half of the study area), plus the limited timeframe in which the field surveys were to be completed, a number of sites were unable to be surveyed. 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 narrow 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 J**. It is noted that at the time of the ground survey, 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.

Descriptions of the vegetation survey points are given in the following sub-sections. The location of these sites is shown in **Appendix K**. The vegetation integrity rating was derived from Wannan (2009).

4.1.5 Vegetation Survey Point 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*), *Corymbia citriodora*, (*E. crebra*).

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

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 schultzii*, (*Aristida* sp.), *Dichanthium sericeum*, Poaceae sp. (erect, tufted 1m), *Glossocardia bidens*, *Aeschynomene* sp., *Rhynchospora corymbosa*, (*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 pseudeulalia*, *Cartonema spicatum*, *Crotalaria brevis*, *Scleria* sp., *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*).

4.1.6 Vegetation Survey Point 2 (Wind Turbine Site 25)

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. crebra*.

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 pseudeulalia*, (*Praxelis clematidea*), *Aristida utilis*, *Eriachne ciliata*, *Glossocardia bidens*, *Eragrostis* sp., Poaceae sp. (superficially similar to *Sarga plumosum*).

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.

4.1.7 Vegetation Survey Point 3 (no wind turbine)

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

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

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

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

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

S2: Absent.

G (0.9): *Heteropogon triticeus*, *Themeda triandra*, *Dichanthium sericeum*, *Xanthorrhoea johnsonii*, *Schizachyrium pseudeulalia*, Poaceae sp. (superficially similar to *Sarga plumosum*).

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.

4.1.8 Vegetation Survey Point 4 (no wind turbine)

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*, Poaceae sp. (superficially similar to *Sarga plumosum*), *Hibbertia stirlingii*, *Schizachyrium pseudeulalia*, *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.

4.1.9 Vegetation Survey Point 5 (no wind turbine)

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

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

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

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

S1 (2 – 3 m): *Eucalyptus crebra*.

S2: Absent.

G (0.6 m): *Xanthorrhoea johnsonii*, *Themeda triandra*, *Dichanthium sericeum*, *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.

4.1.10 Vegetation Survey Point 6 (no wind turbine)

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 disparrima*, *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 pseudeulalia*, *Themeda triandra*, *Hibbertia stirlingii*, *Crotalaria brevis*, *Panicum effusum*, *Dichanthium sericeum*, *Breynia oblongifolia*, *Lomandra* sp. (glaucous leaves), *Heteropogon triticeus*, *Grewia retusifolia*, *Aeschynomene micranthos*, Poaceae sp. (superficially similar to *Sarga plumosum*).

4.1.11 Vegetation Survey Point 7 (no wind turbine)

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.

4.1.12 Vegetation Survey Point 8 (no wind turbine)

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*).

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.

4.1.13 Vegetation Survey Point 9 (no wind turbine)

Mapped RE: 7.12.34 (Least Concern under VMA)

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

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

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

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.

4.1.14 Vegetation Survey Point 10 (no wind turbine)

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 (10 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 paucity of 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.

4.1.15 Vegetation Survey Point 11 (no wind turbine)

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

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

T1 (12 m): *Eucalyptus crebra*, (*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.

4.1.16 Vegetation Survey Point 12 (no wind turbine)

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.

4.1.17 Vegetation Survey Point 13 (no wind turbine)

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.

4.1.18 Vegetation Survey Point 14 (no wind turbine)

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*.

S1: Not recorded.

S2: Not recorded.

G: Not recorded.

Habitat Features: Reduction in structural layering floristic diversity, which is likely to correspond with lesser habitat resources and fewer niche opportunities. Greater exposure to drying elements than VP12. 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.

4.1.19 Vegetation Survey Point 15 (Wind Turbine 56)

Mapped RE: 7.12.57 (Of Concern under VMA)

Field Description: Mixed woodland of *Corymbia abergiana*, *Eucalyptus lockyeri*, *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*, *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.

4.1.20 Vegetation Survey Point 16 (Wind Turbine 57)

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.

4.1.21 Vegetation Survey Point 17 (Wind Turbine 47)

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 pseudeulalia*, *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.

4.1.22 Vegetation Survey Point 18 (Wind Turbine 46)

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 aulacocarpa*.

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

G (0.6 m): *Alloteropsis semialata*, *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.

4.1.23 Vegetation Survey Point 19 (Wind Turbine 45)

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 aulacocarpa*, (*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 pseudeulalia*, *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 composition. Northwards from this site, other sites along the ridge show similar traits of relatively simple floristic and structural composition.

4.1.24 Vegetation Survey Point 20 (Wind Turbine 44)

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 aulacocarpa*, *Jacksonia thesioides*, *Larsenaikia ochreata*.

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 corymbosa*, *Haemodorum coccineum*, Epacridaceae sp., *Schizachyrium pseudeulalia*, *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.

4.1.25 Vegetation Survey Point 21 (Wind Turbine 43)

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.

4.1.26 Vegetation Survey Point 22 (Wind Turbine 42)

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 (two stunted trees present: *C. citriodora* and *E. leptophleba* 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., *Dichanthium sericeum*, Poaceae sp. (5 cm, tufted, very fine leaves), *Grevillea dryandri*, *Phyllanthus* sp., *Praxelis clematidea*, *Hibbertia stirlingii*, *Thelymitra* sp. (*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.

4.1.27 Vegetation Survey Point 23 (no wind turbine)

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 obtusifolia*, (*E. pachycalyx*), *E. lockyeri*.

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*, *Dichanthium sericeum*.

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 Oaky 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.

4.1.28 Vegetation Survey Point 24 (no wind turbine)

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 corymbosa*, (*Crassocephalum crepidioides*), *Haemodorum coccineum*, *Schizachyrium pseudeulalia*, *Phyllanthus* sp., *Dichanthium sericeum*, *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.

4.1.29 Vegetation Survey Point 25 (Wind Turbine Site 22)

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*).

4.1.30 Vegetation Survey Point 26 (Wind Turbine Site 21)

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* 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 ochreata*.

S2: Absent.

G: *Eriachne ciliata*, *Breynia oblongifolia*, *Borya septentrionalis*, *Lomandra filiformis*, *Drynaria rigidula*, *Xanthorrhoea johnsonii*, *Cheilanthes* sp., *Rhynchospora corymbosa*, Apiaceae sp., *Aristida utilis*, *Sida* sp., 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. The vegetation integrity of the site and immediate surrounds is one due to the absence of weeds and other detractors.

4.2 Fauna of the Study Area

Fauna survey sites corresponded with the vegetation survey sites to provide an assessment of fauna habitat and likely occurrence of species throughout all representative habitat types within the study area. A summary of survey methods employed at each site is included in **Appendix L**.

A total of 57 terrestrial fauna species were recorded during the survey. Of these, 54 species were confirmed and three unconfirmed records were also noted. With the exception of *Hipposideros diadema* (Diadem Leaf-nosed Bat), listed as near threatened under Queensland legislation, no threatened fauna species were recorded. One migratory species, *Merops ornatus* (Rainbow Bee-eater) described as common and widespread (Birds in Backyards 2010b) was recorded within the survey area. A full species inventory of fauna recorded during the survey has been included in **Appendix M**.

4.2.1 Birds

A total of 25 birds, including 24 confirmed species and one unconfirmed record, were recorded during walk-through transect surveys or through incidental sightings collected within the site during the survey period. With the exception of *Merops ornatus*, listed as a migratory terrestrial species under the EPBC Act, no other species of conservation significance were recorded during the survey.

The most commonly observed birds included *Pardalotus striatus* (Striated Pardalote) and *Lichmera indistincta* (Brown Honeyeater) both recorded at 13 sites, *Platycercus adscitus* (Pale-headed Rosella), recorded at 10 sites and *Strepera graculina* (Pied Currawong), and recorded at nine of the 24 sites surveyed.

Raptors were scarce during the survey period, and no nocturnal birds of prey were recorded, potentially indicating a low abundance of suitable prey species such as small mammals, which was supported by the results of trapping and spotlighting activities, with no small mammals or evidence of small mammal activity detected during the survey.

4.2.2 Herpetofauna

Twelve reptile species were detected within the site during the survey period. This included three gecko species (**Plate 1**), six skinks (**Plate 2**), one dragon species and two snakes, one of which was identified by a sloughed skin, while the second species was captured in a pitfall trap. While the two snake species were detected only once, with the exception of *Gehyra nana* (Spotted Gecko) all other reptiles were recorded on at least three separate occasions.

In addition, seven species of amphibian were recorded during the survey, including one introduced species, *Chaunus marinus* (Cane Toad), which was observed at seven of the survey sites, and most abundant along the Granite Creek site. The most commonly encountered species was *Litoria inermis* (Bumpy Rocketfrog), which was prolific along the banks of the creek at the Granite Creek site. Multiple individuals were observed baking in full sun throughout the day on the rocky creek banks, dispersing into the water when disturbed.

No species of conservation significance were recorded during the survey, However, an interesting observation of *Litoria latopalmata* (Broad-palmed Frog) was made at proposed turbine site 42, at approximately 850 – 900m elevation (**Plate 3**). Habitat within this site was not considered consistent with the preferred habitat of this species.

4.2.3 Mammals

Two confirmed terrestrial mammal species were recorded during the survey period, including *Tachyglossus aculeatus* (Short-beaked Echidna) and *Equus caballus* (Horse). Evidence of *T. aculeatus* in the form of scratching around termite mounds and the base of tree trunks, was observed at many locations within the site, and the remains of one individual were identified on the access track near Proposed Turbine Site 67 (**Plate 4**). Extensive evidence of rock-wallaby presence was also observed throughout the site, with an abundance of scats observed and collected from rocky outcrops along the ridge tops at a number of the proposed Turbine Sites (**Plate 5**). While this species was not visually observed and is yet to be confirmed, it is considered likely to be *Petrogale mareeba* (mareeba Rock-wallaby), based on the current known distribution of rock-wallaby species throughout North Queensland. *P. mareeba* is listed as near threatened pursuant to the Nature Conservation (Wildlife) Regulation (NCWR) 2006 of the Nature Conservation Act 1992.

Nine microchiropteran species (bats) were positively identified through call recording and analysis (**Appendix N**), of which one species, *Hipposideros diadema* (Diadem leaf-nosed Bat) is listed as near threatened under the NCWR 2006.

Plate 1 - *Oedura coggeri* (Northern Spotted Velvet Gecko), recorded at three sites during the survey.

Plate 2 - *Carlia jarnoldae* (breeding male) observed at Site 21

Plate 3 - *Litoria latopalmata* (Broad-palmed Frog) observed on the rocky ridge top at Site 42

Plate 4 - Remains of *Tachyglossus aculeatus* (Short-beaked Echidna) found near Site 67

Plate 5 - Rock-wallaby scats (possibly of *Petrogale mareeba* (Mareeba Rock-wallaby)) listed as near threatened under the NCA 1992.

4.3 Important Vegetation Types and Habitat

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's 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 the primary artery for ecological 'flows' through the project area. Watercourses 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 – presumed to have occurred in the latter half of 2009 (probably around October). Clearing of these ridgelines could result in the loss or reduction of specialist plant communities reliant on the unusually characterised substrate and extreme exposure. 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.

It was observed that the 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.

4.3.1 Summary of Habitat Types

The rugged, discontinuous 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, 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 an 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 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.
- 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.

4.4 Conservation Values of the Study area

4.4.1 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. It is noted however, that these surveys focussed on targeted sites identified as a proposed location for a wind turbine.

Ground searches detected two species of plants noted as being of conservation interest under both Queensland and Commonwealth legislation. These were the shrubs *Homoranthus porteri* and *Grevillea glossadenia*: both of which were found at one location growing in association on the ridge above the western fall of the range just south of the existing powerline.

No other rare or threatened flora species were recorded during the surveys; however, this does not imply that such species do not occur, and it is 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 (it is recognised that 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 when conditions are more conducive to active growth and flowering of this important vegetation stratum.

4.4.2 Significant Fauna

Thirty-four threatened fauna species, listed under Commonwealth and / or Queensland legislation and 17 migratory species have been identified or have been predicted to occur within the study area. However, during the field investigations, only one species listed as near threatened under the NC Act was confirmed. *Hipposideros diadema* (Diadem's Leafnosed Bat) was recorded on one occasion at the Granite Creek site on the night of 12th May 2010. In addition, it is considered likely that the rock-wallaby species inhabiting the ridge tops is the near threatened *Petrogale mareeba*, also listed under Queensland legislation.

5 Potential Ecological Impacts

5.1 General Impacts on Flora and Fauna

The potential impacts of the project are difficult to categorise and quantify at this stage of the investigation as the preliminary layout may change: i.e. mapping inaccuracies with vegetation community boundaries; noise; rotor blade strike; alienation of wildlife; visual amenity. Nevertheless, it is expected that linear and patch clearing of vegetation will be required for the construction pad of each turbine (approximately 20m 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 reduce connectivity of vegetation and modify important wildlife habitats 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 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).

In the short term, linear clearing within remnant vegetation has the potential to create intermittent breaks in connectivity for ground fauna, but will have a lesser effect for flying and terrestrial fauna. Impacts in this sense are likely to be restricted to direct bird and bat strikes with turbine impellors. Conservation significant fauna could also be affected by the removal or major modification to key habitat resources, such as feed and den or roost trees. In addition, short term disturbance during the construction phase may result in the temporary relocation of local wildlife species and populations.

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 useful suite of plants that could be selected for site rehabilitation is researched.

Loss of vegetation for access tracks and the turbine construction pads could result in impacts to vegetation considered to be habitat for plants of conservation interest 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 shrubs such as *Grevillea glossadenia*, *Homoranthus porteri* and *Acacia purpureopetala* have been collected. 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 on Walsh Bluff and in similar habitats along ridges of the western portion of the project area. Dedicated threatened and near 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 30 metres 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 could result in a very 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. Sometimes this community is expressed as an area no wider than 20 m, 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 suite 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 indiscrete 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 of whether a different suite of colonising plants will eventuate.

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 subshrubs with stunted and contorted forms – an adaptation to persistent wind shearing, cooler 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.).

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 normal 'settled' 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 clay particles can be expected. It was observed during the survey 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.

A discernible characteristic of the study area is its rugged and markedly dissected ridge topography. This landscape situation becomes increasingly more 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.

5.2 Rotor Strike

The primary concern for fauna arising from wind farm developments is the probability of mortality of bird and bat species from collision with turbine rotors (DEWHA 2008). DEWHA further identify that groups of fauna considered being at most risk, and the situations in which they are most affected include the following:

- water birds that are listed threatened species, listed migratory species, and/or part of the ecological character of a Ramsar wetland;
- seabirds that are listed threatened species, listed migratory species and/or part of the ecological character of a Ramsar wetland—in the case of coastal and offshore wind farms;
- listed migratory species and listed threatened species that migrate within Australia where wind farms are situated on migration routes, and
- species that are at risk of extinction, that is, species that are listed as endangered or critically endangered, in particular, certain species of bats and birds, where wind farms are situated on a site they frequent.

It should be noted that some species are more prone to collide with turbine rotors than others (DEWHA 2008). For example, large soaring raptors tend to fly at turbine rotor height and are not agile fliers. Therefore, these species are more likely to collide with rotors than agile species, or those which fly higher or lower than rotor height. Such species are also likely to use the site topography differently and may frequent areas such as cliff edges and other updraft slopes more often (DEWHA 2008).

Some bat species are also known to fly at the height of the turbine rotors. Species that travel in flocks are also at relatively high risk of collision, particularly those that travel at night. Hence, listed threatened species that are nocturnal and also large soaring species are at greater risk of mortality from collision with rotors than are listed threatened species that tend to stay below the sweep area of the rotor blades. Similarly, listed threatened species of birds and bats that prefer open airspace tend to be more at risk than those that stay close to vegetation (DEWHA 2008).

Preliminary investigations undertaken in May 2010 indicate a relatively low diversity of bat and bird species occurring within the site. In addition, only one migratory species, *Merops ornatus* (Rainbow Bee-eater), recognised as a common and widespread species (Birds in Backyards 2010), was observed within the site. The project area is not recognised specifically as a migration route for this species, as northern populations are present year round (Birds in Backyards 2010b). The Rainbow Bee-eater generally flies below the height of the turbine rotor blades, foraging for insects, and as such, the impacts of rotor strike on this migratory species are predicted to be low.

