

# Matters of National Environmental Significance

Lot 102 SP295409 Bohle Plains





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## Executive Summary

AECOM Australia Pty Ltd (AECOM) was engaged by Economic Development Queensland (EDQ) to undertake an assessment of environmental values within the Bohle Plains Renewable Energy Facility (the Project) Study Area, with particular focus on Matters of National Environmental Significance (MNES) as protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

MNES were assessed against the proposed Project activities and relevant significant guidelines outlined in the EPBC Act Policy Statement '*Matters of National Environmental Significance – Significant Impact Guidelines 1.1*' (Department of the Environment, 2013b).

Flora and fauna values were considered to be the only MNES on which the Project has the potential to have a significant impact. Terrestrial ecology MNES values were assessed using desktop and field investigation methods. Desktop and field surveys of the Study Area identified the following occurrence or possible occurrence of MNES:

- Confirmed occurrence of two EPBC Act fauna species including:
  - Black-throated finch (southern) (*Poephila cincta cincta*)
  - Bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniatu*s).
- Potential occurrence of three other EPBC Act fauna species including:
  - White-throated needletail (*Hirundapus caudacutus*)
  - Squatter pigeon (southern) (*Geophaps scripta scripta*)
  - Red goshawk (*Erythrotriochis radiatus*).
  - Potential occurrence of five migratory species:
    - Fork-tailed swift (*Apus pacificus*)
    - Oriental cuckoo (*Cuculus optatus*)
    - White-throated needletail (*Hirundapus caudacutus*)
    - Satin flycatcher (*Myiagra cyano*leuca)
    - Rufous fantail (*Rhipidura rufifrons*).

The significant impact assessments identified that the Project has the potential to have a significant impact on one species, the black-throated finch (southern).

The mitigation hierarchy of avoid, minimise, mitigate and offset has been applied in the design process to reduce potential impacts to the black-throated finch (southern) and other MNES species which are known to or likely to occur. These include:

- Identifying and mapping clear no-go zones within the Study Area to avoid areas of sensitive vegetation and habitat
- Developing an erosion and sediment control plan to control practices along roads and around infrastructure, which will minimise potential for sedimentation within adjoining conserved habitats
- A Significant Species Management Program (SSMP) will be prepared where potential breeding habitat for threatened fauna is identified and needs to be removed as part of the vegetation clearing process
- Agree upon and deliver environmental offsets to counteract any significant residual impacts to MNES, specifically the black-throated finch (southern).

## 1.0 Introduction

### 1.1 Background

AECOM Australia Pty Ltd (AECOM) has been engaged by Economic Development Queensland (EDQ) to provide consultancy services to support the obtainment of Statutory Approvals for the development of the Bohle Plains Renewable Energy Facility (the Project). The Project is located in the Bohle Plains, approximately 15 kilometres (km) west of Townsville City, Queensland, within the Townsville City Council (Figure 1).

### 1.2 Description of the Proposed Action

The proposed development is a utility scale solar farm and will involve the following components:

- Solar modules
- Above ground and underground cabling
- Battery storage facility
- 1.8 km transmission line to Tompkins Road
- Access tracks (10 metres (m) wide)
- Perimeter safety fencing and consideration of firebreaks
- Control system
- Site office and maintenance building
- Temporary infrastructure associated with site construction including the site compound and storage areas.

### 1.3 Study Area and Project Footprint

For the purpose of this report, the 'Study Area' refers to the boundary of Lot 102 SP295409 where land has been proposed for development plus the 1.8 km powerline corridor with a 20 m buffer, totalling approximately 809 hectares (ha) (Figure 1). The Study Area is bordered by residential and industrial development to the north and east, and grazing land dominated by native vegetation to the south and west. The Study Area is bisected by the Townsville Ring Road and Saunders Creek, with numerous unnamed tributaries.

The 'Project Footprint' refers to the bounds within which the solar modules, access tracks, cabling and other associated infrastructure may be located (Figure 1). Following further site investigations during the detailed design phase, the exact location of the solar modules and all other infrastructure will be confirmed within the approved Project Footprint. The overhead powerline illustrated on Figure 1 was added to the Project in March 2020. This powerline has a buffer of 20 m (10 m each side) and has been assessed in this report using desktop information only. No fieldwork has been undertaken in the powerline corridor. Impacts discussed in this report are based on total clearing of the Project Footprint plus the powerline corridor which cover a total area of approximately 235 ha.

### 1.4 Assessment Aims and Objectives

The aim of this report is to present the existing environmental values within the Study Area and assesses the potential impacts of the Project on Matters of National Environmental Significance (MNES) as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

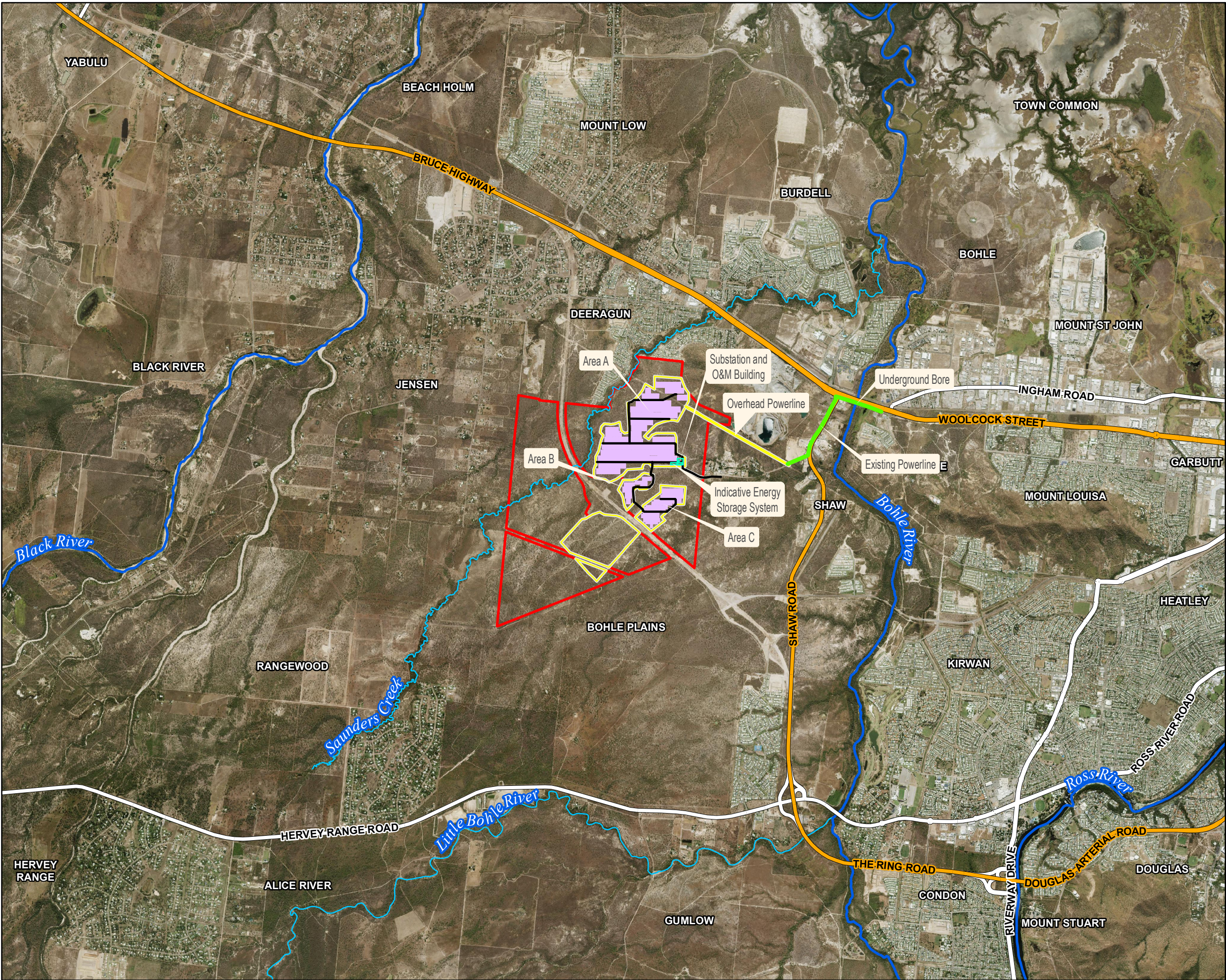
To achieve this aim, the scope of the assessment includes:

- A desktop assessment to characterise and identify potential flora and fauna species and their habitat that may be present in the Study Area.



- A review of the field-verified information obtained during the ecological field surveys of the Study Area.
- Identification of potential impacts of the Project on ecological values and agreed mitigation measures to avoid or mitigate adverse impacts at the construction and operational phases of the Project.
- An assessment to determine whether the Project is likely to have a significant impact on any MNES protected by the EPBC Act in accordance with the EPBC Act Policy Statement 1.1 '*Significant Impact Guidelines: Matters of National Environmental Significance*' (Department of the Environment, 2013b).





**AECOM**



**Legend**

- Watercourse (major)
- Watercourse (minor)
- Highways
- Main road
- Study Area
- Project Footprint
- Additional components (not included in Project assessment)
- Project infrastructure**
  - Solar panels
  - Roads
  - Substation laydown

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**BOHLE PLAINS RENEWABLE ENERGY FACILITY**  
**Matters of National Environmental Significance**

**Study Area and Project Footprint**

**FIGURE 1**

PROJECT ID 60580955  
CREATED BY MackA  
LAST MODIFIED 07-May-2020  
VERSION 1



## 2.0 Regulatory Context

### 2.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act establishes a process for environmental assessment and approval of proposed actions that have, will have or are likely to have a significant impact on MNES or on Commonwealth land.

MNES are outlined in the EPBC Act to include:

- World Heritage Properties
- National Heritage Places
- Wetlands of International Importance (listed under the Ramsar Convention)
- Great Barrier Reef Marine Park
- Commonwealth Marine Areas
- Listed Threatened Ecological Communities
- Listed Threatened Species
- Migratory Species (listed under international agreements)
- Nuclear Actions
- A Water Resource, in relation to coal seam gas development and large coal mining development.

#### 2.1.1 EPBC Referral

Under the EPBC Act, a referral to the Department of Agriculture, Water and the Environment (DAWE) will be required if the Project has the potential to cause a 'significant impact' on MNES. In relation to listed threatened and migratory species, an action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- Extinct
- Extinct in the Wild
- Critically Endangered
- Endangered
- Vulnerable, or
- Migratory (species which are native to Australia and are included in the appendices to the Bonn Convention, and/or included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA), and/or native, migratory species identified in a list established under an international agreement such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)).

Additionally, an action will require approval if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:

- Critically Endangered; or
- Endangered.

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

As identified in Section 1.4, the purpose of this report is to identify the occurrence of MNES within the Study Area and assess the impacts of the proposed Project on these MNES against the EPBC Act *Significant Impact Guideline 1.1* (Department of the Environment, 2013b).



## 3.0 Assessment Methodologies

### 3.1 Desktop Assessment

A desktop assessment was undertaken to characterise and identify ecological values that may be supported in the Study Area. The desktop assessment included a review of literature, and searches of publicly available datasets and online mapping. Desktop searches were initially undertaken in August 2018 and were repeated in May 2019, March 2020 and March 2021. The following information sources were reviewed as part of this assessment:

- EPBC Act Protected Matters Search Tool (PMST) to identify MNES that may occur within a search area extending at least 10 km from the centre of the Study Area
- Department of Environment and Science (DES) Wildlife Online database to identify flora and fauna species records within a search area extending 10 km from the centre of the Study Area
- Atlas of Living Australia database to identify locations of previously recorded flora and fauna species within and adjacent to the Study Area
- DAWES National Flying-fox Monitoring Viewer, to identify known flying-fox camps surrounding the Study Area
- Matters of State Environmental Significance mapping to identify known MSES within the Study Area
- Department of Natural Resources, Mines and Energy (DNRME) Regulated Vegetation Management Map to determine the extent of Category A, Category B, Category C and Category R vegetation within and surrounding the Study Area
- DNRME Vegetation Management Regional Ecosystem (RE) map including essential habitat mapping
- The Queensland Herbarium Regional Ecosystem Description Database (REDD) for current RE descriptions and geological and land zone descriptions
- DES Protected Plants Flora Survey Trigger Map to identify the high-risk areas for protected plants
- DES certified BPA mapping to identify significant wildlife corridors and areas of state, regional and local biodiversity significance
- Existing ecological reports from the region
- Species distribution maps from various current field guides.

Information collected as part of the desktop assessment was reviewed and used in the preparation of the field surveys. Reviews of the above data sources were conducted based on the coordinates presented below in Table 1.

**Table 1 Data source search parameters**

Data source	Search coordinates	Search buffers
EPBC Act Protected Matters Search Tool	-19.27506, 146.66953	10 km
Wildlife Online	-19.2750, 146.6695	10 km
All other mapping	Restricted to the bounds of the Study Area	0 km

### 3.2 Ecological Assessment Approach

In support of the development of the Project, a number of ecological studies have been undertaken to provide baseline data and inform the assessment of potential impacts resulting from the Project. These studies include a number of targeted fauna and flora assessments.

The ecological studies include:

- **Terrestrial ecology assessment of baseline values:** standalone report which documents ecological values, including vegetation communities and the occurrence and potential occurrence of threatened species. Field surveys were undertaken in August 2018 (4 people over 5 days) and April 2019 (4 people over 2 days).
- **Targeted black-throated finch (southern) surveys:** targeted assessments undertaken in November 2018 (4 people over 2 days) and May 2019 (2 people over 1.5 days) to determine the current status and extent of black-throated finch (southern) within the Study Area and surrounding habitats. The surveys focussed on early morning waterhole counts and walking transects to ascertain the presence and extent of the local black-throated finch (southern) population, and to identify key breeding habitat and nesting locations.
- **Bare-rumped sheath-tailed bat habitat model:** a desktop assessment to determine the amount of potential roosting habitat with high, moderate and low suitability within the Study Area, using information obtained during the field surveys.

### 3.3 Survey Effort

The desktop assessment identified a number of threatened and migratory fauna species as either having a 'high' or 'moderate' likelihood to occur within the Study Area (Section 3.4). These species were the subject of targeted survey effort and are identified in Table 2, along with the relevant guideline survey effort and actual survey effort employed for each species.

Where practical, the survey guidelines above have been met as detailed below in Table 2. Where survey guidelines have only partially been met, effort is still considered sufficient due to the adoption of other techniques such as habitat assessments where presence of suitable habitat resources has been used as a surrogate for presence.

Table 2 Target Species, Survey Guideline Requirements and Survey Effort Undertaken

Species	Survey guidelines	Survey guideline requirement	Effort undertaken	Requirements met?
<b>Birds</b>				
Black-throated finch (southern) ( <i>Poephila cincta cincta</i> )	Survey guidelines for Australia's threatened birds (Department of the Environment Water Heritage and the Arts, 2010b). Background paper to the Significant impact guidelines for the endangered black-throated finch (southern) (Department of the Environment Water Heritage and the Arts, 2009).	<p><b>Survey techniques</b> The survey guidelines for Australia's threatened birds recommends the following survey methods and effort for the black-throated finch (southern):</p> <ul style="list-style-type: none"> <li>Land-based area searches: 10 hours over 5 days.</li> <li>Target searches: 6 hours over 2 days.</li> </ul> <p>The Significant impact guidelines for the endangered black-throated finch recommends the following survey methods and effort:</p> <ul style="list-style-type: none"> <li>Nest searches.</li> <li>Wet and dry season waterhole watching: at least three hours after first light on two separate occasions.</li> <li>Target searches in woodland: one hour/ha with maximum of 10 hours per search area.</li> </ul> <p><b>Seasonal considerations</b> As a rough guide surveys are recommended between November and February in areas south of latitude 23° and March to May north of 23°.</p>	<ul style="list-style-type: none"> <li>Late-dry season and post-wet season surveys (November 2018 and May 2019).</li> <li>Methods involved waterhole watching at suitable waterholes, nest searches and targeted searches.</li> <li>Late-dry season: a total of 24-person hours of waterhole watching was undertaken over two days. 16-person hours of walking/flushing/driving transects over 2 days.</li> <li>Post-wet season: a total of 10-person hours of waterhole watching over three days. 20-person hours of walking/flushing/ driving transects over 1.5 days.</li> <li>Targeted habitat assessments were conducted for the species throughout the duration of the field surveys.</li> </ul>	<p><b>Requirements partially met</b> The survey guidelines for this species have been met, with the exception of the effort required for targeted searches (one hour/ha). Due to the large size of the Study Area, this amount of effort was not feasible however good coverage of the Study Area was made and nests were recorded in multiple locations.</p> <p>Black-throated finch (southern) were confirmed within adjacent properties to the Study Area.</p>



Species	Survey guidelines	Survey guideline requirement	Effort undertaken	Requirements met?
Squatter pigeon (southern) ( <i>Geophaps scripta scripta</i> )	Survey guidelines for Australia's threatened birds (Department of the Environment Water Heritage and the Arts, 2010b).	<p><b>Survey techniques</b> The survey guidelines for Australia's threatened birds recommends the following survey methods and effort for the squatter pigeon (southern):</p> <ul style="list-style-type: none"> <li>Road driving during day (driving transects).</li> <li>Active searches: 15 hours over 3 days in areas &lt;50 ha.</li> <li>Flushing surveys: 10 hours over 3 days in areas &lt;50 ha.</li> <li>Waterhole searches: Survey effort not specified.</li> </ul> <p><b>Seasonal considerations</b> No evidence of long-distance seasonal movements or seasonal considerations required.</p>	<ul style="list-style-type: none"> <li>Active searches, flushing surveys and driving transects were conducted during all field surveys: 276-person hours over 12 days.</li> <li>Waterholes and dams were visually surveyed throughout the surveys.</li> <li>Targeted habitat assessments were conducted for the species throughout the duration of the field surveys.</li> </ul>	<p><b>Requirements met</b> Survey effort undertaken exceeds the minimum survey requirements for the species.</p> <p>The survey consisted of all recommended survey techniques (active searches, flushing surveys, road driving and waterhole searches).</p> <p>This species was recorded on an adjacent property to the Study Area.</p>
Red goshawk ( <i>Erythrotriorchis radiatus</i> )	Survey guidelines for Australia's threatened birds (Department of the Environment Water Heritage and the Arts, 2010b).	<p><b>Survey techniques</b> The survey guidelines for Australia's threatened birds recommends the following survey method and effort for the red goshawk:</p> <ul style="list-style-type: none"> <li>Area searches: 80 hours over 10 days.</li> <li>Search in groups of tall trees and in trees along riverbanks for nests.</li> </ul> <p>Red goshawks are very secretive, so scanning for nests is the most effective way to detect the species presence.</p>	<ul style="list-style-type: none"> <li>276-person hours of incidental bird surveys over 12 days.</li> <li>Targeted habitat assessments were conducted for the species throughout the duration of the field surveys.</li> </ul>	<p><b>Requirements met</b> Potential nests for the species were searched throughout the surveys.</p> <p>Audio and visual surveys for birds were conducted throughout the field surveys, including those seen while travelling along roads and tracks.</p> <p>This species was not detected, though presence is assumed.</p>

Species	Survey guidelines	Survey guideline requirement	Effort undertaken	Requirements met?
		<b>Seasonal considerations</b> No evidence of long-distance seasonal movements or seasonal considerations required.		
White-throated needletail ( <i>Hirundapus caudacutus</i> )	No specific guideline, information sourced from literature - Species Profile and Threats Database (Department of Agriculture Water and the Environment, 2020).	<b>Survey techniques</b> Area survey and timed area counts (survey effort not specified).  <b>Seasonal considerations</b> Surveys must be conducted between October and April in northern and eastern Australia.	<ul style="list-style-type: none"> <li>56-person hours of incidental bird surveys over 2 days in November 2018 and 2 days in April 2019.</li> <li>Targeted habitat assessments were conducted for the species throughout the duration of the field surveys.</li> </ul>	<b>Requirements met</b> As no survey effort is specified, the survey requirements are considered to be met. This species was not detected, though presence is assumed.
<b>Migratory Birds</b>				
Oriental cuckoo and five migrant flycatchers during breeding season and migration	Referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015b).	<b>Survey techniques</b> The EPBC Act referral guideline for 14 birds listed as migratory under the EPBC Act prescribes the following survey methods and effort for migratory species: <ul style="list-style-type: none"> <li>Area survey and timed area counts (survey effort not specified).</li> </ul> <b>Seasonal considerations</b> Surveys should be conducted during the appropriate survey period: <ul style="list-style-type: none"> <li>Fork-tailed swift: October to April.</li> <li>Oriental cuckoo: September to May.</li> <li>Satin flycatcher: spring or autumn.</li> <li>Rufous fantail: spring or autumn.</li> <li>White-throated needletail: October to April.</li> </ul>	<ul style="list-style-type: none"> <li>200-person hours of incidental bird surveys over 5 days in August 2018.</li> <li>16-person hours of incidental bird surveys over 2 days in November 2018.</li> <li>40-person hours of incidental bird surveys over 2 days in April 2019.</li> <li>20-person hours of incidental bird surveys over 3 days in May 2019.</li> <li>Targeted habitat assessments were conducted for the species throughout the duration of the field surveys.</li> </ul>	<b>Requirements met</b> As no survey effort is specified, the survey requirements are considered to be met.  These species were not detected, though presence is assumed.

Species	Survey guidelines	Survey guideline requirement	Effort undertaken	Requirements met?
<b>Mammals</b>				
Bare-rumped sheath-tailed bat ( <i>Saccolaimus saccolaimus nudicluniatatus</i> )	Survey guidelines for Australia's threatened bats (Department of the Environment Water Heritage and the Arts, 2010a).	<p><b>Survey techniques</b> The survey guidelines for Australia's threatened bats recommends the following survey method and effort for the bare-rumped sheath-tailed bat:</p> <ul style="list-style-type: none"> <li>Unattended bat recorders: 16 detector nights over 4 nights.</li> <li>Mistnets: 16 trap nights over 4 nights. It should be noted that this species has never been caught in harp traps, mistnets or by using triplines.</li> <li>Roost searches: 1-2 hours per survey day.</li> </ul> <p><b>Seasonal considerations</b> Although virtually nothing is known about seasonal movements of this species, it is recommended that surveys be conducted between August and April.</p>	<ul style="list-style-type: none"> <li>Unattended bat recorders: 21 detector nights in August 2018, April 2019 and May 2019.</li> <li>Counts of hollow-bearing trees were also undertaken.</li> </ul>	<p><b>Requirements partially met</b> The survey guidelines for this species have been partially met.</p> <p>As this species has never been captured in traps, this method was not undertaken.</p> <p>Roost searches were not undertaken due to the difficulty of inspecting hollows at height.</p> <p>This species was confirmed within the Study Area by acoustic detection.</p>



### 3.4 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment for threatened and migratory fauna identified during the desktop review was undertaken. Targeted searches were undertaken in the field for species identified as either having a high or moderate likelihood of occurrence within the Study Area, based on the desktop sources. The methodology was applied again after field surveys to determine the likelihood of occurrence once site-based information became available.

Each species was assessed against the categories defined below.

- Unlikely: The species has no historical records within the vicinity of the Study Area and has no preferred habitat in the Study Area
- Low: Some of the preferred habitat present in the Study Area. Species may infrequently visit the site en-route for foraging but will not roost or otherwise be dependent on habitats on the site for their survival
- Moderate: The Study Area contains some of the preferred habitat to support a population of the species and/or the species has been recorded within the vicinity of Study Area. Migratory and aerial foraging birds may overfly the site
- High: The species has previously been recorded in the Study Area. The site contains significant preferred habitat which is likely to support a population of the species, including roost sites
- Known: The species is directly recorded in the Study Area.

### 3.5 Impact Assessment

The EPBC Act Policy Statement 1.1 *Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013b) provides the framework for the assessment of potential impacts upon MNES as well as a process for determining the level of significance of impacts.

In accordance with the guideline, impacts on MNES are to be assessed utilising the broadest scope of proposed action, with consideration to both direct and indirect impacts and proposed measures that may avoid and reduce impacts. Significance is tested through a set criterion stipulated in the guideline, which is tailored to each MNES and for some values, the conservation status of the MNES.

A generic impact assessment on ecological values within the Study Area has been undertaken to provide an overarching analysis of Project related impacts (refer to Section 6.0). Mitigation measures have also been developed to address identified potential impacts. In addition to this, a specific impact assessment in accordance with the guidelines has been undertaken for each MNES considered to have a moderate or high likelihood of occurrence within the Study Area. The significant impact criteria utilised in the assessment is outlined in Table 3. Results of the generic impact assessment was utilised to inform the significant impact assessment. Other Commonwealth guidelines used to support the assessment of MNES impacts include:

- Referral guidelines for the 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015b)
- Significant Impact Guidelines for the black-throated finch (southern) (Department of the Environment Water Heritage and the Arts, 2009).

Table 3 MNES Relevant to the Project Significant Impact Criteria

MNES	Criteria	Key definitions
Critically endangered and endangered species and ecological communities	<p>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• Lead to a long-term decrease in the size of a population;</li> <li>• Reduce the area of occupancy of the species;</li> <li>• Fragment an existing population into two or more populations;</li> <li>• Adversely affect <b>habitat critical to the survival of a species</b>;</li> <li>• Disrupt the breeding cycle of a population;</li> <li>• Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;</li> <li>• Result in invasive species that are harmful to a Critically Endangered or Endangered species becoming established in the Endangered or Critically Endangered species' habitat;</li> <li>• Introduce disease that may cause the species to decline; or</li> <li>• Interfere with the recovery of the species.</li> </ul>	<p><b>'Habitat critical to the survival of a species'</b> refers to areas that are necessary:</p> <ul style="list-style-type: none"> <li>• For activities such as foraging, breeding, roosting, or dispersal;</li> <li>• For the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators);</li> <li>• To maintain genetic diversity and long-term evolutionary development, or</li> <li>• For the reintroduction of populations or recovery of the species.</li> </ul>
Vulnerable species and ecological communities	<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• Lead to a long-term decrease in the size of an <b>important population</b> of a species;</li> <li>• Reduce the area of occupancy of an important population;</li> <li>• Fragment an existing important population into two or more populations;</li> <li>• Adversely affect <b>habitat critical to the survival of a species</b>;</li> <li>• Disrupt the breeding cycle of an <b>important population</b>;</li> <li>• Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;</li> <li>• Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat;</li> <li>• Introduce disease that may cause the species to decline; or</li> <li>• Interfere substantially with the recovery of the species.</li> </ul>	<p><b>'Habitat critical to the survival of a species'</b> as defined above.</p> <p>An <b>'important population'</b> is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:</p> <ul style="list-style-type: none"> <li>• Key source populations either for breeding or dispersal;</li> <li>• Populations that are necessary for maintaining genetic diversity, and/or</li> <li>• Populations that are near the limit of the species range.</li> </ul>

MNES	Criteria	Key definitions
Migratory species	<p>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of <b>important habitat</b> for a migratory species;</li> <li>Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or</li> <li>Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an <b>ecologically significant proportion of the population</b> of a migratory species.</li> </ul>	<p>An area of <b>'important habitat'</b> for a migratory species is:</p> <ul style="list-style-type: none"> <li>Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or</li> <li>Habitat that is of critical importance to the species at particular life-cycle stages, and/or</li> <li>Habitat utilised by a migratory species which is at the limit of the species range, and/or</li> <li>Habitat within an area where the species is declining.</li> </ul> <p>Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an <b>'ecologically significant proportion'</b> of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).</p>

### 3.6 Limitations

All field assessments are subject to inherent limitations in the detection success of targeted species. These limitations often result in a degree of false-absence records (i.e. a species is present, but not detected). It is important, therefore, that the limitations to surveys are identified and the survey results are viewed with these constraints in mind.

Specific limitations encountered during the field surveys include:

- A fire in the north-east corner of the Study Area during the August 2018 field survey meant that this area could not be accessed by the field staff. The vegetation had not regrown enough during the April 2019 survey to determine the ground-truthed REs and therefore the Queensland Herbarium mapping has been used to determine vegetation and fauna habitat values.
- In March 2020, a powerline corridor was added to the Project. This powerline has a buffer of 20 m (10 m each side) and has been assessed in this report using desktop information only. No fieldwork has been undertaken in the powerline corridor.

The general limitations to this ecology assessment conducted in the Study Area include the following:

- Species with large home ranges may not be present in the Study Area-part of their home range during the survey period.
- The difficulty in detecting certain species during the survey period (e.g. cryptic species and species present in the Study Area in low densities).
- Biological factors such as sex, age-class, and breeding biology which may influence species' habitat use and detectability during different times of year.

In response to these limitations, the fauna assessment with a suitable survey effort was designed to ensure every chance of detecting the target species, if they were present. For those species not detected and with records nearby, habitat assessments were undertaken to determine the value of the Study Area to support such species. Despite the effort and timing of the field surveys, the absence of a species should not be assumed because it was not detected.

## 4.0 Study Area Characteristics

### 4.1 Vegetation Composition

The Study Area is dominated by broad-leaved paperbark (*Melaleuca viridiflora*) woodland and narrow-leaved ironbark (*Eucalyptus crebra*) woodland, with large ephemeral creeks. Dominant canopy species include narrow-leaved ironbark (*Eucalyptus crebra*), Dallachy's gum (*Corymbia dallachiana*), poplar gum (*Eucalyptus platyphylla*), Clarkson's bloodwood (*Corymbia clarksoniana*) and Moreton Bay ash (*Corymbia tessellaris*). Broad-leaved paperbark (*Melaleuca viridiflora*) dominated the sub-canopy layer and the exotic shrub Chinese apple (*Ziziphus mauritiana*\*) was common throughout. The ground layer consisted mostly of native Poaceae species, though some large patches of exotic species were present, including shrubby stylo (*Stylosanthes scabra*\*).

The survey field-verified 763.75 ha of remnant vegetation within the Study Area, with 14.33 ha of non-remnant vegetation.

Four (4) REs were confirmed within the Study Area during the field survey. The field-verified REs are shown in Figure 2 and are listed in Table 4. All field-verified REs identified are Least Concern REs.

**Table 4 Field-verified REs within the Study Area**

RE	Short Description <sup>1</sup>	VM Act Status	Area (ha) within Study Area <sup>2</sup>	Area (ha) within Project Footprint
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	512.56	182.84
11.3.25b	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca fluviatilis</i> , <i>Nauclea orientalis</i> open forest riverine wetland or fringing riverine wetland.	Least Concern	4.54	0.00
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	158.14	32.02
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains.	Least Concern	74.18	0.089
-	Non-remnant vegetation	-	14.33	2.33

<sup>1</sup> Description of REs as contained in the REDD Version 11 (Queensland Herbarium, 2019)

<sup>2</sup> Ground-truthed areas only (excludes powerline easement and fire impacted area)

Additionally, 42.11 ha is mapped as remnant by the Queensland Herbarium in the fire impacted area in the north-east corner of the Study Area, and the powerline easement contains 3.38 ha of mapped remnant vegetation and 0.28 ha of non-remnant vegetation (Table 5). These two areas were not ground-truthed during the field surveys.