Four small raptor species were recorded during the survey, all of which were sighted on one occasion only. One large raptor, *Aquila audax* (Wedge-tailed Eagle), was also recorded at four sites during the survey. No raptor nests were identified, although suitable foraging habitat for these birds occurs within and surrounding the site.

Seabirds and waterbirds, including threatened species, or not considered at risk from the proposed development, as no seabirds or waterbirds were recorded, and no suitable habitat exists within the site or in the close vicinity to support such species or populations.

No threatened bird or bat species were recorded during the survey. However, one near threatened bat species, *Hipposideros diadema* (Diadem leaf-nosed Bat), was recorded at the Granite Creek site. This species is a low flier in gallery forests, over water pools and is also found in disturbed forests (Aul and Vijaykumar 2003). As such, the proposed wind farm should not have a significant impact on this near threatened species through rotor blade strikes.

Appropriate mitigation measures, such as well planned site location, design and construction of wind farms should be included to ensure that native vegetation and habitats are largely preserved, and the risk of direct

rotor blade strikes on bird and bat species is minimised to the greatest extent possible. A range of factors may be considered to reduce the likelihood of direct impellor collision, including:

- Wind farm technology, such as:
  - » the type of wind turbine;
  - » lighting of wind turbines; and
  - » the layout of the wind farm;
- site characteristics, including:
  - » the ecosystems on the wind farm site;
  - » proximity to bird concentrations; and
  - » the numbers of birds moving across the wind farm site;
- the risk behaviours of birds (e.g. soaring at rotor swept area (RSA) height); and
- prevailing weather conditions and other local environmental factors.

In addition, a six-year study assessing the impacts of offshore wind farms on bird species determined that up to 86% of birds travelling towards wind farms avoided going through them (Fox et al. 2006).

It is recognised however, that such incidences are very difficult to quantify at preliminary stages of investigation, and further surveys should be undertaken prior to the construction of the wind farm, to determine the extent of potential risk associated with rotor blade strikes to bird and bat species. Nevertheless, given that no bat roosts or conservation significant fauna species were identified in the study area, the level of impact is postulated to be low. It is also recommended that periodic monitoring of fauna strikes is undertaken and records of these events maintained and disseminated to relevant authorities to further the knowledge of such events. This could be performed as part of the wind farm maintenance schedule.

The disturbance of vegetation and other associated impacts of the wind farm, including noise and shadow effects, may also result in habitat avoidance or alienation from important sites, on or off the wind farm.

In summary, detailed site positioning of wind turbines has the benefit of locating a position of least ecological impact. With careful turbine placement and consideration given to the routing of the road and cabling network, the impacts of the wind farm are expected to be of relatively low intensity and recoverable.

6 Recommendations and Mitigation for Habitat Management

It is recommended that the following mitigation measures should be adhered to or implemented to minimise and monitor any likely and potential ecological impacts of the project:

- An Adaptive Management Program should be implemented, including a bird and bat monitoring program;
- All vegetation removal should be restricted to the actual development footprint. Careful micro-site locating of roads and cabling should be undertaken to minimise potential impacts;
- 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;
- Weed management is strongly recommended given that invasive species such as *Themeda quadrivalvis* (Grader Grass) are known to have a detrimental effect on the function of woodland and open forest plant communities in north Queensland and elsewhere in Australia. A Weed Management Plan could be developed that addresses the strategies and impact mitigation for deleterious species;
- Power line (cabling) between turbines should be constructed underground and along road infrastructure to minimise the number of easements through the property and reduce further incidents of potential avian and bat collisions (including the creation of perching locations in the vicinity of turbines). After initial clearing and construction, the cabling and road network should be allowed to regenerate under natural conditions to 5 m cleared width;
- 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, dead standing timber and living, hollow-bearing trees should be retained. This is particularly important as hollows were generally limited throughout the study area. These hollow-bearing trees have reached mature age and senesced as a natural consequence, and old trees such as these provide a range of important and established habitat niches for nesting, as well as perches (particularly for birds of prey and owls). In sheltered locations these trees assume greater significance due to their proximity to diverse foraging areas.
- 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 groundlayer 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.
- A post-construction bird and bat monitoring program, such as that described by NWCC (1999) and AusWEA (2005) should be established to determine the impacts of the project on bird / bat populations. Such data may prove invaluable for assessing the impacts of future wind farms within Queensland;
- Constructional and operational phases of the development should be in line with the Best Practice Guidelines for Wind Energy Projects (AusWEA 2002), including the implementation of an Environmental Management Plan (EMP) and a Construction Management Plan (CMP);

- The CMP should include appropriate weed control measures such as washing machinery after entering affected areas and spraying road ways to ensure the spread of weeds is restricted during construction and throughout the ongoing operation of the wind farm; and
- Pre-clearing surveys should be undertaken by experienced ecologists at turbine and infrastructure locations to identify hollow-bearing trees and threatened flora species prior to the commencement of any construction and should include:
  - » Marking of hollow bearing or significant habitat trees and threatened flora species (where appropriate);
  - » Areas of vegetation to be retained should be clearly marked, and
  - » Careful micro-site locating of infrastructure and turbines to minimise the removal of hollow-bearing trees and/or threatened flora should be undertaken. Where removal of hollow-bearing trees cannot be avoided, an ecologist (spotter-catcher) should be present during felling to minimise harm to fauna species.
- A Threatened Plant Species Management Plan should be developed that identifies species of conservation interest, which are known to occur in the project area. The plan should include the range of strategies and impact mitigation measures that are be implemented to ensure that respective conservation outcomes are achieved in accordance with Queensland and Commonwealth legislation (*Environment Protection and Biodiversity Conservation Act 1999* and the *Nature Conservation Act 1992* respectively).

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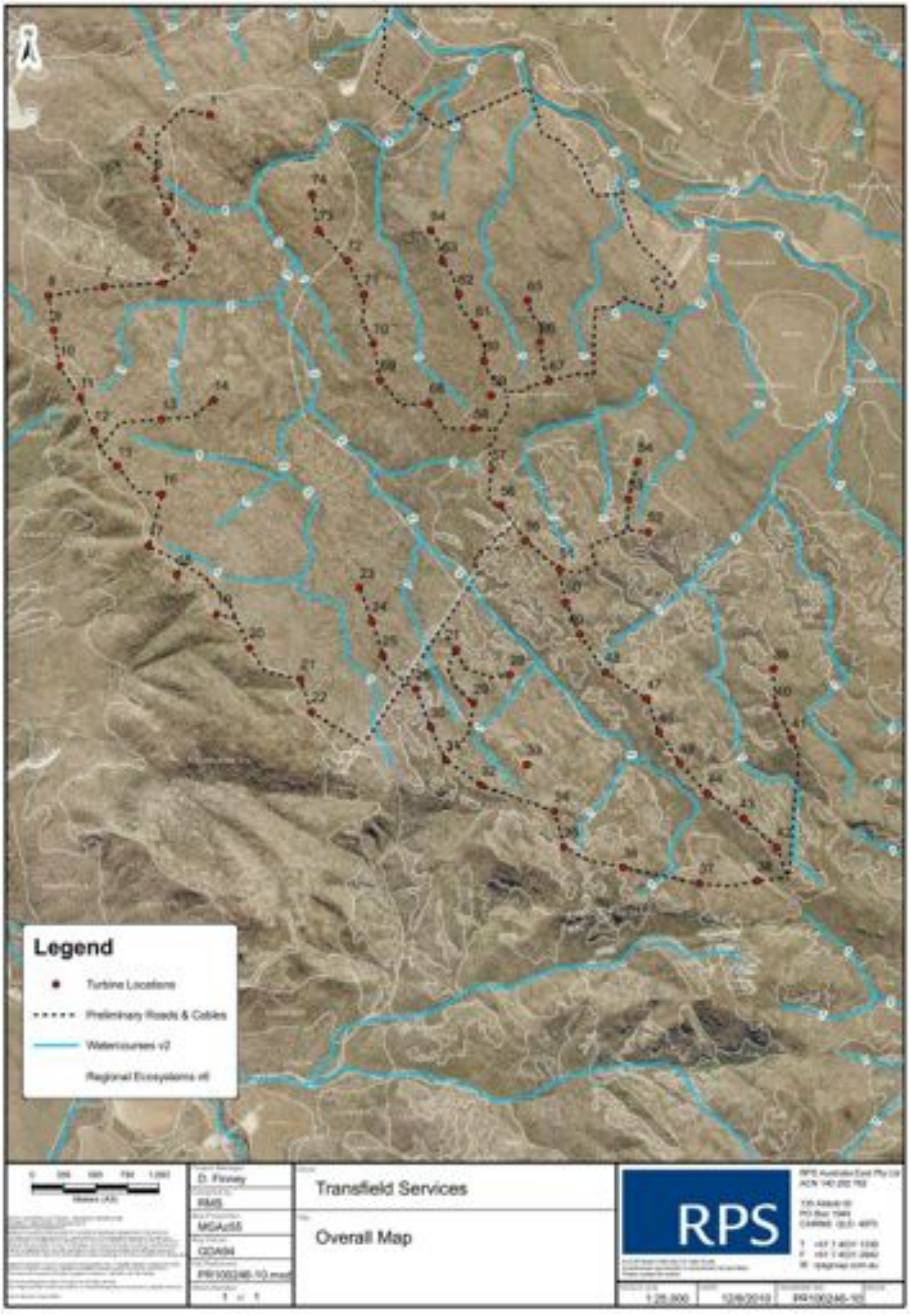
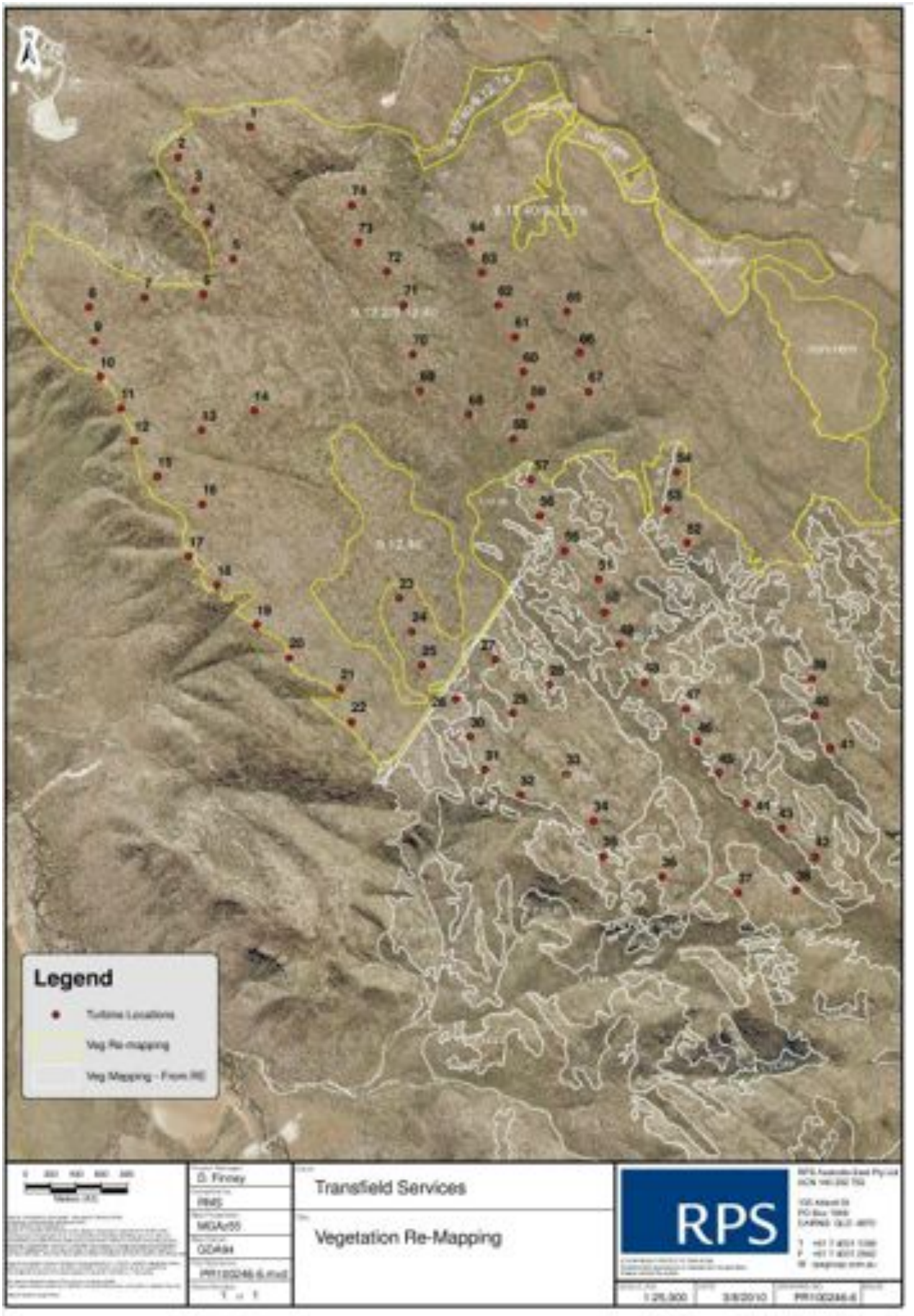
Appendix A

Proposed Turbine Positions, and Road & Cabling Network


Legend
Turbine Locations
Preliminary Roads & Cables
Watercourses v2
Regional Ecosystems v6
D. Finney
RMS
MGAz55
GDA94
Transfield Services
Overall Map
RPS
1:25,000
12/8/2010

Appendix B

Regional Ecosystem Mapping


Legend
Turbine Locations
Veg Re-mapping
Veg Mapping - From RE
D. Finney
RMS
MGA/55
GDA94
Transfield Services
Vegetation Re-Mapping
RPS
1:25,000
3/8/2010

Appendix C

Regional Ecosystem Descriptions

Appendix D

Wildlife Online Database Search Results

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Wildlife Online Extract

Search Criteria: Species List for a Specifed Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 17.1696
Longitude: 145.3898
Distance: 10
Email: lyndall.harvey@rpsgroup.com.au
Date submitted: Tuesday 04 May 2010 10:45:18
Date extracted: Tuesday 04 May 2010 10:46:21

The number of records retrieved = 800

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			2
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		2
animals	amphibians	Hylidae	*Litoria rothii*	northern laughing treefrog		C		1
animals	amphibians	Hylidae	*Litoria bicolor*	northern sedgefrog		C		1
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		1
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		1
animals	amphibians	Myobatrachidae	*Uperoleia altissima*	tableland gungan		C		1
animals	birds	Acanthizidae	*Gerygone albogularis*	white-throated gerygone		C		4
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		1
animals	birds	Acanthizidae	*Sericornis keri*	Atherton scrubwren		C		1
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		2
animals	birds	Acanthizidae	*Sericornis citreogularis*	yellow-throated scrubwren		C		1
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		2
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		2
animals	birds	Acanthizidae	*Oreoscopus gutturalis*	fernwren		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		1
animals	birds	Accipitridae	*Elanus scriptus*	letter-winged kite		C		1
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		11
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		2
animals	birds	Accipitridae	*Erythrotriorchis radiatus*	red goshawk		E	V	1
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		R		2/1
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		4
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		3
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		3
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		R		2
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		1
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		6
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		1
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		4
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		1
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		R		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		5
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		2
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		2
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		4
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		3
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		2
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		2
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		4
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		7
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		3
animals	birds	Campephagidae	*Lalage sueurii*	white-winged triller		C		2
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		7
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		7
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		2
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		4
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		2
animals	birds	Climacteridae	*Cormobates leucophaea minor*	white-throated treecreeper (northern)		C		1
animals	birds	Columbidae	*Columba livia*	rock dove	Y			1
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		2
animals	birds	Columbidae	*Geophaps scripta*	squatter pigeon		C		2/1
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		6
animals	birds	Columbidae	*Macropygia amboinensis*	brown cuckoo-dove		C		1
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			4
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		2
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		5
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites minutillus minutillus*	little bronze-cuckoo		C		1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		2
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		5/1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		1
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		7
animals	birds	Estrildidae	*Erythrura gouldiae*	Gouldian finch		E	E	3
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		3
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		2
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		2
animals	birds	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	Y			1
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		1
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		2
animals	birds	Gruidae	*Grus antigone*	sarus crane		C		1
animals	birds	Gruidae	*Grus rubicunda*	brolga		C		1
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		1
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		11
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		1
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		5
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		2
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		2
animals	birds	Laridae	*Gygis alba*	white tern		C		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		3
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		6
animals	birds	Megapodiidae	*Megapodius reinwardt*	orange-footed scrubfowl		C		1
animals	birds	Meliphagidae	*Meliphaga notata*	yellow-spotted honeyeater		C		1
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		1
animals	birds	Meliphagidae	*Ramsayornis fasciatus*	bar-breasted honeyeater		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		2
animals	birds	Meliphagidae	*Melithreptes lunatus*	white-naped honeyeater		C		1
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		8
animals	birds	Meliphagidae	*Lichenostomus flavus*	yellow honeyeater		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Meliphagidae	*Philemon buceroides*	helmeted friarbird		C		1
animals	birds	Meliphagidae	*Phylidonyris niger*	white-cheeked honeyeater		C		3
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		3/1
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		6
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		1
animals	birds	Meliphagidae	*Melithreptes albogularis*	white-throated honeyeater		C		4
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		4
animals	birds	Meliphagidae	*Lichenostomus frenatus*	bridled honeyeater		C		1
animals	birds	Meliphagidae	*Lichenostomus chrysops*	yellow-faced honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		6
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		2
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		C		1
animals	birds	Monarchidae	*Symposiarchus trivirgatus*	spectacled monarch		C		2
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		25
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		C		1
animals	birds	Nectariniidae	*Nectarinia jugularis*	olive-backed sunbird		C		1
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		4
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		1
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		1
animals	birds	Oriolidae	*Sphecotheres viaillot*	Australasian figbird		C		3
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		1
animals	birds	Pachycephalidae	*Colluricincla boweri*	Bower's shrike-thrush		C		1
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		5
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		2
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		3
animals	birds	Pardalotidae	*Pardalotus rubricatus*	red-browed pardalote		C		1
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			2
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		2
animals	birds	Petroicidae	*Heteromyias cinereifrons*	grey-headed robin		C		1
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		3
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		2
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		1
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		1
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		4
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		2
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		3
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		5
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		10/1
animals	birds	Psittacidae	*Cyclopsitta diophthalma macleayana*	Macleay's fig-parrot		V		1
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		1
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		1
animals	birds	Ptilonorhynchidae	*Ailuroedus melanotis*	spotted catbird		C		6/2
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus nuchalis*	great bowerbird		C		1

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animals	birds	Ptilonorhynchidae	*Scenopoeetes dentirostris*	tooth-billed bowerbird		C		2
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		3
animals	birds	Recurvirostridae	*Recurvirostra novaehollandiae*	red-necked avocet		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		5
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		9
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		C		1
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		1
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		1
animals	birds	Sturnidae	*Sturnus tristis*	common myna	Y			21
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		2
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		7
animals	birds	Turdidae	*Zoothera heinei*	russet-tailed thrush		C		1
animals	birds	Turdidae	*Zoothera lunulata cuneata*	bassian thrush (north-east Queensland)		C		1/1
animals	birds	Turnicidae	*Turnix maculosus*	red-backed button-quail		C		2/1
animals	birds	Turnicidae	*Turnix pyrrhothorax*	red-chested button-quail		C		1/1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		1/1
animals	birds	Tytonidae	*Tyto longimembris*	eastern grass owl		C		3
animals	birds	Tytonidae	*Tyto tenebricosa multipunctata*	lesser sooty owl		C		1
animals	bony fish	Belonidae	*Strongylura krefftii*	freshwater longtom				1
animals	bony fish	Clupeidae	*Nematalosa erebi*	bony bream				1
animals	bony fish	Eleotridae	*Hypseleotris galii*	firetail gudgeon				1
animals	bony fish	Melanotaeniidae	*Melanotaenia eachamensis*	Lake Eacham rainbowfish			E	1/1
animals	bony fish	Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish				2
animals	bony fish	Melanotaeniidae	*Melanotaenia splendida inornata*	checkered rainbowfish				1
animals	bony fish	Terapontidae	*Leiopotherapon unicolor*	spangled perch				1
animals	mammals	Dasyuridae	*Planigale maculata*	common planigale		C		3/2
animals	mammals	Dasyuridae	*Dasyurus hallucatus*	northern quoll		C	E	1/1
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			1
animals	mammals	Macropodidae	*Macropus agilis*	agile wallaby		C		1
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		1
animals	mammals	Macropodidae	*Petrogale mareeba*	Mareeba rock-wallaby		R		3/2
animals	mammals	Macropodidae	*Macropus robustus*	common wallaroo		C		1
animals	mammals	Macropodidae	*Thylogale stigmatica*	red-legged pademelon		C		1
animals	mammals	Muridae	*Rattus rattus*	black rat	Y			1/1
animals	mammals	Muridae	*Mesembriomys gouldi*	black-footed tree-rat		C		1/1
animals	mammals	Muridae	*Rattus sordidus*	canefield rat		C		1/1
animals	mammals	Ornithorhynchidae	*Ornithorhynchus anatinus*	platypus		C		1
animals	mammals	Peramelidae	*Perameles nasuta*	long-nosed bandicoot		C		1/1
animals	mammals	Petauridae	*Dactylopsila trivirgata*	striped possum		C		1
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		2/2
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		2/1
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		1
animals	mammals	Pseudocheiridae	*Pseudochirops archeri*	green ringtail possum		R		2/2
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		1/1
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		29

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animals	mammals	Pteropodidae	*Pteropus conspicillatus*	spectacled flying-fox		C	V	11/3
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		C		2/2
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		5
animals	reptiles	Boidae	*Morelia kinghorni*	amethystine python (Australian form)		C		1
animals	reptiles	Boidae	*Aspidites melanocephalus*	black-headed python		C		2
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		1/1
animals	reptiles	Elapidae	*Cacophis churchilli*			C		1/1
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		1/1
animals	reptiles	Elapidae	*Acanthophis antarcticus*	common death adder		R		1/1
animals	reptiles	Elapidae	*Rhinoplocephalus nigrescens*	eastern small-eyed snake		C		1/1
animals	reptiles	Gekkonidae	*Oedura rhombifer*	zig-zag gecko		C		1
animals	reptiles	Scincidae	*Carlia storri*			C		1/1
animals	reptiles	Scincidae	*Eulamprus tenuis*			C		1/1
animals	reptiles	Scincidae	*Cryptoblepharus metallicus*	metallic snake-eyed skink		C		1
fungi	club fungi	Basidiomycota	*Amanita*			C		1/1
fungi	club fungi	Basidiomycota	*Agaricus*			C		1/1
fungi	club fungi	Basidiomycota	*Polyporus*			C		1/1
fungi	club fungi	Basidiomycota	*Scleroderma*			C		1/1
fungi	club fungi	Basidiomycota	*Trametes lactinea*			C		1/1
fungi	club fungi	Basidiomycota	*Coriolus unguiatus*			C		1/1
fungi	club fungi	Basidiomycota	*Armillaria luteobubalina*			C		1/1
fungi	club fungi	Basidiomycota	*Ganoderma williamsianum*			C		1/1
fungi	club fungi	Basidiomycota	*Microporellus obovatus*			C		1/1
fungi	club fungi	Basidiomycota	*Macrolepiota clelandii*			C		1/1
fungi	club fungi	Basidiomycota	*Coriolus elongatus*			C		1/1
fungi	club fungi	Basidiomycota	*Stereum ostrea*			C		1/1
fungi	club fungi	Basidiomycota	*Pisolithus*			C		1/1
fungi	club fungi	Basidiomycota	*Inonotus*			C		1/1
fungi	club fungi	Basidiomycota	*Lepista*			C		1/1
fungi	club fungi	Basidiomycota	*Boletus*			C		1/1
fungi	sac fungi	Acarosporaceae	*Acarospora*			C		1/1
fungi	sac fungi	Pertusariaceae	*Pertusaria subventosa var. subventosa*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia*			C		1/1
fungi	sac fungi	Physciaceae	*Pyxine plumea*			C		1/1
fungi	uncertain	Ascomycota	*Roselinia arcuata*			C		1/1
plants	club mosses	Lycopodaceae	*Huperzia phlegmaria*	coarse tassel fern		R		1/1
plants	conifers	Araucariaceae	*Agathis robusta*	kauri pine		C		1/1
plants	conifers	Araucariaceae	*Agathis microstachya*	bull kauri		R		2/2
plants	conifers	Cupressaceae	*Callitris intratropica*	coast cypress pine		C		3/1
plants	conifers	Podocarpaceae	*Sundacarpus amarus*			C		1/1
plants	cycads	Cycadaceae	*Cycas media subsp. banksii x C.platyphylla*			C		1/1
plants	ferns	Adiantaceae	*Cheilanthes*			C		4
plants	ferns	Adiantaceae	*Adiantum philippense*			C		1/1
plants	ferns	Adiantaceae	*Cheilanthes tenuifolia*	rock fern		C		1/1
plants	ferns	Adiantaceae	*Adiantum hispidulum var. minus*			C		1/1
plants	ferns	Adiantaceae	*Doryopteris concolor*			C		1/1

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plants	ferns	Adiantaceae	*Adiantum silvaticum*			C		1/1
plants	ferns	Aspleniaceae	*Asplenium palleacaum*	scaly asplenium		C		1/1
plants	ferns	Aspleniaceae	*Asplenium australasicum*			C		1/1
plants	ferns	Athyriaceae	*Diplazium dilatatum*			C		2/2
plants	ferns	Athyriaceae	*Calliparis prolifera*			C		2/2
plants	ferns	Azollaceae	*Azolla pinnata*	ferny azolla		C		1/1
plants	ferns	Blechnaceae	*Blechnum wununuran*			C		1/1
plants	ferns	Blechnaceae	*Pteridoblechnum neglectum*			C		1/1
plants	ferns	Cyatheaceae	*Cyathea celebica*			R		2/2
plants	ferns	Cyatheaceae	*Cyathea baileyana*	wig tree fern		R		1/1
plants	ferns	Davalliaceae	*Davallia pyxidata*			C		1/1
plants	ferns	Dicksoniaceae	*Dicksonia herbertii*			C		2/2
plants	ferns	Dryopteridaceae	*Lastreopsis rufescens*			C		1/1
plants	ferns	Dryopteridaceae	*Lastreopsis microsora subsp. microsora*			C		2/2
plants	ferns	Gleicheniaceae	*Sticherus flabellatus var. flabellatus*			C		1/1
plants	ferns	Hymenophyllaceae	*Hymenophyllum samoense*			C		1/1
plants	ferns	Marattiaceae	*Marattia oreades*	potato fern		C		1/1
plants	ferns	Nephrolepidaceae	*Arthropteris tenella*	climbing fern		C		1/1
plants	ferns	Ophioglossaceae	*Ophioglossum gramineum*			C		1/1
plants	ferns	Polypodiaceae	*Colysis sayeri*			C		1/1
plants	ferns	Polypodiaceae	*Pyrrosia confluens var. dielsii*			C		1/1
plants	ferns	Pteridaceae	*Pteris tripartita*	lacy bracken		C		1/1
plants	ferns	Pteridaceae	*Acrostichum aureum*	golden mangrove fern		C		1/1
plants	ferns	Thelypteridaceae	*Cyclosorus interruptus*			C		1/1
plants	ferns	Thelypteridaceae	*Sphaerostephanos unitus var. unitus*			C		2/2
plants	ferns	Vittariaceae	*Monogramma acrocarpa*			C		1/1
plants	higher dicots	Acanthaceae	*Brunoniella acaulis*			C		1
plants	higher dicots	Acanthaceae	*Asystasia sp. (Newcastle Bay L.J.Brass 18671)*			C		1/1
plants	higher dicots	Acanthaceae	*Rostellularia adscendens var. hispida*			C		1/1
plants	higher dicots	Acanthaceae	*Brunoniella australis*	blue trumpet		C		1/1
plants	higher dicots	Acanthaceae	*Hemiera hygrophiloides*	white karambol		C		1/1
plants	higher dicots	Acanthaceae	*Hypoestes phyllostachya*		Y			2/2
plants	higher dicots	Amaranthaceae	*Amaranthus spinosus*	needle bur	Y			1/1
plants	higher dicots	Amaranthaceae	*Deeringia amaranthoides*	redberry		C		1/1
plants	higher dicots	Apiaceae	*Actinotus gibbonsii*	dwarf flannel flower		C		2/2
plants	higher dicots	Apiaceae	*Mackinlaya macrosciadea*	mackinlaya		C		1/1
plants	higher dicots	Apocynaceae	*Alyxia spicata*			C		1/1
plants	higher dicots	Apocynaceae	*Wrightia saligna*			C		1/1
plants	higher dicots	Apocynaceae	*Phyllanthera grayi*			V		7/7
plants	higher dicots	Apocynaceae	*Tylophora benthamii*	coast tylophora		C		1/1
plants	higher dicots	Apocynaceae	*Catharanthus roseus*	pink periwinkle	Y			1/1
plants	higher dicots	Apocynaceae	*Tylophora colorata*			C		1/1
plants	higher dicots	Apocynaceae	*Neisosperma poweri*			C		1/1
plants	higher dicots	Apocynaceae	*Alstonia muelleriana*	hard milkwood		C		1/1
plants	higher dicots	Apocynaceae	*Marsdenia longipedicellata*			C		1/1
plants	higher dicots	Apocynaceae	*Marsdenia suboviculatis*			C		1/1

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plants	higher dicots	Apocynaceae	*Gomphocarpus physocarpus*	balloon cottonbush	Y			2/2
plants	higher dicots	Apocynaceae	*Asclepias curassavica*	red-head cottonbush	Y			1/1
plants	higher dicots	Araliaceae	*Hydrocotyle*			C		1/1
plants	higher dicots	Araliaceae	*Astrotricha pterocarpa*			C		1/1
plants	higher dicots	Asteraceae	*Bidens pilosa*		Y			1
plants	higher dicots	Asteraceae	*Cirsium vulgare*	spear thistle	Y			2/2
plants	higher dicots	Asteraceae	*Cyanthillium cinereum*			C		4
plants	higher dicots	Asteraceae	*Pterocaulon redolens*			C		5
plants	higher dicots	Asteraceae	*Praxelis clematidea*		Y			2/2
plants	higher dicots	Asteraceae	*Ageratum conyzoides*	billygoat weed	Y			1
plants	higher dicots	Asteraceae	*Camptacra gracilis*			C		1/1
plants	higher dicots	Asteraceae	*Eclipta prostrata*	white eclipta		C		1
plants	higher dicots	Asteraceae	*Ageratina riparia*	mistflower	Y			1/1
plants	higher dicots	Asteraceae	*Senecio tamoides*		Y			1/1
plants	higher dicots	Asteraceae	*Cosmos caudatus*		Y			2/2
plants	higher dicots	Asteraceae	*Centratherum punctatum subsp. punctatum*		Y			1/1
plants	higher dicots	Asteraceae	*Acmella grandiflora var. brachyglossa*			C		5/5
plants	higher dicots	Asteraceae	*Phaseolothrix cladochaeta*			C		1/1
plants	higher dicots	Asteraceae	*Parthenium hysterophorus*	parthenium weed	Y			1/1
plants	higher dicots	Asteraceae	*Coronidium newcastlianum*			C		1
plants	higher dicots	Asteraceae	*Ozothamnus cassinioides*			C		1/1
plants	higher dicots	Asteraceae	*Tithonia diversifolia*	Japanese sunflower	Y			1/1
plants	higher dicots	Asteraceae	*Montanoa hibiscifolia*		Y			1/1
plants	higher dicots	Balanopaceae	*Balanops australiana*			C		1/1
plants	higher dicots	Bignoniaceae	*Macfadyena unguis-cati*	cat's claw creeper	Y			1/1
plants	higher dicots	Bignoniaceae	*Spathodea campanulata subsp. nilotica*		Y			1/1
plants	higher dicots	Bignoniaceae	*Dolichandrone heterophylla*			C		2
plants	higher dicots	Boraginaceae	*Trichodesma zeylanicum*			C		1
plants	higher dicots	Boraginaceae	*Heliotropium tabulilagae*			C		1/1
plants	higher dicots	Brassicaceae	*Lepidium virginicum*	Virginian peppercress	Y			1/1
plants	higher dicots	Burseraceae	*Canarium australasicum*	mango bark		C		1
plants	higher dicots	Byttneriaceae	*Keraudrenia lanceolata*			C		1/1
plants	higher dicots	Caesalpiniaceae	*Cassia*			C		2
plants	higher dicots	Caesalpiniaceae	*Senna septentrionalis*		Y			1/1
plants	higher dicots	Caesalpiniaceae	*Chamaecrista mimosoides*	dwarf cassia		C		1/1
plants	higher dicots	Caesalpiniaceae	*Erythrophleum chlorostachys*			C		3/2
plants	higher dicots	Campanulaceae	*Lobelia*			C		1
plants	higher dicots	Campanulaceae	*Lobelia gibbosa var. gibbosa*			C		1/1
plants	higher dicots	Campanulaceae	*Wahlenbergia*			C		1
plants	higher dicots	Caryophyllaceae	*Polycarpaea corymbosa*			C		1
plants	higher dicots	Caryophyllaceae	*Polycarpaea spirostylis subsp. spirostylis*			C		1/1
plants	higher dicots	Casuarinaceae	*Allocasuarina torulosa*			C		1/1
plants	higher dicots	Casuarinaceae	*Allocasuarina littoralis*			C		2/1
plants	higher dicots	Celastraceae	*Celastraceae*			C		1
plants	higher dicots	Celastraceae	*Euonymus australiana*			C		2/2
plants	higher dicots	Celastraceae	*Elaeodendron melanocarpum*			C		1/1