Table 5 Queensland Herbarium Mapped REs in Fire Impacted Area and Powerline Corridor

RE ID	Short Description <sup>1</sup>	VM Act Status	Area within Study Area (ha) <sup>2</sup>	Area (ha) within Project Footprint
<b>Fire Impacted Area</b>				
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	15.69	3.97
11.3.25b	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca fluviatilis</i> , <i>Nauclea orientalis</i> open forest riverine wetland or fringing riverine wetland.	Least Concern	1.43	0.00
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	4.07	0.00
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains.	Least Concern	20.92	9.62
<b>Powerline Corridor</b>				
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	0.95	0.95
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	1.97	1.97
11.12.9	<i>Eucalyptus platyphylla</i> woodland on igneous rocks.	Least Concern	0.46	0.46
-	Non-remnant vegetation	-	0.28	0.28

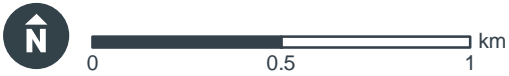
## 4.2 Wetlands and Watercourses

Saunders Creek runs through the Study Area, as well as numerous other drainage lines and small tributaries of the Bohle River. All watercourses are highly ephemeral and only contain water during the wet season for a short period of time.

One wetland is found within the Study Area. This wetland was found to contain exotic aquatic vegetation and was also highly ephemeral. No muddy margins or gently sloping edges were recorded at the wetland.

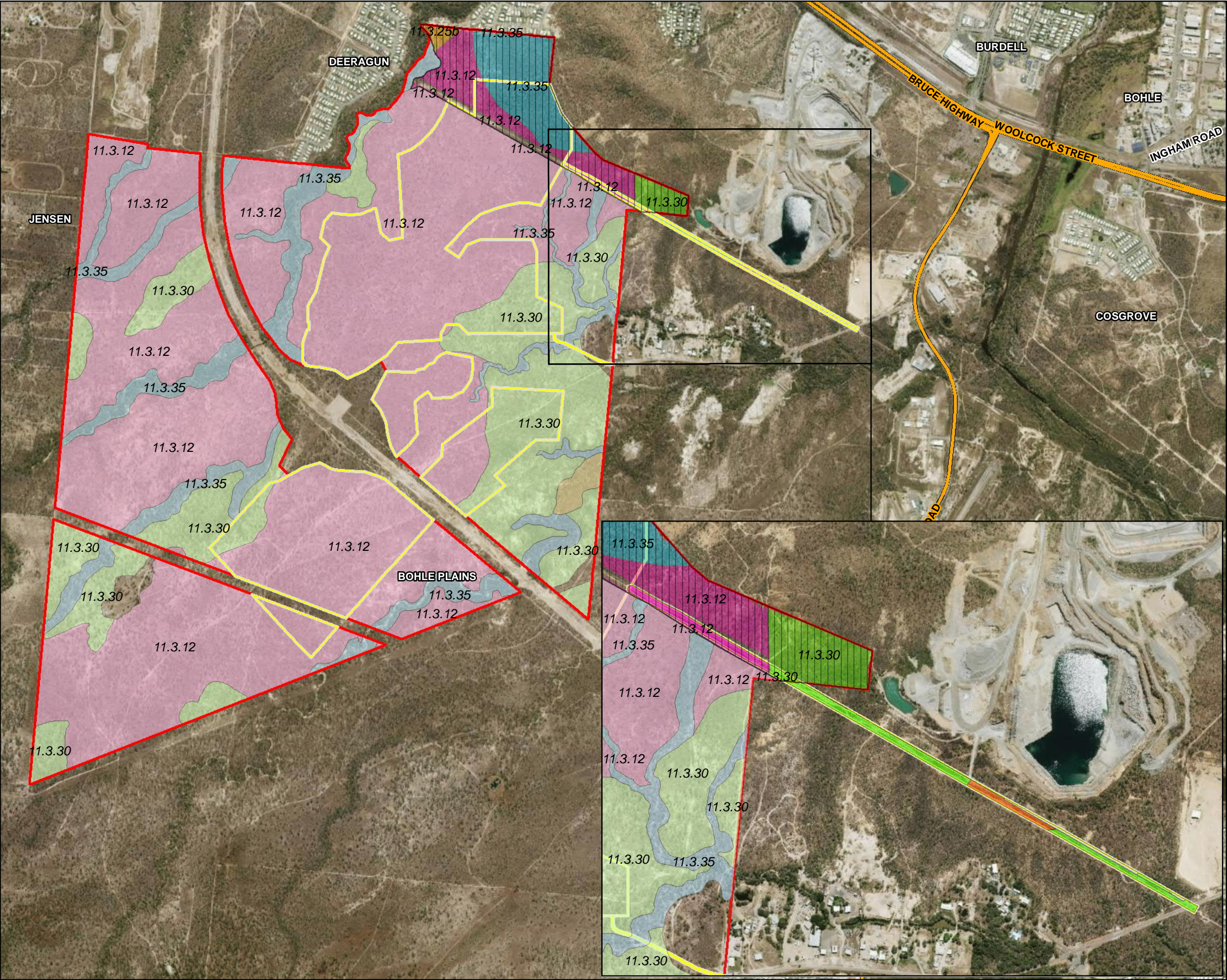
No permanent water is found within the Study Area.





Legend

- Highways
- Study Area
- Project Footprint
- Fire impacted area (August 2018)
- Field-verified regional ecosystems
  - 11.3.12
  - 11.3.25b
  - 11.3.30
  - 11.3.35
  - Non-remnant
- Queensland Herbarium regional ecosystems
  - 11.3.12
  - 11.3.25b
  - 11.3.30
  - 11.3.35
  - 11.12.9
  - Non-remnant



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BOHLE PLAINS RENEWABLE ENERGY FACILITY  
Matters of National Environmental Significance

Regional Ecosystems

FIGURE 2

PROJECT ID 60580955  
CREATED BY MackA  
LAST MODIFIED 07-May-2020  
VERSION 1



### 4.3 Fauna Habitat Types

Four dominant fauna habitat types were recorded within the Study Area (Table 6; Figure 3). Ground-truthed REs were used to map the fauna habitat within the Study Area. Since no ground-truthed data is available for the fire impacted area and the powerline easement, area calculations shown below are excluding these areas.

**Table 6 Fauna Habitat Types**

Habitat Type	Analogous RE/s	Area within the Study Area (ha)	Area within Project Footprint (ha)
1. <i>Melaleuca viridiflora</i> woodland on alluvial plains	11.3.12	512.56	182.84
2. Open <i>Eucalyptus crebra</i> woodland on alluvial plains	11.3.30	158.14	32.02
3. <i>Eucalyptus</i> and <i>Corymbia</i> riparian woodland	11.3.25b, 11.3.35	78.72	0.089
4. Non-remnant vegetation	-	14.33	2.33

For areas that have been field validated, key habitat features within the woodland habitats include an open canopy, the presence or absence of a shrub layer, occasional hollow-bearing trees, a grassy understorey and an abundance of nectar-rich plants. The woodlands are in varying states of integrity and most areas have experienced some form of disturbance (fire, weed invasion, human disturbance (evidence of trespassing)).

The most significant feature is the open structure and grassy understorey. While these areas are likely to provide general habitat for most fauna species, some areas are likely to provide key breeding and foraging habitat for threatened species, such as the black-throated finch (southern).

Along the creek lines, a high diversity of fauna species was recorded, and habitat features include seasonal water, deep leaf litter, a high abundance of hollow-bearing trees and dense canopy cover (and therefore shade). These areas are likely to be core habitat for fauna species such as the bare-rumped sheath-tailed bat and may provide protection from climatic extremes.

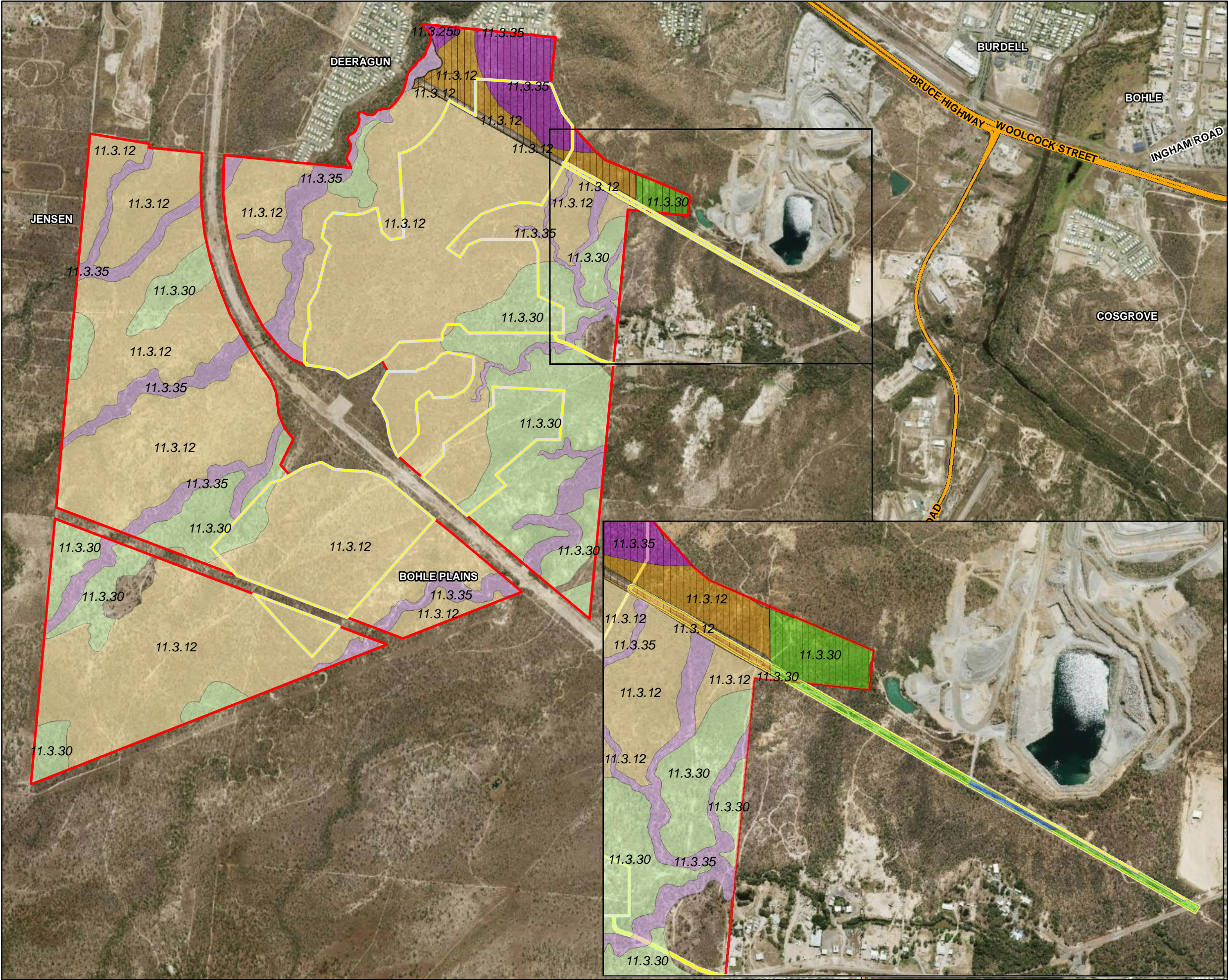
### 4.4 Landscape Connectivity

The Study Area is dominated by remnant vegetation, including riparian woodlands associated with Saunders Creek and a small tributary of Bohle River. The Townsville Ring Road dissects the Study Area and presents a significant barrier to north-south fauna movement, although movement allowances exist within Saunders Creek. To the north and east of the Study Area, urban development exists which limits movement opportunities existing outside of Saunders Creek.

Vegetated areas to the west and south of the Study Area provide good connectivity although agricultural land practices that dominate the landscape may create some barriers, dependent on the degree of grassland modification and presence of weeds.

Hervey's Range Road in the south presents a minor to moderate barrier to movement to State significant corridors associated with the Pinnacles National Park, located to the south of the Study Area.





AECOM



Legend

- Highways
- Study Area
- Project Footprint
- Fire impacted area (August 2018)
- Field-verified fauna habitat types**
  - 1. *Melaleuca viridiflora* woodland on alluvial plains
  - 2. Open *Eucalyptus crebra* woodland on alluvial plains
  - 3. *Eucalyptus* and *Corymbia* riparian woodland
  - 4. Non-remnant
- Queensland Herbarium fauna habitat types**
  - 1. *Melaleuca viridiflora* woodland on alluvial plains
  - 2. Open *Eucalyptus crebra* woodland on alluvial plains
  - 3. *Eucalyptus* and *Corymbia* riparian woodland
  - 4. Non-remnant
  - 5. *Eucalyptus platyphylla* woodland on igneous rocks

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**BOHLE PLAINS RENEWABLE ENERGY FACILITY**  
**Matters of National Environmental Significance**

**Fauna Habitat Types**

**FIGURE 3**

PROJECT ID 60580955  
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VERSION 1



## 5.0 Matters of National Environmental Significance

### 5.1 World Heritage Properties

There are no World Heritage Properties within proximity to the Study Area. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.2 National Heritage Places

There are no National Heritage Places within proximity to the Study Area. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.3 Wetlands of International Importance (Ramsar)

There are no Wetlands of International Importance within proximity to the Study Area. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.4 Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park is not located within proximity to the Study Area. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.5 Commonwealth Marine Area

The Study Area is sufficiently distant from any Commonwealth Marine Area that no impacts are anticipated. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.6 Listed Threatened Ecological Communities

No threatened ecological communities (TECs) were identified as likely to occur within the Study Area during the desktop assessment. None were identified during the field surveys. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

### 5.7 Listed Threatened Species

#### 5.7.1 Flora

The desktop assessment identified six threatened flora species as potentially occurring within the Study Area. These species and their respective conservation status under the EPBC Act are detailed in Table 7 below.

**Table 7 Desktop Results for Threatened Flora Species**

Common Name	Scientific Name	EPBC Act
Bluegrass	<i>Dichanthium setosum</i>	Vulnerable
Mt Stuart Ironbark	<i>Eucalyptus paedoglauca</i>	Vulnerable
Shrubby bush pear	<i>Marsdenia brevifolia</i>	Vulnerable
Ant plant	<i>Myrmecodia beccarii</i>	Vulnerable
-	<i>Omphalea celata</i>	Vulnerable
-	<i>Tephrosia leveillei</i>	Vulnerable

No threatened flora species were identified within the Study Area during the field survey and none are considered likely to occur, based on the lack of suitable habitat within the Study Area. The full likelihood of occurrence assessment is presented in Appendix B.



### 5.7.2 Fauna

The desktop assessment identified 27 threatened fauna species as potentially occurring within the Study Area. These species and their respective conservation status under the EPBC Act are detailed in Table 8 below. Given the Study Area is not located along the coast, strictly marine species have been excluded.

**Table 8 Desktop Results for Threatened Fauna Species**

Common Name	Scientific Name	EPBC Act
<b>Birds</b>		
Australasian bittern	<i>Botaurus poiciloptilus</i>	Endangered
Red knot	<i>Calidris canutus</i>	Endangered / Migratory
Curlew sandpiper	<i>Calidris ferruginea</i>	Critically Endangered / Migratory
Great knot	<i>Calidris tenuirostris</i>	Critically Endangered / Migratory
Greater sand plover	<i>Charadrius leschenaultii</i>	Vulnerable / Migratory
Lesser sand plover	<i>Charadrius mongolus</i>	Endangered / Migratory
Red goshawk	<i>Erythrorhynchus radiatus</i>	Vulnerable
Grey falcon	<i>Falco hypoleucos</i>	Vulnerable
White-bellied storm petrel	<i>Fregetta grallaria grallaria</i>	Vulnerable / Migratory
Squatter pigeon (southern)	<i>Geophaps scripta scripta</i>	Vulnerable
White-throated needletail	<i>Hirundapus caudacutus</i>	Vulnerable / Migratory
Western Alaskan bar-tailed godwit	<i>Limosa lapponica baueri</i>	Vulnerable
Star finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	Endangered
Eastern curlew	<i>Numenius madagascariensis</i>	Critically Endangered / Migratory
Black-throated finch (southern)	<i>Poephila cincta cincta</i>	Endangered
Australian painted snipe	<i>Rostratula australis</i>	Endangered
Masked owl (northern)	<i>Tyto novaehollandiae kimberli</i>	Vulnerable
<b>Mammals</b>		
Northern quoll	<i>Dasyurus hallucatus</i>	Endangered
Semon's leaf-nosed bat	<i>Hipposideros semoni</i>	Vulnerable
Ghost bat	<i>Macroderma gigas</i>	Vulnerable
Black-footed tree rat	<i>Mesembriomys gouldii rattoides</i>	Vulnerable
Sharman's rock wallaby	<i>Petrogale sharmani</i>	Vulnerable
Koala	<i>Phascolarctos cinereus</i>	Vulnerable
Spectacled flying-fox	<i>Pteropus conspicillatus</i>	Endangered
Bare-rumped sheath-tailed bat	<i>Saccolaimus saccolaimus nudiclunatus</i>	Vulnerable
Water mouse	<i>Xeromys myoides</i>	Vulnerable
<b>Reptiles</b>		
Yakka skink	<i>Egernia rugosa</i>	Vulnerable

Two threatened fauna species were recorded within the Study Area:

- Black-throated finch (southern)
- Bare-rumped sheath-tailed bat.

Additionally, the likelihood of occurrence assessment (Appendix B) identified three threatened fauna species with a moderate or high likelihood of occurrence within the Study Area based on the habitat encountered during the field surveys:

- White-throated needletail (moderate likelihood)
- Squatter pigeon (southern) (high likelihood)
- Red goshawk (moderate likelihood).

The detailed assessments against the EPBC Act *Significant Impact Guideline 1.1* for each threatened species is presented in Section 7.0.

## 5.8 Migratory Species

The desktop assessment identified 44 migratory species as potentially occurring within the Study Area. These species and their respective conservation status under the EPBC Act are detailed in Table 9 below. Given the Study Area is not located along the coast, strictly marine species have been excluded.

**Table 9 Desktop Results for Migratory Species**

Common Name	Scientific Name	EPBC Act
<b>Migratory Marine Birds</b>		
Common noddy	<i>Anous stolidus</i>	Migratory
Fork-tailed swift	<i>Apus pacificus</i>	Migratory
Lesser frigatebird	<i>Fregata ariel</i>	Migratory
Great frigatebird	<i>Fregata minor</i>	Migratory
Little tern	<i>Sternula albifrons</i>	Migratory
<b>Migratory Marine Species</b>		
Saltwater crocodile	<i>Crocodylus porosus</i>	Migratory
<b>Migratory Terrestrial Species</b>		
Oriental cuckoo	<i>Cuculus optatus</i>	Migratory
White-throated needletail	<i>Hirundapus caudacutus</i>	Vulnerable / Migratory
Black-faced monarch	<i>Monarcha melanopsis</i>	Migratory
Spectacled monarch	<i>Monarcha trivirgatus</i>	Migratory
Yellow wagtail	<i>Motacilla flava</i>	Migratory
Satin flycatcher	<i>Myiagra cyanoleuca</i>	Migratory
Rufous fantail	<i>Rhipidura rufifrons</i>	Migratory
<b>Migratory Wetland Species</b>		
Common sandpiper	<i>Actitis hypoleucos</i>	Migratory
Ruddy turnstone	<i>Arenaria interpres</i>	Migratory
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	Migratory
Red knot	<i>Calidris canutus</i>	Endangered / Migratory

Common Name	Scientific Name	EPBC Act
Curlew sandpiper	<i>Calidris ferruginea</i>	Critically Endangered / Migratory
Pectoral sandpiper	<i>Calidris melanotos</i>	Migratory
Red-necked stint	<i>Calidris ruficollis</i>	Migratory
Great knot	<i>Calidris tenuirostris</i>	Critically Endangered / Migratory
Double-banded plover	<i>Charadrius bicinctus</i>	Migratory
Little ringed plover	<i>Charadrius dubius</i>	Migratory
Greater sand plover	<i>Charadrius leschenaultii</i>	Vulnerable / Migratory
Lesser sand plover	<i>Charadrius mongolus</i>	Endangered / Migratory
Oriental plover	<i>Charadrius veredus</i>	Migratory
Latham's snipe	<i>Gallinago hardwickii</i>	Migratory
Swinhoe's snipe	<i>Gallinago megala</i>	Migratory
Pin-tailed snipe	<i>Gallinago stenura</i>	Migratory
Broad-billed sandpiper	<i>Limicola falcinellus</i>	Migratory
Bar-tailed godwit	<i>Limosa lapponica</i>	Migratory
Black-tailed godwit	<i>Limosa limosa</i>	Migratory
Eastern curlew	<i>Numenius madagascariensis</i>	Critically Endangered / Migratory
Little curlew	<i>Numenius minutus</i>	Migratory
Whimbrel	<i>Numenius phaeopus</i>	Migratory
Osprey	<i>Pandion haliaetus</i>	Migratory
Pacific golden plover	<i>Pluvialis fulva</i>	Migratory
Grey plover	<i>Pluvialis squatarola</i>	Migratory
Grey-tailed tattler	<i>Tringa brevipes</i>	Migratory
Wood sandpiper	<i>Tringa glareola</i>	Migratory
Wandering tattler	<i>Tringa incana</i>	Migratory
Common greenshank	<i>Tringa nebularia</i>	Migratory
Marsh sandpiper	<i>Tringa stagnatilis</i>	Migratory
Terek sandpiper	<i>Xenus cinereus</i>	Migratory

No migratory species were identified during the field surveys. The likelihood of occurrence assessment (Appendix B) identified five migratory species with a moderate likelihood of occurrence within the Study Area based on the habitat encountered during the field surveys:

- Fork-tailed swift (moderate likelihood)
- Oriental cuckoo (moderate likelihood)
- White-throated needletail (moderate likelihood)
- Satin flycatcher (moderate likelihood)
- Rufous fantail (moderate likelihood).

The detailed assessments against the EPBC Act *Significant Impact Guideline 1.1* for each migratory species is presented in Section 7.0.

## 5.9 Nuclear Actions

The Project is not and does not involve a nuclear action. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.1* has not been undertaken.

## 5.10 A Water Resource, in Relation to Coal Seam Gas Development and Large Coal Mining Development

The Project is not a coal seam gas development or a large coal mining development. A detailed assessment against the EPBC Act *Significant Impact Guideline 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (Department of the Environment, 2013a) has not been undertaken.

## 6.0 Potential Impacts and Mitigation Measures

Potential impacts to flora and fauna values may occur in the following phases of the Project:

1. Construction Phase
2. Operation and Maintenance Phase.

Further information on the potential impacts associated with the Project is outlined below, as well as mitigation measures to minimise the potential impacts on flora and fauna values.

### 6.1 Construction Phase

The most significant impacts on ecological values will occur during the Project's construction phase, when vegetation and habitat removal will occur.

#### 6.1.1 Vegetation Clearance

The Study Area covers approximately 808.9 ha including the 1.8 km powerline corridor with a 20 m buffer.

Table 10 quantifies the potential clearing impact to vegetation communities. Ground-truthed REs have been used to map the REs within the Study Area. Queensland Herbarium mapping has been used to map the REs within the fire impacted area and the powerline corridor.

**Table 10 Potential Impact to Vegetation Communities**

RE	Short Description <sup>1</sup>	VM Act Status	Area (ha) within Study Area	Area (ha) within Project Footprint
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	512.56	182.84
11.3.25b	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca fluviatilis</i> , <i>Nauclea orientalis</i> open forest riverine wetland or fringing riverine wetland.	Least Concern	4.54	0.00
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	158.14	32.02
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains.	Least Concern	74.18	0.089
-	Non-remnant vegetation	-	14.33	2.33
<b>Fire Impacted Area</b>				
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	15.69	3.97
11.3.25b	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca fluviatilis</i> , <i>Nauclea orientalis</i> open forest riverine wetland or fringing riverine wetland.	Least Concern	1.43	0.00
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	4.07	0.00
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains.	Least Concern	20.92	9.62

RE	Short Description <sup>1</sup>	VM Act Status	Area (ha) within Study Area	Area (ha) within Project Footprint
<b>Powerline Corridor</b>				
11.3.12	<i>Melaleuca viridiflora</i> with occasional <i>Melaleuca argentea</i> +/- <i>Melaleuca dealbata</i> woodland on alluvial plains.	Least Concern	0.95	0.95
11.3.30	<i>Eucalyptus crebra</i> and <i>Corymbia dallachiana</i> woodland on alluvial plains.	Least Concern	1.97	1.97
11.12.9	<i>Eucalyptus platyphylla</i> woodland on igneous rocks.	Least Concern	0.46	0.46
-	Non-remnant vegetation	-	0.28	0.28

<sup>1</sup> Description of REs as contained in the REDD Version 11 (Queensland Herbarium, 2019)

While the extent of the Project will mean that impacts on remnant vegetation communities are unavoidable, there are a range of measures that will be implemented to minimise the level of impact from clearing vegetation. These include:

- Vegetation clearing will be avoided or minimised in sensitive environments, specifically riparian areas around creek lines
- The Project Environmental Management Plans will include vegetation management to provide clear guidance on areas to be cleared and retained, methods for clearing and other relevant environmental protection measures
- A Project Ecologist will be present on site during all vegetation clearing operations
- Appropriate erosion and sediment control measures will be installed and maintained.

#### 6.1.2 Loss of Fauna Habitat

The clearance of native vegetation can adversely affect native fauna species. Potential impacts resulting from clearing native vegetation can include:

- Loss of habitat causing a reduction of biological diversity or loss of local populations and genotypes
- Fragmentation of populations, which can reduce gene flow between small isolated populations, reduce the potential for species to adapt to environmental change and loss or severe modification of the interactions between species
- Disturbance which can degrade or permit the establishment and spread of exotic species within remaining habitat that may result in the displacement of native species
- Loss of sheltering and nesting resources such as hollow-bearing trees, logs, leaf litter, rocky outcrops
- Loss of food resources such as foliage, flowers, nectar, fruit and seeds.

The fauna habitat types occurring within the Study Area and the area (ha) likely to be affected by the Project are provided in Table 11. Ground-truthed REs have been used to map the fauna habitat types within the Study Area. Queensland Herbarium RE mapping has been used to map the fauna habitat types within the fire impacted area and the powerline corridor.



**Table 11 Fauna Habitat Types and Potentially Associated Threatened Species**

Broad Habitat Type	Potential Threatened Species	Area (ha) within Study Area	Area (ha) within Project Footprint
<b>Study Area</b>			
<i>Melaleuca viridiflora</i> woodland on alluvial plains	Black-throated finch (southern); squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	512.56	182.84
Open <i>Eucalyptus crebra</i> woodland on alluvial plains	Black-throated finch (southern); red goshawk; squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	158.14	32.02
<i>Eucalyptus</i> and <i>Corymbia</i> riparian woodland	Black-throated finch (southern); red goshawk; squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	78.72	0.089
Non-remnant vegetation	Black-throated finch (southern); squatter pigeon (southern); fork-tailed swift; white-throated needletail.	14.33	2.33
<b>Fire Impacted Area</b>			
<i>Melaleuca viridiflora</i> woodland on alluvial plains	Black-throated finch (southern); squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	15.69	3.97
Open <i>Eucalyptus crebra</i> woodland on alluvial plains	Black-throated finch (southern); red goshawk; squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	4.07	0.00
<i>Eucalyptus</i> and <i>Corymbia</i> riparian woodland	Black-throated finch (southern); red goshawk; squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	20.92	9.62
<b>Powerline Corridor</b>			
<i>Melaleuca viridiflora</i> woodland on alluvial plains	Black-throated finch (southern); squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	0.95	0.95
Open <i>Eucalyptus crebra</i> woodland on alluvial plains	Black-throated finch (southern); red goshawk; squatter pigeon (southern); bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	1.97	1.97
<i>Eucalyptus platyphylla</i> woodland on igneous rocks	Black-throated finch (southern); red goshawk; bare-rumped sheath-tailed bat; fork-tailed swift; oriental cuckoo; white-throated needletail; satin flycatcher; rufous fantail.	0.46	0.46
Non-remnant vegetation	Black-throated finch (southern); squatter pigeon (southern); fork-tailed swift; white-throated needletail.	0.28	0.28

The riparian habitats on watercourses and the remnant woodlands that are present in the Study Area facilitate wildlife movement and provide food and water resources for a range of fauna species. There is the potential that these locations are used by threatened species and hence are considered important areas. Additionally, large trees containing hollows are present throughout the Study Area and provide habitat opportunities for fauna. Due to the long time period required for trees to form hollows (100+ years); hollow-bearing trees are considered to be an important habitat feature in the landscape.

The construction of solar panels and security perimeter fencing may obstruct the movement of fauna species through the landscape and may trap fauna within the Study Area.

While the extent of vegetation clearing for the Project will mean that impacts on fauna habitat are unavoidable, there are a range of measures that may be taken to minimise the level of impact. These include:

- The Project Footprint has been designed to maximise retention of riparian vegetation (RE 11.3.25b and 11.3.35). Further micro-sighting of infrastructure and access should be undertaken in detailed design phase to avoid important habitat features such as hollow-bearing trees
- Suitably qualified fauna spotter catchers must be engaged to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm
- A Construction Environmental Management Plan will be prepared to provide clear guidance on areas to be cleared and retained, methods for clearing, role of the spotter-catcher and other relevant environmental protection matters
- Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed
- Identify and map clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat; such as identified nests and trees that are to be retained
- Habitat features such as felled trees and logs will be considered for relocation to other areas where practical to provide microhabitat for fauna
- A Significant Species Management Program (SSMP) will be prepared where potential breeding habitat for threatened fauna is identified and needs to be removed as part of the vegetation clearing process.

### **6.1.3 Fauna Mortality or Injury**

Clearing of vegetation can result in injury or mortality of fauna, particularly ground dwelling fauna (e.g. reptiles), that may be crushed by machinery or struck by vehicles. Arboreal mammals may be trapped in trees as they are felled. Mitigation measures to reduce the likelihood of injury or mortality to fauna include:

- Pre-clearance surveys to identify shelters and breeding places potentially utilised by Least Concern species, colonial breeders and threatened fauna will be undertaken
- Fauna spotter-catchers will be used to capture and relocate fauna prior to clearing
- No vegetation clearing will occur during the early evening or at night, as this is when fauna species are most likely to be on the move and are more vulnerable to injury
- No unauthorised off-track driving
- If any hollow-bearing tree is found or suspected to contain any threatened species, the tree should be left in place for a minimum of two days and, if possible, be reinspected no more than two hours prior to felling
- Any injured, sick and dead vertebrate fauna will be recorded before (by fauna spotter-catchers), during and after construction and operation.