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plants	higher dicots	Celastraceae	*Maytenus cunninghamii*	yellow berry bush		C		6
plants	higher dicots	Celastraceae	*Maytenus disperma*	orange boxwood		C		3/3
plants	higher dicots	Convolvulaceae	*Xenostegia tridentata*			C		1/1
plants	higher dicots	Convolvulaceae	*Ipomoea polpha subsp. polpha*			C		6/6
plants	higher dicots	Cucurbitaceae	*Neoalsomitra clavigera*			C		1/1
plants	higher dicots	Cunoniaceae	*Pullea stutzeri*	hard alder		C		1/1
plants	higher dicots	Dilleniaceae	*Hibbertia*			C		2/1
plants	higher dicots	Dilleniaceae	*Hibbertia longifolia*			C		2
plants	higher dicots	Ebenaceae	*Diospyros australis*	black plum		C		1/1
plants	higher dicots	Elaeocarpaceae	*Elaeocarpus eumundi*	Eumundi quandong		C		1/1
plants	higher dicots	Elaeocarpaceae	*Elaeocarpus coorangaoloo*			R		12/12
plants	higher dicots	Ericaceae	*Monotoca scoparia*	prickly broom heath		C		1/1
plants	higher dicots	Ericaceae	*Acrotriche aggregata*	red cluster heath		C		1/1
plants	higher dicots	Ericaceae	*Melichrus urceolatus*	honey gorse		C		1/1
plants	higher dicots	Ericaceae	*Leucopogon ruscifolius*			C		1/1
plants	higher dicots	Ericaceae	*Astroloma sp. (Basil Gammon B.P.Hyland 10341)*			C		1/1
plants	higher dicots	Ericaceae	*Acrothamnus spathaceus*			C		1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia*			C		1
plants	higher dicots	Euphorbiaceae	*Croton insularis*	Queensland cascarilla		C		2/2
plants	higher dicots	Euphorbiaceae	*Bertya polystigma*			C		1/1
plants	higher dicots	Euphorbiaceae	*Alchornea ilicifolia*	native holly		C		2/2
plants	higher dicots	Euphorbiaceae	*Mallotus philippensis*	red kamala		C		1
plants	higher dicots	Euphorbiaceae	*Aleurites rockinghamensis*			C		1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia pulcherrima*		Y			1/1
plants	higher dicots	Euphorbiaceae	*Baloghia parviflora*			C		2/2
plants	higher dicots	Fabaceae	*Vigna*			C		1/1
plants	higher dicots	Fabaceae	*Zornia*			C		1/1
plants	higher dicots	Fabaceae	*Desmodium*			C		1
plants	higher dicots	Fabaceae	*Hovea rana*			C		2/2
plants	higher dicots	Fabaceae	*Uraria picta*			C		1/1
plants	higher dicots	Fabaceae	*Derris sp. (Claudie River L.J.Webb+ 8348)*			C		1/1
plants	higher dicots	Fabaceae	*Cajanus acaraboeoides var. acaraboeoides*			C		3/3
plants	higher dicots	Fabaceae	*Crotalaria montana var. angustifolia*			C		1/1
plants	higher dicots	Fabaceae	*Cajanus reticulatus var. reticulatus*			C		2/2
plants	higher dicots	Fabaceae	*Austrosteenisia blackii var. blackii*			C		1/1
plants	higher dicots	Fabaceae	*Mirbelia speciosa subsp. ringrosei*			C		1/1
plants	higher dicots	Fabaceae	*Macroptyloma axillare var. axillare*		Y			2/2
plants	higher dicots	Fabaceae	*Galactia tenuiflora forma sericea*			C		2/2
plants	higher dicots	Fabaceae	*Pultenaea millarii var. millarii*			C		5/5
plants	higher dicots	Fabaceae	*Neonotonia wightii var. wightii*		Y			2/2
plants	higher dicots	Fabaceae	*Glycine tomentella*	woolly glycine		C		3/2
plants	higher dicots	Fabaceae	*Crotalaria montana*			C		2
plants	higher dicots	Fabaceae	*Galactia muelleri*			C		1
plants	higher dicots	Fabaceae	*Crotalaria brevis*			C		1/1
plants	higher dicots	Fabaceae	*Clitoria ternatea*	butterfly pea	Y			1/1
plants	higher dicots	Fabaceae	*Tephrosia juncea*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Fabaceae	*Mirbelia pungens*			C		1/1
plants	higher dicots	Fabaceae	*Hovea longipes*	brush hovea		C		1/1
plants	higher dicots	Fabaceae	*Cajanus cajan*	pigeon pea	Y			1/1
plants	higher dicots	Fabaceae	*Indigofera pratensis*			C		6
plants	higher dicots	Fabaceae	*Indigofera linifolia*			C		2/1
plants	higher dicots	Fabaceae	*Gompholobium nitidum*			C		1/1
plants	higher dicots	Fabaceae	*Flemingia paniflora*	flemingia		C		4
plants	higher dicots	Fabaceae	*Crotalaria goreensis*	gambia pea	Y			3/2
plants	higher dicots	Fabaceae	*Centrosema pascuorum*		Y			1/1
plants	higher dicots	Fabaceae	*Crotalaria calycina*			C		2/2
plants	higher dicots	Fabaceae	*Lotononis bainesii*	lotononis	Y			1/1
plants	higher dicots	Fabaceae	*Kennedia rubicunda*	red Kennedy pea		C		1/1
plants	higher dicots	Fabaceae	*Rhynchosia minima var. minima*			C		1/1
plants	higher dicots	Fabaceae	*Macroptilium atropurpureum*	siratro	Y			1/1
plants	higher dicots	Fabaceae	*Austrodolichos errabundus*			C		1/1
plants	higher dicots	Fabaceae	*Aphyllodium biarticulatum*			C		1/1
plants	higher dicots	Fabaceae	*Macroptilium lathyroides*		Y			1/1
plants	higher dicots	Fabaceae	*Desmodium rhytidophyllum*			C		2/1
plants	higher dicots	Fabaceae	*Stylosanthes guianensis*		Y			3/1
plants	higher dicots	Fabaceae	*Lamprolobium fruticosum*			C		4/3
plants	higher dicots	Fabaceae	*Indigofera suffruticosa*		Y			1/1
plants	higher dicots	Fabaceae	*Castanospermum australe*	black bean		C		1/1
plants	higher dicots	Fabaceae	*Aeschynomene paniculata*		Y			1/1
plants	higher dicots	Fabaceae	*Indigofera bancroftii*			C		1/1
plants	higher dicots	Fabaceae	*Erythrina vespertilio*			C		2/2
plants	higher dicots	Fabaceae	*Uraria lagopodioides*			C		1/1
plants	higher dicots	Fabaceae	*Tephrosia leptoclada*			C		1/1
plants	higher dicots	Fabaceae	*Stylosanthes humilis*	Townsville stylo	Y			1/1
plants	higher dicots	Fabaceae	*Jacksonia thesioides*			C		1
plants	higher dicots	Fabaceae	*Stylosanthes*			C		4
plants	higher dicots	Fabaceae	*Tephrosia*			C		1/1
plants	higher dicots	Fabaceae	*Cajanus*			C		1
plants	higher dicots	Flacourtiaceae	*Homalium brachybotrys*			C		2/2
plants	higher dicots	Gentianaceae	*Fagraea fagraeacea*			C		3/3
plants	higher dicots	Goodeniaceae	*Goodenia rosulata*			C		1/1
plants	higher dicots	Haloragaceae	*Haloragis heterophylla*	rough raspweed		C		1/1
plants	higher dicots	Lamiaceae	*Prostanthera*			C		2/2
plants	higher dicots	Lamiaceae	*Salvia misella*		Y			2/2
plants	higher dicots	Lamiaceae	*Plectranthus amoenus*			V		5/5
plants	higher dicots	Lamiaceae	*Platostoma longicorne*			C		1/1
plants	higher dicots	Lamiaceae	*Prostanthera sp. (Olinda P.I.Forster+ PIF17342)*			E		1/1
plants	higher dicots	Lamiaceae	*Plectranthus graveolens*	flea bush		C		1/1
plants	higher dicots	Lamiaceae	*Plectranthus diversus*			C		1/1
plants	higher dicots	Lamiaceae	*Pogostemon stellatus*			C		1/1
plants	higher dicots	Lamiaceae	*Hyptis suaveolens*	hyptis	Y			1/1
plants	higher dicots	Lecythidaceae	*Planchonia careya*	cockatoo apple		C		6

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plants	higher dicots	Lentibulariaceae	*Utricularia bifida*			C		1/1
plants	higher dicots	Loranthaceae	*Amyema miquelii*			C		1/1
plants	higher dicots	Loranthaceae	*Decaisnina brittenii subsp. brittenii*			C		1/1
plants	higher dicots	Loranthaceae	*Lysiana bifida*			R		1/1
plants	higher dicots	Lythraceae	*Rotala tripartita*			C		1/1
plants	higher dicots	Malvaceae	*Sida*			C		1
plants	higher dicots	Malvaceae	*Hibiscus meraukensis*	Merauke hibiscus		C		1
plants	higher dicots	Melastomataceae	*Melastoma malabathricum subsp. malabathricum*			C		1/1
plants	higher dicots	Menyanthaceae	*Nymphoides*			C		1
plants	higher dicots	Menyanthaceae	*Nymphoides indica*	water snowflake		C		2/2
plants	higher dicots	Mimosaceae	*Acacia*			C		1
plants	higher dicots	Mimosaceae	*Acacia burraria*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia humifusa*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia galioides*			C		1
plants	higher dicots	Mimosaceae	*Acacia purpureopetala*			V	V	1/1
plants	higher dicots	Mimosaceae	*Acacia multisiliqua*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia melanoxylon*	blackwood		C		1/1
plants	higher dicots	Mimosaceae	*Acacia crassicarpa*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia aulacocarpa*			C		3/1
plants	higher dicots	Mimosaceae	*Acacia leptocarpa*	north coast wattle		C		3/1
plants	higher dicots	Mimosaceae	*Acacia hemignosta*			C		3/2
plants	higher dicots	Mimosaceae	*Acacia flavescens*	toothed wattle		C		1/1
plants	higher dicots	Mimosaceae	*Acacia nesophila*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia dipsamma subsp. calidestris*			C		2/2
plants	higher dicots	Mimosaceae	*Acaciella angustissima*		Y			1/1
plants	higher dicots	Mimosaceae	*Acacia bidwillii*			C		5/1
plants	higher dicots	Mimosaceae	*Acacia goymeri*			V	V	1
plants	higher dicots	Mimosaceae	*Acacia whitei*			C		3/2
plants	higher dicots	Mimosaceae	*Acacia simsii*			C		1/1
plants	higher dicots	Moraceae	*Ficus obliqua*			C		3/3
plants	higher dicots	Moraceae	*Ficus mollior var. mollior*			C		2/2
plants	higher dicots	Moraceae	*Trophis scandens subsp. scandens*			C		2/2
plants	higher dicots	Moraceae	*Ficus superba var. henneana*			C		1/1
plants	higher dicots	Moraceae	*Streblus brunonianus*	whalebone tree		C		1/1
plants	higher dicots	Moraceae	*Ficus leptoclada*			C		1/1
plants	higher dicots	Myrsinaceae	*Myrsine variabilis*			C		1/1
plants	higher dicots	Myrsinaceae	*Tapeinosperma pallidum*			C		1/1
plants	higher dicots	Myrsinaceae	*Myrsine subsessilis subsp. cryptostemon*			C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca*			C		2/2
plants	higher dicots	Myrtaceae	*Melaleuca uxorum*			E		2/2
plants	higher dicots	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		4
plants	higher dicots	Myrtaceae	*Melaleuca recurva*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus cullenii*	Cullen's ironbark		C		3/3
plants	higher dicots	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		3/2
plants	higher dicots	Myrtaceae	*Syzygium johnsonii*	Johnson's satinash		C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca monantha*			C		3/3