#### 6.1.4 Increased Spread of Weeds

Indirect impacts to vegetation through the construction phase of the Project include the potential introduction or exacerbation of weeds and erosion. The risk of these potential impacts can be appropriately mitigated and managed, with potential mitigation measures including the adoption of a Biosecurity Management Plan. The Plan is to include:

- Staff and contractors must be equipped with information on the location of biosecurity threats, which enables them to move within 'clean areas' without the need to wash-down
- When moving from a 'dirty area' to a clean area, a vehicle hygiene inspection will be required to determine whether a wash-down is necessary
- Known WoNS, Restricted Invasive or Regionally Declared weeds will be identified in the Study Area
- The origin of high-risk construction materials, machinery and equipment will be identified to mitigate introduction of weed species
- Management methods to control spread of weeds considered to be Restricted Matters must be in keeping with regional management practice or Queensland Department of Agriculture and Fisheries pest control prescriptions
- Promote the awareness of weed management, by inclusion of weed issues, pictures and procedures into the Project's site induction program
- Appropriate weed monitoring to identify any new incidence of weeds.

A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project.

#### 6.1.5 Increased Dust

Deposition of dust, sand and soil resulting from construction may have potential impacts on vegetation if excessive levels are sustained over extended periods. When dust settles on plant foliage it can reduce the amount of light penetration on the leaf surface, block and damage stomata, and slow rates of gas exchange and water loss (Farmer, 1993). Reduction in the ability to photosynthesise due to physical effects may result in reduced growth rates of vegetation and decreases in floral vigour and overall community health.

The dominant flora species of the vegetation communities in the Study Area generally exhibit physiological qualities that are not sensitive to dust deposition. The sclerophyllous foliage of *Eucalyptus* and *Corymbia* species is generally pendulous (i.e. points down), with a thick smooth cuticle that does not encourage particulate matter to remain on the surface. The dominant woodland species are also generally hardy and well adapted to adverse conditions (e.g. extended dry conditions and low nutrient soils).

To minimise the deposition of dust on adjacent vegetation, engineering controls and dust suppression measures should be implemented, such as water trucks and sprinklers. Vehicle speeds should also be restricted on cleared tracks to minimise the generation of dust.

#### 6.1.6 Edge Effects

Edge effects are zones of changed environmental conditions (e.g. altered light levels, wind speed, temperature) occurring along the edges of habitat fragments. Examples of edge effects include weed invasion and altered community assemblage. Clearing in remnant, high ecological value areas can promote the growth of different vegetation types (Moenting & Morris, 2006) and allow invasion by introduced species specialising in edge habitats.

To minimise edge effects within the Study Area, the following measures should be implemented:

- Clear demarcation of remnant vegetation at the boundary of the clearing footprint that must not be disturbed, to avoid inadvertent clearing and disturbance
- Measures associated with weed management.

### 6.1.7 Activity and Noise

During the construction phase, there will be an increase in noise and activity in the Study Area as machinery undertakes clearing for access and construction activities. It is important to note that these potential impacts will not affect the entire Study Area simultaneously nor will they persist in any one area for a considerable period of time (months). However, when activity and noise is occurring in areas adjoining retained habitat, potential impacts may include:

- Reduced foraging ability by auditory predators due to increased background noise
- Increased risk of predation by visual predators due to increased background noise
- Increased potential for collisions with vehicles
- Periodic displacement of inhabiting fauna species
- Human visitation causing disturbance to forage or breeding behaviours.

Current research indicates that there are no government policies or other widely-accepted guidelines in respect to the noise levels which may be acceptable to wildlife. The levels or character of noise that may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are also not firmly established in the technical literature.

Sudden loud, impulsive or impact noises are capable of causing birds and other fauna to become startled, which if occurring over the longer term, may affect feeding and breeding behaviour in some species. It is expected that excavation, construction and earthmoving associated with the Project will potentially cause disturbance to all groups of fauna, especially birds. This will most likely result in avoidance of the area for the duration of these activities.

Mitigation measures to minimise the effects of activity and noise include:

- Construction will be limited during the breeding seasons of threatened species, specifically black-throated finch (southern) and bare-rumped sheath-tailed bat
- No night-time construction activities will occur
- Noise-reduction measures on equipment will be used where necessary.

## 6.2 Operation and Maintenance Phases

Impacts to the ecological values within the Study Area during the operational phase include:

- Security fences may obstruct the movement of larger terrestrial species such as kangaroos, wallabies, emus and other fauna species
- Light spill from artificial lighting within the Study Area may adversely affect the natural behaviour of nocturnal fauna species such as arboreal mammals, birds and foraging microbats
- Increased traffic within the Study Area may facilitate the encroachment of plant weeds that could further degrade the retained areas of native woodland
- Increased visitation of the Study Area may disturb resident fauna and disrupt their natural behaviour.

The mitigation measures outlined in Section 6.1 will apply.

## 7.0 Significant Impact Assessments

### 7.1 Endangered Species

#### 7.1.1 Black-throated finch (southern) (*Poephila cincta cincta*)

##### 7.1.1.1 Distribution

The black-throated finch (southern) historically occurred from far south-eastern Queensland, near the Queensland-New South Wales border, through eastern Queensland north to the divide between the Burdekin and Lynd Rivers. The subspecies is now extinct at most sites south of Burdekin River, and is confined to a very few remaining 'pockets' of suitable habitat.

Since 1998, birds likely to be of the southern subspecies have been recorded at the following sites (Department of Agriculture Water and the Environment, 2020):

- Townsville and its surrounds (Giru, Serpentine Lagoon, Toonpan, and near Ross River Dam)
- Ingham, and sites nearby (near Mutarnee [at Ollera Creek], and near Mount Fox)
- scattered sites in central-eastern Queensland (Great Basalt Wall, Yarrowmere Station, Moonoomoo Station, Doongmabulla Station, Fortuna Station and Aramac).

##### 7.1.1.2 Habitat

The black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. Some of the more common species of eucalypts in woodlands and forests frequented by the subspecies include narrow-leaved ironbark (*Eucalyptus crebra*), river red gum (*Eucalyptus camaldulensis*), silver-leaved ironbark (*Eucalyptus melanophloia*), Brown's box (*Eucalyptus brownii*), yellowjacket (*Eucalyptus similis*) and forest red gum (*Eucalyptus tereticornis*).

Black-throated finches (southern) require habitat where there is access to seeding grasses and water and will utilize a variety of different habitats for foraging, particularly in north Queensland during the wet season. This subspecies feed on the seeds of grasses (such as *Urochloa mosambicensis*, *Digitaria ciliaris*, *Melinis repens*, *Chloris inflata*) and herbaceous plants. They obtain most of their food by pecking seeds from the ground. However, they will also reach or jump up to take seeds from low inflorescences, perch on stems to take seeds from inflorescences, perch on grass stems and use their body weight to bring the stems to the ground to feed and reach for inflorescences from perches other than the food plant (Black-throated Finch Recovery Team, 2007a).

##### 7.1.1.3 Species Presence and Utilisation of the Study Area

During the August 2018 field survey, black-throated finch (southern) nests were identified within the Study Area. Further, waterhole counts within the adjacent property have regularly recorded this subspecies (e.g. AECOM (2012); Natural Resource Assessment Environmental Consultants (2012); Northern Resource Consultants (2016a)). Habitat within the Study Area is within the known foraging range from these permanent water sources (Northern Resource Consultants, 2016b). AECOM therefore undertook targeted field surveys for the black-throated finch (southern) during the 2018 late dry-season and 2019 breeding season. While no black-throated finch (southern) individuals were recorded within the Study Area during the targeted surveys, more nests were located, and suitable foraging and nesting habitat was identified.

From a habitat perspective, the areas within 400 m of water are the most limiting, and therefore critical, for the species' persistence in the landscape. There is no permanent water found within the Study Area. Black-throated finches (southern) present within the Study Area would most likely drink from a variety of water sources during the dry and wet seasons, including potentially the ephemeral streams within the Study Area during the wet season. During the dry season, individuals may pass through the Study Area to access permanent water sources, such as farm dams, outside the Study Area.

Habitat mapping was undertaken to estimate the extent of high and moderate potential habitat in the Study Area and Project Footprint. The final map is presented in Figure 4 and the mapping criterion is presented in Appendix B.

#### **7.1.1.4 Significant Impact Guidelines**

The Significant Impact Guidelines for the black-throated finch (southern) identify ‘important areas’ that are surrounding recent records (Department of the Environment Water Heritage and the Arts, 2009). Actions proposed in grassland or grassy woodland within an important area requires a habitat assessment. Where suitable habitat exists, the species should be presumed to be present.

Within these important areas, uses and developments that markedly degrade the landscape value may have a significant impact on the black-throated finch (southern). As a guide, the character and quality of the habitat may be significantly diminished if an action result in:

- Net loss or degradation of water sources (either permanent or seasonal) in the locality.
- Widespread or indiscriminate loss of trees, including known nest trees within 1 km of a water source.
- A decrease in tree recruitment capacity which limits the area’s ability to be self-sustaining.
- The degradation of foraging habitat (grassland) where known black throated finch (southern) records exist, including the intensification of biomass reduction or stocking rates.

Examples of actions that may lead to the loss, degradation and/or fragmentation of black-throated finch (southern) habitat and may have a significant impact on the subspecies, could include, but are not limited to (Department of the Environment Water Heritage and the Arts, 2009):

- Clearing of grassland and/or grassy woodland.
- Damming or disrupting the natural flows of creeks and rivers.
- Earthworks or excavation.
- Pasture improvement (to previously unimproved grassland).
- Changes in management regimes, such as burning, slashing and grazing.
- Construction of roads, structures and/or hard surfaces.
- Construction of temporary or permanent structures for storage and accommodation.
- The introduction of domestic and agricultural animals.

The Study Area is located within an ‘important area’ identified in the Guidelines and suitable habitat exists in this area.

#### **7.1.1.5 Habitat Critical to the Survival of the Species**

Habitat critical to the survival of the species has been identified as water sources, grass seeds, and trees providing suitable nesting habitat (Black-throated Finch Recovery Team, 2007b).

The Study Area contains suitable grass species and nesting trees. No permanent water is found within the Study Area, through areas surrounding the Study Area may contain permanent water sources.

Based on this definition, the Study Area contains habitat critical to the survival of the species.

#### **7.1.1.6 Potential Impacts**

Potential impacts of the Project on this species include the loss and/or fragmentation of foraging and nesting habitat.

The extent of habitat loss expected by the Project is illustrated in Table 12.



**Table 12 Habitat Impacts to the Black-throated Finch (southern)**

Habitat Type	Area (ha) within Project Footprint <sup>1</sup>	Notes
'High suitability' nesting	217.99	Potential nest trees include <i>Melaleuca viridiflora</i> , <i>Eucalyptus platyphylla</i> , <i>Eucalyptus crebra</i> , <i>Corymbia dallachiana</i> , <i>Corymbia tessellaris</i> , <i>Melaleuca leucadendra</i> and <i>Corymbia clarksoniana</i> .
'Moderate suitability' nesting	14.21	
'Low suitability' nesting	0.08	
<b>Total nesting</b>	<b>232.28</b>	
Foraging / Dispersal	232.28	All remnant areas within the Study Area are considered potential foraging habitat. Foraging grass species include <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> , <i>Eriachne armittii</i> , <i>Dichanthium sericeum</i> , <i>Alloteropsis semialata</i> , <i>Eragrostis</i> spp., <i>Aristida</i> spp., <i>Panicum effusum</i> , and <i>Panicum decompositum</i> .

<sup>1</sup> Area calculations based on ground-truthed REs within the Study Area, and Queensland Herbarium mapped REs within the fire impacted area and the powerline corridor as no field verification has been undertaken in these areas

Mitigation measures (in addition to those identified in Section 6.0) include:

- Vegetation clearing will be limited during the black-throated finch (southern) breeding period (February to May).
- Pre-clearance surveys by a spotter-catcher will be undertaken in mapped habitat areas and near water sources to ensure nests have been vacated prior to vegetation clearance.
- Weed wash down requirements for all vehicles coming into and exiting the Study Area will be strictly implemented to avoid the introduction or spread of weed species into and around the Study Area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for the various construction activities on site. These will be required for the entire Study Area and will have a stringent focus around waterway works.

#### 7.1.1.7 Significant Impact Assessment

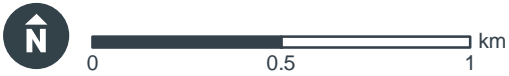
An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 13. Based on the assessment, it is **possible** that the Project will have a significant impact on the black-throated finch (southern).

**Table 13 Significant Impact Assessment for Black-throated Finch (southern)**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Lead to a long-term decrease in the size of a population?	<p><b>Possibly.</b></p> <p>Garnett, Szabo, &amp; Dutson (2011) indicate that that Townsville has one of the largest known populations of the species and consists of no more than 600 birds.</p> <p>There is no permanent water within the Study Area. Black-throated finches (southern) present within the Study Area would most likely drink from a variety of water sources during the dry and wet seasons, including potentially the ephemeral streams within the Study Area during the wet season. During the dry season, individuals may pass through the Study Area to access permanent water sources, such as farm dams, outside the Study Area.</p> <p>As no individuals were recorded within the Study Area during the targeted field surveys, it is unlikely that the Study Area is utilised by a significant proportion of the Townsville population. However, as approximately 232.28 ha of potential nesting and foraging habitat is proposed to be cleared for the Project, it is possible that vegetation removal associated with the Project may lead to a long-term decrease in the size of a population.</p>
Reduce the area of occupancy of the species?	<p><b>Possibly.</b></p> <p>The area of occupancy is estimated to be 5,000 km<sup>2</sup>. This has declined with the decrease in the extent of occurrence. Vegetation removal will occur within an identified ‘important area’ (Department of the Environment Water Heritage and the Arts, 2009). Approximately 232.28 ha of potential nesting and foraging habitat is proposed to be cleared for the Project, though no permanent water sources will be impacted. It is possible that the Project may reduce the area of occupancy of this species.</p>
Fragment an existing population into two or more populations?	<p><b>No.</b></p> <p>For an aerial species such as the black-throated finch (southern), the Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat. Therefore, it is unlikely that the Project will fragment an existing population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>Likely.</b></p> <p>Habitat critical to the survival of the species has been identified as water sources, grass seeds, and trees providing suitable nesting habitat (Black-throated Finch Recovery Team, 2007b). Water sources will not be impacted by the Project; however, the loss of grass seeds and suitable nesting habitat is expected to occur, including within an identified ‘important area’.</p> <p>Approximately 232.28 ha of potential nesting and foraging habitat is proposed to be cleared for the Project. It is likely that the Project will adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population?	<p><b>Possibly.</b></p> <p>Breeding can occur throughout the year under optimal conditions. In the Townsville area, the peak breeding period is during the wet season between February and May (Department of the Environment Water Heritage and the Arts, 2009). Vegetation clearing will be limited during the black-throated finch (southern) breeding period (February to May). Suitable nesting trees will be removed for the Project, and it is unknown how the displacement of individuals from the Study Area from Project activities may affect the breeding cycle. It is possible that the Project will disrupt the breeding cycle of a population.</p>

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>Possibly.</b> A loss of trees and foraging habitat are expected to occur within potential black-throated finch (southern) habitat, including within an identified ‘important area’. It is possible that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Critically Endangered or Endangered species becoming established in the Endangered or Critically Endangered species’ habitat?	<b>No.</b> Invasive flora species have been identified on the Species Profile and Threats (SPRAT) database as a key threat to the subspecies; however, it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No.</b> Disease has not been identified as a main threat to the species. The Construction Weed and Pest Management Plan for the Project will detail the measures to prevent the introduction and spread of disease.
Interfere with the recovery of the species?	<b>Possibly.</b> The Recovery Plan for the black-throated finch (southern) identifies the recovery objectives to manage and protect the black-throated finch and its habitat, and to promote the recovery of the southern subspecies (Black-throated Finch Recovery Team, 2007b). Approximately 232.28 ha of potential nesting and foraging habitat is proposed to be cleared for the Project. This vegetation removal will occur within an identified ‘important area’, and therefore the Project may interfere with the recovery of the species.





Legend

- Highways
- Permanent creek
- Seasonal creek/drainage line
- Study Area
- Project Footprint
- Permanent dam
- Seasonal dam
- Black-throated finch (southern) nest
- Fire impacted area (August 2018)
- Nesting habitat**
  - High suitability
  - Moderate suitability
  - Low suitability
- Foraging habitat**
  - High suitability
  - Moderate suitability
  - Low suitability

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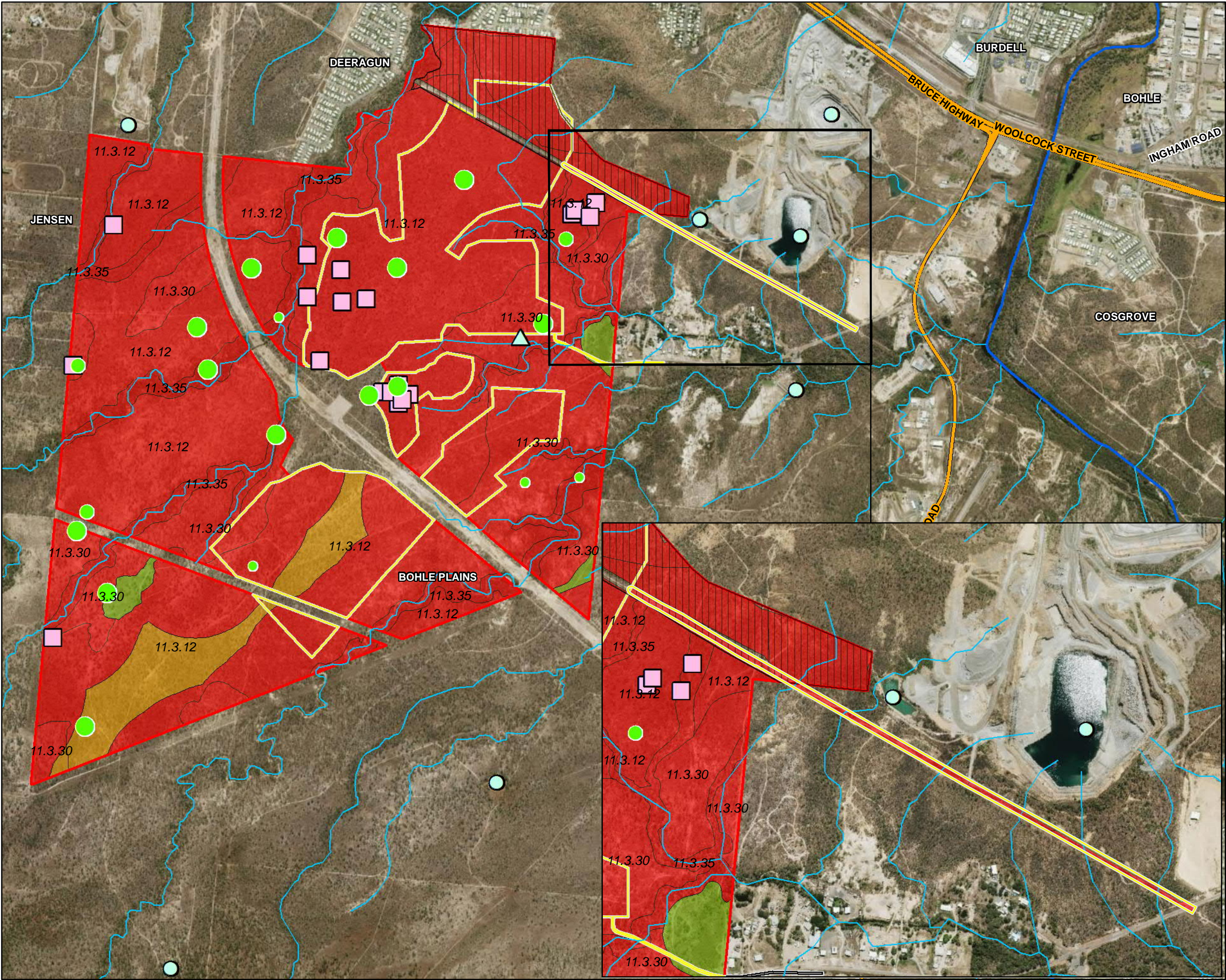
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BOHLE PLAINS RENEWABLE ENERGY FACILITY  
Matters of National Environmental Significance

Black-throated Finch (southern)  
Habitat Mapping

FIGURE 4

PROJECT ID 60580955  
CREATED BY MackA  
LAST MODIFIED 07-May-2020  
VERSION 1





## 7.2 Vulnerable Species

### 7.2.1 Bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniat*)

#### 7.2.1.1 Distribution

The bare-rumped sheath-tailed bat occurs in two distinct populations, one in coastal Queensland from around Townsville to near Coen, and another in the top end of the Northern Territory. It has been assumed that the bat species occurs in naturally low densities across the landscape (Murphy, 2002), however, the area occupied by a colony for foraging purposes has never been documented, and it is unknown how many colonies the broader area of contiguous vegetation could potentially contain. Their 'highly probable' presence at multiple locations across the landscape indicates that a high proportion of the area is being utilised for foraging purposes (Department of Agriculture Water and the Environment, 2020).

#### 7.2.1.2 Habitat

The bare-rumped sheath-tailed bat is insectivorous, although the type of insects taken has not been documented. The species has a fast, direct flight and is likely to forage primarily for aerial insects over the woodland/forest canopy but may fly lower when foraging over open situations (Churchill, 2008).

The bare-rumped sheath-tailed bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments. The habitat adjacent to the roost in the Jerona Fauna Sanctuary at Ayr in north Queensland was in *Eucalyptus platyphylla* woodland, typical of the alluvial plains adjacent to the lower Burdekin and Houghton Rivers, near Townsville (Compton & Johnson, 1983). Adjacent to this habitat were woodlands dominated by *Eucalyptus tessellaris* and *Eucalyptus papuana*. At Iron Range, Queensland, roosts were located in *Eucalyptus tetrodonta* with *Corymbia clarksoniana* and *Eucalyptus tessellaris* subdominant. Adjacent to the roost was a narrow strip of gallery forest along a seasonally dry watercourse and less than one kilometre away were large patches of rainforest associated with the Claudie River floodplain (Murphy, 2002). There is no information available on foraging habitat shifts between the dry and wet seasons.

No studies have been conducted on the roosting ecology of this species and all located roosts are from incidental records (such as, as a result of land clearance). In Australia, all confirmed roosting records are from deep tree hollows in *Eucalyptus platyphylla*, *Eucalyptus miniata*, *Eucalyptus tetrodonta* and *Melaleuca leucadendra* (Churchill, 2008). Hollows in these tree species have also been used as maternity roosts. Habitat ecology for this bat is not well known, the presumption is that it breeds in the tropical wet season (Schulz & Thomson, 2007).

#### 7.2.1.3 Species Presence and Utilisation of the Study Area

During the April 2019 field survey, 37 acoustic calls over three nights of the bare-rumped sheath-tailed bat were detected within the Study Area within REs 11.3.25b and 11.3.35. This species has also been recorded foraging in multiple locations across the Townsville region including at James Cook University, the Townsville Ring Road Section 4, the Haughton River and at Riverway Drive (RPS, 2013).

Within the Study Area, *Eucalyptus platyphylla* (a known roosting tree) was recorded occasionally within RE 11.3.12 and as a dominant species within 11.3.35, and *Melaleuca leucadendra* (another known roosting tree) was recorded within RE 11.3.25b. Based on this information and the species records within the Study Area, it is likely that this species primarily forages and roosts along the riparian corridors (REs 11.3.25b and 11.3.35). RE 11.12.9 is also mapped by the Queensland Herbarium within the powerline corridor. This community is dominated by *Eucalyptus platyphylla* and may also provide suitable roosting habitat for this species. Foraging may occur throughout the entire Study Area (excluding non-remnant areas).

Habitat modelling was undertaken to estimate the extent of high and moderate potential roosting habitat in the Study Area and Project Footprint. The final map is presented in Figure 5 and the mapping criterion is presented in Appendix C.

#### 7.2.1.4 Habitat Critical to the Survival of the Species

The conservation advice for this species states that no roosts are currently protected from known threatening processes and habitat critical to the survival of the species has not been identified

(Threatened Species Scientific Committee, 2016). As such the generic definition of habitat critical to the survival of the species has been used (Section 3.5). Based on this definition, REs 11.3.25b, 11.3.35 and 11.12.9 within the Study Area may be considered critical to the survival of the species given the suitability for foraging, breeding, roosting and dispersal.

#### 7.2.1.5 Important Population

Prior to this species being changed from Critically Endangered to Vulnerable, Schulz & Thomson (2007) suggest that all populations were to be considered important based on few recent records. Advances in vocalisation interpretation suggest that this species may be more abundant resulting in it being relisted as Vulnerable. As a consequence, the views of Schulz & Thomson (2007) regarding important populations should be treated within the context of time.

The SPRAT profile does not identify important populations of the bare-rumped sheath-tailed bat. Therefore, any population occurring within the Study Area has been assessed against the generic definition in the *Significant Impact Guideline 1.1* (Section 3.5). Based on this definition, the Study Area does not contain an important population as it is not near the limit of the species range, it is not known to be important for maintaining genetic diversity and it is not known to be a key source population. The bare-rumped sheath-tailed bat is highly mobile and is considered to be one population in Queensland, Northern Territory and beyond Australia (Threatened Species Scientific Committee, 2016).

#### 7.2.1.6 Potential Impacts

Potential impacts of the Project on this species include the loss and/or fragmentation of foraging and roosting habitat.

The extent of habitat loss expected by the Project is illustrated in Table 14.

**Table 14 Habitat Impacts to the Bare-rumped Sheath-tailed Bat**

Habitat Type	Area (ha) within Project Footprint <sup>1</sup>	Suitable Habitat
'High suitability' roosting	10.17	Primary roost trees include <i>Eucalyptus platyphylla</i> and <i>Melaleuca leucadendra</i> .
'Moderate suitability' roosting	36.91	
'Low suitability' roosting	186.81	
<b>Total roosting</b>	<b>233.89</b>	
Foraging / Dispersal	233.89	All remnant vegetation within the Study Area is considered potential foraging/dispersal habitat.

<sup>1</sup> Area calculations based on ground-truthed REs within the Study Area, and Queensland Herbarium mapped REs within the fire impacted area and the powerline corridor as no field verification has been undertaken in these areas

Mitigation measures (in addition to those identified in Section 6.0) include:

- A spotter-catcher will be on-site during clearing activities in order to identify any potential roost trees (i.e. hollow bearing trees). Found bats will be relocated to a nearby tree that is to be retained.
- Clearing works will be staged to allow bats to leave roosting sites.
- No vegetation clearing to occur at night (bright lights can interfere with bat behaviour).
- Vegetation clearing will be limited during the breeding period (December to April) so young are not keeping adult bats in roosting sites.
- Clearing of hollow-bearing trees will only occur where necessary and cleared logs/stags will be relocated to adjoining habitat that is to be retained.

### 7.2.1.7 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 15. Based on the assessment, the Project is unlikely to have a significant impact on the bare-rumped sheath-tailed bat.

**Table 15 Significant Impact Assessment for Bare-rumped Sheath-tailed Bat**

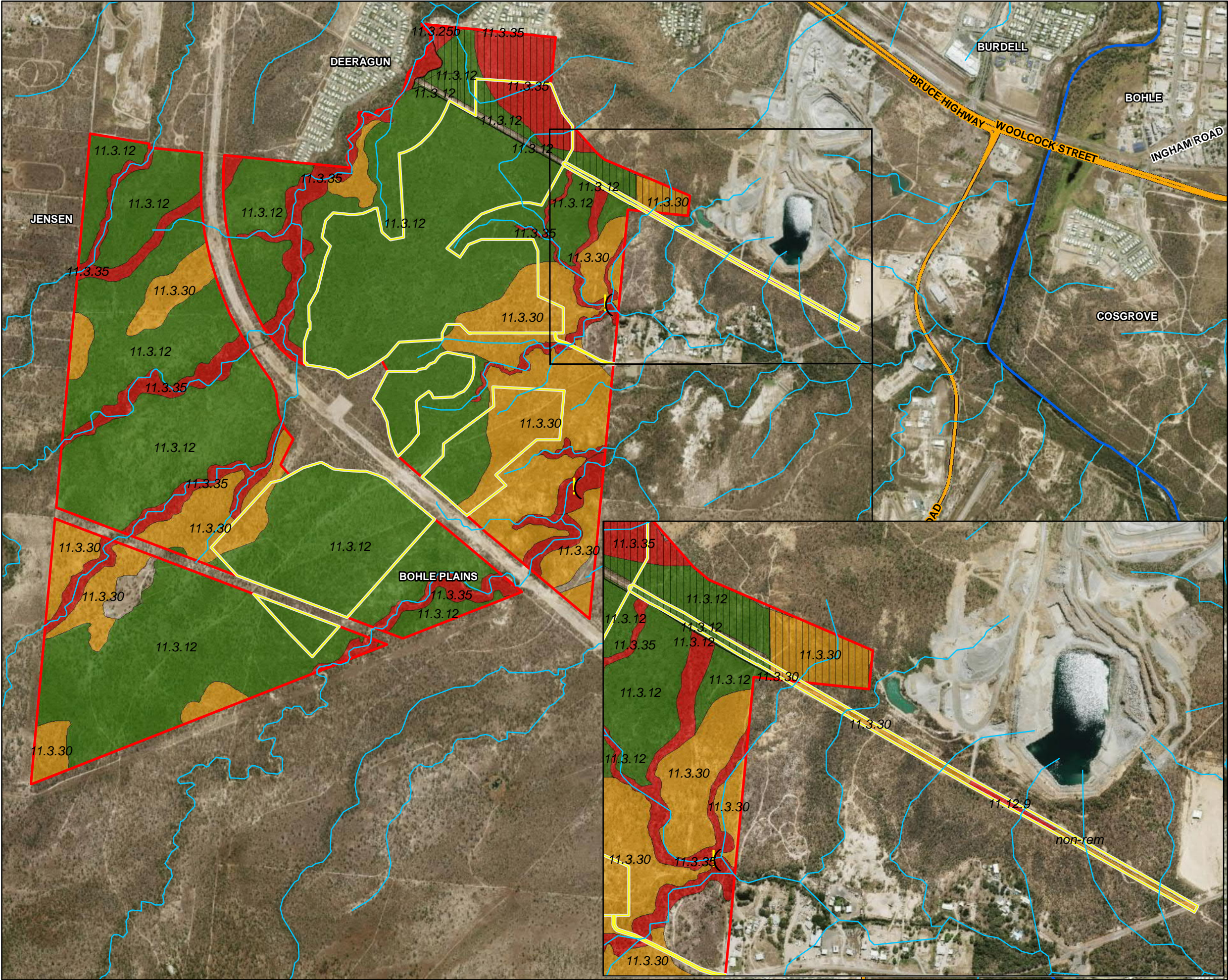
Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Lead to a long-term decrease in the size of an important population of a species?	<p><b>No.</b></p> <p>No populations are currently known to be under threat. Burbidge, Harrison, &amp; Woinarski (2014) suspects the number of mature individuals to be greater than 10,000, given that there is likely to be good roosting potential for the species in a significant proportion of the available habitats across its broad distribution. The Recovery Plan for this species notes that evidence suggests they occur at low densities in the region (Schulz &amp; Thomson, 2007). From this we can conclude that the bare-rumped sheath-tailed bat may be expected to only utilise a small percentage of available suitable hollows in the suitable habitat within the Study Area.</p> <p>No important populations are expected to occur within the Study Area. The Study Area is most likely used for foraging and potentially for opportunistic roosting. Considering the general low abundance of bare-rumped sheath-tailed bats in the landscape, the low amount of high potential roosting habitat being cleared (10.17 ha), and the mitigation measures proposed to ensure no bats are harmed during the tree clearing process; it is unlikely that there will be a long-term decrease in the size of an important population.</p>
Reduce the area of occupancy of an important population?	<p><b>No.</b></p> <p>Based on the mapping of point records from 1976 to 2016, the extent of occurrence is estimated at 1,579,652 km<sup>2</sup>, and the area of occupancy estimated at 140 km<sup>2</sup>. However, Burbidge et al. (2014) considered that the area of occupancy, which they estimated to be 32 km<sup>2</sup>, is an under-estimate due to limited sampling across the occupied range, and is likely to be greater than 2,000km<sup>2</sup>. The Recovery Plan for this species notes that evidence suggests they occur at low densities in the region (Schulz &amp; Thomson, 2007). From this we can conclude that the bare-rumped sheath-tailed bat may be expected to only utilise a small percentage of available suitable hollows in the suitable habitat within the Study Area.</p> <p>No important populations are expected to occur within the Study Area. The majority of the Project Footprint is considered ‘low’ potential roosting habitat, due to the presence of scattered hollow-bearing trees. Little vegetation clearing is proposed within high potential roosting habitat (REs 11.3.25b, 11.3.35 and 11.12.9), with a total of 10.17 ha. Considering this, it is unlikely that the Project will reduce the area of occupancy of an important population.</p>
Fragment an existing important population into two or more populations?	<p><b>No.</b></p> <p>For an aerial species such as the bare-rumped sheath-tailed bat, the Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat. This species has been recorded on Magnetic Island, 8 km off the Townsville coast, indicating that they are capable of flying over expanses of open areas. No important populations are expected to occur within the Study Area. Therefore, it is unlikely that the Project will fragment an existing important population into two or more populations.</p>

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Adversely affect habitat critical to the survival of a species?	<b>No.</b> Critical habitat for the survival of this species is not defined. REs 11.3.25b, 11.3.35 and 11.12.9 within the Study Area may be considered critical to the survival of the species given the suitability for foraging, breeding, roosting and dispersal. No clearing is proposed within RE 11.3.25b, and 10.17 ha is proposed to be cleared in RE 11.3.35 and 11.12.9. Given the proposed mitigation and avoidance measures, and the low density of <i>Eucalyptus platyphylla</i> trees to be cleared, the Project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population?	<b>No.</b> Females give birth to a single young, with birth records from Queensland in December and January. Vegetation clearing will be limited during the breeding period (December to April) so young are not keeping adult bats in roosting sites. Therefore, the Project is unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No.</b> The Recovery Plan for this species notes that evidence suggests they occur at low densities in the region (Schulz & Thomson, 2007). From this we can conclude that the bare-rumped sheath-tailed bat may be expected to only utilise a small percentage of available suitable hollows in suitable habitat. The majority of the Project Footprint is considered low potential roosting habitat, due to the presence of scattered hollow-bearing trees. Little vegetation clearing is proposed within high potential roosting habitat (REs 11.3.25b, 11.3.35 and 11.12.9), with a total of 10.17 ha. Considering the very small amount of potential roosting habitat being removed, the general low abundance of bare-rumped sheath-tailed bats in the landscape, and the mitigation measures proposed to ensure no bats are harmed during the tree clearing process; it is unlikely that the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	<b>No.</b> Invasive flora and fauna species have not been identified on the SPRAT database as a key threat to the species. It is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.



Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Introduce disease that may cause the species to decline?	<p><b>No.</b></p> <p>Disease has been identified as a threat to the species: congeners are known to carry the Australian bat Lyssavirus, but the consequences are unknown. Lyssavirus was first reported from the Townsville area in 1995 and is known to infect a closely related species, the yellow-bellied sheath-tailed bat (<i>Saccolaimus flaviventris</i>) (Churchill, 2008). Infection is generally spread by bites or scratches from infected animals, though infection by rabies has been reported in cases where the aerosolized virus is in a confined space with little to no air movement. Incidence of the disease in microbats is relatively uncommon. The Construction Weed and Pest Management Plan for the Project will detail the measures to prevent the introduction and spread of disease.</p>
Interfere substantially with the recovery of the species?	<p><b>No.</b></p> <p>The federal environment minister has declared that that a national recovery plan for the bare-rumped sheath-tailed bat is not required; however current threats to this species include habitat loss and fragmentation of preferred habitat (tall eucalypt open forest), competition for tree hollows by bees and birds, disease (unknown), and too frequent burning. REs 11.3.25b, 11.3.35 and 11.12.9 are considered critical habitat for this species; however only 10.17 ha of this habitat is proposed to be cleared by the Project. Given this, the Project is unlikely to interfere with the recovery of the bare-rumped sheath-tailed bat.</p>





**AECOM**



**Legend**

- Highways
- Watercourse (major)
- Watercourse (minor and drainage features)
- Study Area
- Project Footprint
- Fire impacted area (August 2018)
- Roosting habitat**
  - High suitability
  - Moderate suitability
  - Low suitability
  - Bare-rumped sheath-tailed bat acoustic record

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**BOHLE PLAINS RENEWABLE ENERGY FACILITY**  
**Matters of National Environmental Significance**

**Bare-rumped Sheath-tailed Bat Roost Habitat Mapping**

**FIGURE 5**

PROJECT ID	60580955
CREATED BY	MackA
LAST MODIFIED	07-May-2020
VERSION	1



## 7.2.2 Squatter pigeon (southern) (*Geophaps scripta scripta*)

### 7.2.2.1 Distribution

The known distribution of the squatter pigeon (southern) extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern New South Wales, and from the east coast to Hughenden, Longreach and Charleville, Queensland. Overall, the subspecies' known distribution is estimated to occur within the latitudes, 17° to 30° S, and the longitudes, 141° to 153° 30' E (Squatter Pigeon Workshop, 2011).

### 7.2.2.2 Habitat

In Queensland, squatter pigeon (southern) foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e. Land Zone 5), and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e. Land Zone 7) (Squatter Pigeon Workshop, 2011). Breeding habitat is within 1 km of a suitable, permanent waterbody (Squatter Pigeon Workshop, 2011).

The squatter pigeon (southern) is known to access suitable waterbodies to drink on a daily basis. Waterbodies that are suitable for the species occur on the lower, gentle slopes and plateaus of sandstone ranges (equivalent to Queensland Regional Ecosystem Land Zone 10), alluvial clay soils on river or creek flats (represented by Queensland Regional Ecosystem Land Zone 3) or non-alluvial clay soils on flats or plains which are not associated with current alluvial deposits (represented by Queensland Regional Ecosystem Land Zone 4). Hence, where natural foraging or breeding habitat occurs (i.e. on Queensland Regional Ecosystem Land Zones 5 and 7), the squatter pigeon (southern) may be found in vegetation types growing on the above soil types (Squatter Pigeon Workshop, 2011).

Squatter pigeon (southern) dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. Such patches of vegetation tend not to be suitable for the species' foraging or breeding, but facilitate the local movement of the species between patches of foraging habitat, breeding habitat and/or waterbodies, or the wider dispersal of individuals in search of reliable water sources during the dry season or during droughts (Squatter Pigeon Workshop, 2011).

### 7.2.2.3 Species Presence and Utilisation of the Study Area

Despite extensive search effort, the squatter pigeon (southern) was not recorded within the Study Area during the field surveys. However, this species has been previously identified within the Study Area ((AECOM (2012); Natural Resource Assessment Environmental Consultants (2013b)).

No permanent water is found within the Study Area; therefore, no breeding habitat has been identified.

Ground-truthed RE mapping of the Study Area show that sandy soil (Land Zone 3) is found within the entire Study Area, with a small mapped area on Land Zone 12. Seasonal waterbodies occur, including dams and low-order streams. Foraging and breeding is known to occur on Land Zones 5 and 7 which do not occur within the Study Area. Therefore, the Study Area is considered dispersal habitat only.

### 7.2.2.4 Habitat Critical to the Survival of the Species

There are no species-specific guidelines for determining habitat critical to the survival of the squatter pigeon (southern). Therefore, the generic *Significant Impact Guideline 1.1* definition of habitat critical to the survival of a species has been applied (Section 3.5). Based on this definition, habitat critical to the survival of squatter pigeon would include foraging and/or breeding habitat. As no foraging or breeding habitat is found within the Study Area, no habitat critical to the survival is found.

### 7.2.2.5 Important population

As this species currently has no adopted recovery plan, important populations of squatter pigeon (southern) have been defined as per those listed in the SPRAT database (Department of Agriculture Water and the Environment, 2020):

- Populations occurring in the Condamine River catchment and Darling Downs of southern Queensland
- The populations known to occur in the Warwick-Inglewood-Texas region of southern Queensland, and

- Any populations potentially occurring in northern New South Wales.

None of these populations exist within the Project Area. This species remains common north of the Carnarvon Ranges in Central Queensland and is considered to be distributed as a single, continuous (i.e. inter-breeding) sub-population. Any population of squatter pigeon (southern) in the Study Area does not meet the definition of an important population.

#### 7.2.2.6 Potential Impacts

The potential impacts on the squatter pigeon (southern) include habitat loss and/or fragmentation and direct mortality from vehicle strike or destruction of nests. The extent of habitat loss expected by the Project is illustrated in Table 16.

**Table 16 Habitat Impacts to the Squatter Pigeon (southern)**

Habitat Type	Area (ha) within Project Footprint <sup>1</sup>	Notes
Breeding	0.00	Breeding occurs on Land Zones 5 and 7. The entire Study Area is on Land Zone 3 with a small amount on Land Zone 12.
Foraging	0.00	Foraging occurs on Land Zones 5 and 7. The entire Study Area is on Land Zone 3 with a small amount on Land Zone 12.
Dispersal	234.25	Dispersal habitat occurs across the entire Study Area.

<sup>1</sup> Area calculations based on ground-truthed REs within the Study Area, and Queensland Herbarium mapped REs within the fire impacted area and the powerline corridor as no field verification has been undertaken in these areas

Mitigation measures (in addition to those identified in Section 6.0) include:

- Prior to site entry, all site construction personnel will be appropriately trained and made aware of the potential occurrence of this species and its potential vulnerability to vehicle collision.
- Due to the potential location of nests (on ground) and the ground dwelling nature of the birds, all vehicles and pedestrians will remain wherever practicable within designated access tracks.

#### 7.2.2.7 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 17. Based on the assessment, the Project is unlikely to have a significant impact on the squatter pigeon (southern).

**Table 17 Significant Impact Assessment for Squatter Pigeon (southern)**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Lead to a long-term decrease in the size of an important population of a species?	<b>No.</b> A potential population of squatter pigeons (southern) in the Study Area is not considered an important population. Habitat within the Study Area is considered dispersal habitat only. Therefore, it is unlikely that the Project will lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population?	<b>No.</b> The area of occupancy of the squatter pigeon (southern) was estimated to be 10,000 km <sup>2</sup> in the year 2000. Habitat within the Study Area is considered dispersal habitat only. A potential population of squatter pigeons (southern) in the Study Area is not considered an important population. Therefore, it is unlikely that the Project will reduce the area of occupancy of an important population.

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Fragment an existing important population into two or more populations?	<b>No.</b> The Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat for an aerial species such as the squatter pigeon (southern). Habitat within the Study Area is considered dispersal habitat only. A potential population of squatter pigeons (southern) in the Study Area is not considered an important population. Therefore, it is unlikely that the Project will fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	<b>No.</b> Critical habitat for the survival of this species is not defined; however, the squatter pigeon (southern) is known to access suitable waterbodies to drink on a daily basis, and foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (Land Zones 5 and 7). The Study Area does not contain suitable, permanent waterbodies for this species to access, and does not have suitable foraging or breeding habitat. If present, this species is likely to only occur as a transient visitor to more suitable habitats. The Project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population?	<b>No.</b> This species breeds at any time of the year if conditions are favourable with most activity in May to June. Breeding habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km of a suitable, permanent waterbody (Squatter Pigeon Workshop, 2011). No permanent water is found within the Study Area, and no suitable breeding habitat is found. A potential population of squatter pigeons (southern) in the Study Area is not considered an important population. Therefore, the Project is unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No.</b> Habitat within the Study Area is considered dispersal habitat only, as no suitable breeding or foraging habitat is found. Therefore, the Project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	<b>No.</b> Invasive flora and fauna species have been identified on the SPRAT database as a key threat to the species; however, it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No.</b> Disease has not been identified as a main threat to the species. The Construction Weed and Pest Management Plan for the Project will detail the measures to prevent the introduction and spread of disease.



Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Interfere substantially with the recovery of the species?	<b>No.</b> The federal environment minister has declared that a national recovery plan for the squatter pigeon (southern) is not required; however current threats to this species include loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by overgrazing by domesticated herbivores, the degradation of habitat by invasive weeds, and predation by numerous avian and terrestrial predators. Habitat within the Study Area is considered dispersal habitat only, as no suitable breeding or foraging habitat is found. In addition, the species is known to utilise a wide range of different habitats, minimising the impact of habitat clearing on the species. Given this, the Project is unlikely to interfere with the recovery of the squatter pigeon (southern).

### **7.2.3 Red goshawk (*Erythrorchis radiatus*)**

#### **7.2.3.1 Distribution**

The red goshawk is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division (north of 19°S) to north-eastern New South Wales (north of 33°), and occasionally on continental islands (Department of Agriculture Water and the Environment, 2020).

#### **7.2.3.2 Habitat**

This species inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests, usually on fertile soils. In partly cleared parts of eastern Queensland it is associated with gorge and escarpment country. In northern Queensland, red goshawks are mainly associated with extensive, uncleared, mosaics of native vegetation, especially riparian vegetation, open forest and woodland that contain a mix of eucalypt, ironbark and bloodwood species.

The red goshawk rarely breeds in areas with fragmented native vegetation. The stick nests, in which 1–2 eggs are laid, are restricted to trees that are taller than 20 m within 1 km of and often beside, permanent water (river, swamp, pool), usually in fairly open, biologically rich forest or woodland (Department of Agriculture Water and the Environment, 2020). The species hunts within a home range of up to 200 km<sup>2</sup> in open forests and gallery forests, taking mostly medium to large birds.

This species is usually observed singly, and occasionally in pairs or family groups, and pairs are believed to remain within the nesting territory all year, but some may expand their home range when not breeding. In 2000, it was estimated that there were 1,000 breeding birds in Australia. Czechura, Hobson and Stewart, (2011) found that following field surveys, it was estimated that there were 35–40 pairs in northern Queensland.

#### **7.2.3.3 Species Presence and Utilisation of the Study Area**

The red goshawk was not recorded within the Study Area during the field surveys; however suitable foraging habitat (comprising areas of contiguous woodland containing a mix of eucalypt, ironbark and bloodwood species) occurs within the Study Area. No permanent water is found within the Study Area and no nests were recorded during the field surveys.

#### **7.2.3.4 Habitat Critical to the Survival of the Species**

The National Recovery Plan for the Red Goshawk (Department of Environment and Resource Management, 2012) identifies habitat critical for red goshawk survival as all known sites for nesting, food resources, water, shelter, essential travel routes, dispersal, buffer areas, and sites needed for the future recovery as defined by the EPBC Act. Much of the remaining feeding and nesting habitat in eastern Queensland is on public reserves and state forests. The Study Area does not contain a known nesting pair, nor is the habitat considered critical for food resources, breeding, water, shelter, an essential travel route, and has not been identified as needed for future recovery. Based on this definition, the Study Area does not contain habitat critical to the survival of the species.

#### **7.2.3.5 Important Population**

The SPRAT profile does not identify important populations of the red goshawk. Therefore, any population occurring within the Study Area has been assessed against the generic definition in the *Significant Impact Guideline 1.1* (Section 3.5). Based on this definition, the Study Area does not contain an important population as it is not near the limit of the species range, it is not known to be important for maintaining genetic diversity and it is not known to be a key source population. The red goshawk population is considered to be continuous.

#### **7.2.3.6 Potential Impacts**

Potential impacts of the Project on this species include the loss and/or fragmentation of foraging habitat. The extent of habitat loss expected by the Project is illustrated in Table 18.

**Table 18 Habitat Impacts to the Red Goshawk**

Habitat Type	Area (ha) within Project Footprint <sup>1</sup>	Notes
Breeding	9.71	The riparian corridors within the Study Area (REs 11.3.25b and 11.3.35) may provide suitable breeding habitat, although no nests were identified during any of the field surveys.
Foraging	231.84	All remnant vegetation within the Study Area is considered foraging habitat.

<sup>1</sup> Area calculations based on ground-truthed REs within the Study Area, and Queensland Herbarium mapped REs within the fire impacted area and the powerline corridor as no field verification has been undertaken in these areas

Management for this species will be undertaken as per Section 6.0.

### 7.2.3.7 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 19. Based on the assessment, the Project is unlikely to have a significant impact on the red goshawk.

**Table 19 Significant Impact Assessment for Red Goshawk**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Lead to a long-term decrease in the size of an important population of a species?	<b>No.</b> A potential population of red goshawk in the Study Area is not considered an important population. No breeding pairs have been identified within the Study Area, and none are known from the Townsville region. Therefore, if present, this species is likely to only forage throughout the site. Due to the abundance of potential foraging habitat within the wider area, and the absence of a known breeding pair, the Project is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population?	<b>No.</b> The estimated area of occupancy is suspected to be between 100,000 km <sup>2</sup> to 200,000 km <sup>2</sup> (Department of Agriculture Water and the Environment, 2020). A potential population of red goshawk in the Study Area is not considered an important population. No breeding pairs have been identified within the Study Area, and none are known from the Townsville region. No suitable nesting habitat is found within the Study Area and there is no permanent water. Therefore, if present, this species is likely to only forage throughout the site. Due to the abundance of potential foraging habitat within the wider area, and the absence of a known breeding pair, the Project is unlikely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations?	<b>No.</b> The Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat, as this species can travel up to 50 km while foraging. The Project is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	<b>No.</b> No habitat critical to the survival of the species is found within the Study Area.

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Disrupt the breeding cycle of an important population?	<b>No.</b> Red goshawks are probably monogamous and the same territories may be occupied year after year. The red goshawk breeds solitarily, in forested or wooded areas, within 1 km of permanent water, and in a large (over 20 m tall) tree. Breeding generally occurs in spring, with laying occurring in the north from May to October. No permanent water is found within the Study Area, and no nests have been identified during any of the field surveys. Therefore, the Project is unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No.</b> No breeding pairs have been identified within the Study Area, and none are known from the Townsville region. No suitable nesting habitat is found within the Study Area and there is no permanent water. Therefore, if present, this species is likely to only forage throughout the site. Due to the abundance of potential foraging habitat within the wider area, and the absence of a known breeding pair, the Project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	<b>No.</b> Invasive flora and fauna species have not been identified as a key threat to the species and it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	<b>No.</b> Disease has not been identified as a main threat to the species. The Construction Weed and Pest Management Plan for the Project will detail the measures to prevent the introduction and spread of disease.

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Interfere substantially with the recovery of the species?	<p><b>No.</b></p> <p>A National Recovery Plan for the Red Goshawk is currently in place (Department of Environment and Resource Management, 2012). Recovery actions needed to recover this species are listed as:</p> <ul style="list-style-type: none"> <li>• Monitor red goshawk habitat and determine territory occupancy and productivity, and use DNA analyses of feathers to determine adult survival rates;</li> <li>• Collate information on known nest sites from the past 25 years and produce descriptive maps of important habitat and ensure information is secure;</li> <li>• Conduct searches to identify previously unknown pairs of red goshawks, nest sites, and habitats critical for red goshawk survival;</li> <li>• Identify important populations and nest sites, and use the information to inform monitoring programs and state and federal government planning frameworks;</li> <li>• Provide specific information and advice to assist with the identification, acquisition and management of important habitat for the red goshawk;</li> <li>• Conduct research to understand the relationship between habitat fragmentation, prey density and population persistence to better inform management;</li> <li>• Protect habitat through acquisition or voluntary conservation agreements;</li> <li>• Reduce the effects of red goshawk habitat fragmentation and degradation by encouraging landholders to protect and manage threatened red goshawk territories;</li> <li>• Train personnel from state and local government to identify and understand the threats to red goshawk habitat;</li> <li>• Produce and distribute information on the conservation status and habitat requirements of the red goshawk;</li> <li>• Provide feedback to the public and agency personnel on progress of red goshawk recovery; and</li> <li>• Review the effectiveness of the community awareness program.</li> </ul> <p>Based on the above, the Project is unlikely to interfere with the recovery of the species.</p>



#### **7.2.4 White-throated needletail (*Hirundapus caudacutus*)**

##### **7.2.4.1 Distribution**

The white-throated needletail breeds in the northern hemisphere and migrates in the austral summer months to Australia. During the non-breeding season, this species is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Department of Agriculture Water and the Environment, 2020).

The white-throated needletail is generally gregarious when in Australia, sometimes occurring in large flocks, comprising hundreds or thousands of birds. In Australia, this species is mostly aerial, flying from heights of less than 1 m up to more than 1,000 m above the ground. For a time it was commonly believed that this species did not land while in Australia; however it is now accepted that birds will roost in trees (Tarburton, 1993), particularly in tree hollows in tall trees on ridge-tops, on bark or rock faces (Department of Agriculture Water and the Environment, 2020). During the day it is known to follow storm fronts across the landscape across a range of habitat types.

##### **7.2.4.2 Habitat**

Although this species occurs over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Higgins, 1999). Important habitat includes large tracts of native vegetation, particularly forest.

While in Australia, this species has been recorded feeding on a range of insects and roosting in trees in forests and woodland, both among dense foliage in the canopy or in hollows.

##### **7.2.4.3 Species Presence and Utilisation of the Study Area**

Although this species occurs over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Higgins, 1999). Important habitat includes large tracts of native vegetation, particularly forest.

This species is a non-breeding visitor within Australia; however it may forage and disperse above the Study Area. The white-throated needletail has highly diverse foraging habitat requirements and disperses over all habitat types, therefore it has conservatively been assumed all remnant and non-remnant areas within the Study Area are suitable foraging and dispersal habitat and it may also roost in woodland areas.

##### **7.2.4.4 Habitat Critical to the Survival of the Species**

There are no species-specific guidelines for determining habitat critical to the survival of the white-throated needletail. Therefore, the generic EPBC Act *Significant Impact Guideline 1.1* definition of habitat critical to the survival of a species has been applied (Section 3.5). This species does not breed in Australia and is predominantly aerial. If roosting was to occur within the Study Area, this would only be for short periods as the species moves through the landscape. Based on the ecological requirements of the species, the definition has not been met and no habitat critical to the survival of the species is present.

##### **7.2.4.5 Important Population**

The SPRAT profile does not identify important populations of the white-throated needletail. Therefore, any population potentially occurring within the proposed alignment has been assessed against the generic definition in the EPBC Act *Significant Impact Guideline 1.1* (Section 3.5). As records are widely available within the region, the species does not breed in Australia and the Study Area is not near the limit of the species range, no important populations are expected to occur. This species is highly mobile and does not breed in Australia.

##### **7.2.4.6 Potential Impacts**

Potential impacts of the Project on this species include the loss and/or fragmentation of foraging habitat. The extent of habitat loss expected by the Project is illustrated in Table 20.

**Table 20 Habitat Impacts to the White-throated Needletail**

Habitat Type	Area (ha) within Project Footprint <sup>1</sup>	Notes
Breeding	0.00	This species does not breed within Australia.
Foraging / Dispersal / Opportunistic Roosting	231.84	All remnant vegetation within the Study Area is considered foraging habitat. This species may opportunistically roost within the Study Area.

<sup>1</sup> Area calculations based on ground-truthed REs within the Study Area, and Queensland Herbarium mapped REs within the fire impacted area and the powerline corridor as no field verification has been undertaken in these areas

Management for this species will be undertaken as per Section 6.0.

#### 7.2.4.7 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 21. Based on the assessment, the Project is unlikely to have a significant impact on the white-throated needletail.

**Table 21 Significant Impact Assessment for White-throated Needletail**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Lead to a long-term decrease in the size of an important population of a species?	<b>No.</b> A potential population of white-throated needletail within the Study Area is not considered an important population, therefore the Project is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population?	<b>No.</b> The area of occupancy of the white-throated needletail has been estimated at 126,200 km <sup>2</sup> . A potential population of white-throated needletail within the Study Area is not considered an important population, therefore the Project is unlikely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations?	<b>No.</b> The Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat. A potential population of white-throated needletail in the Study Area is not considered an important population. Therefore, it is unlikely that the Project will fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	<b>No.</b> The habitat within the Study Area was assessed against the generic definition of habitat critical to the survival of a species. Based on the ecological requirements of the species, it's mostly aerial nature and high mobility, the definition has not been met and no habitat critical to the survival of the species is present within the Study Area.
Disrupt the breeding cycle of an important population?	<b>No.</b> The white-throated needletail is a non-breeding visitor to Australia. The Project is unlikely to disrupt the breeding cycle of a potential population of white-throated needletail.

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<b>No.</b> Suitable foraging, dispersal and opportunistic roosting habitat occurs within the Study Area. However, this species forages on insects aerially from 1 m to 1,000 m above the ground and has been recorded roosting in woodlands and forest in Australia. Given the species large area of occupancy and extensive range, it is unlikely the Project will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	<b>No.</b> No invasive species are known to be harmful to the white-throated needletail. It is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. Weed and pest management controls will be developed to mitigate and manage the potential spread of pest flora and fauna species.
Introduce disease that may cause the species to decline?	<b>No.</b> Disease has not been identified as a threat to the white-throated needletail. Weed and pest management controls for the project will ensure best practice site hygiene measures.
Interfere substantially with the recovery of the species?	<b>No.</b> No recovery plan has been developed for this species; however, the SPRAT profile provides information on priority actions, direction to mitigate against key threats and enable recovery. Key threats that have been identified include: <ul style="list-style-type: none"> <li>• habitat loss and fragmentation</li> <li>• direct mortality and poisoning from insecticides, particularly organochlorines.</li> </ul> The Project will not result in exacerbation of any of these threats to the species. Due to the limited nature of any impacts to the species, its ability to disperse widely and its broad habitat tolerance, the Project is not expected to significantly increase threats to the species to the extent that it will interfere with the recovery of the species.



## 7.3 Migratory Species

### 7.3.1 Fork-tailed swift (*Apus pacificus*)

#### 7.3.1.1 Distribution

The fork-tailed swift is a non-breeding migrant to Australia and is generally recorded east of the Great Dividing Range from Cooktown to the New South Wales border but extends further west in southern Queensland (Department of the Environment, 2015b).

#### 7.3.1.2 Habitat

The fork-tailed swift is an aerial forager, spending most of its time in Australia on the wing. In Australia, this species mostly occurs over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. Fork-tailed swifts also occur over settled areas, including towns, urban areas and cities. This species forages aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. They feed in flocks ranging from 10 to 1,000 birds (Higgins, 1999).

#### 7.3.1.3 Species Presence and Utilisation of the Study Area

The fork-tailed swift occupies the airspace over a diverse range of habitats during their non-breeding season in Australia. This species was not recorded during the field surveys; however, all habitat within the Study Area may be used to forage and disperse over aerially. It is highly transitory and as such is unlikely to occupy the airspace above the Study Area for an extended period.

#### 7.3.1.4 Important Habitat and Ecologically Significant Proportion of a Population

Important habitat for the fork-tailed swift has been identified as (Department of the Environment, 2015b):

- Non-breeding habitat only
- Found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial
- Based on this definition, the Study Area contains important habitat for the fork-tailed swift.

The upper (1%) and lower (0.1%) thresholds for ecologically significant proportions of the population of this species are estimated at 1,000 and 100 respectively. This species is known to move in large flocks which have the potential to occur on a temporal basis in the airspace above the proposed alignment. These flocks may include an ecologically significant proportion of the national population.

#### 7.3.1.5 Potential Impacts

Potential impacts of the Project on this species include the loss and/or fragmentation of foraging habitat, although impacts will be limited as this species is aerial.

Management for this species will be undertaken as per Section 6.0.

#### 7.3.1.6 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 22. Based on the assessment, the Project is unlikely to have a significant impact on the fork-tailed swift.

**Table 22 Significant Impact Assessment for Fork-tailed Swift**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	<b>No.</b> The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. No clearing thresholds for important habitat for this species can be determined at this time due to the species ecology (Department of the Environment, 2015b). However, as this species is almost exclusively aerial, the Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the fork-tailed swift.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<b>No.</b> Invasive flora and fauna species have not been identified as a key threat to the species and it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<b>No.</b> As this species moves in large flocks and is primarily aerial, Study Area may support an ecologically significant proportion of the population. This species was not observed during the field survey however its occurrence and abundance within the Study Area within successive years is likely to be highly variable. This species is transitory at most sites (Department of the Environment, 2015b), and therefore the Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population, particularly given the project will not likely impact the species when on the wing.

## **7.3.2 Oriental cuckoo (*Cuculus optatus*)**

### **7.3.2.1 Distribution**

The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (September to May) in coastal regions across northern and eastern Australia as well as offshore islands. This species is a winter visitor to Australia and unlike all other cuckoos, do not breed in Australia. Oriental cuckoos are mainly seen in northern Australia, occasionally they are sighted as far south as Sydney (BirdLife International, 2020).