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plants	higher dicots	Myrtaceae	*Gossia dallachiana*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus grandis*	flooded gum		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus exserta*	Queensland peppermint		C		1
plants	higher dicots	Myrtaceae	*Uromyrtus tenella*			C		2/2
plants	higher dicots	Myrtaceae	*Syzygium australe*	scrub cherry		C		3/3
plants	higher dicots	Myrtaceae	*Thaleropia queenslandica*	pink myrtle		R		4/4
plants	higher dicots	Myrtaceae	*Lophostemon grandiflorus*			C		1/1
plants	higher dicots	Myrtaceae	*Acmenosperma claviflorum*	grey satinash		C		1/1
plants	higher dicots	Myrtaceae	*Waterhousea unipunctata*			C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca trichostachya*			C		2/2
plants	higher dicots	Myrtaceae	*Leptospermum amboinense*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis*			C		2
plants	higher dicots	Myrtaceae	*Rhodamnia sessiliflora*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus cloeziana*	Gympie messmate		C		1
plants	higher dicots	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		4/3
plants	higher dicots	Myrtaceae	*Corymbia ellipsoidea*			C		1/1
plants	higher dicots	Myrtaceae	*Corymbia dallachiana*			C		4
plants	higher dicots	Myrtaceae	*Syzygium luehmannii*			C		2/2
plants	higher dicots	Myrtaceae	*Melaleuca virminalis*			C		1/1
plants	higher dicots	Myrtaceae	*Homoranthus porteri*			V	V	3/3
plants	higher dicots	Myrtaceae	*Gossia myrsinocarpa*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus shirleyi*			C		1
plants	higher dicots	Myrtaceae	*Melaleuca stenostachya*			C		4/3
plants	higher dicots	Myrtaceae	*Leptospermum neglectum*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus platyphylla*	poplar gum		C		5/3
plants	higher dicots	Myrtaceae	*Eucalyptus ochrophloia*	yapunyah		C		1
plants	higher dicots	Myrtaceae	*Eucalyptus melanoleuca*	Nanango ironbark		C		1
plants	higher dicots	Myrtaceae	*Eucalyptus leptophleba*	Molloy red box		C		13/6
plants	higher dicots	Myrtaceae	*Corymbia erythrophloia*	variable-barked bloodwood		C		2
plants	higher dicots	Myrtaceae	*Melaleuca viridiflora*			C		4
plants	higher dicots	Myrtaceae	*Melaleuca leucadendra*	broad-leaved tea-tree		C		2/2
plants	higher dicots	Myrtaceae	*Corymbia leichhardtii*	rustyjacket		C		3/1
plants	higher dicots	Myrtaceae	*Corymbia clarksoniana*			C		12/6
plants	higher dicots	Myrtaceae	*Eucalyptus granitica*	granite ironbark		C		2/2
plants	higher dicots	Myrtaceae	*Melaleuca sp. (Ropers Peak P.I.Forster PIF7208)*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		1/1
plants	higher dicots	Myrtaceae	*Lophostemon grandiflorus subsp. riparius*			C		2/2
plants	higher dicots	Myrtaceae	*Melaleuca viridiflora var. viridiflora*			C		1/1
plants	higher dicots	Myrtaceae	*Corymbia citriodora subsp. citriodora*			C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca nervosa subsp. nervosa*			C		1/1
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		1/1
plants	higher dicots	Myrtaceae	*Archirhodomyrtus beckleri*	rose myrtle		C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca nervosa*			C		3
plants	higher dicots	Myrtaceae	*Syzygium oleosum*	blue cherry		C		7/7
plants	higher dicots	Myrtaceae	*Gossia bidwillii*			C		2/2
plants	higher dicots	Myrtaceae	*Leptospermum*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Myrtaceae	*Gossia hillii*			C		2/2
plants	higher dicots	Myrtaceae	*Syzygium wesa*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus*			C		1
plants	higher dicots	Nyctaginaceae	*Mirabilis jalapa*	four o'clock	Y			1/1
plants	higher dicots	Nyctaginaceae	*Pisonia aculeata*	thorny Pisonia		C		1/1
plants	higher dicots	Ochnaceae	*Brackenridgea australiana*			C		1/1
plants	higher dicots	Oleaceae	*Olea paniculata*			C		1/1
plants	higher dicots	Oleaceae	*Jasminum dallachii*	soft jasmine		C		2/2
plants	higher dicots	Oleaceae	*Notelaea sp. (Barakula A.R.Bean 7553)*			C		1/1
plants	higher dicots	Oleaceae	*Ligustrum australianum*			C		1/1
plants	higher dicots	Oleaceae	*Ligustrum sinense*	small-leaved privet	Y			1/1
plants	higher dicots	Onagraceae	*Ludwigia octovalvis*	willow primrose		C		1
plants	higher dicots	Opiliaceae	*Opilia amentacea*			C		1/1
plants	higher dicots	Oxalidaceae	*Oxalis*			C		1/1
plants	higher dicots	Passifloraceae	*Passiflora herbertiana subsp. herbertiana*	native passionfruit		C		1/1
plants	higher dicots	Pentaphylacaceae	*Ternstroemia cherryi*	cherry beech		C		1/1
plants	higher dicots	Phyllanthaceae	*Breynia*			C		1
plants	higher dicots	Phyllanthaceae	*Antidesma bunius*	currantwood		C		1/1
plants	higher dicots	Phyllanthaceae	*Glochidion hylandii*			C		1/1
plants	higher dicots	Phyllanthaceae	*Sauropus macranthus*			V	V	2/7
plants	higher dicots	Phyllanthaceae	*Glochidion harveyanum*			C		1/1
plants	higher dicots	Phyllanthaceae	*Poranthera microphylla*	small poranthera		C		2/1
plants	higher dicots	Phyllanthaceae	*Glochidion harveyanum var. harveyanum*			C		1/1
plants	higher dicots	Phyllanthaceae	*Margaritaria dubium-traceyi*			C		2/2
plants	higher dicots	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		1/1
plants	higher dicots	Phyllanthaceae	*Antidesma parvifolium*			C		1/1
plants	higher dicots	Phytolaccaceae	*Phytolacca octandra*	inkweed	Y			1/1
plants	higher dicots	Picrodendraceae	*Petalostigma banksii*			C		1/1
plants	higher dicots	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		2
plants	higher dicots	Picrodendraceae	*Pseudanthus ligulatus subsp. ligulatus*			C		1/1
plants	higher dicots	Pittosporaceae	*Bursaria incana*			C		2/1
plants	higher dicots	Pittosporaceae	*Pittosporum revolutum*	yellow pittosporum		C		1/1
plants	higher dicots	Polygalaceae	*Salomonia ciliata*			C		1/1
plants	higher dicots	Polygalaceae	*Polygala paniculata*		Y			1/1
plants	higher dicots	Polygalaceae	*Comesperma*			C		2/2
plants	higher dicots	Polygalaceae	*Polygala persicariifolia*			C		1/1
plants	higher dicots	Polygalaceae	*Polygala sp. (Portland Roads L.Pedley 2757)*			C		1/1
plants	higher dicots	Polygonaceae	*Persicaria*			C		1
plants	higher dicots	Polygonaceae	*Muehlenbeckia zippelii*			C		2/2
plants	higher dicots	Polygonaceae	*Persicaria barbata*			C		1/1
plants	higher dicots	Polygonaceae	*Persicaria decipiens*	slender knotweed		C		3/3
plants	higher dicots	Proteaceae	*Xylomelum scottianum*			C		2
plants	higher dicots	Proteaceae	*Grevillea glossadenia*			V	V	3/3
plants	higher dicots	Proteaceae	*Grevillea pteridifolia*	golden parrot tree		C		2/1
plants	higher dicots	Proteaceae	*Stenocarpus angustiflolius*			C		2/2
plants	higher dicots	Proteaceae	*Grevillea dryandri subsp. dryandri*			C		1/1

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plants	higher dicots	Proteaceae	*Banksia spinulosa var. spinulosa*			C		1/1
plants	higher dicots	Proteaceae	*Stenocarpus sinuatus*	wheel of fire		C		1/1
plants	higher dicots	Proteaceae	*Lomatia fraseriana*			C		1/1
plants	higher dicots	Proteaceae	*Grevillea parallela*			C		5/1
plants	higher dicots	Proteaceae	*Alloxylon wickhamii*			C		1/1
plants	higher dicots	Proteaceae	*Grevillea coriacea*			C		1/1
plants	higher dicots	Proteaceae	*Alloxylon flammeum*			V	V	4/4
plants	higher dicots	Proteaceae	*Persoonia falcata*			C		5
plants	higher dicots	Proteaceae	*Hakea persiehana*			C		4/1
plants	higher dicots	Proteaceae	*Grevillea glauca*	bushy's clothes peg		C		6/1
plants	higher dicots	Putranjivaceae	*Drypetes acuminata*			C		1/1
plants	higher dicots	Putranjivaceae	*Drypetes deplanchei*	grey boxwood		C		2/2
plants	higher dicots	Rhamnaceae	*Alphitonia*			C		1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1/1
plants	higher dicots	Rhamnaceae	*Cryptandra debilis*			C		2/2
plants	higher dicots	Rhamnaceae	*Alphitonia pomaderroides*			C		2/1
plants	higher dicots	Rhamnaceae	*Emmenosperma alphitonioides*	yellow ash		C		1/1
plants	higher dicots	Rhamnaceae	*Rhamnus nipalensis*			C		1/1
plants	higher dicots	Rhamnaceae	*Alphitonia petrei*	pink ash		C		1/1
plants	higher dicots	Rubiaceae	*Coffea arabica*	Arabian coffee	Y			1/1
plants	higher dicots	Rubiaceae	*Ixora creagerii*			C		1/1
plants	higher dicots	Rubiaceae	*Psydrax attenuata*			C		2/2
plants	higher dicots	Rubiaceae	*Randia tuberculosa*			C		1/1
plants	higher dicots	Rubiaceae	*Lasianthus ochreatus*			C		1/1
plants	higher dicots	Rubiaceae	*Richardia brasiliensis*	white eye	Y			1/1
plants	higher dicots	Rubiaceae	*Pogonolobus reticulatus*			C		1
plants	higher dicots	Rubiaceae	*Atractocarpus fitzalanii subsp. fitzalanii*			C		1/1
plants	higher dicots	Rubiaceae	*Hodgkinsonia frutescens*			C	V	1/1
plants	higher dicots	Rubiaceae	*Opercularia diphylla*			C		1/1
plants	higher dicots	Rubiaceae	*Psydrax latiflorens*			C		1/1
plants	higher dicots	Rubiaceae	*Mitracarpus hirtus*		Y			2
plants	higher dicots	Rutaceae	*Zieria whitei*			C		3/3
plants	higher dicots	Rutaceae	*Boronia bipinnata*	rock boronia		C		1/1
plants	higher dicots	Rutaceae	*Zieria cytisoides*	downy Zieria		C		1/1
plants	higher dicots	Rutaceae	*Flindersia schottiana*	bumpy ash		C		2/2
plants	higher dicots	Rutaceae	*Pitaviaster haplophyllus*			C		1/1
plants	higher dicots	Rutaceae	*Zanthoxylum avicennae*			C		2/2
plants	higher dicots	Rutaceae	*Acronychia oblongifolia*			C		1/1
plants	higher dicots	Rutaceae	*Melicope broadbentiana*			C		2/2
plants	higher dicots	Rutaceae	*Flindersia bourjotiana*			C		1/1
plants	higher dicots	Rutaceae	*Zanthoxylum veneficum*			C		2/2
plants	higher dicots	Rutaceae	*Acronychia vestita*			C		1/1
plants	higher dicots	Rutaceae	*Halfordia kendack*	saffron heart		C		1/1
plants	higher dicots	Rutaceae	*Acronychia laevis*	glossy acronychia		C		3/3
plants	higher dicots	Rutaceae	*Melicope rubra*			C		1/1
plants	higher dicots	Santalaceae	*Exocarpos latifolius*			C		1/1