### **7.3.2.2 Habitat**

The oriental cuckoo uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. This species feeds arboreally, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground but requires shrubs or trees from which it sallies and returns to consume prey items (Department of the Environment, 2015b).

### **7.3.2.3 Species Presence and Utilisation of the Study Area**

The oriental cuckoo was not recorded during the field surveys; however suitable habitat is found within the Study Area. The oriental cuckoo may utilise the riparian woodlands and dry woodland communities within the Study Area for foraging and dispersal.

### **7.3.2.4 Important Habitat and Ecologically Significant Proportion of a Population**

Important habitat for the oriental cuckoo has been identified as (Department of the Environment, 2015b):

- Non-breeding habitat only
- Monsoonal rainforest, vine thickets, wet sclerophyll forest or open *Casuarina*, *Acacia* or *Eucalyptus* woodlands
- Based on this definition, the Study Area contains important habitat for the oriental cuckoo.

The upper (1%) and lower (0.1%) thresholds for ecologically significant proportions of the population of this species are estimated at 10,000 and 1,000 respectively. The suitable habitat within the Study Area is not of suitable size to support an ecologically significant proportion of the population.

### **7.3.2.5 Potential Impacts**

Potential impacts of the Project on this species include the loss and/or fragmentation of 231.84 ha of foraging habitat.

Management for this species will be undertaken as per Section 6.0.

### **7.3.2.6 Significant Impact Assessment**

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 23. Based on the assessment, the Project is unlikely to have a significant impact on the oriental cuckoo.



**Table 23 Significant Impact Assessment for Oriental Cuckoo**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	<p><b>No.</b></p> <p>The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Substantial loss or modification of important habitat has been identified as a loss of 250,000 ha (1%) and 25,000 ha (0.1%). The oriental cuckoo may use the riparian corridors and eucalypt woodlands within the Study Area. Approximately 231.84 ha of woodland vegetation is proposed to be cleared for the Project infrastructure. The Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the oriental cuckoo.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<p><b>No.</b></p> <p>Invasive flora and fauna species have not been identified as a key threat to the species and it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<p><b>No.</b></p> <p>This species was not recorded during the field surveys, however suitable habitat was present in the Study Area. The area of potential habitat is unlikely to support an ecologically significant proportion of the population. The oriental cuckoo is also a non-breeding visitor to Australia, so this habitat is suitable for foraging only. The Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.</p>

### 7.3.4 Satin flycatcher (*Myiagra cyanoleuca*)

#### 7.3.4.1 Distribution

This species occurs throughout eastern Australia and Papua New Guinea and occasionally vagrant individuals occur in New Zealand. It is widespread in Queensland however more scattered records are available in the north, whilst it is observed more regularly in the area from Fraser Island, west to Goombi and south to the New South Wales border (Department of the Environment, 2019).

This species migrates to northern Australia (from Innisfail to Cape York) and Papua New Guinea in autumn and returns to south eastern Australia in spring. Their migration route appears to follow the Great Dividing Range but reported sightings have occurred in coastal New South Wales. Departure times vary dependant on location, but it is generally between February and early May. Timing for returning south to breed also varies dependant on location but ranges between August to November.

#### 7.3.4.2 Habitat

Satin flycatchers are mainly recorded in eucalypt forests, especially wet sclerophyll forest, often dominated by eucalypts such as *Eucalypt fastigata*, *Eucalyptus dalrympleana*, *Eucalyptus cypellocarpa*, *Eucalyptus radiata*, *Eucalyptus viminalis*, or occasionally *Eucalyptus regnans*. This species also sometimes occurs in dry sclerophyll forests and woodlands, usually dominated by eucalypts such as *Eucalyptus blakelyi*, *Eucalyptus sideroxylon*, *Eucalyptus melliodora*, *Eucalyptus albens*, *Eucalyptus viminalis*, or stringybarks, including *Eucalyptus macrorhyncha* and *Eucalyptus caliginosa*, usually with open understorey. This species breeds in south-eastern Australia during summer.

The satin flycatcher is primarily insectivorous, preying on arthropods, mostly insects, although very occasionally they will also eat seeds. They are arboreal foragers, feeding high in the canopy and subcanopy of trees, usually sallying for prey in the air or picking prey from foliage and branches of trees, flitting from one perch to another (Department of the Environment, 2019).

#### 7.3.4.3 Species Presence and Utilisation of the Study Area

The satin flycatcher may utilise the Study Area on passage between breeding grounds in south-eastern Australia and wintering in northern Australia and Papua New Guinea. During migration their habitat preferences are known to expand and include all wooded habitat types. No breeding habitat is present in the Study Area; however, the remnant woodlands may provide suitable foraging and dispersal opportunities during migration.

#### 7.3.4.4 Important Habitat and Ecologically Significant Proportion of a Population

Important habitat for the satin flycatcher has been identified as (Department of the Environment, 2015b):

- Eucalypt forest and woodlands, at high elevations when breeding. Particularly common in tall wet sclerophyll forest, often in gullies or along water courses
- In woodlands, prefer open, grassy woodland types
- During migration, habitat preferences expand into most wooded habitats except rainforests
- Wintering birds in northern Queensland use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps
- Based on this definition, the Study Area contains important habitat for the satin flycatcher during migration (non-breeding).

An ecologically significant proportion of the satin flycatcher population is estimated at 17,000 (1%) and 1,700 (0.1 %). This species is likely to be a seasonal visitor to the Study Area during migration. The Study Area is not of suitable size or value to support an ecologically significant proportion of the population.

#### 7.3.4.5 Potential Impacts

Potential impacts of the Project on this species include the loss and/or fragmentation of 231.84 ha of foraging habitat.

Management for this species will be undertaken as per Section 6.0.

#### 7.3.4.6 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 24. Based on the assessment, the Project is unlikely to have a significant impact on the satin flycatcher.

**Table 24 Significant Impact Assessment for Satin Flycatcher**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	<b>No.</b> The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Substantial loss or modification of important habitat has been identified as a loss of 4,400 ha (1%) and 440 ha (0.1%). Migrating satin flycatchers may use the dry eucalypt woodlands within the Study Area. Approximately 231.84 ha of woodland vegetation is proposed to be cleared for the Project infrastructure. The Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the satin flycatcher.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<b>No.</b> Black rat ( <i>Rattus rattus</i> ) and invasive vines of riparian habitat (e.g. rubber vine ( <i>Cryptostegia grandiflora</i> )) have been identified as a key threat to the species. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<b>No.</b> The global population size has not been quantified, but the species is reported to be commonest in the south of its range in Australia (especially Tasmania) and scarce in the north. The range of the population and the extent of the habitat used suggest that the population is at least tens of thousands. This species was not recorded during the field surveys, however suitable habitat was present in the Study Area. The area of potential habitat is unlikely to support an ecologically significant proportion of the population, particular given that on passage they typically move singly, in pairs or in small loose groups rather than large aggregations (Department of the Environment, 2019). The Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.



### 7.3.5 Rufous fantail (*Rhipidura rufifrons*)

#### 7.3.5.1 Distribution

Three subspecies of rufous fantail are recognised (Department of the Environment, 2015a):

- *Rhipidura rufifrons rufifrons* occurs in south-eastern mainland Australia, from approximately Brisbane, through New South Wales and Victoria and across to the eastern side of the Adelaide Hills. This subspecies primarily breeds in forests within 300 km of the coast and migrates northwards during non-breeding periods.
- *Rhipidura rufifrons intermedia* occurs along the north-eastern seaboard of Australia, from northern New South Wales along the coast to the Cape York Peninsula. This is core breeding and non-breeding habitat with local movements and altitudinal migration observed as well as regular longer distance migration to the Trans Fly region of New Guinea.
- *Rhipidura rufifrons dryas* occurs across the northern seaboard of Australia, from around Normanton in the east, across to Western Australia in the coastal areas of the Kimberley. This subspecies is largely sedentary with some movement away from riverine and mangrove areas during the wet season.

#### 7.3.5.2 Habitat

In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, usually with a dense shrubby understorey often including ferns. They are found in rainforest, dense wet eucalypt and monsoon forest, paperbark and mangrove swamp, riverside vegetation; and open country while migrating (Morcombe, 2004). Breeding habitat occurs in dense wet forests – rainforests, mangroves, the wet fern gullies in eucalypt forests and other dense vegetation.

This species occurs as solitary birds or in pairs or small parties. Birds occur in coastal northern and eastern Australia and on islands. The species is a summer breeding migrant (October to April) to south-eastern Australia, mostly in coastal areas east of the Great Dividing Range, but the range extends well inland in river red gum forest of the Murray Valley and Riverina (Morcombe, 2004).

#### 7.3.5.3 Species Presence and Utilisation of the Study Area

The rufous fantail was not recorded during the field surveys; however suitable habitat is found within the Study Area. The riparian woodlands and dry woodland communities within the Study Area may provide foraging habitat and dispersal pathways for this species. It is unlikely that the rufous fantail breeds in the Study Area due to the lack of wet forest and rainforest.

#### 7.3.5.4 Important Habitat and Ecologically Significant Proportion of a Population

Important habitat for the rufous fantail has been identified as (Department of the Environment, 2015a):

- Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey;
- When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands.
- Based on this definition, the Study Area contains important habitat for the rufous fantail while on passage only. No preferred breeding habitat (i.e. rainforest/ dense wet forest) occurs within the Study Area.

The upper (1%) and lower (0.1%) thresholds for ecologically significant proportions of the population of this species are estimated at 48,000 and 4,800 respectively (combined for all three subspecies). While this species may be a year-round visitor to the Study Area, it is not of suitable size or value to support an ecologically significant proportion of the population.

#### 7.3.5.5 Potential Impacts

Potential impacts of the Project on this species include the loss and/or fragmentation of 231.84 ha of foraging habitat.

Management for this species will be undertaken as per Section 6.0.

### 7.3.5.6 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guidelines 1.1* for this species is provided in Table 25. Based on the assessment, the Project is unlikely to have a significant impact on the rufous fantail.

**Table 25 Significant Impact Assessment for Rufous Fantail**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	<b>No.</b> The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Substantial loss or modification of important habitat has been identified as a loss of 7,500 ha (1%) and 750 ha (0.1%). Approximately 231.84 ha of woodland vegetation is proposed to be cleared for the Project infrastructure. The Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the rufous fantail.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<b>No.</b> Black rat ( <i>Rattus rattus</i> ) and invasive vines of riparian habitat (e.g. rubber vine ( <i>Cryptostegia grandiflora</i> )) have been identified as a key threat to the species. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<b>No.</b> The population of rufous fantail has not been estimated; however it is considered to be a ‘common and secure species’. This species was not recorded during the field surveys, however suitable habitat was present in the Study Area. The area of potential habitat is unlikely to support an ecologically significant proportion of the population. No breeding habitat is found within the Study Area. The Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.

### 7.3.6 White-throated needletail (*Hirundapus caudacutus*)

Due to the white-throated needletail being listed as Vulnerable under the EPBC Act it has been assessed against the EPBC Act *Significant Impact Guideline 1.1* Vulnerable criteria in Section 7.2.4.

This species is also listed as Migratory under the EPBC Act and as such assessment against the significance criteria for migratory species is also required. In doing so, impacts to important habitat and ecologically significant proportions of the population must be assessed.

#### 7.3.6.1 Important Habitat and Ecologically Significant Proportion of a Population

Important habitat for the white-throated needletail has been identified as (Department of the Environment, 2015b):

- Non-breeding habitat only. Found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial
- Large tracts of native vegetation, particularly forest, may be a key habitat requirement for species
- Found to roost in tree hollows in tall trees on ridge-tops, on bark or rock faces. Appears to have traditional roost sites.

Based on this definition, the Study Area contains important habitat for the white-throated needletail.

The upper (1%) and lower (0.1%) thresholds for ecologically significant proportions of the population of this species are estimated at 100 and 10 respectively. This species is known to move in large flocks which have the potential to occur on a temporal basis in the airspace above the Study Area. These flocks may include an ecologically significant proportion of the national population.

#### 7.3.6.2 Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 26. Based on the assessment, the Project is unlikely to have a significant impact on the white-throated needletail.

**Table 26 Significant Impact Assessment for White-throated Needletail**

Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	<p><b>No.</b></p> <p>The Project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. No clearing threshold for important habitat for this species can be determined at this time due to the species ecology (Department of the Environment, 2015b). Tracking studies on this species has identified that whilst this species often forages with 100-200 others, only a small proportion will use trees for roosting, suggesting they might roost in many places, to avoid nocturnal predators taking a regular &amp; significant toll (Tarburton, 1993). Therefore, while low numbers of this species may opportunistically roost in the Study Area, the Project is unlikely to substantially modify, destroy or isolate an area of important habitat for the white-throated needletail.</p>



Criterion – “is there a real chance or possibility that the Project will...”	Assessment
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	<p><b>No.</b></p> <p>Invasive flora and fauna species have not been identified as a key threat to the species and it is unlikely that the Project will exacerbate invasive species beyond current levels. A Land Management Plan (AECOM, 2019) has been developed for the Study Area which outlines a strategy to manage current and potential future land management matters and proposes management measures to be implemented for the Project. A detailed Construction Weed and Pest Management Plan will also be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	<p><b>No.</b></p> <p>The population is estimated to be at least 10,000 individuals but probably fewer than 100,000. As this species moves in large flocks and is primarily aerial, the Study Area may support an ecologically significant proportion of the population. This species was not observed during the field surveys however its occurrence and abundance within the Study Area within successive years is likely to be highly variable. Given the species large area of occupancy and extensive range, its ability to disperse widely and its broad habitat tolerance, the Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population, particularly given the Project will not likely impact the species when on the wing.</p>

## 8.0 Conclusion

This report assessed MNES against the proposed Project activities and relevant significant guidelines outlined in the EPBC Act Policy Statement '*Matters of National Environmental Significance – Significant Impact Guidelines 1.1*' (Department of the Environment, 2013b).

Environmental values assessed and included in this report include:

- Terrestrial flora and fauna values including:
  - Flora and fauna species listed as threatened under the EPBC Act (Section 5.7)
  - Migratory species listed under the EPBC Act (Section 5.8).

Based on this assessment, flora and fauna values were considered to be the only MNES on which the Project has the potential to have a significant impact. Terrestrial ecology MNES values were assessed using desktop and field investigation methods. Desktop and field surveys of the Study Area identified the following occurrence or possible occurrence of MNES:

- Confirmed occurrence of two EPBC fauna species including:
  - Black-throated finch (southern) (*Poephila cincta cincta*)
  - Bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniatus*).
- Potential occurrence of three other threatened fauna species including:
  - Squatter pigeon (southern) (*Geophaps scripta scripta*)
  - Red goshawk (*Erythrotriochis radiatus*)
  - White-throated needletail (*Hirundapus caudacutus*).
- Potential occurrence of five migratory species:
  - Fork-tailed swift (*Apus pacificus*)
  - Oriental cuckoo (*Cuculus optatus*)
  - White-throated needletail (*Hirundapus caudacutus*)
  - Satin flycatcher (*Myiagra cyancoleuca*)
  - Rufous fantail (*Rhipidura rufifrons*).

The potential impact on EPBC fauna and migratory species was assessed against significant impact criteria (Section 3.5). It was identified that the Project has the potential to have a significant impact on one species, the black-throated finch (southern).

The mitigation hierarchy of avoid, minimise and mitigate has been applied in the design process to reduce potential impacts to the black-throated finch (southern) and other MNES species which are known to or likely to occur. These include:

- Identifying and mapping clear no-go zones within the Study Area to avoid areas of sensitive vegetation and habitat
- Developing an erosion and sediment control plan to control practices along roads and around infrastructure, which will minimise potential for sedimentation within adjoining conserved habitats
- A Significant Species Management Program (SSMP) will be prepared where potential breeding habitat for threatened fauna is identified and needs to be removed as part of the vegetation clearing process.

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# Appendix A

## PMST & Wildlife Online Reports



# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

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

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

Report created: 15/03/21 13:42:17

[Summary](#)

[Details](#)

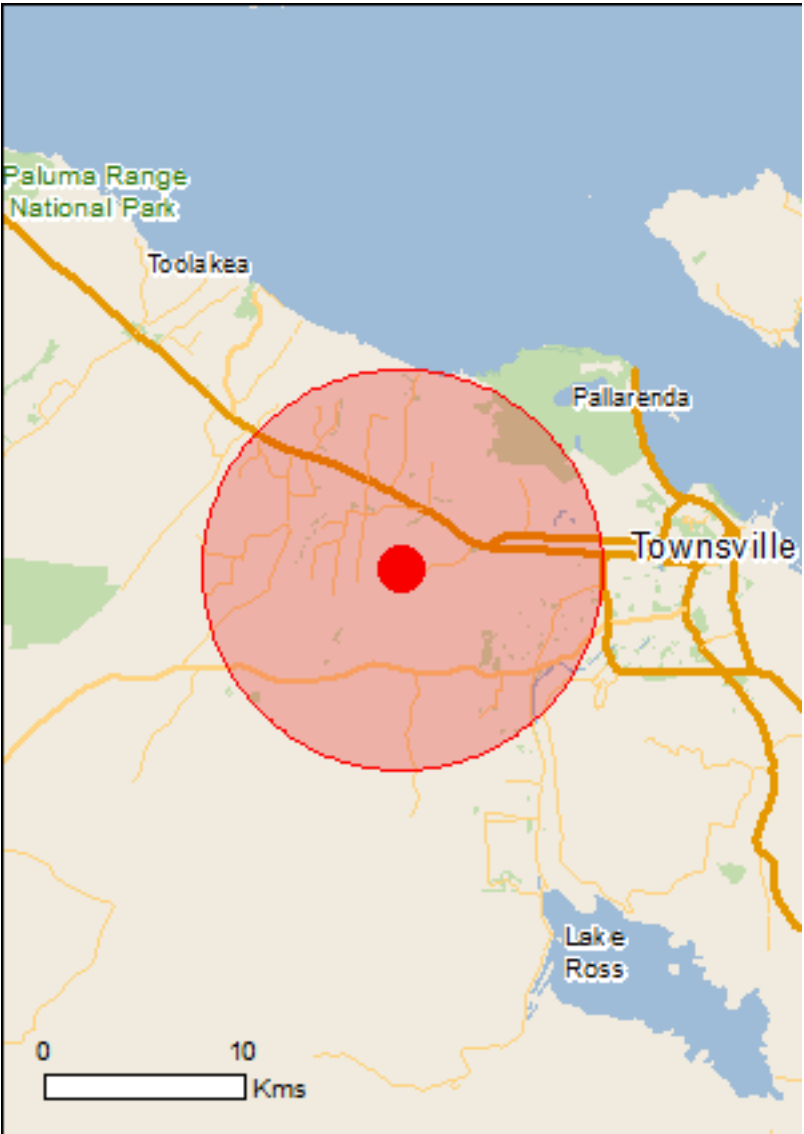
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

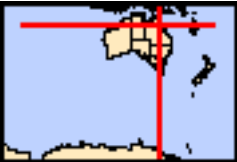
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[Buffer: 10.0Km](#)





# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	1
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	1
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	44
<a href="#">Listed Migratory Species:</a>	67

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	4
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	110
<a href="#">Whales and Other Cetaceans:</a>	12
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	35
<a href="#">Nationally Important Wetlands:</a>	2
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

World Heritage Properties		[ Resource Information ]
Name	State	Status
<a href="#">Great Barrier Reef</a>	QLD	Declared property
National Heritage Properties		[ Resource Information ]
Name	State	Status
Natural		
<a href="#">Great Barrier Reef</a>	QLD	Listed place
Great Barrier Reef Marine Park		[ Resource Information ]
Type	Zone	IUCN
Conservation Park	CP-19-4058	IV

Listed Threatened Species		[ Resource Information ]
Name	Status	Type of Presence
Birds		
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Erythrorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Fregetta grallaria grallaria</a> White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-	Vulnerable	Species or species

Name	Status	Type of Presence
tailed Godwit [86380]		habitat known to occur within area
<a href="#">Neochmia ruficauda ruficauda</a>		
Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a>		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Poephila cincta cincta</a>		
Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area
<a href="#">Rostratula australis</a>		
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
<a href="#">Tyto novaehollandiae kimberli</a>		
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
<a href="#">Balaenoptera musculus</a>		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Dasyurus hallucatus</a>		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
<a href="#">Hipposideros semoni</a>		
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macroderma gigas</a>		
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area
<a href="#">Megaptera novaeangliae</a>		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Mesembriomys gouldii rattoides</a>		
Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat may occur within area
<a href="#">Petrogale sharmani</a>		
Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a>		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pteropus conspicillatus</a>		
Spectacled Flying-fox [185]	Endangered	Species or species habitat likely to occur within area
<a href="#">Saccolaimus saccolaimus nudicluniatus</a>		
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Xeromys myoides</a>		
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
Plants		
<a href="#">Dichanthium setosum</a>		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Eucalyptus paedoglauca</a>		
Mt Stuart Ironbark [56188]	Vulnerable	Species or species

Name	Status	Type of Presence
<a href="#">Marsdenia brevifolia</a> [64585]	Vulnerable	habitat likely to occur within area  Species or species habitat may occur within area
<a href="#">Myrmecodia beccarii</a> Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Omphalea celata</a> [64586]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tephrosia leveillei</a> [16946]	Vulnerable	Species or species habitat likely to occur within area

Reptiles		
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Sharks		
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[ <a href="#">Resource Information</a> ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat likely to occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area



Name	Threatened	Type of Presence
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
<a href="#">Sternula albifrons</a> Little Tern [82849]		Species or species habitat may occur within area
Migratory Marine Species		
<a href="#">Anoxypristis cuspidata</a> Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
<a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
<a href="#">Orcaella heinsohni</a> Australian Snubfin    Dolphin [81322]		Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Migratory Terrestrial Species		
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Roosting known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius dubius</a> Little Ringed Plover [896]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area

Name	Threatened	Type of Presence
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area
<a href="#">Tringa brevipes</a> Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area
<a href="#">Tringa incana</a> Wandering Tattler [831]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[ <a href="#">Resource Information</a> ]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - Mount Stuart Close Training Area
Defence - TOWNSVILLE - AP28 TACAN
Defence - TOWNSVILLE - AP40 BOHLE RIVER TRANS STATION
Defence - TOWNSVILLE - RAAF BASE

Listed Marine Species	[ <a href="#">Resource Information</a> ]
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\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat likely to occur within area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Breeding known to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Breeding likely to occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Foraging, feeding or



Name	Threatened	Type of Presence
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Endangered	related behaviour known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Roosting known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]		Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius dubius</a> Little Ringed Plover [896]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Roosting known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]	Endangered	Roosting known to occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]	Endangered	Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area

Name	Threatened	Type of Presence
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Heteroscelus incanus</a> Wandering Tattler [59547]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Himantopus himantopus</a> Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area

Name	Threatened	Type of Presence
<a href="#">Recurvirostra novaehollandiae</a> Red-necked Avocet [871]	Endangered*	Foraging, feeding or related behaviour known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]		Species or species habitat known to occur within area
<a href="#">Sterna albifrons</a> Little Tern [813]		Species or species habitat may occur within area
<a href="#">Stiltia isabella</a> Australian Pratincole [818]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
<a href="#">Acentronura tentaculata</a> Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
<a href="#">Campichthys tryoni</a> Tryon's Pipefish [66193]		Species or species habitat may occur within area
<a href="#">Choeroichthys brachysoma</a> Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
<a href="#">Choeroichthys suillus</a> Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
<a href="#">Corythoichthys amplexus</a> Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
<a href="#">Corythoichthys flavofasciatus</a> Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area
<a href="#">Corythoichthys intestinalis</a> Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area
<a href="#">Corythoichthys ocellatus</a> Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
<a href="#">Corythoichthys paxtoni</a> Paxton's Pipefish [66204]		Species or species habitat may occur within area
<a href="#">Corythoichthys schultzi</a> Schultz's Pipefish [66205]		Species or species habitat may occur within

Name	Threatened	Type of Presence
<a href="#">Cosmocampus darrosanus</a> D'Arros Pipefish [66207]		area  Species or species habitat may occur within area
<a href="#">Doryrhamphus excisus</a> Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
<a href="#">Festucalex cinctus</a> Girdled Pipefish [66214]		Species or species habitat may occur within area
<a href="#">Halicampus dunckeri</a> Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
<a href="#">Halicampus nitidus</a> Glittering Pipefish [66224]		Species or species habitat may occur within area
<a href="#">Halicampus spinirostris</a> Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
<a href="#">Hippichthys cyanospilos</a> Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
<a href="#">Hippichthys heptagonus</a> Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
<a href="#">Hippocampus bargibanti</a> Pygmy Seahorse [66721]		Species or species habitat may occur within area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area
<a href="#">Hippocampus zebra</a> Zebra Seahorse [66241]		Species or species habitat may occur within area
<a href="#">Micrognathus andersonii</a> Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
<a href="#">Micrognathus brevirostris</a> thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
<a href="#">Nannocampus pictus</a> Painted Pipefish, Reef Pipefish [66263]		Species or species habitat may occur within area
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
<a href="#">Solenostomus paradoxus</a> Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
<a href="#">Trachyrhamphus longirostris</a> Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammals		
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area
Reptiles		
<a href="#">Acalyptophis peronii</a> Horned Seasnake [1114]		Species or species habitat may occur within area
<a href="#">Aipysurus duboisii</a> Dubois' Seasnake [1116]		Species or species habitat may occur within area
<a href="#">Aipysurus eydouxii</a> Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
<a href="#">Aipysurus laevis</a> Olive Seasnake [1120]		Species or species habitat may occur within area
<a href="#">Astrotia stokesii</a> Stokes' Seasnake [1122]		Species or species habitat may occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Disteira kingii</a> Spectacled Seasnake [1123]		Species or species habitat may occur within area
<a href="#">Disteira major</a> Olive-headed Seasnake [1124]		Species or species habitat may occur within area
<a href="#">Enhydrina schistosa</a> Beaked Seasnake [1126]		Species or species habitat may occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		related behaviour known to occur within area
<a href="#">Hydrophis mcdowelli</a> null [25926]		Species or species habitat may occur within area
<a href="#">Hydrophis ornatus</a> Spotted Seasnake, Ornate Reef Seasnake [1111]		Species or species habitat may occur within area
<a href="#">Lapemis hardwickii</a> Spine-bellied Seasnake [1113]		Species or species habitat may occur within area
<a href="#">Laticauda colubrina</a> a sea krait [1092]		Species or species habitat may occur within area
<a href="#">Laticauda laticaudata</a> a sea krait [1093]		Species or species habitat may occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]		Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]		Breeding known to occur within area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[ Resource Information ]
Name	Status	Type of Presence
Mammals		
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]		Species or species habitat may occur within area
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Species or species habitat known to occur within area
<a href="#">Orcaella brevirostris</a> Irrawaddy Dolphin [45]		Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[ Resource Information ]
Name	State
Townsville Town Common	QLD

Invasive Species

[ Resource Information ]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area

Name	Status	Type of Presence
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Annona glabra Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red		Species or species habitat likely to occur



Name	Status	Type of Presence
Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Opuntia spp. Prickly Pears [82753]		within area  Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Lepidodactylus lugubris Mourning Gecko [1712]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat known to occur within area

Nationally Important Wetlands		[ Resource Information ]
Name		State
<a href="#">Great Barrier Reef Marine Park</a>		QLD
<a href="#">RAAF Townsville</a>		QLD

# Caveat

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

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

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

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

# Coordinates

-19.27506 146.66953

# Acknowledgements

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

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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# Queensland Government

## Wildlife Online Extract

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Status: All

Records: All

Date: Since 1980

Latitude: -19.2750

Longitude: 146.6695

Distance: 10

Email: [jessie.mckee@aecom.com](mailto:jessie.mckee@aecom.com)

Date submitted: Monday 15 Mar 2021 12:43:01

Date extracted: Monday 15 Mar 2021 12:50:01

The number of records retrieved = 964

### **Disclaimer**

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

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

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.



Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			89
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		13/5
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		1
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		6/5
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		10/6
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		4
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		9
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		35
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		21/9
animals	amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog		C		14/6
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		7
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		15/7
animals	amphibians	Hylidae	<i>Litoria sp.</i>			C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		9
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		41
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		46/3
animals	amphibians	Limnodynastidae	<i>Notaden melanoscaphus</i>	brown shovelfoot		C		1
animals	amphibians	Myobatrachidae	<i>Uperoleia lithomoda</i>	stonemason gungan		C		1
animals	amphibians	Myobatrachidae	<i>Crinia deserticola</i>	chirping froglet		C		3
animals	amphibians	Myobatrachidae	<i>Uperoleia mimula</i>	mimicking gungan		C		29/10
animals	birds	Acanthizidae	<i>Gerygone magnirostris</i>	large-billed gerygone		C		17
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		6
animals	birds	Acanthizidae	<i>Gerygone levigaster</i>	mangrove gerygone		C		30
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		9
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		1
animals	birds	Acanthizidae	<i>Smicrornis brevirostris</i>	weebill		C		7
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		1
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmny kite		C		99
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		22
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		193
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk		E	V	1
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		7
animals	birds	Accipitridae	<i>Hamirostra melanosternon</i>	black-breasted buzzard		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		9
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		77
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		26
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		8
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		16
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		18
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		148
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		79
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		23
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		13
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		81

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Acrocephalidae	<i>Acrocephalus orientalis</i>	oriental reed-warbler		SL		6
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		4
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		15
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		14
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		11
animals	birds	Anatidae	<i>Anas castanea</i>	chestnut teal		C		8
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		29
animals	birds	Anatidae	<i>Radjah radjah</i>	radjah shelduck		C		2
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		17
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		22
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		107
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		4
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		35
animals	birds	Anatidae	<i>Spatula rhynchotis</i>	Australasian shoveler		C		3
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		22
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		4
animals	birds	Anatidae	<i>Spatula querquedula</i>	garganey		SL		3
animals	birds	Anatidae	<i>Stictonetta naevosa</i>	freckled duck		C		1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		8
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		4
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		98
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		102
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	3
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		1
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		4
animals	birds	Ardeidae	<i>Egretta picata</i>	pied heron		C		15
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		24
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		112
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		142
animals	birds	Ardeidae	<i>Butorides striata</i>	striated heron		C		35
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		152
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		12
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		23
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		116
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		3
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		38
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		37
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		116
animals	birds	Artamidae	<i>Strepera graculina</i>	pied currawong		C		3
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		2
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		124
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		1
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird		C		47
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		7
animals	birds	Artamidae	<i>Melloria quoyi</i>	black butcherbird		C		11

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animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		2
animals	birds	Burhinidae	<i>Esacus magnirostris</i>	beach stone-curlew		V		19
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		63
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii banksii</i>	red-tailed black-cockatoo (Cape York & Eastern Aust)		C		1
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		32
animals	birds	Cacatuidae	<i>Cacatua tenuirostris</i>	long-billed corella	Y	C		2
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		54
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		5
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		85
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		88
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		119
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cicadabird		C		6
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		119
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		74
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		21
animals	birds	Campephagidae	<i>Coracina lineata</i>	barred cuckoo-shrike		C		1
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		1
animals	birds	Charadriidae	<i>Charadrius dubius</i>	little ringed plover		SL		3
animals	birds	Charadriidae	<i>Charadrius veredus</i>	oriental plover		SL		2
animals	birds	Charadriidae	<i>Charadrius mongolus</i>	lesser sand plover		E	E	40
animals	birds	Charadriidae	<i>Elseyaornis melanops</i>	black-fronted dotterel		C		62
animals	birds	Charadriidae	<i>Charadrius hiaticula</i>	ringed plover		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		165
animals	birds	Charadriidae	<i>Pluvialis squatarola</i>	grey plover		SL		9
animals	birds	Charadriidae	<i>Vanellus miles miles</i>	masked lapwing (northern subspecies)		C		2
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		124
animals	birds	Charadriidae	<i>Charadrius leschenaultii</i>	greater sand plover		V	V	65
animals	birds	Charadriidae	<i>Pluvialis fulva</i>	Pacific golden plover		SL		12
animals	birds	Charadriidae	<i>Erythronyx cinctus</i>	red-kneed dotterel		C		12
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		64
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		299
animals	birds	Columbidae	<i>Ptilinopus regina</i>	rose-crowned fruit-dove		C		2
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		5
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		64
animals	birds	Columbidae	<i>Ptilinopus superbus</i>	superb fruit-dove		C		4
animals	birds	Columbidae	<i>Ptilinopus magnificus</i>	wompoo fruit-dove		C		1
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		4
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			20
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		2
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	17
animals	birds	Columbidae	<i>Chalcophaps indica</i>	emerald dove		C		1
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		40
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		6
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		240

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animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		3
animals	birds	Columbidae	<i>Ducula bicolor</i>	pied imperial-pigeon		C		28
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			13
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		59
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		1
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		16
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		45
animals	birds	Corvidae	<i>Corvus sp.</i>			C		1
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		65
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		52
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		15
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		5
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		6
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		17
animals	birds	Cuculidae	<i>Cuculus optatus</i>	oriental cuckoo		SL		6
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		45
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		49
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		101
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		9
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		5
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)		C		3
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		155
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			114
animals	birds	Estrildidae	<i>Poephila cincta</i>	black-throated finch		C		2
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		18
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch		C		6
animals	birds	Estrildidae	<i>Poephila personata</i>	masked finch		C		2
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		98
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		2
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		27
animals	birds	Estrildidae	<i>Heteromunia pectoralis</i>	pictorella mannikin		C		1
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)		E	E	40
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		90
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		2
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		9
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		37
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		16
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		27
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Falconidae	<i>Falco hypoleucos</i>	grey falcon		V	V	1
animals	birds	Fregatidae	<i>Fregata ariel</i>	lesser frigatebird		SL		2
animals	birds	Glareolidae	<i>Stiltia isabella</i>	Australian pratincole		C		6
animals	birds	Glareolidae	<i>Glareola maldivarum</i>	oriental pratincole		SL		6
animals	birds	Gruidae	<i>Antigone rubicunda</i>	brilga		C		78
animals	birds	Gruidae	<i>Antigone antigone</i>	sarus crane		C		2



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animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher		C		120
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher		C		4
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		105
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		50
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		53
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		91
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		3
animals	birds	Halcyonidae	<i>Todiramphus sordidus</i>	Torresian kingfisher		C		9
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		11
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		117
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		154
animals	birds	Hirundinidae	<i>Hirundo rustica</i>	barn swallow		SL		2
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		42
animals	birds	Laridae	<i>Thalasseus bergii</i>	crested tern		SL		44
animals	birds	Laridae	<i>Thalasseus bengalensis</i>	lesser crested tern		C		20
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull		C		103
animals	birds	Laridae	<i>Sterna hirundo</i>	common tern		SL		4
animals	birds	Laridae	<i>Sterna sumatrana</i>	black-naped tern		SL		1
animals	birds	Laridae	<i>Onychoprion anaethetus</i>	bridled tern		SL		1
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		11
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		105
animals	birds	Laridae	<i>Chlidonias leucopterus</i>	white-winged black tern		SL		7
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		94
animals	birds	Laridae	<i>Sternula albifrons</i>	little tern		SL		37
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		82
animals	birds	Maluridae	<i>Malurus amabilis</i>	lovely fairy-wren		C		1
animals	birds	Megaluridae	<i>Megalurus gramineus</i>	little grassbird		C		5
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		1
animals	birds	Megaluridae	<i>Cincloramphus cruralis</i>	brown songlark		C		1
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		14
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl		C		1
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		38
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		1
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		21
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		37
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		168
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		4
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		5
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		84
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		1
animals	birds	Meliphagidae	<i>Phylidonyris niger</i>	white-cheeked honeyeater		C		4
animals	birds	Meliphagidae	<i>Purnella albifrons</i>	white-fronted honeyeater		C		1
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		4
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		60
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		33

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animals	birds	Meliphagidae	<i>Cissomela pectoralis</i>	banded honeyeater		C		2
animals	birds	Meliphagidae	<i>Epthianura aurifrons</i>	orange chat		C		3
animals	birds	Meliphagidae	<i>Gavicalis versicolor</i>	varied honeyeater		C		7
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		127
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		6
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		3
animals	birds	Meliphagidae	<i>Ptilotula flavescens</i>	yellow-tinted honeyeater		C		1
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		84
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		40
animals	birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater		C		1
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		3
animals	birds	Meliphagidae	<i>Microptilotis gracilis</i>	graceful honeyeater		C		2
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		72
animals	birds	Meliphagidae	<i>Anthochaera carunculata</i>	red wattletail		C		1
animals	birds	Meliphagidae	<i>Conopophila albogularis</i>	rufous-banded honeyeater		C		1
animals	birds	Meliphagidae	<i>Conopophila rufogularis</i>	rufous-throated honeyeater		C		20
animals	birds	Meliphagidae	<i>Gavicalis fasciogularis</i>	mangrove honeyeater		C		2
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		2
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		112
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		1
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		168
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		7
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		98
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		4
animals	birds	Monarchidae	<i>Myiagra alecto</i>	shining flycatcher		C		6
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		214
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		7
animals	birds	Monarchidae	<i>Carterornis leucotis</i>	white-eared monarch		C		2
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		4
animals	birds	Motacillidae	<i>Motacilla cinerea</i>	grey wagtail		SL		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		40
animals	birds	Motacillidae	<i>Motacilla flava sensu lato</i>	yellow wagtail		SL		3
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		138
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		118
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		1
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		42
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		90
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		21
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		31
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		1
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		29
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		1
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		50
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			43
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		128
animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		8

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animals	birds	Petroicidae	<i>Peneoenanthe pulverulenta</i>	mangrove robin		C		9
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		4
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		20
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		85
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		104
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		11
animals	birds	Phasianidae	<i>Excalfactoria chinensis</i>	king quail		C		1
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		15
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		25
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		2
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		20
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		3
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		62
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		181
animals	birds	Psittacidae	<i>Platycercus adscitus adscitus</i>	pale-headed rosella (northern form)		C		1
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		38
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		70
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		134
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		1
animals	birds	Rallidae	<i>Porzana pusilla</i>	Baillon's crane		C		9
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		7
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		2
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		11
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		8
animals	birds	Rallidae	<i>Tribonyx ventralis</i>	black-tailed native-hen		C		1
animals	birds	Rallidae	<i>Porzana fluminea</i>	Australian spotted crane		C		5
animals	birds	Rallidae	<i>Porzana tabuensis</i>	spotless crane		C		2
animals	birds	Rallidae	<i>Amaurornis cinerea</i>	white-browed crane		C		16
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		58
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		13
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		9
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		67
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		42
animals	birds	Rostratulidae	<i>Rostratula australis</i>	Australian painted snipe		E	E	9
animals	birds	Scolopacidae	<i>Calidris canutus</i>	red knot		E	E	19
animals	birds	Scolopacidae	<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit		V	V	119
animals	birds	Scolopacidae	<i>Calidris tenuirostris</i>	great knot		CR	CE	71
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		13
animals	birds	Scolopacidae	<i>Calidris falcinellus</i>	broad-billed sandpiper		SL		2
animals	birds	Scolopacidae	<i>Calidris ruficollis</i>	red-necked stint		SL		60
animals	birds	Scolopacidae	<i>Calidris ferruginea</i>	curlew sandpiper		CR	CE	10
animals	birds	Scolopacidae	<i>Calidris alba</i>	sanderling		SL		4
animals	birds	Scolopacidae	<i>Gallinago sp.</i>			C		1
animals	birds	Scolopacidae	<i>Limosa limosa</i>	black-tailed godwit		SL		19

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Scolopacidae	<i>Tringa incana</i>	wandering tattler		SL		1
animals	birds	Scolopacidae	<i>Xenus cinereus</i>	terek sandpiper		SL		22
animals	birds	Scolopacidae	<i>Tringa brevipes</i>	grey-tailed tattler		SL		82
animals	birds	Scolopacidae	<i>Tringa glareola</i>	wood sandpiper		SL		8
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew		E	CE	145
animals	birds	Scolopacidae	<i>Numenius minutus</i>	little curlew		SL		13
animals	birds	Scolopacidae	<i>Tringa nebularia</i>	common greenshank		SL		70
animals	birds	Scolopacidae	<i>Numenius phaeopus</i>	whimbrel		SL		133
animals	birds	Scolopacidae	<i>Actitis hypoleucos</i>	common sandpiper		SL		13
animals	birds	Scolopacidae	<i>Arenaria interpres</i>	ruddy turnstone		SL		15
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper		SL		31
animals	birds	Scolopacidae	<i>Calidris melanotos</i>	pectoral sandpiper		SL		11
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		SL		24
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		2
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		13
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		10
animals	birds	Sturnidae	<i>Acridotheres tristis</i>	common myna	Y			69
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		1
animals	birds	Sturnidae	<i>Sturnus vulgaris</i>	common starling	Y			1
animals	birds	Sulidae	<i>Sula leucogaster</i>	brown booby		SL		2
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		26
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		109
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		213
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		24
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		102
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		3
animals	birds	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail		C		4
animals	birds	Turnicidae	<i>Turnix velox</i>	little button-quail		C		2
animals	birds	Turnicidae	<i>Turnix pyrrhotorax</i>	red-chested button-quail		C		8
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		4
animals	birds	Tytonidae	<i>Tyto longimembris</i>	eastern grass owl		C		2
animals	insects	Hesperiidae	<i>Suniana sunias</i>					1
animals	insects	Lycaenidae	<i>Hypolycaena phorbas phorbas</i>	black-spotted flash				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				1
animals	insects	Lycaenidae	<i>Ogyris amaryllis</i>					1/1
animals	insects	Lycaenidae	<i>Ogyris zosine</i>	northern purple azure				1/1
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				1
animals	insects	Nymphalidae	<i>Hypolimnas bolina nerina</i>	varied eggfly				1
animals	insects	Nymphalidae	<i>Danaus affinis affinis</i>	swamp tiger				1
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				1
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				1
animals	insects	Pieridae	<i>Eurema brigitta australis</i>	no-brand grass-yellow				1
animals	mammals	Bovidae	<i>Bos sp.</i>	cattle	Y			1
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			2



Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Canidae	<i>Canis sp.</i>		Y			2
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			4
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				4
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		18/3
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	2
animals	mammals	Emballonuridae	<i>Saccolaimus sp.</i>			C		14
animals	mammals	Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail bat		C		1
animals	mammals	Emballonuridae	<i>Taphozous sp.</i>			C		14
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			4
animals	mammals	Hipposideridae	<i>Hipposideros ater aruensis</i>	eastern dusky leaf-nosed bat		C		1
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			9
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		8
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		7
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby		C		4
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo		C		3
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		16
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		23
animals	mammals	Molossidae	<i>Chaerephon jobensis</i>	northern freetail bat		C		21
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat		C		2
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		14
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		21
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		6
animals	mammals	Muridae	<i>Leggadina lakedownensis</i>	Lakeland Downs mouse		C		1
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		1
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			39/7
animals	mammals	Muridae	<i>Rattus sordidus</i>	canefield rat		C		12/6
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		1
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		13/6
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		11/1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		9
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		3
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		2
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		1
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		3
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			3
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		10
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		11
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>			C		2
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		10
animals	mammals	Vespertilionidae	<i>Scotorepens sanborni</i>	northern broad-nosed bat		C		1
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		11
animals	ray-finned fishes	Ambassidae	<i>Ambassis agrammus</i>	sailfin glassfish				33
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				18
animals	ray-finned fishes	Anguillidae	<i>Anguilla sp.</i>					2
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				98
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				497

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	ray-finned fishes	Belontiidae	<i>Strongylura krefftii</i>	freshwater longtom				43
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				530
animals	ray-finned fishes	Cichlidae	<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y			178
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				235
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				89
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris galii</i>	firetail gudgeon				8
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				3
animals	ray-finned fishes	Leiognathidae	<i>Leiognathus equulus</i>	common ponyfish				3
animals	ray-finned fishes	Lutjanidae	<i>Lutjanus argentimaculatus</i>	mangrove jack				22
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				159
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				3
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtl</i>	Hyrtl's catfish				2
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				5
animals	ray-finned fishes	Plotosidae	<i>Porochilus rendahli</i>	Rendahli's catfish				3
animals	ray-finned fishes	Poeciliidae	<i>Poecilia reticulata</i>	guppy	Y			1
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				87
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				13
animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				31
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon			C	1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead			C	10
animals	reptiles	Agamidae	<i>Chlamydosaurus kingii</i>	frilled lizard			C	8/1
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon			C	1
animals	reptiles	Agamidae	<i>Diporiphora sp.</i>				C	1
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi			C	1
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python			C	3
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python			C	2
animals	reptiles	Boidae	<i>Liasis fuscus</i>	water python			C	3
animals	reptiles	Chelidae	<i>Chelodina canni</i>	Cann's longneck turtle			C	2
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefftt's river turtle			C	18
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake			C	22/1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake			C	19
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake			C	1
animals	reptiles	Crocodylidae	<i>Crocodylus johnstoni</i>	Australian freshwater crocodile			C	1
animals	reptiles	Crocodylidae	<i>Crocodylus porosus</i>	estuarine crocodile			V	3
animals	reptiles	Diplodactylidae	<i>Diplodactylus platyurus</i>	eastern fat-tailed gecko			C	1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko			C	2
animals	reptiles	Diplodactylidae	<i>Amalosia rhombifer</i>	zig-zag gecko			C	7/6
animals	reptiles	Diplodactylidae	<i>Oedura castelnaui</i>	northern velvet gecko			C	4
animals	reptiles	Elapidae	<i>Cryptophis nigrostriatus</i>	black-striped snake			C	2
animals	reptiles	Elapidae	<i>Demansia vestigiata</i>	lesser black whipsnake			C	5
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake			C	2
animals	reptiles	Elapidae	<i>Demansia papuensis</i>	greater black whipsnake			C	2/1
animals	reptiles	Elapidae	<i>Demansia sp.</i>				C	1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko			C	16
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella			C	12
animals	reptiles	Gekkonidae	<i>Hemidactylus frenatus</i>	house gecko	Y			18/3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Pygopodidae	<i>Delma tincta</i>	excitable delma		C		2
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		6
animals	reptiles	Pygopodidae	<i>Pygopus schraderi</i>	eastern hooded scaly-foot		C		1
animals	reptiles	Scincidae	<i>Carlia decora</i>	elegant rainbow skink		C		3
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		5/1
animals	reptiles	Scincidae	<i>Lygisaurus aeratus sensu lato</i>			C		1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		20
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		3
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		8
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		5
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		1
animals	reptiles	Scincidae	<i>Carlia storri</i>	Storr's rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		4
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		5
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		11
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		2
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		2
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		2
animals	reptiles	Scincidae	<i>Lygisaurus sesbrauna</i>	Eastern Cape litter-skink		C		1
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		3
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus</i>	striped snake-eyed skink		C		6
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		1
animals	reptiles	Typhlopidae	<i>Indotyphlops braminus</i>	flowerpot blind snake	Y			3/1
animals	reptiles	Varanidae	<i>Varanus gouldii</i>	sand monitor		C		2
animals	reptiles	Varanidae	<i>Varanus semiremex</i>	rusty monitor		C		1
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		3
animals	reptiles	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor		C		2
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				17
plants	Charophyceae	Characeae	<i>Nitella</i>					1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Barleria lupulina</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		1
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>			C		1/1
plants	land plants	Acanthaceae	<i>Ruellia simplex</i>		Y			2/2
plants	land plants	Acanthaceae	<i>Thunbergia alata</i>	black-eyed Susan	Y			1/1
plants	land plants	Acanthaceae	<i>Hemigraphis reptans</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			1/1
plants	land plants	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			1/1
plants	land plants	Aizoaceae	<i>Trianthema triquetra</i>	red spinach		C		2/2
plants	land plants	Alismataceae	<i>Echinodorus cordifolius</i>		Y			2/2
plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		1
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		2/2
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Celosia argentea</i>		Y			3/2

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plants	land plants	Amaranthaceae	<i>Alternanthera denticulata</i> var. <i>micrantha</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			2/2
plants	land plants	Amaryllidaceae	<i>Crinum arenarium</i>			C		1/1
plants	land plants	Amaryllidaceae	<i>Crinum</i>					1
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1/1
plants	land plants	Anacardiaceae	<i>Euroschinus falcatus</i> var. <i>falcatus</i>			C		1/1
plants	land plants	Anacardiaceae	<i>Schinus terebinthifolius</i>		Y			1/1
plants	land plants	Annonaceae	<i>Annona reticulata</i>	custard apple	Y			1/1
plants	land plants	Annonaceae	<i>Melodorum crassipetalum</i>			C		1/1
plants	land plants	Annonaceae	<i>Fitzalania heteropetala</i>			C		2/2
plants	land plants	Apiaceae	<i>Centella asiatica</i>			C		1/1
plants	land plants	Apocynaceae	<i>Cynanchum viminale</i> subsp. <i>brunonianum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum carnosum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Rauvolfia tetraphylla</i>		Y			2/2
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			1/1
plants	land plants	Apocynaceae	<i>Marsdenia rostrata</i>			C		1/1
plants	land plants	Apocynaceae	<i>Cascabela thevetia</i>	yellow oleander	Y			1/1
plants	land plants	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		1/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			3/1
plants	land plants	Apocynaceae	<i>Vincetoxicum williamsii</i>			C		1/1
plants	land plants	Aponogetonaceae	<i>Aponogeton queenslandicus</i>			C		1/1
plants	land plants	Araceae	<i>Pistia stratiotes</i>	water lettuce	Y			1/1
plants	land plants	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia elegans</i>	calico-flower	Y			1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia thozetii</i>			C		1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia pubera</i> var. <i>pubera</i>			C		1/1
plants	land plants	Asteraceae	<i>Zinnia elegans</i>		Y			1/1
plants	land plants	Asteraceae	<i>Bidens bipinnata</i>	bipinnate beggar's ticks	Y			1/1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			1/1
plants	land plants	Asteraceae	<i>Erigeron pusillus</i>		Y			1/1
plants	land plants	Asteraceae	<i>Peripleura scabra</i>			C		1/1
plants	land plants	Asteraceae	<i>Tridax procumbens</i>	tridax daisy	Y			1
plants	land plants	Asteraceae	<i>Camptacra gracilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Peripleura bicolor</i>			C		1/1
plants	land plants	Asteraceae	<i>Ageratum conyzoides</i>	billygoat weed	Y			1/1
plants	land plants	Asteraceae	<i>Chromolaena odorata</i>	Siam weed	Y			2/2
plants	land plants	Asteraceae	<i>Praxelis clematidea</i>		Y			2/2
plants	land plants	Asteraceae	<i>Streptoglossa odora</i>			C		3/3
plants	land plants	Asteraceae	<i>Erigeron bonariensis</i>		Y			1/1
plants	land plants	Asteraceae	<i>Pluchea rubelliflora</i>			C		1/1
plants	land plants	Asteraceae	<i>Synedrella nodiflora</i>		Y			1/1
plants	land plants	Asteraceae	<i>Gnaphalium polycaulon</i>		Y			1/1
plants	land plants	Asteraceae	<i>Thymophylla tenuiloba</i>		Y			1/1
plants	land plants	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1
plants	land plants	Asteraceae	<i>Sphagneticola trilobata</i>		Y			1/1



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plants	land plants	Asteraceae	<i>Symphotrichum subulatum</i>		Y			1/1
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		1
plants	land plants	Asteraceae	<i>Phacellothrix cladochaeta</i>			C		1/1
plants	land plants	Asteraceae	<i>Sphaeromorphaea australis</i>			C		1
plants	land plants	Asteraceae	<i>Peripleura hispidula</i> var. <i>setosa</i>			C		1/1
plants	land plants	Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>		Y			1/1
plants	land plants	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandra unguis-cati</i>	cat's claw creeper	Y			2/2
plants	land plants	Bignoniaceae	<i>Dolichandrone heterophylla</i>			C		1/1
plants	land plants	Boraginaceae	<i>Coldenia procumbens</i>			C		2/2
plants	land plants	Boraginaceae	<i>Heliotropium indicum</i>		Y			1/1
plants	land plants	Boraginaceae	<i>Trichodesma zeylanicum</i>			C		2/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium peninsulare</i>			C		1/1
plants	land plants	Brassicaceae	<i>Cardamine flexuosa</i>	wood bittercress	Y			1/1
plants	land plants	Cabombaceae	<i>Cabomba caroliniana</i> var. <i>caroliniana</i>	cabomba	Y			2/2
plants	land plants	Caesalpiniaceae	<i>Senna alata</i>		Y			3/3
plants	land plants	Caesalpiniaceae	<i>Delonix regia</i>	poinciana	Y			1/1
plants	land plants	Caesalpiniaceae	<i>Guilandina bonduc</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Senna obtusifolia</i>		Y			1/1
plants	land plants	Caesalpiniaceae	<i>Tamarindus indica</i>		Y			1/1
plants	land plants	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		3/3
plants	land plants	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			2/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista mimosoides</i>	dwarf cassia		C		1/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista rotundifolia</i>		Y			1/1
plants	land plants	Capparaceae	<i>Capparis lucida</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea corymbosa</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia disperma</i>			C		1/1
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		2/1
plants	land plants	Cleomaceae	<i>Cleome viscosa</i>	tick-weed		C		1/1
plants	land plants	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		3/3
plants	land plants	Combretaceae	<i>Terminalia muelleri</i>			C		1/1
plants	land plants	Commelinaceae	<i>Murdannia nudiflora</i>		Y			1/1
plants	land plants	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		1/1
plants	land plants	Convolvulaceae	<i>Distimake quinquefolius</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea carnea</i> subsp. <i>fistulosa</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Evolvulus nummularius</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		1
plants	land plants	Convolvulaceae	<i>Bonamia dietrichiana</i>			C		1
plants	land plants	Convolvulaceae	<i>Ipomoea hederifolia</i>		Y			1
plants	land plants	Convolvulaceae	<i>Ipomoea mauritiana</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea eriocarpa</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Cressa australis</i>			C		1/1

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plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Ipomoea triloba</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine			C	1/1
plants	land plants	Convolvulaceae	<i>Ipomoea coptica</i>				C	2/2
plants	land plants	Convolvulaceae	<i>Ipomoea nil</i>		Y			1/1
plants	land plants	Cucurbitaceae	<i>Momordica balsamina</i>	balsam apple	Y			2/2
plants	land plants	Cyperaceae	<i>Fuirena ciliaris</i>				C	2/2
plants	land plants	Cyperaceae	<i>Eleocharis philippinensis</i>				C	1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>				C	1/1
plants	land plants	Cyperaceae	<i>Fimbristylis cinnamometorum</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus haspan subsp. haspan</i>				C	1/1
plants	land plants	Cyperaceae	<i>Schoenoplectiella articulata</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus nutans var. eleusinoides</i>	flatsedge			C	1/1
plants	land plants	Cyperaceae	<i>Cyperus flavidus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Scleria brownii</i>				C	1
plants	land plants	Cyperaceae	<i>Eleocharis nuda</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus conicus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Fimbristylis</i>					2
plants	land plants	Cyperaceae	<i>Cyperus iria</i>				C	1/1
plants	land plants	Cyperaceae	<i>Fimbristylis littoralis</i>				C	2/2
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush			C	2/2
plants	land plants	Cyperaceae	<i>Eleocharis geniculata</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus alopecuroides</i>				C	2/2
plants	land plants	Cyperaceae	<i>Cyperus involucratus</i>		Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus platystylis</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus alaticaulis</i>				C	1
plants	land plants	Cyperaceae	<i>Cyperus leiocaulon</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus cyperoides</i>				C	1/1
plants	land plants	Cyperaceae	<i>Rhynchospora leae</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus trinervis</i>				C	2/2
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus javanicus</i>				C	2/2
plants	land plants	Cyperaceae	<i>Cyperus difformis</i>	rice sedge			C	3/3
plants	land plants	Cyperaceae	<i>Fimbristylis schoenoides</i>				C	1/1
plants	land plants	Cyperaceae	<i>Scleria novae-hollandiae</i>				C	1/1
plants	land plants	Droseraceae	<i>Drosera serpens</i>				C	1/1
plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony			C	1/1
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia serpens</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Macaranga tanarius</i>	macaranga			C	1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia hassallii</i>				C	1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia prostrata</i>		Y			2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia thymifolia</i>		Y			2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia cyathophora</i>	dwarf poinsettia	Y			1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia heterophylla</i>		Y			1/1

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plants	land plants	Euphorbiaceae	<i>Euphorbia hyssopifolia</i>		Y			2/2
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			1
plants	land plants	Euphorbiaceae	<i>Microstachys chamaelea</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis subsp. tannensis</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium subsp. tenerifolium</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			1/1
plants	land plants	Fabaceae	<i>Vigna</i>					1/1
plants	land plants	Fabaceae	<i>Vigna sp. (Greta Creek R.J.Lawn+ AQ532201)</i>			C		1/1
plants	land plants	Fabaceae	<i>Cajanus cajan</i>	pigeon pea	Y			1/1
plants	land plants	Fabaceae	<i>Centrosema molle</i>		Y			2/1
plants	land plants	Fabaceae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	land plants	Fabaceae	<i>Abrus precatorius</i>	crabs-eye vine		C		2/1
plants	land plants	Fabaceae	<i>Clitoria ternatea</i>	butterfly pea	Y			4/3
plants	land plants	Fabaceae	<i>Flemingia lineata</i>			C		1/1
plants	land plants	Fabaceae	<i>Millettia pinnata</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia filipes</i>			C		1
plants	land plants	Fabaceae	<i>Zornia stirlingii</i>			C		2/2
plants	land plants	Fabaceae	<i>Cajanus marmoratus</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria pallida</i>		Y			1
plants	land plants	Fabaceae	<i>Desmodium pullenii</i>			C		1/1
plants	land plants	Fabaceae	<i>Glycine tomentella</i>	woolly glycine		C		2/1
plants	land plants	Fabaceae	<i>Indigofera colutea</i>	sticky indigo		C		1/1
plants	land plants	Fabaceae	<i>Indigofera spicata</i>	creeping indigo	Y			1/1
plants	land plants	Fabaceae	<i>Indigofera tryonii</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		2/2
plants	land plants	Fabaceae	<i>Crotalaria calycina</i>			C		2/2
plants	land plants	Fabaceae	<i>Desmodium filiforme</i>			C		2/2
plants	land plants	Fabaceae	<i>Stylosanthes scabra</i>		Y			1
plants	land plants	Fabaceae	<i>Centrosema pascuorum</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria goreensis</i>	gambia pea	Y			2
plants	land plants	Fabaceae	<i>Crotalaria verrucosa</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera linifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera pratensis</i>			C		1/1
plants	land plants	Fabaceae	<i>Pycnospora lutescens</i>	pycnospora		C		1/1
plants	land plants	Fabaceae	<i>Sesbania grandiflora</i>		Y			1/1
plants	land plants	Fabaceae	<i>Stylosanthes humilis</i>	Townsville stylo	Y			1
plants	land plants	Fabaceae	<i>Stylosanthes viscosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus vaginalis</i>		Y			2/2
plants	land plants	Fabaceae	<i>Erythrina vespertilio</i>			C		2/1
plants	land plants	Fabaceae	<i>Aeschynomene brevifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria laburnifolia</i>		Y			2/2
plants	land plants	Fabaceae	<i>Indigofera polygaloides</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera suffruticosa</i>		Y			1
plants	land plants	Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y			1
plants	land plants	Fabaceae	<i>Rhynchosia minima var. minima</i>			C		1
plants	land plants	Fabaceae	<i>Crotalaria montana var. exserta</i>			C		1/1

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plants	land plants	Fabaceae	<i>Crotalaria pallida</i> var. <i>obovata</i>		Y			2/2
plants	land plants	Fabaceae	<i>Galactia tenuiflora</i> var. <i>villosa</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria mitchellii</i> subsp. <i>laevis</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			C		1
plants	land plants	Fabaceae	<i>Tephrosia brachyodon</i> var. <i>brachyodon</i>			C		2/2
plants	land plants	Fabaceae	<i>Zornia muelleriana</i> subsp. <i>muelleriana</i>			C		2/2
plants	land plants	Fabaceae	<i>Crotalaria medicaginea</i> var. <i>medicaginea</i>			C		1/1
plants	land plants	Fabaceae	<i>Glycine</i>					2/2
plants	land plants	Gentianaceae	<i>Canscora diffusa</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia purpurascens</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Scaevola</i>					1/1
plants	land plants	Haemodoraceae	<i>Haemodorum coccineum</i>			C		2/1
plants	land plants	Hemerocallidaceae	<i>Dianella</i>					1
plants	land plants	Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	scrambling lily		C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>fragrans</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			C		2/2
plants	land plants	Hydroleaceae	<i>Hydrolea zeylanica</i>			C		1/1
plants	land plants	Johnsoniaceae	<i>Tricoryne anceps</i> subsp. <i>anceps</i>			C		1/1
plants	land plants	Juncaginaceae	<i>Cycnogeton dubius</i>			C		1/1
plants	land plants	Lamiaceae	<i>Hyptis capitata</i>		Y			2/2
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/2
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			5/2
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		3/1
plants	land plants	Lauraceae	<i>Cassytha</i>					1
plants	land plants	Lauraceae	<i>Cassytha filiformis</i>	dodder laurel		C		2/1
plants	land plants	Laxmanniaceae	<i>Thysanotus tuberosus</i> subsp. <i>tuberosus</i>			C		1/1
plants	land plants	Laxmanniaceae	<i>Lomandra</i>					1
plants	land plants	Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C		1/1
plants	land plants	Limncharitaceae	<i>Limncharis flava</i>	yellow burrhead	Y			4/4
plants	land plants	Loganiaceae	<i>Strychnos psilosperma</i>	strychnine tree		C		1/1
plants	land plants	Loganiaceae	<i>Mitrasacme multicaulis</i>			C		1/1
plants	land plants	Loganiaceae	<i>Mitrasacme nudicaulis</i> var. <i>nudicaulis</i>			C		2/2
plants	land plants	Loganiaceae	<i>Mitrasacme prolifera</i>			C		1/1
plants	land plants	Loranthaceae	<i>Amyema mackayensis</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		1/1
plants	land plants	Lythraceae	<i>Ammannia baccifera</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida rhombifolia</i>		Y			1/1
plants	land plants	Malvaceae	<i>Abelmoschus moschatus</i> subsp. <i>tuberosus</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida acuta</i>	spinyhead sida	Y			2/1
plants	land plants	Malvaceae	<i>Sida spinosa</i>	spiny sida	Y			1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Malvaceae	<i>Sida cordifolia</i>		Y			3/1
plants	land plants	Malvaceae	<i>Abutilon albescens</i>			C		1/1
plants	land plants	Marsileaceae	<i>Marsilea crenata</i>			C		1/1