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plants	higher dicots	Santalaceae	*Santalum lanceolatum*			C		2/1
plants	higher dicots	Sapindaceae	*Guioa montana*			C		1/1
plants	higher dicots	Sapindaceae	*Arytera divaricata*	coogera		C		4/4
plants	higher dicots	Sapindaceae	*Dodonaea tenuifolia*			C		1/1
plants	higher dicots	Sapindaceae	*Castanospora alphandii*	brown tamarind		C		1/1
plants	higher dicots	Sapindaceae	*Dodonaea lanceolata var. subsessilifolia*			C		1/1
plants	higher dicots	Sapindaceae	*Distichostemon dodecandrus*			C		1
plants	higher dicots	Sapindaceae	*Diploglottis bernaisna*			C		1/1
plants	higher dicots	Sapindaceae	*Alectryon tomentosus*			C		4/4
plants	higher dicots	Sapindaceae	*Atalaya variifolia*			C		1
plants	higher dicots	Sapindaceae	*Guioa acutifolia*	northern guioa		C		3/3
plants	higher dicots	Sapotaceae	*Sersalisia sericea*			C		2/1
plants	higher dicots	Scrophulariaceae	*Striga parviflora*			C		1/1
plants	higher dicots	Scrophulariaceae	*Limnophila fragrans*			C		1/1
plants	higher dicots	Scrophulariaceae	*Limnophila aromatica*			C		1/1
plants	higher dicots	Scrophulariaceae	*Rhamphicarpa australiensis*			R		1/1
plants	higher dicots	Solanaceae	*Solanum torvum*	devil's fig	Y			1/1
plants	higher dicots	Solanaceae	*Cestrum nocturnum*		Y			3/3
plants	higher dicots	Solanaceae	*Physalis peruviana*		Y			1/1
plants	higher dicots	Solanaceae	*Solanum viridifolium*			C		1/1
plants	higher dicots	Solanaceae	*Nicandra physalodes*	apple of Peru	Y			1/1
plants	higher dicots	Solanaceae	*Solanum nodiflorum*		Y			1/1
plants	higher dicots	Solanaceae	*Nicotiana tabacum*		Y			2/2
plants	higher dicots	Solanaceae	*Solanum seaforthianum*	Brazilian nightshade	Y			1/1
plants	higher dicots	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		1
plants	higher dicots	Sparrmanniaceae	*Grewia retusifolia*			C		8/2
plants	higher dicots	Sterculiaceae	*Brachychiton*			C		1
plants	higher dicots	Sterculiaceae	*Argyrodendron peralatum*	red tulip oak		C		1/1
plants	higher dicots	Sterculiaceae	*Brachychiton diversifolius subsp. orientalis*			C		1/1
plants	higher dicots	Sterculiaceae	*Franciscodendron laurifolium*			C		1/1
plants	higher dicots	Stylidiaceae	*Stylidium eriorhizum*			C		1/1
plants	higher dicots	Stylidiaceae	*Stylidium coralloides*			C		2/2
plants	higher dicots	Surianaceae	*Guilfoylia monostylis*	guilfoylia		C		2/2
plants	higher dicots	Symplocaceae	*Symplocos cochinchinensis var. pilosiuscula*			C		1/1
plants	higher dicots	Thymelaeaceae	*Wikstroemia indica*	tie bush		C		4
plants	higher dicots	Thymelaeaceae	*Phaleria chermsideana*	scrub daphne		C		1/1
plants	higher dicots	Thymelaeaceae	*Phaleria clerodendron*	scented daphne		C		1/1
plants	higher dicots	Thymelaeaceae	*Pimelea trichostachya*	flaxweed		C		1
plants	higher dicots	Thymelaeaceae	*Thecanthes cornucopiae*			C		1/1
plants	higher dicots	Thymelaeaceae	*Pimelea sericostachya subsp. sericostachya*			C		1/1
plants	higher dicots	Ulmaceae	*Trema*			C		1
plants	higher dicots	Urticaceae	*Urtica incisa*	stinging nettle		C		1/1
plants	higher dicots	Verbenaceae	*Lantana camara cv. Gol Gol*		Y			1
plants	higher dicots	Violaceae	*Hybanthus enneaspermus*			C		1
plants	higher dicots	Viscaceae	*Viscum articulatum*	flat mistletoe		C		1/1
plants	higher dicots	Viscaceae	*Notothixos subaureus*	golden mistletoe		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Vitaceae	*Cissus*			C		1
plants	higher dicots	Vitaceae	*Cissus hypoglauca*			C		2/2
plants	higher dicots	Vitaceae	*Cissus penninervis*			C		1/1
plants	higher dicots	Vitaceae	*Clematicissus opaca*			C		3/3
plants	higher dicots	Vitaceae	*Tetrastigma petraeum*			C		3/3
plants	higher dicots	Vitaceae	*Cissus cardiophylla*			C		1/1
plants	higher dicots	Vitaceae	*Cayratia trifolia*			C		4/1
plants	higher dicots	Zygophyllaceae	*Tribulus terrestris*	caltrop		C		1/1
plants	lower dicots	Annonaceae	*Polyalthia nitidissima*	polyalthia		C		1/1
plants	lower dicots	Cabombaceae	*Brasenia schreberi*			R		1/1
plants	lower dicots	Himantandraceae	*Galbulimima baccata*			C		2/2
plants	lower dicots	Lauraceae	*Litsea leefeana*			C		1/1
plants	lower dicots	Lauraceae	*Endiandra insignis*			C		1/1
plants	lower dicots	Lauraceae	*Neolitsea brassii*			C		1/1
plants	lower dicots	Lauraceae	*Neolitsea dealbata*	white bolly gum		C		1/1
plants	lower dicots	Lauraceae	*Cinnamomum camphora*	camphor laurel	Y			1/1
plants	lower dicots	Lauraceae	*Endiandra discolana*			C		1/1
plants	lower dicots	Lauraceae	*Beilschmiedia recurva*			C		1/1
plants	lower dicots	Lauraceae	*Cryptocarya densiflora*			C		1/1
plants	lower dicots	Lauraceae	*Cryptocarya triplinervis var. pubens*			C		1/1
plants	lower dicots	Lauraceae	*Cryptocarya hypospodia*	north Queensland purple laurel		C		1/1
plants	lower dicots	Lauraceae	*Cryptocarya cocosoides*			C		6/6
plants	lower dicots	Lauraceae	*Endiandra bessaphila*			C		4/4
plants	lower dicots	Lauraceae	*Cinnamomum laubatii*			C		1/1
plants	lower dicots	Lauraceae	*Cassytha filiformis*	dodder laurel		C		1/1
plants	lower dicots	Monimiaceae	*Steganthera macrorrala*			C		1/1
plants	lower dicots	Nymphaeaceae	*Nymphaea*			C		1
plants	lower dicots	Nymphaeaceae	*Nymphaea immutabilis subsp. immutabilis*			C		1/1
plants	lower dicots	Ranunculaceae	*Clematis pickeringii*			C		1/1
plants	monocots	Alismataceae	*Caldesia parnassifolia*			C		1/1
plants	monocots	Araceae	*Spirodela punctata*	thin duckweed		C		3/3
plants	monocots	Arecaceae	*Laccospadix australasica*	Atherton palm		C		1/1
plants	monocots	Boryaceae	*Borya septentrionalis*			C		1/1
plants	monocots	Colchicaceae	*Iphigenia indica*			C		1/1
plants	monocots	Colchicaceae	*Schelhammera multiflora*			C		1/1
plants	monocots	Commelinaceae	*Murdannia vaginata*		Y			1/1
plants	monocots	Cyperaceae	*Cyperus*			C		1
plants	monocots	Cyperaceae	*Eleocharis*			C		1
plants	monocots	Cyperaceae	*Cyperus distans*			C		1/1
plants	monocots	Cyperaceae	*Cyperus aquatilis*			C		2/2
plants	monocots	Cyperaceae	*Fimbristylis nutans*			C		1/1
plants	monocots	Cyperaceae	*Fimbristylis cymosa*			C		1/1
plants	monocots	Cyperaceae	*Bulbostylis barbata*			C		1/1
plants	monocots	Cyperaceae	*Cyperus unioloides*			C		1/1
plants	monocots	Cyperaceae	*Schoenus falcatus*			C		1/1
plants	monocots	Cyperaceae	*Fuirena umbellata*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Cyperaceae	*Eleocharis minuta*		Y			1/1
plants	monocots	Cyperaceae	*Eleocharis dulcis*			C		1/1
plants	monocots	Cyperaceae	*Cyperus trinervis*			C		1/1
plants	monocots	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		1/1
plants	monocots	Cyperaceae	*Schoenoplectus laevis*			C		1/1
plants	monocots	Cyperaceae	*Lepidosperma laterale*			C		1
plants	monocots	Cyperaceae	*Eleocharis geniculata*			C		1/1
plants	monocots	Cyperaceae	*Eleocharis equisetina*			C		1/1
plants	monocots	Cyperaceae	*Lipocarpha chinensis*			C		2/2
plants	monocots	Cyperaceae	*Cyperus polystachyos*			C		2/2
plants	monocots	Cyperaceae	*Cyperus involucratus*		Y			1/1
plants	monocots	Cyperaceae	*Cyperus holoschoenus*			C		1/1
plants	monocots	Cyperaceae	*Cyperus polystachyos var. polystachyos*			C		1/1
plants	monocots	Cyperaceae	*Cyperus haspan subsp. haspan*			C		1/1
plants	monocots	Cyperaceae	*Cyperus conicus var. conicus*			C		1/1
plants	monocots	Cyperaceae	*Rhynchospora subterminalis*			C		1/1
plants	monocots	Cyperaceae	*Schoenoplectus mucronatus*			C		4/3
plants	monocots	Cyperaceae	*Eleocharis atropurpurea*			C		2/2
plants	monocots	Cyperaceae	*Cyperus flavidus*			C		1/1
plants	monocots	Cyperaceae	*Cyperus fulvus*			C		1/1
plants	monocots	Eriocaulaceae	*Eriocaulon nanum*			C		1/1
plants	monocots	Eriocaulaceae	*Eriocaulon scariosum*			C		1/1
plants	monocots	Haemodoraceae	*Dianella ataxia*			C		1/1
plants	monocots	Hydrocharitaceae	*Ottelia alismoides*			C		1/1
plants	monocots	Hypoxidaceae	*Curculigo ensifolia var. ensifolia*			C		1/1
plants	monocots	Johnsoniaceae	*Tricoryne anceps subsp. anceps*			C		2/1
plants	monocots	Laxmanniaceae	*Lomandra*			C		1/1
plants	monocots	Laxmanniaceae	*Lomandra filiformis*			C		1/1
plants	monocots	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		1/1
plants	monocots	Orchidaceae	*Diuris aporina*	northern white donkeys tails		R		1/1
plants	monocots	Orchidaceae	*Phaius australis*			E	E	1/1
plants	monocots	Orchidaceae	*Zeuxine oblonga*	hairy jewel orchid		C		1/1
plants	monocots	Orchidaceae	*Corybas cerasinus*			R		1/1
plants	monocots	Orchidaceae	*Acianthus borealis*			C		1/1
plants	monocots	Orchidaceae	*Octarrhena pusilla*			C		1/1
plants	monocots	Orchidaceae	*Drymoanthus minutus*			C		1/1
plants	monocots	Orchidaceae	*Pterostylis despauperata*			C		1/1
plants	monocots	Orchidaceae	*Arthrochilus oreophilus*			C		1/1
plants	monocots	Orchidaceae	*Spathoglottis paulnae*			R		1/1
plants	monocots	Orchidaceae	*Peristylus banfieldii*			R		1/1
plants	monocots	Orchidaceae	*Corybas aconitiflorus*			C		1/1
plants	monocots	Orchidaceae	*Acianthus fornicatus*	pixie caps		C		1/1
plants	monocots	Orchidaceae	*Pterostylis stricta*			C		1/1
plants	monocots	Orchidaceae	*Dipodium ensifolium*	leafy hyacinth orchid		C		1/1
plants	monocots	Orchidaceae	*Chiloglottis ovata*	caterpillar orchid		C		1/1
plants	monocots	Orchidaceae	*Erpusa habenarioa*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Pandanaceae	*Pandanus cookii*			C		1/1
plants	monocots	Pandanaceae	*Freycinetia excelsa*	climbing pandanus		C		1/1
plants	monocots	Poaceae	*Paspalum paniculatum*	Russell River grass	Y			1/1
plants	monocots	Poaceae	*Aristida superpendens*			C		1/1
plants	monocots	Poaceae	*Heteropogon contortus*	black speargrass		C		10/1
plants	monocots	Poaceae	*Schizachyrium fragile*	firegrass		C		2
plants	monocots	Poaceae	*Urochloa subquadripara*		Y			2/2
plants	monocots	Poaceae	*Panicum antidotale*	giant panic	Y			1/1
plants	monocots	Poaceae	*Oryza meridionalis*			C		1/1
plants	monocots	Poaceae	*Digitaria bicornis*			C		2/2
plants	monocots	Poaceae	*Arundinella setosa*			C		2
plants	monocots	Poaceae	*Aristida warburgii*			C		1/1
plants	monocots	Poaceae	*Urochloa pubigera*			C		4/4
plants	monocots	Poaceae	*Urochloa piligera*			C		1/1
plants	monocots	Poaceae	*Panicum coloratum*		Y			1/1
plants	monocots	Poaceae	*Themeda triandra*	kangaroo grass		C		11
plants	monocots	Poaceae	*Urochloa polyphylla*			C		1/1
plants	monocots	Poaceae	*Melinis minutiflora*	molasses grass	Y			2/1
plants	monocots	Poaceae	*Megathyrsus maximus*		Y			1/1
plants	monocots	Poaceae	*Cymbopogon ambiguus*	lemon grass		C		1
plants	monocots	Poaceae	*Urochloa distachya*		Y			1/1
plants	monocots	Poaceae	*Urochloa decumbens*		Y			1/1
plants	monocots	Poaceae	*Urochloa brizantha*		Y			2/2
plants	monocots	Poaceae	*Setaria sphacelata*		Y			1
plants	monocots	Poaceae	*Panicum incomtum*			C		1/1
plants	monocots	Poaceae	*Leersia hexandra*	swamp rice grass		C		2/1
plants	monocots	Poaceae	*Urochloa mutica*		Y			1
plants	monocots	Poaceae	*Panicum effusum*			C		1/1
plants	monocots	Poaceae	*Eriachne obtusa*			C		1/1
plants	monocots	Poaceae	*Panicum semiundum var. caimsianum*			C		1/1
plants	monocots	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1/1
plants	monocots	Poaceae	*Megathyrsus maximus var. maximus*		Y			1/1
plants	monocots	Poaceae	*Ischaemum australe var. australe*			C		1/1
plants	monocots	Poaceae	*Sorghum nitidum forma aristatum*			C		1/1
plants	monocots	Poaceae	*Setaria pumila subsp. pumila*		Y			1/1
plants	monocots	Poaceae	*Aristida utilis var. utilis*			C		1/1
plants	monocots	Poaceae	*Mnesithea rottboellioides*			C		4
plants	monocots	Poaceae	*Capillipedium parviflorum*	scented top		C		1/1
plants	monocots	Poaceae	*Dactyloctenium aegyptium*	coast button grass	Y			2/2
plants	monocots	Poaceae	*Sporobolus jacquemontii*		Y			2/2
plants	monocots	Poaceae	*Eleusine indica*	crowsfoot grass	Y			1/1
plants	monocots	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			1/1
plants	monocots	Poaceae	*Bambusa balcooa*		Y			1/1
plants	monocots	Poaceae	*Sarga plumosum*			C		3
plants	monocots	Poaceae	*Melinis repens*	red natal grass	Y			1
plants	monocots	Poaceae	*Eriachne ciara*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Arundinella*			C		3
plants	monocots	Poaceae	*Aristida*			C		2
plants	monocots	Poaceae	*Panicum*			C		1
plants	monocots	Poaceae	*Cenchrus calyculatus*	hillside burrgrass		C		1/1
plants	monocots	Poaceae	*Cyrtococcum deltoideum*		Y			1/1
plants	monocots	Poaceae	*Heteropogon triticeus*	giant speargrass		C		6/1
plants	monocots	Poaceae	*Cymbopogon bombycinus*	silky oilgrass		C		1
plants	monocots	Poaceae	*Whiteochloa airoides*			C		1/1
plants	monocots	Poaceae	*Themeda quadrivalvis*	grader grass	Y			3/2
plants	monocots	Pontederiaceae	*Monochoria cyanea*			C		1/1
plants	monocots	Potamogetonaceae	*Potamogeton*			C		1/1
plants	monocots	Typhaceae	*Typha domingensis*			C		1/1
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea johnsonii*			C		2
plants	monocots	Xyridaceae	*Xyris complanata*	yellow-eye		C		1/1
plants	mosses	Meteoriaceae	*Aerobryopsis longissima*			C		1/1
plants	mosses	Sematophyllaceae	*Sematophyllum subpinnatum*			C		1/1
plants	uncertain	Indet.	*Indet.*			C		1
plants	whisk ferns	Psilotaceae	*Psilotum nudum*	skeleton fork fern		C		2/2
plants		Atherospermataceae	*Doryphora aromatica*			C		1/1

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are 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). This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon. This number is output as 999 if it equals or exceeds this value.

Appendix E

EPBC Act Protected Matters Report

Protected Matters Search Tool

You are here: Environment Home > EPBC Act > Search

4 May 2010 11:36

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. 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

Search Type: Point
Buffer: 10 km
Coordinates: -17.16957,145.3898

Report Contents:

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 Sites)	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	1

Threatened Species:	37
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:	None
Commonwealth Heritage Places:	None
Places on the RNE:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Threatened Ecological Communities [Dataset Information]	Status	Type of Presence
Mixtr Forest (Complex Notophyll Vine Forest 5b)	Critically Endangered	Community known to occur within area
Threatened Species [Dataset Information]	**Status**	**Type of Presence**
Birds		
Casuarius casuarius johnsonii Southern Cassowary (Australian), Southern Cassowary	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk	Vulnerable	Species or species habitat likely to occur within area

Erythrura gouldiae Gouldian Finch	Endangered	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern)	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria nannotis Waterfall Frog, Torrent Tree Frog	Endangered	Species or species habitat may occur within area
Litoria nyakalensis Mountain Mistfrog	Critically Endangered	Species or species habitat likely to occur within area
Litoria rheocola Common Mistfrog	Endangered	Species or species habitat may occur within area
Nyctimystes dayi Lace-eyed Tree Frog, Australian Lacelid	Endangered	Species or species habitat may occur within area
Pseudophryne covacevichae Magnificent Brood Frog	Vulnerable	Species or species habitat likely to occur within area
Taudactylus acutirostris Sharp-snouted Day Frog, Sharp-snouted Torrent Frog	Extinct	Species or species habitat likely to occur within area
Mammals		
Dasyurus hallucatus Northern Quoll	Endangered	Species or species habitat known to occur within area
Dasyurus maculatus gracilis Spotted-tailed Quoll or Yarri (North Queensland subspecies)	Endangered	Species or species habitat likely to occur within area
Hipposideros semoni Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat	Endangered	Species or species habitat may occur within area
Petaurus australis unnamed subsp. Fluffy Glider, Yellow-bellied Glider (Wet Tropics)	Vulnerable	Species or species habitat likely to occur within area
Pteropus conspicillatus Spectacled Flying-fox	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat may occur within area
Rhinolophus philippinensis (large form) Greater Large-eared Horseshoe Bat	Endangered	Species or species habitat known to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheathtail Bat	Critically Endangered	Species or species habitat may occur within area
Ray-finned fishes		
Melanotaenia eachamensis Lake Eacham Rainbowfish	Endangered	Species or species habitat likely to occur within area
Reptiles		
Egernia rugosa Yakka Skink	Vulnerable	Species or species habitat likely to occur within area
Sharks		
Pristis microdon Freshwater Sawfish	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia purpureopetala	Vulnerable	Species or species habitat likely to occur within area
Acacia ramiflora	Vulnerable	Species or species habitat may occur within area
Alloxylon flammeum Red Silky Oak, Queensland Waratah, Tree Waratah	Vulnerable	Species or species habitat likely to occur within area

Charmeayca caricavides	Vulnerable	Species or species habitat likely to occur within area
Cycas ptiophylla a cycad	Vulnerable	Species or species habitat likely to occur within area
Dendrobium superbiens Curly Pinks	Vulnerable	Species or species habitat likely to occur within area
Davallea glaucolepis	Vulnerable	Species or species habitat likely to occur within area
Hodgkinsonia frutescens Atherton Turkey Bush	Vulnerable	Species or species habitat likely to occur within area
Huperzia filiformis Rat's Tail Tassel-fern	Endangered	Species or species habitat likely to occur within area
Huperzia marsupiiformis Water Tassel-fern	Vulnerable	Species or species habitat likely to occur within area
Huperzia phlegmarioides Layered Tassel-fern	Vulnerable	Species or species habitat likely to occur within area
Phalaenopsis rosenstromii	Endangered	Species or species habitat likely to occur within area
Taeniophyllum muelleri Minute Orchid, Ribbon-root Orchid	Vulnerable	Species or species habitat likely to occur within area
Tropilis pellucidula Thin Feather Orchid	Vulnerable	Species or species habitat likely to occur within area
Tylophora nyssicola	Endangered	Species or species habitat likely to occur within area

Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Erythrura gouldiae Gouldian Finch	Migratory	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Hirundo rustica Barn Swallow	Migratory	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Migratory	Breeding likely to occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Migratory Wetland Species		
Birds		
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Grus antigone Sarus Crane	Migratory	Species or species habitat likely to occur within area

Nettapus coromandelianus albipennis Australian Cotton Pygmy-goose	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Migratory Marine Species		
Reptiles		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile	Migratory	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose	Listed - overfly marine area	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Hirundo rustica Barn Swallow	Listed - overfly marine area	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Listed - overfly	Breeding likely to occur within area

	marine area	
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Species or species habitat likely to occur within area
Nettapus coromandelianus albipennis Australian Cotton Pygmy-goose	Listed - overfly marine area	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile	Listed	Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile	Listed	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 this 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 migratory and marine provisions of the Act have been mapped.

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.

Acknowledgments

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

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- 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
- Other groups and individuals

ANUCRM Version 1.6, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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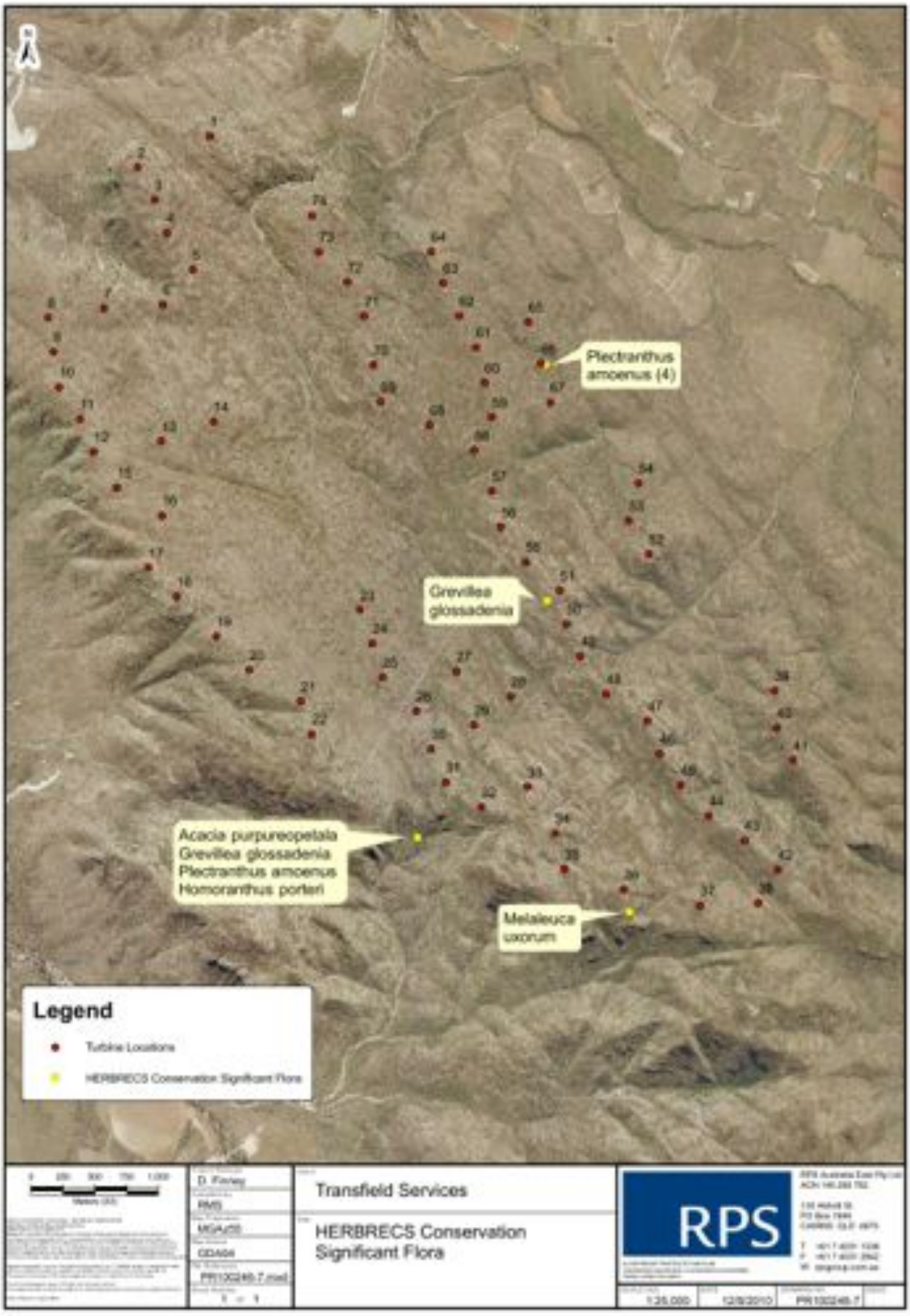
Last updated: Thursday, 20-Nov-2008 14:17:56 EST

Appendix F

HERBRECS – Conservation Significant Plants

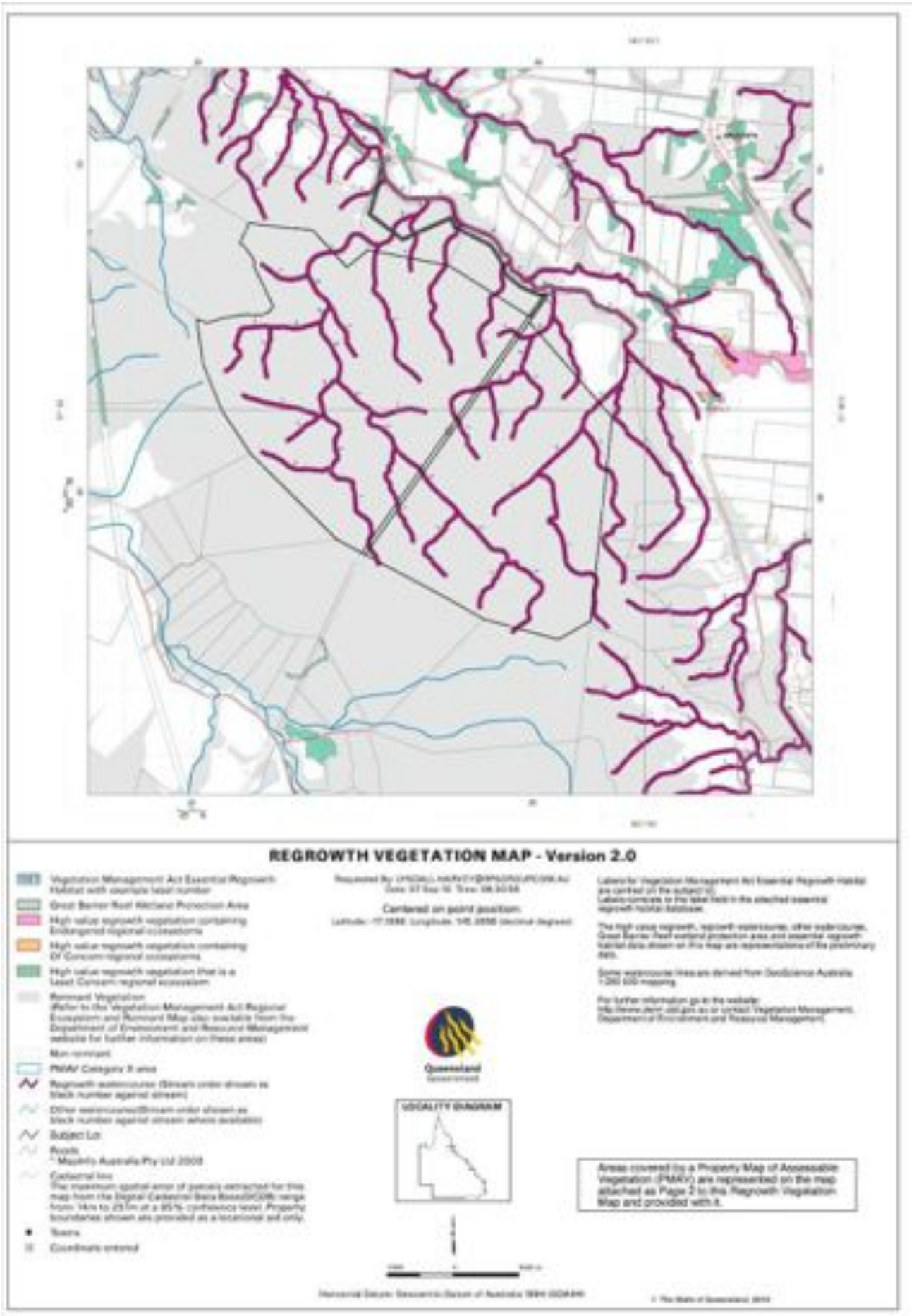

Plectranthus amoenus (4)
Grevillea glossadenia
Acacia purpureopetala
Grevillea glossadenia
Plectranthus amoenus
Homoranthus porteri
Melaleuca uxorum
Legend
Turbine Locations
HERBRECS Conservation Significant Flora
Transfield Services
HERBRECS Conservation Significant Flora
RPS

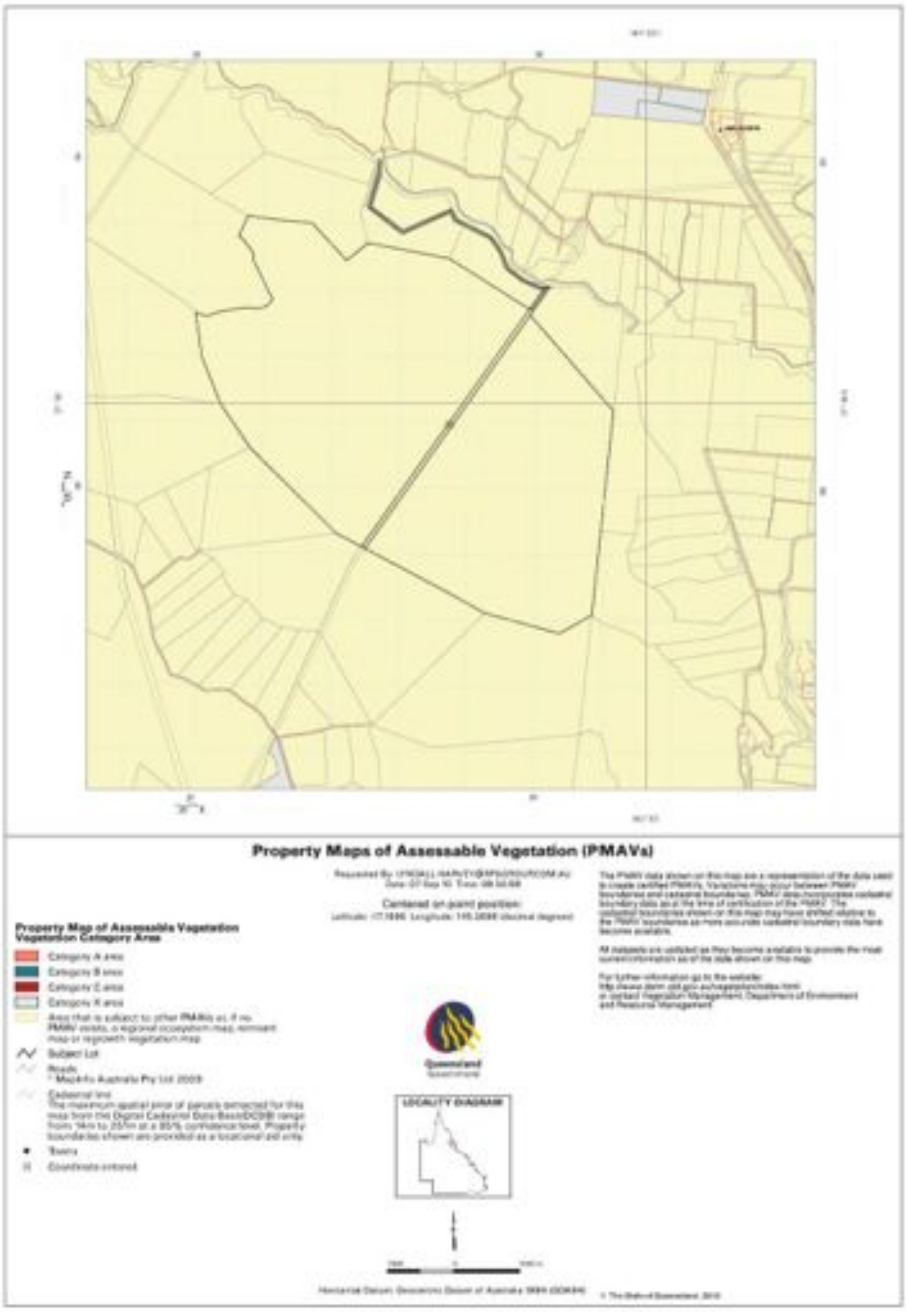
Appendix G

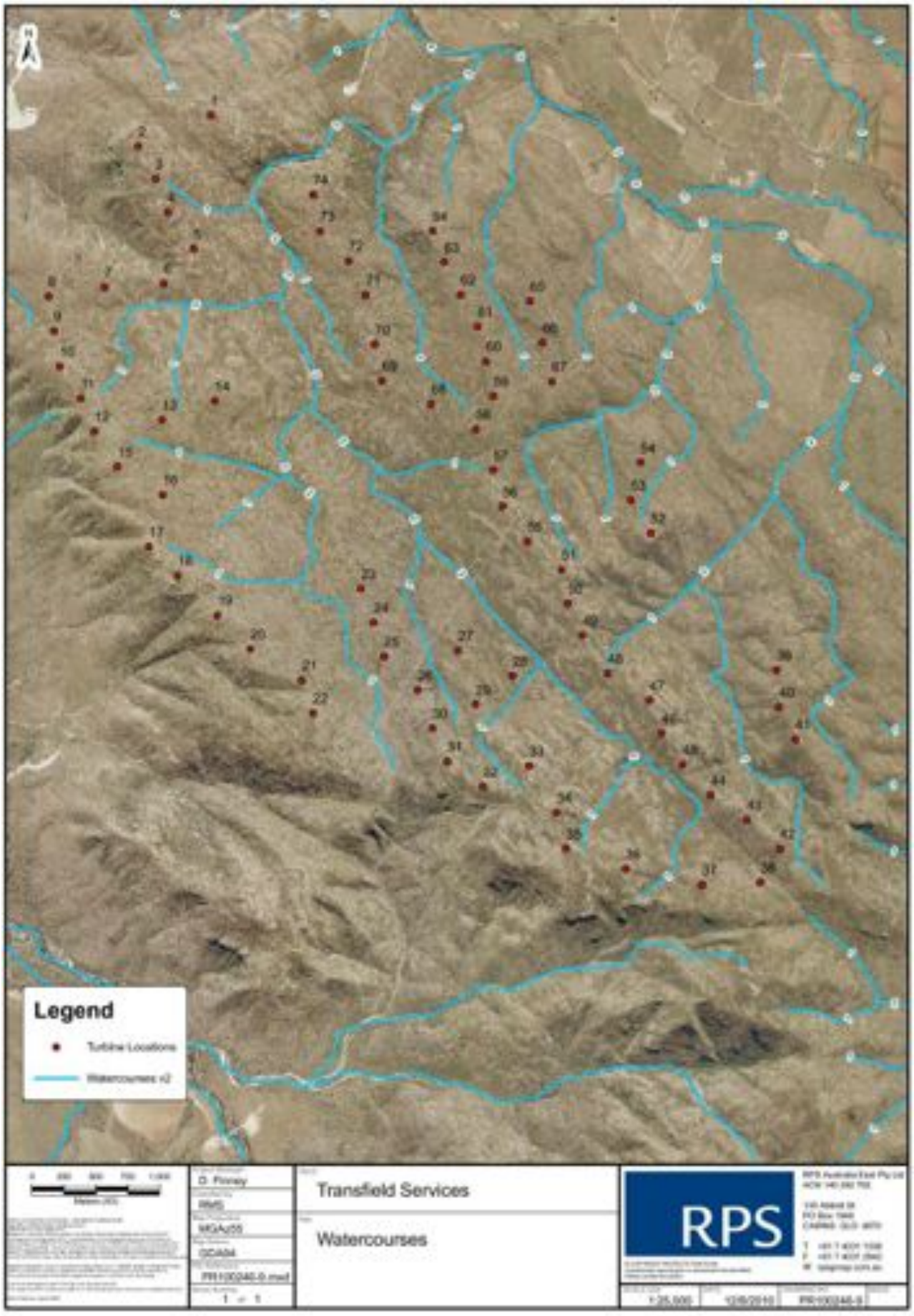
Regional Vegetation Management Code

Appendix H

Watercourse Mapping


REGROWTH VEGETATION MAP - Version 2.0
Centered on point position:
Areas covered by a Property Map of Assessable Vegetation (PMAV) are represented on the map attached as Page 2 to this Regrowth Vegetation Map and provided with it.