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plants	land plants	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		1/1
plants	land plants	Memecylaceae	<i>Memecylon pauciflorum</i>			C		1/1
plants	land plants	Menispermaceae	<i>Tinospora smilacina</i>	snakevine		C		1/1
plants	land plants	Menispermaceae	<i>Stephania japonica</i> var. <i>timoriensis</i>			C		1/1
plants	land plants	Menispermaceae	<i>Stephania tuberosa</i>			C		1
plants	land plants	Menyanthaceae	<i>Nymphoides exiliflora</i>			C		1/1
plants	land plants	Mimosaceae	<i>Neptunia gracilis</i> forma <i>glandulosa</i>			C		1/1
plants	land plants	Mimosaceae	<i>Albizia procera</i>			C		1
plants	land plants	Mimosaceae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Mimosaceae	<i>Desmanthus pernambucanus</i>		Y			1
plants	land plants	Mimosaceae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia dimorphantha</i>			C		1/1
plants	land plants	Mimosaceae	<i>Neptunia major</i>			C		2/2
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i> subsp. <i>glabrata</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Acacia victoriae</i>			C		1
plants	land plants	Mimosaceae	<i>Acacia flavescens</i>	toothed wattle		C		1
plants	land plants	Mimosaceae	<i>Acacia leptocarpa</i>	north coast wattle		C		1
plants	land plants	Mimosaceae	<i>Acacia crassicarpa</i>			C		4
plants	land plants	Mimosaceae	<i>Acacia holosericea</i>			C		2/1
plants	land plants	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		2/1
plants	land plants	Mimosaceae	<i>Vachellia bidwillii</i>			C		1
plants	land plants	Mimosaceae	<i>Vachellia farnesiana</i>		Y			2/2
plants	land plants	Mimosaceae	<i>Acacia auriculiformis</i>	black wattle		C		1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i>		Y			6
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus opposita</i>			C		2/1
plants	land plants	Moringaceae	<i>Moringa oleifera</i>		Y			1/1
plants	land plants	Muntingiaceae	<i>Muntingia calabura</i>		Y			1/1
plants	land plants	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		2
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		1/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		2/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		2
plants	land plants	Myrtaceae	<i>Melaleuca viridiflora</i>			C		3/1
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		3/1
plants	land plants	Myrtaceae	<i>Melaleuca fluvialis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		1
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C		1/1
plants	land plants	Nyctaginaceae	<i>Boerhavia dominii</i>			C		1/1
plants	land plants	Nymphaeaceae	<i>Nymphaea immutabilis</i>			C		1
plants	land plants	Nymphaeaceae	<i>Nymphaea jacobsii</i>			C		1/1
plants	land plants	Nymphaeaceae	<i>Nymphaea</i>					2/2
plants	land plants	Nymphaeaceae	<i>Nymphaea pubescens</i>			C		1/1
plants	land plants	Oleaceae	<i>Jasminum didymum</i> subsp. <i>racemosum</i>			C		3/2
plants	land plants	Onagraceae	<i>Ludwigia perennis</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		1/1
plants	land plants	Onagraceae	<i>Ludwigia hyssopifolia</i>		Y			3/3
plants	land plants	Orchidaceae	<i>Geodorum densiflorum</i>	pink nodding orchid		C		1/1
plants	land plants	Orchidaceae	<i>Dendrobium canaliculatum</i>			C		1
plants	land plants	Orobanchaceae	<i>Buchnera linearis</i>			C		2/2
plants	land plants	Orobanchaceae	<i>Rhaphicarpa australiensis</i>			C		6/3
plants	land plants	Oxalidaceae	<i>Oxalis perennans</i>			C		1/1
plants	land plants	Pandanaceae	<i>Pandanus cookii</i>			C		2/1
plants	land plants	Pandanaceae	<i>Pandanus brookei</i>			C		1/1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			5/2
plants	land plants	Pentapetaceae	<i>Melhania oblongifolia</i>			C		1/1
plants	land plants	Philydraceae	<i>Philydrum lanuginosum</i>	frogsmouth		C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus simplex</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Flueggea virosa subsp. melanthesoides</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus novae-hollandiae</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus</i>					1
plants	land plants	Phyllanthaceae	<i>Phyllanthus urinaria</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion lobocarpum</i>			C		1/1
plants	land plants	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		4/2
plants	land plants	Piperaceae	<i>Peperomia pellucida</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Limnophila fragrans</i>			C		2/2
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			1/1
plants	land plants	Poaceae	<i>Cynodon dactylon var. dactylon</i>		Y			1/1
plants	land plants	Poaceae	<i>Ischaemum rugosum var. rugosum</i>			C		1/1
plants	land plants	Poaceae	<i>Ischaemum rugosum var. segetum</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra decipiens var. decipiens</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne ciliata</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium udum</i>			V		3/2
plants	land plants	Poaceae	<i>Paspalum notatum</i>	bahia grass	Y			1/1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		3/1
plants	land plants	Poaceae	<i>Cenchrus setaceus</i>		Y			2/2
plants	land plants	Poaceae	<i>Digitaria brownii</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria gibbosa</i>			C		1/1
plants	land plants	Poaceae	<i>Mnesithea formosa</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium rarum</i>			C		3/3
plants	land plants	Poaceae	<i>Aristida latifolia</i>	feathertop wiregrass		C		1/1
plants	land plants	Poaceae	<i>Cenchrus setigerus</i>		Y			1/1
plants	land plants	Poaceae	<i>Digitaria ciliaris</i>	summer grass	Y			2/2
plants	land plants	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass	Y			1/1
plants	land plants	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass		C		2/1
plants	land plants	Poaceae	<i>Eragrostis curvula</i>		Y			2/2
plants	land plants	Poaceae	<i>Eragrostis dielsii</i>	mallee lovegrass		C		1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>			C		3/3
plants	land plants	Poaceae	<i>Sacciolepis indica</i>	Indian cupscale grass		C		1/1
plants	land plants	Poaceae	<i>Brachyachne tenella</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	<i>Cymbopogon ambiguus</i>	lemon grass		C		1/1
plants	land plants	Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y			1/1
plants	land plants	Poaceae	<i>Ectrosia nervilemma</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis mexicana</i>	Mexican lovegrass	Y			1/1
plants	land plants	Poaceae	<i>Megathyrsus maximus</i>		Y			4
plants	land plants	Poaceae	<i>Paspalidium distans</i>	shotgrass		C		2/2
plants	land plants	Poaceae	<i>Paspalidium gracile</i>	slender panic		C		1/1
plants	land plants	Poaceae	<i>Bothriochloa pertusa</i>		Y			1/1
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		1
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass		C		2/1
plants	land plants	Poaceae	<i>Digitaria violascens</i>	bastard summergrass	Y			1/1
plants	land plants	Poaceae	<i>Eragrostis schultzei</i>			C		2/2
plants	land plants	Poaceae	<i>Eriachne triodioides</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1/1
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			4/1
plants	land plants	Poaceae	<i>Whiteochloa airoides</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		2/2
plants	land plants	Poaceae	<i>Eragrostis unioloides</i>		Y			1/1
plants	land plants	Poaceae	<i>Eremochloa bimaclata</i>	poverty grass		C		1/1
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		4/2
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		4
plants	land plants	Poaceae	<i>Sporobolus natalensis</i>		Y			1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i>			C		1
plants	land plants	Poaceae	<i>Bothriochloa ewartiana</i>	desert bluegrass		C		1/1
plants	land plants	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		2/2
plants	land plants	Poaceae	<i>Echinochloa crus-galli</i>	barnyard grass	Y			2/2
plants	land plants	Poaceae	<i>Enneapogon polyphyllus</i>	leafy nineawn		C		1/1
plants	land plants	Poaceae	<i>Urochloa subquadriflora</i>		Y			1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1/1
plants	land plants	Poaceae	<i>Digitaria nematostachya</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis leptostachya</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis spartinioides</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis stenostachya</i>			C		1/1
plants	land plants	Poaceae	<i>Pseudoraphis spinescens</i>	spiny mudgrass		C		1/1
plants	land plants	Poaceae	<i>Dactyloctenium aegyptium</i>	coast button grass	Y			1
plants	land plants	Poaceae	<i>Enneapogon robustissimus</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus australasicus</i>			C		1/1
plants	land plants	Poaceae	<i>Thaumastochloa pubescens</i>			C		1
plants	land plants	Poaceae	<i>Cymbopogon queenslandicus</i>			C		1/1
plants	land plants	Poaceae	<i>Mnesithea rothboelliioides</i>			C		1/1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus coromandelianus</i>		Y			1/1
plants	land plants	Poaceae	<i>Hyparrhenia rufa subsp. rufa</i>		Y			2/2
plants	land plants	Poaceae	<i>Arthrargrostis deschampsiioides</i>			C		2/2
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis</i> 'Olive'		Y			1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		2/1
plants	land plants	Poaceae	<i>Megathyrsus maximus</i> var. <i>coloratus</i>		Y			2/2
plants	land plants	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			C		2/2
plants	land plants	Poaceae	<i>Ischaemum australe</i> var. <i>arundinaceum</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>			C		1/1
plants	land plants	Poaceae	<i>Urochloa holosericea</i> subsp. <i>holosericea</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>queenslandica</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum</i>					1
plants	land plants	Poaceae	<i>Eragrostis</i>					1
plants	land plants	Poaceae	<i>Sporobolus</i>					1
plants	land plants	Poaceae	<i>Eriachne rara</i>			C		3/2
plants	land plants	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			1
plants	land plants	Poaceae	<i>Chloris lobata</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>			C		1/1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			5
plants	land plants	Poaceae	<i>Sarga plumosum</i>			C		1/1
plants	land plants	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			1
plants	land plants	Poaceae	<i>Chloris pumilio</i>			C		2/2
plants	land plants	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			1
plants	land plants	Poaceae	<i>Eriachne obtusa</i>			C		1/1
plants	land plants	Poaceae	<i>Sehima nervosum</i>			C		1/1
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum x almum</i>		Y			1/1
plants	land plants	Poaceae	<i>Themeda arguens</i>			C		3/3
plants	land plants	Poaceae	<i>Cynodon dactylon</i>		Y			1
plants	land plants	Poaceae	<i>Digitaria minima</i>			C		1/1
plants	land plants	Polygalaceae	<i>Salomonina ciliata</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria attenuata</i>			C		2/2
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		1/1
plants	land plants	Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C		1/1
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>			C		1/1
plants	land plants	Pontederiaceae	<i>Monochoria vaginalis</i>			C		1/1
plants	land plants	Pontederiaceae	<i>Eichhornia crassipes</i>	water hyacinth	Y			1/1
plants	land plants	Portulacaceae	<i>Portulaca pilosa</i>		Y			1/1
plants	land plants	Portulacaceae	<i>Calandrinia</i> sp. (Olive River J.R.Clarkson+ 10012)			C		1/1
plants	land plants	Portulacaceae	<i>Calandrinia gracilis</i>			C		1/1
plants	land plants	Potamogetonaceae	<i>Potamogeton crispus</i>	curly pondweed		C		1/1
plants	land plants	Potamogetonaceae	<i>Potamogeton octandrus</i>			C		1/1
plants	land plants	Potamogetonaceae	<i>Potamogeton</i>					1/1
plants	land plants	Proteaceae	<i>Xylomelum scottianum</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>			C		3/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		2
plants	land plants	Pteridaceae	<i>Adiantum atroviride</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>			C		2/2
plants	land plants	Pteridaceae	<i>Ceratopteris thalictroides</i>			C		1/1



Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		2/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			7/2
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		2/2
plants	land plants	Rhizophoraceae	<i>Bruguiera exaristata</i>			C		1/1
plants	land plants	Rubiaceae	<i>Mitracarpus hirtus</i>		Y			2/1
plants	land plants	Rubiaceae	<i>Aidia racemosa</i>			C		1/1
plants	land plants	Rubiaceae	<i>Oldenlandia</i>					1
plants	land plants	Rubiaceae	<i>Psydrax</i>					1
plants	land plants	Rubiaceae	<i>Spermacoce brachystema</i>			C		1
plants	land plants	Rubiaceae	<i>Paranotis mitrasacmoides subsp. trachymenoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Oldenlandia corymbosa var. corymbosa</i>		Y			1/1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Coelospermum reticulatum</i>			C		1
plants	land plants	Rubiaceae	<i>Psydrax saligna forma saligna</i>			C		2/1
plants	land plants	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		1/1
plants	land plants	Rutaceae	<i>Micromelum minutum</i>	clusterberry		C		1/1
plants	land plants	Rutaceae	<i>Muraya ovatifoliolata</i>			C		1/1
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea lanceolata var. subsessilifolia</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa subsp. burmanniana</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa subsp. viscosa</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea vestita</i>			C		1
plants	land plants	Sapindaceae	<i>Dodonaea dodecandra</i>			C		1/1
plants	land plants	Sapotaceae	<i>Mimusops elengi</i>			C		1/1
plants	land plants	Solanaceae	<i>Solanum americanum</i>		Y			2/2
plants	land plants	Solanaceae	<i>Physalis angulata</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			2/2
plants	land plants	Solanaceae	<i>Datura innoxia</i>		Y			1/1
plants	land plants	Sparrmanniaceae	<i>Grewia asiatica</i>		Y			1
plants	land plants	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		1/1
plants	land plants	Sparrmanniaceae	<i>Corchorus aestuans</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>			C		2/2
plants	land plants	Sparrmanniaceae	<i>Corchorus olitorius</i>	jute		C		2/2
plants	land plants	Stylidiaceae	<i>Stylidium</i>					1
plants	land plants	Taccaceae	<i>Tacca leontopetaloides</i>			C		1/1
plants	land plants	Tamaricaceae	<i>Tamarix aphylla</i>	athel pine	Y			1/1
plants	land plants	Turneraceae	<i>Turnera ulmifolia</i>		Y			1/1
plants	land plants	Typhaceae	<i>Typha domingensis</i>			C		3/3
plants	land plants	Ulmaceae	<i>Trema tomentosa</i>			C		1/1
plants	land plants	Urticaceae	<i>Pipturus argenteus</i>	white nettle		C		1/1
plants	land plants	Verbenaceae	<i>Lantana camara</i>	lantana	Y			3/1
plants	land plants	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			4/1
plants	land plants	Violaceae	<i>Afrohybanthus enneaspermus</i>			C		2/1
plants	land plants	Viscaceae	<i>Viscum articulatum</i>	flat mistletoe		C		1/1
plants	land plants	Vitaceae	<i>Causonis trifolia</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Xyridaceae	<i>Xyris complanata</i>	yellow-eye		C		1/1

#### CODES

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

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

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

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

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

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

# Appendix B

## Likelihood of Occurrence Assessments

## Appendix B Likelihood of Occurrence Assessments

Table 27 Likelihood of Occurrence Assessment - Threatened Flora

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
<b>Plants</b>			
Bluegrass ( <i>Dichanthium setosum</i> )	Vulnerable	<p><i>Dichanthium setosum</i> is associated with heavy basaltic black soils and red-brown loams with clay subsoil (often in gilgai). Associated species include <i>Eucalyptus albens</i>, <i>Eucalyptus melanophloia</i>, <i>Eucalyptus melliodora</i>, <i>Eucalyptus viminalis</i>, <i>Myoporum debile</i>, <i>Aristida ramosa</i>, <i>Themeda triandra</i>, <i>Poa sieberiana</i>, <i>Bothriochloa ambigua</i>, <i>Bothriochloa decipiens</i>, <i>Macrozamia stenomera</i>, <i>Medicago minima</i>, <i>Leptorhynchus squamatus</i>, <i>Lomandra aff. longifolia</i>, <i>Ajuga australis</i>, <i>Calotis hispidula</i> and <i>Austrodanthonia</i> spp., <i>Dichopogon</i> spp., <i>Brachyscome</i> spp., <i>Vittadinia</i> spp., <i>Wahlenbergia</i> spp. and <i>Psoralea</i> spp.</p> <p>In Queensland this species has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>No known populations occur within the Study Area, and the Study Area lacks the habitat this species is known to occur on.</p>
Mt Stuart ironbark ( <i>Eucalyptus paedoglauca</i> )	Vulnerable	<p><i>Eucalyptus paedoglauca</i> is a tree up to 15 m that occurs only in the Townsville area of north-east Queensland (Department of the Environment Water Heritage and the Arts, 2008). It occurs on ridges or hill slopes on shallow sandy-load soil. All known populations occur in areas of remnant vegetation.</p>	<p><b>Unlikely</b></p> <p>The Study Area does not occur within the distributions detailed on the species' SPRAT. Habitat within the Study Area is largely unsuitable (floodplain) and this species was not recorded during any of the field surveys.</p>



Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
<i>Marsdenia brevifolia</i>	Vulnerable	<p>North of Rockhampton, this species grows on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland, often with <i>Eucalyptus fibrosa</i> and <i>Corymbia xanthope</i>. At Hidden Valley near Paluma, plants grow in woodland on granite soils and on Magnetic Island the species occurs in open forest on dark acid agglomerate soils.</p> <p><i>Marsdenia brevifolia</i> occurs in north and central Queensland where it is known from near Townsville, Springsure and north of Rockhampton (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>No known populations occur within the Study Area, and the Study Area lacks the habitat this species is known to occur in.</p>
<i>Myrmecodia beccarii</i>	Vulnerable	<p>This species occurs in open woodland dominated by <i>Melaleuca viridiflora</i> or mangroves.</p> <p><i>Myrmecodia beccarii</i> occurs in coastal woodland and mangrove between Cooktown and Ingham in Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>While <i>Melaleuca viridiflora</i> woodland is found within the Study Area, this species has not been recorded south of Toomulla which is approximately 50 km north of the Study Area.</p>
<i>Omphalea celata</i>	Vulnerable	<p><i>Omphalea celata</i> is a small tree to 12 m that occurs in fragmented semi-evergreen vine thicket or araucarian microphyll vine forest. It has been recorded along watercourses in steep sided gorges and gullies on weather metamorphic or granitic soils (Queensland Department of Environment and Science, 2019).</p> <p>It has a very restricted distribution in central Queensland and is known only from two localities: Hazlewood Gorge west of Mackay and on Gloucester Island north of Prosperine.</p>	<p><b>Unlikely</b></p> <p>The Study Area does not occur within the distributions detailed on the species' SPRAT. Habitat within the Study Area is unsuitable and this species was not recorded during any of the field surveys.</p>
<i>Tephrosia leveillei</i>	Vulnerable	<p>This species has been recorded growing on alluvial plains in <i>Eucalyptus cullenii</i> woodland with <i>Corymbia erythrophloia</i>, <i>Erythrophleum chlorostachys</i> and <i>Grevillea glauca</i>, and in tall open forest of <i>Eucalyptus</i> and <i>Corymbia</i> species over dense <i>Heteropogon contortus</i> on red sand.</p> <p><i>Tephrosia leveillei</i> is currently known from the area between Chillagoe and Forty Mile Scrub (five collections) with one collection further south, near Ravenswood (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>No known populations occur within or nearby to the Study Area, and the Study Area lacks the habitat this species is known to occur in.</p>

Table 28 Likelihood of Occurrence Assessment - Threatened Fauna

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
<b>Birds</b>			
Australasian bittern ( <i>Botaurus poiciloptilus</i> )	Endangered	<p>The Australasian bittern occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds.</p> <p>In Australia, the Australasian bittern occurs from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the southwest of Western Australia. Vagrants have also been recorded from northern Australia, including one record from Argyle Downs in the extreme north-east of Western Australia (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records are along the Australian coastline. This species is a vagrant in northern Australia.</p>
Red knot ( <i>Calidris canutus</i> )	Endangered & Migratory	<p>In Australasia the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. This species does not breed in Australia.</p> <p>The red knot is common in all the main suitable habitats around the coast of Australia, and is occasionally recorded inland. In Queensland, this species migrates along the coast north of 19 °S, sometimes in large numbers, and is widespread along the coast south of Townsville (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records are along the Australian coastline.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Curlew sandpiper ( <i>Calidris ferruginea</i> )	Critically Endangered & Migratory	<p>Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They occur in both fresh and brackish waters. This species does not breed in Australia.</p> <p>In Australia, curlew sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records in northern Queensland are along the coastline.</p>
Great knot ( <i>Calidris tenuirostris</i> )	Critically Endangered & Migratory	<p>The great knot is a non-breeding migrant to Australia. It has been recorded around the entirety of the Australian coast, with a few scattered records inland. Sheltered coastal habitats, with large intertidal mudflats or sandflats are preferred. However, they have also been found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records in northern Queensland are along the coastline.</p>
Greater sand plover ( <i>Charadrius leschenaultii</i> )	Vulnerable & Migratory	<p>The greater sand plover is a non-breeding migrant to Australia. It is almost entirely coastal, inhabiting littoral and estuarine habitats. They are reported to mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, inshore reefs, small rocky islands or coral reefs (Department of Agriculture Water and the Environment, 2020).</p> <p>It has been recorded in the coastal areas of all states in Australia, however the greatest numbers occur in northern Australia. Internationally important sites in Australia include Eighty Mile Beach (Western Australia), Roebuck Bay (Western Australia), south-eastern corner of Gulf of Carpentaria (Queensland), Ashmore Reef (Western Australia) and the Darwin area (Northern Territory).</p>	<p><b>Unlikely</b></p> <p>No suitable habitat occurs within the Study Area. All records in northern Queensland are long the coastline.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Lesser sand plover ( <i>Charadrius mongolus</i> )	Endangered & Migratory	<p>The lesser sand plover is a non-breeding migrant to Australia. Within Australia, this species is widespread in coastal regions and has been recorded in all states. It mainly occurs in northern and eastern Australia, in south-eastern parts of the Gulf of Carpentaria, western Cape York Peninsula and islands in Torres Strait, and along the entire east coast, though it occasionally also occurs inland. There are nine internationally important sites for this species in Queensland including Townsville and the Ross River mouth (Department of Agriculture Water and the Environment, 2020).</p> <p>It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves.</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records in northern Queensland are along the coastline.</p>
Red goshawk ( <i>Erythrotriorchis radiatus</i> )	Vulnerable	<p>In northern Queensland, red goshawks are mainly associated with extensive, uncleared, mosaics of native vegetation, especially riparian vegetation, open forest and woodland that contain a mix of eucalypt, ironbark and bloodwood species. Permanent water (watercourses and wetlands) is usually present in close proximity, with tall emergent trees used for nesting. The red goshawk is thought to have a very large home range covering between 50 and 220 square kilometres.</p> <p>This species is sparsely distributed across coastal and sub-coastal Australia, from the western Kimberly to northern New South Wales. There appears to have been a contraction in range in recent years. Occasionally recorded from gorge country in central Australia and western Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Moderate</b></p> <p>No nests were identified during the field surveys. However, foraging habitat (comprising areas of contiguous woodland containing a mix of eucalypt, ironbark and bloodwood species) occurs within the Study Area. A record of a red goshawk from 2000 is found approximately 6km west of the Study Area along the Black River (ALA).</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Grey falcon ( <i>Falco hypoleucos</i> )	Vulnerable & Migratory	<p>The grey falcon occurs at low densities across inland Australia, though the ecology of the grey falcon is known almost entirely from anecdotal and opportunistic observations. This species frequents timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined water courses. It has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter.</p> <p>The grey falcon occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. This species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species becomes more widespread (Department of the Environment and Energy, 2019a).</p>	<p><b>Low</b></p> <p>Although suitable habitat may occur within the Study Area, the average annual rainfall in Townsville is 1143 mm and the climate is characterised as tropical (BoM, 2021).</p> <p>One grey falcon record is reported on the Wildlife Online, however this is likely to correspond to the ALA record in Paluma Range National Park which has a very high degree of spatial uncertainty.</p>
White-bellied storm-petrel ( <i>Fregetta grallaria grallaria</i> )	Vulnerable & Migratory	<p>The white-bellied storm-petrel breeds on small offshore islets and rocks in the Lord Howe Island group, including Roach Island and Balls Pyramid.</p> <p>In Australia, white-bellied storm petrels are only occasionally found in inshore waters and more commonly along the edge of the continental shelf and further out to sea (Department of the Environment, 2019).</p>	<p><b>Low</b></p> <p>No suitable habitat occurs within the Study Area. All records in northern Queensland are along the coastline.</p>
Squatter pigeon (southern) ( <i>Geophaps scripta scripta</i> )	Vulnerable	<p>The squatter pigeon occurs in dry grassy woodland and open forest, mostly in sandy areas close to water. Natural foraging habitat for this species is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3km of a suitable, permanent or seasonal waterbody.</p> <p>This species is now largely (if not wholly) restricted to Queensland, from the New South Wales border, north to the Burdekin River, west to Charleville and Longreach, and east to the coast to Townsville and Proserpine (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>High</b></p> <p>Suitable habitat occurs within the Study Area, and essential habitat is mapped immediately south of the Study Area. The squatter pigeon (southern) has been previously identified within the Study Area (AECOM (2012); Natural Resource Assessment Environmental Consultants (2013b)).</p>



Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
White-throated needletail ( <i>Hirundapus caudacutus</i> )	Vulnerable & Migratory	<p>The white-throated needletail is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though does occasionally roost in tree hollows and the foliage canopy. It forages for insects on the wing; flying anywhere between “cloud level” and “ground level” and readily forms mixed feeding flocks with other aerial insectivores.</p> <p>This species is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Moderate</b></p> <p>Aerial species known to fly over broad habitat types. Records occur surrounding the Study Area from 2016 (ALA). This species may occur in the airspace above the Study Area and may occasionally roost in the tree hollows.</p>
Western Alaskan bar-tailed godwit ( <i>Limosa lapponica baueri</i> )	Vulnerable	<p>The bar-tailed godwit (western Alaskan) usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They prefer exposed sandy or soft mud substrates on intertidal flats, banks and beaches. On Heron Island, they have been seen feeding on insect larvae among the roots of <i>Casuarina</i>. The bar-tailed godwit (western Alaskan) usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh.</p> <p>The bar-tailed godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, New South Wales and Victoria (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands and waterbodies suitable for this species to persist are not present within the Study Area. No nearby records occur.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Star finch (eastern) ( <i>Neochmia ruficauda ruficauda</i> )	Endangered	<p>The star finch (eastern) occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water. It also occurs in cleared or suburban areas such as along roadsides and in towns. Studies at nine former sites of the star finch (eastern) found that the habitat consisted mainly of woodland. These habitats are dominated by trees that are typically associated with permanent water or areas that are regularly inundated; the most common species are <i>Eucalyptus coolabah</i>, <i>Eucalyptus tereticornis</i>, <i>Eucalyptus tessellaris</i>, <i>Melaleuca leucadendra</i>, <i>Eucalyptus camaldulensis</i> and <i>Casuarina cunninghamii</i>.</p> <p>Based on the small number of accepted records, the distribution of this species formerly extended from Bowen in central Queensland, south to the Namoi River in northern New South Wales, and west to the Blackall Range. Recent records have been obtained only from scattered sites in central Queensland (i.e. between 21°S and 25°S, and 141°E and 150°E) and, consequently, the star finch (eastern) now appears to be extinct in both south-eastern Queensland and northern New South Wales (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>While suitable habitat occurs within the Study Area, no confirmed sightings of this species have been made since 1995.</p>
Eastern curlew ( <i>Numenius madagascariensis</i> )	Critically Endangered & Migratory	<p>During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (<i>Zosteraceae</i>). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.</p> <p>Within Australia, the eastern curlew has a primarily coastal distribution, they are rarely recorded inland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Scattered records occur surrounding the Study Area (ALA), although these are typically along major rivers such as Black River and Ross River.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Black-throated finch (southern) ( <i>Poephila cincta cincta</i> )	Endangered	<p>The black-throated finch's (southern) preferred habitat is grassy open woodland/forest dominated by <i>Eucalyptus</i>, <i>Melaleuca</i> or <i>Acacia</i>, but they are also known from pandanus flats and scrubby plains. The black-throated finch (southern) feeds on the seed of native grasses from the ground. Three resources are required for the species to persist: water, grass seeds and trees providing suitable habitat. If any of these three resources are not available, black-throated finch (southern) is unlikely to be present.</p> <p>The black-throated finch's (southern) primary stronghold is the region surrounding Townsville; however it is also known to occur in scattered locations across central-eastern Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Known</b></p> <p>Suitable habitat for this species is found within the Study Area, and recent records from 2015 occur within the Study Area (WildNet). Nests confirmed as belonging to the species were recorded in the Study Area during the field surveys.</p>
Australian painted snipe ( <i>Rostratula australis</i> )	Endangered	<p>Preferred habitat includes shallow inland wetlands, brackish or freshwater, that are permanently or temporarily inundated. Breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and canegrass.</p> <p>Has been recorded from wetlands in all Australian states, however is most common in eastern Australia, especially the Murray-Darling Basin. Individuals are nomadic, and there is some evidence of partial migration from south-eastern wetlands to coastal central and northern Queensland in autumn and winter (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. A record from 2011 is found approximately 5km south-east of the Study Area in Carlyle (ALA).</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Masked owl (northern) ( <i>Tyto novaehollandiae kimberli</i> )	Vulnerable	<p>The masked owl (northern) is known to use a range of habitat types in Queensland including riparian forest, rainforest, open forests, <i>Melaleuca</i> swamps, and mangrove edges and along sugar cane field margins. This species usually nests in tree hollows, within patches of closed forest.</p> <p>In Queensland, there are historical records of the masked owl (northern) from the Normanton region, and from Pascoe, Archer, Chester and Watson Rivers on Cape York Peninsula. It occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is typically found in dense habitats and rainforest. The Study Area contains very open woodlands that do not represent the preferred habitat for this species. Large hollows suitable for roosting were also absent. One record from 1998 occurs south at Kelso and the remainder of the records are from the Paluma State Forest (ALA).</p>
<b>Mammals</b>			
Northern quoll ( <i>Dasyurus hallucatus</i> )	Endangered	<p>The northern quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll are also known to occupy non rocky lowland habitats such as beach scrub communities in central Queensland. Northern quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.</p> <p>In Queensland, the northern quoll is known to occur as far south as Gracemere and Mount Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into central Queensland to the vicinity of Carnarvon Range National Park (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>The Study Area does not support rocky areas, and targeted surveys for the northern quoll in the Townsville area in 2007 failed to find any signs of the species (Woinarski et al., 2008).</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Semon's leaf-nosed bat ( <i>Hipposideros semoni</i> )	Vulnerable	<p>The Semon's leaf-nosed bat is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland.</p> <p>The full distribution of this species is still unknown. In Queensland it is known to occur along eastern Cape York Peninsula to Townsville, with the only confirmed records from Kutini-Payamu (Iron Range) National Park to the Cooktown area (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is known from coastal areas; however the majority of records are near Cooktown. Two undated records of this species occur in Townsville City (ALA). No previous surveys within or adjacent to the Study Area have identified this species and the habitat is considered marginal.</p>
Ghost bat ( <i>Macroderma gigas</i> )	Vulnerable	<p>The ghost bat currently occupies habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. From September to April, ghost bats aggregate in maternity roost sites to breed. Most of the colony disperses (up to 150km) from maternity roosts during the non-breeding season in the cooler months. During this time, ghost bats use large numbers of caves, rock shelters, overhangs, vertical cracks, and mines as day roosts. Ghost bats forage an average of 1.9km from day roosts.</p> <p>The species' current range is discontinuous, with geographically disjunct colonies occurring in the Pilbara, Kimberley, Northern Territory, the Gulf of Carpentaria, coastal and near coastal eastern Queensland from Cape York to near Rockhampton, and western Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>No caves, old mines or rock crevices suitable for day roosts were identified within the Study Area. No maternity roosts are known in the Townsville region. Ghost bats are known to forage and use day roosts on Hervey Range (ALA); however as the Study Area is further than 2km from Hervey Range, the bats roosting in this location are unlikely to regularly forage within the Study Area.</p>
Black-footed tree rat ( <i>Mesembriomys gouldii rattoides</i> )	Vulnerable	<p>The black-footed tree-rat (north Queensland) is a nocturnal medium-sized native mammal and one of the largest rodents in Australia. Its distribution and ecology are poorly known. In north Queensland, this species mostly occurs in eucalypt forests and woodlands, especially where hollows are relatively plentiful. Denning mostly occurs in tree hollows, but occasionally in dense foliage (notably of Pandanus) and in buildings (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>The Study Area does contain eucalypt woodland however is not known to contain Pandanus trees which are important to this species. No ALA records occur in the wider Townsville area, and no records are identified on the Wildlife Online report.</p>



Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Sharman's rock-wallaby ( <i>Petrogale sharmani</i> )	Vulnerable	<p>The species occurs in a variety of rocky habitats (including rocky outcrops, boulder piles, gorges, cliff lines and rocky slopes) within open forests or grassy woodlands. It shelters during the day in rocky refuges or dense vegetation, emerging at dusk to feed.</p> <p>The range of Sharman's rock-wallaby is limited. It is known from only about 20 colonies scattered within a 2,000 km<sup>2</sup> area of the Seaview and Coane Ranges, west of Ingham in north-eastern Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>Suitable habitat for this species is not found within the Study Area and the Study Area is outside the known distribution.</p>
Koala ( <i>Phascolarctos cinereus</i> )	Vulnerable; Vulnerable	<p>Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities. Koalas eat a variety of eucalypt leaves and a few other related tree species, including <i>Lophostemon</i>, <i>Melaleuca</i> and <i>Corymbia</i> species. Koalas are found in higher densities where food trees are growing on more fertile soils and along watercourses.</p> <p>In north Queensland, the koala's distribution extends inland from the east coast: from the Wet Tropics bioregion, into the Einasleigh Uplands bioregion in the north of the state (Department of Agriculture Water and the Environment, 2020). The northern limit of the distribution of the koala in Queensland has contracted to the south, from approximately Cooktown to inland of Cairns, since the late 1960s.</p> <p>All observations of koala in the Townsville area, both anecdotal and confirmed, have been of koalas in <i>Eucalyptus crebra</i>-dominated woodland habitat, where the woodlands are contiguous with large areas of similar floristic composition, or in riparian areas with <i>Eucalyptus tereticornis</i> as the characteristic species.</p> <p><i>Eucalyptus tereticornis</i> does not occur in the Study Area. <i>Eucalyptus crebra</i> is represented in the Study Area, but does not form extensive areas of woodland, and the area of vegetation impacted by the Project is alienated from contiguous areas of vegetation both to the north and south, by the Townsville Ring Road and residential development.</p>	<p><b>Low</b></p> <p><i>Eucalyptus</i> and <i>Corymbia</i> species are common within the Study Area; however koalas are extremely rare in the Townsville area and the only locally confirmed records for the koala occur on Magnetic Island (Dr. C. Hoskin, James Cook University Townsville, pers. comm, 2018). Records on ALA include one from 1960 at Hervey Range, two at Townsville city with unknown coordinate precisions, and one at Bluewater. Numerous records occur on Magnetic Island.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Spectacled flying-fox ( <i>Pteropus conspicillatus</i> )	Endangered	<p>This species was long assumed to feed primarily on rainforest species but individuals regularly feed on a wide variety of non-rainforest species, including eucalypts (<i>Eucalyptus</i> spp., <i>Corymbia</i> spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems.</p> <p>The spectacled flying-fox occurs in north-eastern Queensland, north of Cardwell with past records from Brisbane and Chillagoe. It is restricted to tropical rainforest areas, most specifically, the species occurs between Ingham and Cooktown, and between the McIlwraith and Iron Ranges of Cape York (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b> No suitable habitat is found within the Study Area and there are no nearby camps identified on the National Flying-fox Register. No nearby records occur.</p>
Bare-rumped sheath-tailed bat ( <i>Saccolaimus saccolaimus nudicluniatus</i> )	Vulnerable	<p>The bare-rumped sheath-tailed bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments, and possibly rainforest. The habitat adjacent to the roost in the Jerona Fauna Sanctuary at Ayr in north Queensland was in <i>Eucalyptus platyphylla</i> woodland, typical of the alluvial plains adjacent to the lower Burdekin and Haughton Rivers, near Townsville. Adjacent to this habitat were woodlands dominated by <i>Eucalyptus tessellaris</i> and <i>Eucalyptus papuana</i>. At Iron Range, roosts were located in <i>Eucalyptus tetradonta</i> with <i>Corymbia clarksoniana</i>.</p> <p>The type locality for the bare-rumped sheath-tailed bat is Babinda Creek near Cardwell, North Queensland. Occasional individuals have been collected from a narrow coastal region between Ayr and Cooktown, with one isolated specimen from north of Coen on Cape York Peninsula. Other observations include a road-killed individual on Magnetic Island off Townsville; a sighting of up to 15 individuals flushed from a roost tree in the Iron Range area; and likely acoustic detection in an area to the west of Townsville (Department of Agriculture Water and the Environment, 2020). Moreover, recent studies by AECOM in Townsville confirmed echolocation calls of this species at Townsville Ring Road Section 4, the Haughton River area, and along Riverway Drive (AECOM, 2012; AECOM, 2016).</p>	<p><b>Known</b> Suitable habitat for this species is found within the Study Area, and acoustic calls of this species were recorded within the Study Area during the April 2019 field survey.</p>

Species	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
Water mouse ( <i>Xeromys myoides</i> )	Vulnerable	<p>Although the water mouse had been documented in three distinct locations (Northern Territory, central south Queensland, south-east Queensland) they require similar habitat including mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. In central south Queensland, the water mouse has only been captured in the high inter-tidal zone in tall, closed fringing mangrove forest containing only <i>Ceriops tagal</i> and/or <i>Bruguiera</i> sp. Although not considered core habitat, the water mouse has also been captured in closed forest of <i>Avicennia marina</i>.</p> <p>The water mouse occurs in three regions of coastal Australia: The Northern Territory, central south Queensland and south-east Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b> No suitable habitat is found within the Study Area. No nearby records occur.</p>
<b>Reptiles</b>			
Yakka skink ( <i>Egernia rugosa</i> )	Vulnerable	<p>Common woodland and open forest types this species has been recorded in include <i>Acacia harpophylla</i>; <i>Acacia aneura</i>; <i>Acacia catenulata</i>; <i>Acacia shirleyi</i>; <i>Casuarina cristata</i>; <i>Eucalyptus populnea</i>; Ironbark (<i>Eucalyptus</i> spp.); and <i>Callitris glaucophylla</i>. The yakka skink is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation.</p> <p>The known distribution of the yakka skink extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. This vast area covers portions of the Brigalow Belt (North and South), Mulga Lands, South-east Queensland, Einasleigh Uplands, Wet Tropics and Cape York Peninsula Biogeographical Regions (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b> No suitable habitat is found within the Study Area, and the Study Area lacks the coarse woody debris and large logs required by the species. No nearby records occur.</p>

Table 29 Likelihood of Occurrence Assessment - Migratory Species

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
<b>Migratory Marine Birds</b>			
Common noddy ( <i>Anous stolidus</i> )	Migratory	<p>During the breeding season, the common noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters. Birds may nest in bushes, saltbush, or other low vegetation. During the non-breeding period, this species occurs in groups throughout the pelagic zone (open ocean).</p> <p>In Australia, the common noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>This species nests on island and forages in the pelagic zone. No suitable habitat is found within the Study Area and no nearby records occur.</p>
Fork-tailed swift ( <i>Apus pacificus</i> )	Migratory	<p>The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. This species mostly occurs over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes.</p> <p>This species is generally recorded east of the Great Dividing Range from Cooktown to the New South Wales border, but extends further west in southern Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Moderate</b></p> <p>Aerial species known to fly over broad habitat types. Records occur surrounding the Study Area including from 2016 and 2017 (ALA). This species may occur in the airspace above the Study Area.</p>
Lesser frigatebird ( <i>Fregata ariel</i> )	Migratory	This species is found in tropical and subtropical seas, coasts and islands, nesting in low trees, shrubs and grasses (Department of Agriculture Water and the Environment, 2020).	<p><b>Unlikely</b></p> <p>This species is largely marine and therefore unlikely to be present in the Study Area. No nearby records occur.</p>
Great frigatebird ( <i>Fregata minor</i> )	Migratory	This species is found in tropical and subtropical seas, coasts and islands, nesting in low trees, shrubs and grasses (Department of Agriculture Water and the Environment, 2020).	<p><b>Unlikely</b></p> <p>This species is largely marine and therefore unlikely to be present in the Study Area. No nearby records occur.</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Little tern ( <i>Sternula albifrons</i> )	Migratory	The Australian breeding population can be divided into two major subpopulations: (1) a northern subpopulation that breeds across northern Australia, from about Broome in north-western Western Australia, through coastal Northern Territory to the Gulf of Carpentaria and eastern Cape York Peninsula; and (2) an eastern subpopulation that breeds on the eastern and south-eastern coast of the mainland and northern and eastern Tasmania. In Australia, little terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches (Department of the Environment, 2019).	<b>Low</b> This species is primarily coastal and wetlands suitable for this species to persist are not present within the Study Area. Scattered records occur surrounding the Study Area (ALA), although these are typically along major rivers such as the Bohle River.
<b>Migratory Marine Species</b>			
Saltwater crocodile ( <i>Crocodylus porosus</i> )	Migratory	The saltwater crocodile mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150km inland from the coast. Preferred nesting habitat includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements.  In Queensland the saltwater crocodile inhabits reef, coastal and inland waterways from Gladstone on the east coast, throughout the Cape York Peninsula and west to the Queensland - Northern Territory border (Department of Agriculture Water and the Environment, 2020).	<b>Low</b> No large, permanent creeks are found within the Study Area. Essential habitat for the saltwater crocodile is mapped in the land parcel immediately south of the Study Area. Records of this species occur at Ross Creek (ALA).
<b>Migratory Terrestrial Species</b>			
Oriental cuckoo ( <i>Cuculus optatus</i> )	Migratory	This species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types.  The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept- May) in coastal regions across northern and eastern Australia as well as offshore islands (Department of the Environment, 2015b).	<b>Moderate</b> Suitable habitat occurs within the Study Area. This species was recorded along the Bohle River in 2011 and numerous records occur along the Ross River (ALA).



Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
White-throated needletail ( <i>Hirundapus caudacutus</i> )	Vulnerable & Migratory	<p>The white-throated needletail is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though does occasionally roost in tree hollows and the foliage canopy. It forages for insects on the wing; flying anywhere between “cloud level” and “ground level” and readily forms mixed feeding flocks with other aerial insectivores.</p> <p>This species is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Department of the Environment, 2015b).</p>	<p><b>Moderate</b></p> <p>Aerial species known to fly over broad habitat types. Records occur surrounding the Study Area from 2016 (ALA). This species may occur in the airspace above the Study Area, and may occasionally roost in the tree hollows.</p>
Black-faced monarch ( <i>Monarcha melanopsis</i> )	Migratory	<p>The black-faced monarch is a wet forest specialist, occurring mainly in rainforests and riparian vegetation. This species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrub land, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.</p> <p>In Queensland, the black-faced monarch is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border (Department of the Environment, 2015b).</p>	<p><b>Low</b></p> <p>Wet forest and rainforest do not occur within the Study Area. Numerous records exist around Townsville (ALA); however these are likely of birds on migration rather than relying on the habitat for roosting and breeding.</p>
Spectacled monarch ( <i>Monarcha trivirgatus</i> )	Migratory	<p>This species occupies dense vegetation, mainly in rainforest but also in moist or wet sclerophyll forest and occasionally in other densely vegetated habitats such as mangroves, drier forest, woodlands, parks and gardens.</p> <p>The spectacled monarch is found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales (Department of the Environment, 2015b).</p>	<p><b>Low</b></p> <p>Wet forest and rainforest do not occur within the Study Area. Occasional records exist around Townsville and along the Ross River (ALA); however these are likely of birds on migration rather than relying on the habitat for roosting and breeding.</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Yellow wagtail ( <i>Motacilla flava</i> )	Migratory	<p>Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves.</p> <p>The yellow wagtail is a regular wet season visitor to northern Australia. In Queensland this species is a regular visitor from Mossman south to Townsville. The species is a vagrant further south and on Heron Island (Department of the Environment, 2015b).</p>	<p><b>Low</b></p> <p>Limited suitable habitat exists in the Study Area. Records occur near the Townsville Town Common (ALA). The yellow wagtail is also considered an uncommon migrant (Department of the Environment, 2015b).</p>
Satin flycatcher ( <i>Myiagra cyanoleuca</i> )	Migratory	<p>Satin flycatchers are eucalypt forest and woodland inhabitants. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland. The diversity of occupied habitats expands during migration, with the species recorded in most wooded habitats. Wintering birds in northern Queensland will use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps.</p> <p>In Queensland, this species is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin flycatchers are also found extensively along the Great Dividing Range (Department of the Environment, 2015b).</p>	<p><b>Moderate</b></p> <p>Suitable habitat exists in the Study Area, and records occur near the Townsville Town Common (ALA). A recent (2017) record also occurs approximately 10km south-east of the Study Area at the James Cook University (ALA).</p>
Rufous fantail ( <i>Rhipidura rufifrons</i> )	Migratory	<p>In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts, usually with a dense shrubby understorey often including ferns.</p> <p>The rufous fantail is found in northern and eastern coastal Australia, being more common in the north. This species migrates to south-east Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Department of the Environment, 2015b).</p>	<p><b>Moderate</b></p> <p>Suitable habitat exists in the Study Area, and numerous records occur in the region. A recent (2013) record also occurs along the Bohle River (ALA).</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
<b>Migratory Wetland Species</b>			
Common sandpiper ( <i>Actitis hypoleucos</i> )	Migratory	<p>The common sandpiper is known to occur in a range of wetland environments, both coastal and inland. Their primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves.</p> <p>Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. The majority of records are along the Australian coastline.</p>
Ruddy turnstone ( <i>Arenaria interpres</i> )	Migratory	<p>This species is a non-breeding migrant to Australia. It is found in most coastal regions, with occasional records of inland populations. It is reported to strongly prefer rocky shores or beaches where there are large deposits of rotting seaweed. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. There are 15 recognised sites of international importance in Australia, however none occur in Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is primarily coastal and wetlands suitable for this species to persist are not present within the Study Area. In Queensland, all records are along the coastline.</p>
Sharp-tailed sandpiper ( <i>Calidris acuminata</i> )	Migratory	<p>In Australasia, the sharp-tailed sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland.</p> <p>In Queensland, the sharp-tailed sandpiper is recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions. Many inland records are of birds on passage (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Scattered inland records occur; however these are typically at large rivers and dams. In Queensland, all records of this species are along the coastline.</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Sanderling ( <i>Calidris alba</i> )	Migratory	<p>The sanderling is a non-breeding migrant in Australia, almost always occurring in coastal areas. Inland records have occurred in most states of singles or small groups, birds probably on migration. In Queensland, this species is occasionally recorded in the Gulf of Carpentaria and Torres Strait. Scattered records also occur in mid-east and south-east Queensland from Townsville and Alva Beach, south to Fraser Island, and around Moreton Bay and Point Danger, including on offshore islands (Department of Agriculture Water and the Environment, 2020).</p> <p>Preferred habitat includes open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks. Rarely they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, saltponds and samphire flats.</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records are along the Australian coastline.</p>
Red knot ( <i>Calidris canutus</i> )	Endangered & Migratory	<p>In Australasia the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. This species does not breed in Australia.</p> <p>The red knot is common in all the main suitable habitats around the coast of Australia, and is occasionally recorded inland. In Queensland, this species migrates along the coast north of 19 °S, sometimes in large numbers, and is widespread along the coast south of Townsville (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records are along the Australian coastline.</p>
Curlew sandpiper ( <i>Calidris ferruginea</i> )	Critically Endangered & Migratory	<p>Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They occur in both fresh and brackish waters. This species does not breed in Australia.</p> <p>In Australia, curlew sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. All records in northern Queensland are along the coastline.</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Pectoral sandpiper ( <i>Calidris melanotos</i> )	Migratory	<p>This species is usually found in coastal or near coastal habitat but very occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire.</p> <p>In Queensland, most records for the pectoral sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Records also exist in the south-east of the state as well as a few inland records at Mount Isa, Longreach and Oakley (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. In Queensland, all records are along the coastline.</p>
Red-necked stint ( <i>Calidris ruficollis</i> )	Migratory	<p>This species is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The red-necked stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable.</p> <p>In Australasia, the red-necked stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is primarily coastal and wetlands suitable for this species to persist are not present within the Study Area. In Queensland, all records are along the coastline.</p>
Little ringed plover ( <i>Charadrius dubius</i> ),	Migratory	<p>This species is a non-breeding migrant to Australia. It has an extremely large range across the northern hemisphere, but in Australia records are rare. In Queensland it has been recorded in Cairns and south of Ayr.</p>	<p><b>Unlikely</b></p> <p>This species is rare in Australia and not known from the Townsville area (eBird, 2021).</p>
Oriental plover ( <i>Charadrius veredus</i> )	Migratory	<p>The oriental plover is a non-breeding migrant, primarily present in Australia during the months of summer. It has been recorded in all states, but is most common in the coastal areas and in northern Australia. They inhabit open grasslands in arid and semi-arid zones; and less often in estuarine or littoral environments (Birdlife, 2020). Preferred habitat has sparse cover of short grass (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is primarily coastal and wetlands suitable for this species to persist are not present within the Study Area. In Queensland, all records are along the coastline.</p>



Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Latham's snipe ( <i>Gallinago hardwickii</i> )	Migratory	<p>In Australia, the Latham's snipe occurs in permanent and ephemeral wetlands up to 2,000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies).</p> <p>Latham's snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Scattered nearby records occur, including from 2008 and 2010 near the Bohle River, and 2014 along Mount Low Parkway north of the Study Area (ALA).</p>
Swinhoe's snipe ( <i>Gallinago megala</i> ) & Pin-tailed snipe ( <i>Gallinago stenura</i> )	Migratory & Migratory	Both snipe species occur in Australia generally from October to April, during the non-breeding season. These species occur at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. They have also been recorded in grasslands and drier cultivated areas (Department of Agriculture Water and the Environment, 2020).	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Neither species has ALA records in the Townsville area.</p>
Broad-billed sandpiper ( <i>Limicola falcinellus</i> )	Migratory	The broad-billed sandpiper is a non-breeding migrant to Australia. In Australia, the species is most common on the north and north-west coasts. In Queensland, they have been seen at Coen River, Eagle Island, Cairns, Innisfail, Townsville and Jerona. It occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby (Department of Agriculture Water and the Environment, 2020).	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. In the Townsville area, reliable ALA records are restricted to the coast.</p>
Bar-tailed godwit ( <i>Limosa lapponica</i> ) & Black-tailed godwit ( <i>Limosa limosa</i> )	Migratory & Migratory	<p>Both godwit species have been found in all states and territories of Australia; however, they are known to prefer coastal regions.</p> <p>In Australia these species primarily inhabit coastal environments. They are commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Both species are primarily coastal and wetlands within the Study Area do not provide suitable roosting habitat. In the Townsville area, reliable ALA records are restricted to the coast and Lake Ross.</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Eastern curlew ( <i>Numenius madagascariensis</i> )	Critically Endangered & Migratory	<p>During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (<i>Zosteraceae</i>). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.</p> <p>Within Australia, the eastern curlew has a primarily coastal distribution, they are rarely recorded inland (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Scattered records occur surrounding the Study Area (ALA), although these are typically along major rivers such as Black River and Ross River.</p>
Osprey ( <i>Pandion haliaetus</i> )	Migratory	<p>Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging.</p> <p>The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in New South Wales; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Unlikely</b></p> <p>No suitable habitat is found within the Study Area.</p>
Pacific golden plover ( <i>Pluvialis fulva</i> )	Migratory	<p>Within Australia, this species is widespread in coastal regions, though there are also a number of inland records (in all states), sometimes far inland and usually along major river systems, especially the Murray and Darling Rivers and their tributaries. Most Pacific Golden Plovers occur along the east coast, and are especially widespread along the Queensland and NSW coastlines. They usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i>, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks.</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Numerous records occur around Townsville, however only close to the coastline (ALA).</p>

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Grey plover ( <i>Pluvialis squatarola</i> )	Migratory	The grey plover is a non-breeding migrant to Australia, where it is found along the coasts of all states and is especially abundant on the western and southern coastlines. Internationally important sites in Queensland include south-eastern Gulf of Carpentaria and the Great Sandy Strait. This species usually inhabits sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes (Department of Agriculture Water and the Environment, 2020).	<b>Low</b> Wetlands suitable for this species to persist are not present within the Study Area. Numerous records occur around Townsville, however only close to the coastline (ALA).
Grey-tailed tattler ( <i>Tringa brevipes</i> ) &	Migratory	The grey-tailed tattler is a non-breeding migrant to Australia. It has a primarily northern coastal distribution and is found in most coastal regions. This species is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide (Department of Agriculture Water and the Environment, 2020).	<b>Unlikely</b> No suitable habitat occurs within the Study Area. Reliable ALA records occur only along the coastline.
Wood sandpiper ( <i>Tringa glareola</i> )	Migratory	In Queensland, there are sparsely scattered records, generally south of 17° S, but also around Cairns. The wood sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (Department of Agriculture Water and the Environment, 2020).	<b>Low</b> Wetlands suitable for this species to persist are not present within the Study Area. Numerous records occur around Townsville, close to the coastline (ALA).
Wandering tattler ( <i>Tringa incana</i> )	Migratory	The wandering tattler is a non-breeding vagrant in the East Asian-Australasian Flyway and is uncommon in Australia, although it may sometimes be overlooked. The Townsville area forms part of the species potential distribution as per SPRAT. IT is generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches, and tends to avoid mudflats (Department of Agriculture Water and the Environment, 2020).	<b>Unlikely</b> No suitable habitat occurs within the Study Area. ALA records occur only along the coast line.

Species	Status (EPBC Act; NC Act)	Preferred Habitat	Likelihood of Occurrence
Common greenshank ( <i>Tringa nebularia</i> )	Migratory	<p>The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms.</p> <p>In Queensland, this species is widespread in the Gulf country and eastern Gulf of Carpentaria. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. Inland, there have been a few records south of a line from near Dalby to Mount Guide, and sparsely scattered records elsewhere (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Numerous records occur around Townsville, close to the coastline (ALA).</p>
Marsh sandpiper ( <i>Tringa stagnatilis</i> )	Migratory	<p>The marsh sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. This species lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>Wetlands suitable for this species to persist are not present within the Study Area. Numerous ALA records occur around Townsville, close to the coastline and at Lake Ross.</p>
Terek sandpiper ( <i>Xenus cinereus</i> )	Migratory	<p>The terek sandpiper is a non-breeding migrant to Australia. In Australia, this species has a primarily coastal distribution and is more widespread and common in northern and eastern Australia than southern Australia. There are twelve sites of international significance in Australia, four of which are in Queensland including south-east Gulf of Carpentaria, Shoalwater Bay and Broad Sound, the Great Sandy Strait and Moreton Bay. It mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (<i>Halosarcia</i> spp.). Mangroves are preferred for roosting (Department of Agriculture Water and the Environment, 2020).</p>	<p><b>Low</b></p> <p>This species is primarily coastal and wetlands within the Study Area are not tidal. In the Townsville area, reliable ALA records are restricted to the coast.</p>

# Appendix C

## Black-throated Finch (southern) Habitat Mapping Criteria



## Appendix C Black-throated Finch (southern) Habitat Mapping Criteria

The information gathered during the field surveys was used to map suitable black-throated finch (southern) habitat within the Study Area. The mapping criteria are defined below.

### 1. Nesting Habitat:

REs in which the black-throated finch (southern) has been recorded in north Queensland since 1994 (Black-throated Finch Recovery Team, 2007b) were the basis for identification of suitable nesting habitat. During the breeding season, black-throated finches (southern) typically nest in trees located within 400m of water sources (Rechetelo, 2015).

- High suitability = REs 11.3.12, 11.3.25, 11.3.25b, 11.3.27, 11.3.30, 11.3.35, 11.11.9 and 11.12.9 within 400 m of water
- Medium suitability = REs 11.3.12, 11.3.25, 11.3.25b, 11.3.27, 11.3.30, 11.3.35, 11.11.9 and 11.12.9 within 400-1,500 m of water
- Low suitability = All remaining vegetation within 5 km. The 5 km buffer is defined as one of convenience and is recommended by the Department of the Environment Water Heritage and the Arts, (2013).

Ground-truthed REs were used to map habitat within the Study Area however, the Queensland Herbarium mapping was used in the north-east corner of the site, as it had been recently fire impacted by a fire and was unable to be verified in the field. Additionally, a powerline corridor was added to the Project in March 2020; this area was not surveyed during the field assessments. Queensland Herbarium RE mapping was also used to map habitat in this area.

### 2. Foraging Habitat:

During the April 2019 field survey, 20 50 m transects were laid out within the Study Area and the ground cover was assessed within ten 1 x 1 m quadrats along the transects. The data collected included:

- Percent cover of all species
- Organic litter cover
- Bare-ground cover.

The information gathered at each transect was then used to map suitable black-throated finch (southern) habitat.

- High suitability =  $\geq 6$  food species present
- Moderate suitability = 3 - 5 food species present
- Low suitability = 1 - 2 food species present
- Not suitable = 0 food species present.

It should be noted that for mobile species such as birds that are highly dispersive across the landscape and seasonal in their movement patterns and resource use, it is likely that polygons of continuous suitable habitat within and beyond the buffer boundaries are likely to be used and may constitute potential habitat.

Permanent and seasonal water sources were also identified within the Study Area using the criteria below:

- Seasonal water source = watercourses classed as stream order 1, 2, and 3; and dams identified during the field surveys as seasonal

Permanent water source = watercourses classed as stream order 4 or above; and dams identified during the field surveys as permanent.

# Appendix D

## Bare-rumped Sheath-tailed Bat Roost Habitat Mapping Criteria

## Appendix D Bare-rumped Sheath-tailed Bat Roost Habitat Mapping Criteria

To quantify suitable roosting habitat within the Study Area, the following criteria was applied to create a roost habitat model:

- Each RE was assessed as a separate unit. Field-verified REs were used; however, the Queensland Herbarium mapping was used within the fire impacted area and the powerline corridor as these areas were not verified in the field.
- Within each RE, the following habitat characteristics were assessed:
  - Ecologically dominant layer height and presence of known mature roosting tree species
  - Average hollow-bearing tree count
  - Habitat connectivity. As all RE's within the Study Area were deemed to have suitable habitat connectivity this characteristic was subsequently omitted from the mapping model.

Table 30 outlines the parameters for scoring each of the associated habitat characteristics.

**Table 30 Habitat Characteristic and Score Classifications**

Habitat Characteristic	Score		
	1	2	3
Ecologically dominant layer height and presence of known mature roosting tree species	Ecologically dominant layer height is <10m. Does not contain a known roosting tree species. Other <i>Eucalyptus</i> and/or <i>Corymbia</i> species may be located throughout RE.	Ecologically dominant layer height is >10m. Does not contain a known roosting tree species. Other <i>Eucalyptus</i> and/or <i>Corymbia</i> species may be located throughout RE.	Ecologically dominant layer height is >10m. Contains at least one mature known roosting species ( <i>Eucalyptus platyphylla</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus miniata</i> , <i>Melaleuca leucadendra</i> , <i>Corymbia tessellaris</i> ).
Average hollow-bearing tree count (per ha)	≤10 hollow-bearing trees per ha	11-20 hollow-bearing trees per ha	≥21 hollow-bearing trees per ha

Each RE within the Study Area was assessed on the above matrix and the final score was then used to determine the suitability rating (Table 31).

**Table 31 Final Scores and Associated Suitability Ratings**

Score	Suitability Rating
0 to 2	Low
3 to 4	Moderate
≥5	High

It should be noted that foraging habitat was not modelled as it is likely that the entire Study Area is utilised for foraging.