Property Maps of Assessable Vegetation (PMAVs)
Property Map of Assessable Vegetation
Vegetation Category Area
Category A area
Category B area
Category C area
Category R area
Subject Lot
Roads
Cadastral line
Towns
Coordinate entered
Centered on point position:
LOCALITY DIAGRAM


Legend
Turbine Locations
Watercourses +2
D. Finney
RMS
MGA55
GDA94
PR100246-0.mxd
1 : 1
Transfield Services
Watercourses
RPS
1:25,000
12/8/2010
PR100246-0

Appendix I

Summary of Weather Conditions

Date	Day	Temperature (°c)		Rainfall (mm)	Humidity (%)	Wind Speed (km/hr)	Wind Direction	Comments
		Min	Max					
10/5/10	Monday	16.6	25.9	0.2	79	*13	SE	Hot, dry and sunny during the day. Breezy during the day at the creek camp site, increasing to very windy over night. Some cloud forming at dusk, but clearing to fine by 1845 hours.
11/5/10	Tuesday	17.3	26.0	0	76	*15	ESE	Fine, hot and dry during the day, with some light sirus clouds ($^{2}/_{8}$ cloud cover) developing around 0900 hours. Very windy all day, increasing wind speed over night. Cool night.
12/5/10	Wednesday	17.7	24.7	0	74	*19	SE	Very windy all day, with high, fast moving cloud ($^{3}/_{8}$ cloud cover) early morning, and some low, cumulus clouds developing by 0930 hours ($^{5}/_{8}$ cloud cover). Wind dropped in the late afternoon (approximately 1700 hours, but picked up again at approximately 1845 hours and very windy overnight. Heavy rain clouds developing by 1200 hours, and rain could be observed in the surrounding areas, with only a light drizzle falling on the site. Clearing to fine by 1845 hours.
13/5/10	Thursday	17.2	24.5	0	77	*11	SE	Very windy all day. Hot and dry, with some heavy rain clouds forming by approximately 1500 hours. Some rain overnight, falling between 2000 hours and 2200 hours. Very windy overnight.
14/5/10	Friday	16.7	25.5	4.0	73	*11	SE	Very windy all day. Hot, fine and sunny with some cloud cover developing by 0930 hours ($^{3}/_{8}$).

Source: Australian Government Bureau of Meteorology, Walkamin Queensland, May 2010 Daily Weather Observations

* Note: Wind speed observations obtained from the Walkamin Weather Station do not provide an accurate wind speed for the subject site, located at higher elevation on the plateau near the Walkamin Township.

Appendix J

Provisional Checklist of Flora

Appendix K

Summary of Fauna Survey Effort

Site (Turbine) Number	Survey Activity								Notes
	Pitfall traps	Elliott traps	Funnel traps	Harp trap	Anabat call recording	Spotlight	*Bird Survey	**Habitat Searches	
17	✓	✓				✓	✓	✓	
20	✓	✓				✓	✓	✓	
21							✓	✓	
22							✓	✓	
South 22							✓	✓	
Far South 22							✓	✓	
24							✓	✓	
25							✓	✓	
42							✓	✓	
43							✓	✓	
44							✓	✓	
45							✓	✓	
46							✓	✓	
47							✓	✓	
48							✓		Snapshot survey during brief walk through (restricted access to site)
49							✓		Snapshot survey during brief walk through (restricted access to site)
50						✓			Snapshot survey during brief walk through (restricted access to site)
51						✓			
55						✓			
56		✓				✓	✓	✓	
57		✓				✓	✓	✓	
67		✓				✓	✓	✓	
Granite Creek	✓	✓		✓	✓		✓	✓	
Creek Line on Power Line Access Track			✓						

* Minimum 45 minutes of bird surveys conducted at each site
** Minimum 45 minutes of habitat searches conducted at each site

Appendix L

Provisional Checklist of Fauna

Species	Common Name	Conservation status		Location of Observation																				
		EPBC	NCA	Granite Ck	17	20	21	22	South 22	Far south 22	24	25	42	43	44	45	46	47	48	49	50	56	57	67
REPTILES																								
Oedura coggeri	Northern Spotted Velvet Gecko			✓			✓	✓																
Gehyra nana	Spotted Gecko							✓																
Heteronotia binoei	Bynoe's Gecko												✓	✓	✓	✓	✓							
Carlia jarnoldae	Lined Rainbow Skink						✓	✓	✓						✓									
Carlia longipes	Rainbow Skink													✓	✓	✓								
Carlia munda	Rainbow Skink												✓			✓	✓							
Carlia mundivensis	Rainbow Skink			✓			✓			✓														
Carlia pectoralis	Open Litter Rainbow Skink			✓					✓						✓									
Ctenotus taeniolatus	Copper-tailed Skink			✓									✓	✓		✓								
Diporiphora australis	Tommy Roundhead Dragon			✓	✓											✓								
Cryptophis nigrostriatus	Black-striped Snake			✓																				
Tropidonophis mairii	Keelback			✓																				
AMPHIBIANS																								
Chaunus marinus syn. Bufo	Cane Toad		I	✓	✓	✓	✓	✓	✓				✓									✓	✓	✓
Litoria caerulea	Green Tree Frog			✓																	✓			
Litoria inermis	Bumpy Rocketfrog			✓	✓																			
Litoria latopalmata	Broad-palmed Frog			✓									✓											
Litoria lesueuri	Stony Creek Frog			✓																				
Litoria rubella	Naked Tree Frog			✓																				
Litoria nasuta	Striped Rocketfrog			✓				✓																
BIRDS																								
Unknown	Goshawk species			✓																				
Milvus migrans	Black Kite																							
Accipiter	Collared			✓																				

Species	Common Name	Conservation status		Location of Observation																				
		EPBC	NCA	Granite Ck	17	20	21	22	South 22	Far south 22	24	25	42	43	44	45	46	47	48	49	50	56	57	67
cirrocephalus	Sparrowhawk																							
Aquila audax	Wedge-tailed Eagle			✓			✓	✓							✓									
Falco cenchroides	Nankeen Kestrel						✓																	
Geopelia striata	Peaceful Dove			✓	✓	✓						✓										✓	✓	
Calyptorhynchus banksii	Red-tailed Black Cockatoo			✓		✓																		
Platycercus adscitus	Pale-headed Rosella			✓	✓	✓		✓	✓	✓		✓			✓	✓	✓							✓
Dacelo novaeguineae	Laughing Kookaburra			✓		✓	✓					✓												
Merops ornatus	Rainbow Bee-eater			✓	✓										✓	✓								
Pardalotus striatus	Striated pardalote			✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		✓				✓		
Acanthiza nana	Yellow Thornbill			✓																				
Philemon corniculatus	Noisy Friarbird			✓						✓														✓
Lichmera indistincta	Brown Honeyeater			✓	✓	✓	✓	✓	✓	✓	✓	✓			✓							✓	✓	✓
Oreoica gutturalis	Crested Bellbird						✓	✓	✓	✓			✓	✓	✓	✓								
Pachycephala rufiventris	Rufous Whistler														✓									
Rhipidura leucophrys	Willie Wagtail			✓	✓																			
Rhipidura albiscarpa	Grey Fantail			✓	✓						✓	✓												
Cracticus torquatus	Grey Butcherbird								✓	✓														
Cracticus nigrogularis	Pied Butcherbird							✓	✓	✓														
Grallina cyanoleuca	Magpie-lark			✓																				
Gymnorhina tibicen	Australian Magpie			✓	✓		✓	✓	✓	✓												✓	✓	
Strepera graculina	Pied Currawong			✓	✓	✓	✓			✓		✓	✓		✓				✓					
Corvus orru	Torresian Crow			✓	✓																			

Species	Common Name	Conservation status		Location of Observation																				
		EPBC	NCA	Granite Ck	17	20	21	22	South 22	Far south 22	24	25	42	43	44	45	46	47	48	49	50	56	57	67
Dicaeum hirundinaceum	Mistletoebird														✓	✓								
MAMMALS - TERRESTRIAL																								
Tachyglossus aculeatus	Short-beaked Echidna			✓	✓			✓				✓		✓	✓	✓	✓	✓						✓
Petrogale mareeba	*Mareeba Rock-wallaby		NT			✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Equus caballus	**Horse		I	✓																				
MAMMALS - MICROBATS																								
Hipposideros diadema	Diadem's Leafnosed bat		NT	✓																				
Scotorepens sanborni	Northern Broad-nosed Bat			✓																				
Vespadelus troughtoni	Eastern Cave Bat			✓																				
Miniopterus australis	Little Bent-wing Bat			✓																				
Miniopterus orianae oceanensis	Eastern Bent-wing Bat			✓																				
Austronomus australis	White-striped Freetail Bat			✓																				
Chaerephon jobensis	Northern Freetail Bat			✓																				
Mormopterus ridei	Eastern Freetail Bat			✓																				
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat			✓																				
Chalinolobus nigrogriseus[UC]	Hoary Wattled Bat			✓																				

* Unidentifiable scats collected from rocky ridge tops. No visual identification possible during this survey. Suspected Mareeba rock-wallaby based on habitat and current known distribution of species.

** Scats collected and tracks recorded, however, no visual observations were made during this survey.

UC Unconfirmed recording

CE: Critically Endangered; E: Endangered; V: Vulnerable; NT: Near Threatened; I: Introduced

Appendix M

Anabat Analysis

Anabat echolocation data interpretation summary

Client: RPS (Cairns/Townsville) **Job no.:** RPS-1002 **Analysis Date:** 11/06/2010

Project name/location: Arriga Plateau (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					
Hipposideros diadema			1		1
Scotorepens sanborni	3				3
Vespadelus troughtoni	1				1
Miniopterus australis	5		1	4	10
Miniopterus orianae oceanensis	20	1	13	21	57
Austronomus australis	1		4		5
Chaerephon jobensis	1				1
Mormopterus ridei				2	2
Saccolaimus flaviventris	1				1
Total calls positively identified	32	1	19	27	81
Calls NOT positively identified					
Chalinolobus nigrogriseus / S. sanborni	1				1
S. flaviventris / C. jobensis	2	1		2	5
unknown bat call	24	1	4	13	42
Total calls NOT positively identified	27	4	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

Chalinolobus nigrogriseus / S. sanborni	calls are at similar frequencies; usually differentiated on slightly different pulse shapes but one call form this survey with intermediate shape and could have been either species
S. flaviventris / C. jobensis	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.

Prepared by Greg Ford
11/06/2010

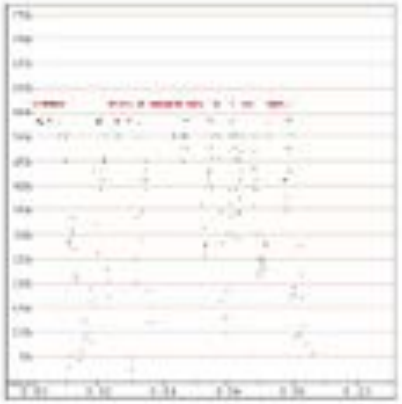
balance!
P.O. Box 1744, Toowoomba QLD 4350

Anabat Data Analysis Summary

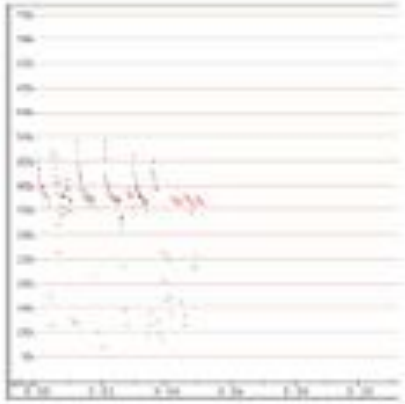
Sample calls extracted from theArriga Plateau survey data (RPS Townsville; May 2010)

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

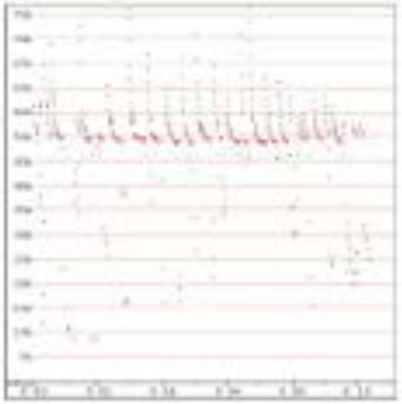
Species positively identified



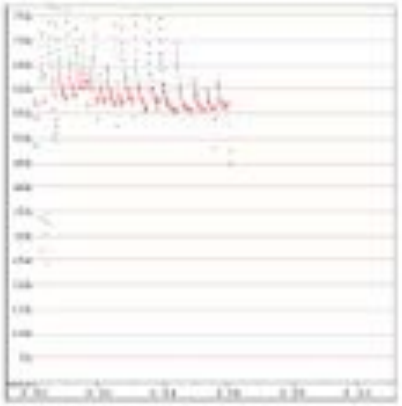
Hipposideros diadema



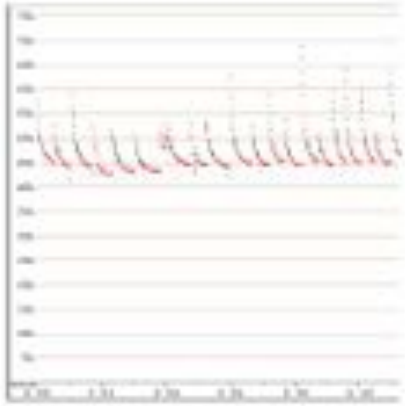
Scotorepens sanborni



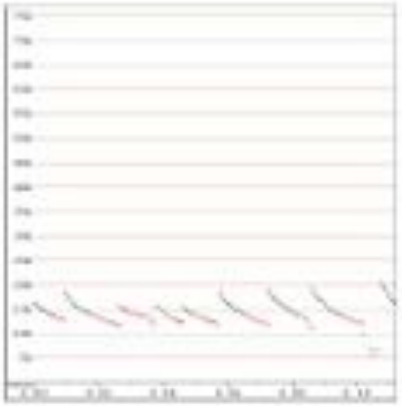
Vespadelus troughtoni



Miniopterus australis



Miniopterus orianae oceanensis



Austronomus australis

Prepared by Greg Ford
11/06/2010

balance!
PO Box 1744, Toowoomba Qld 4350

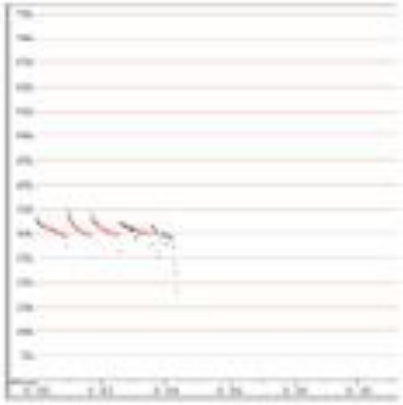
Anabat Data Analysis Summary

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

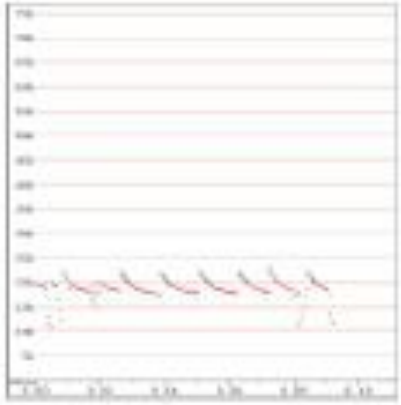
Scale: 10 msec per tick; time between pulses removed (AnalookW F7 compressed mode)

Species positively identified

Chaerephon jobensis

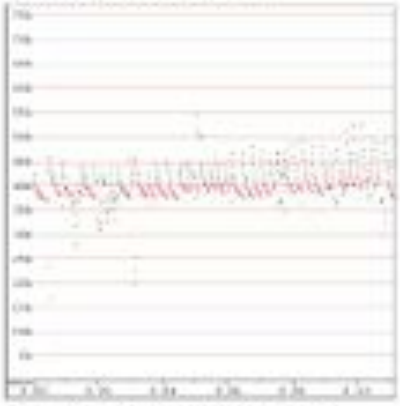


Mormopterus ridei

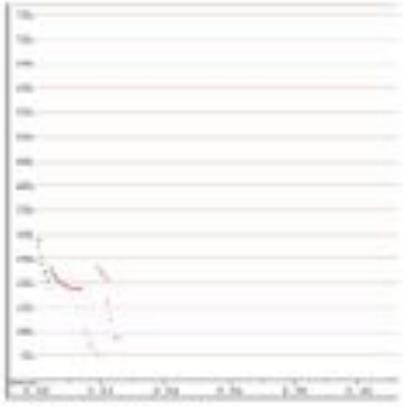


Saccolaimus flaviventris

Calls NOT positively identified



Chalinolobus nigrogriseus / S. sanborni



S. flaviventris / C. jobensis