# Sconi Battery Minerals Project
# Aquatic Ecology Report

**PREPARED FOR**
Australian Mines Limited

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Sconi Battery Minerals Project
AQUATIC ECOLOGY
ASSESSMENT

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## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| - | - | Negative |
| % | - | Percent |
| + | - | Positive |
| < | - | Less than |
| °C | - | Degrees Celsius |
| *µS* | - | microSiemens |
| *µg* | - | microgram |
| AARC | - | AARC Environmental Solutions Pty Ltd |
| ACA | - | Aquatic Conservation Assessments |
| ANZFA | - | Australia New Zealand Food Authority |
| ANZECC | - | *Australian and New Zealand Environment and Conservation Council* |
| AquaBAMM | - | Aquatic Biodiversity Assessment and Mapping Method |
| ARMCANZ | - | *Agriculture and Resource Management Council of Australia and New Zealand* |
| AUSRIVAS | - | Australian River Assessment System |
| BOM | - | Bureau of Meteorology |
| BoT | - | Back on Track |
| CAMBA | - | China – Australia Migratory Bird Agreement |
| CE | - | Critically Endangered |
| CIM | - | Criteria, Indicators and Measures |
| cm | - | centimetre(s) |
| DAF | - | Department of Agriculture and Fisheries |
| DERM | - | Department of Environment and Resource Management |
| DES | - | Department of Environment and Science |
| DO | - | Dissolved oxygen |
| DoE | - | Department of Environment (prior to DoEE) |

| | | |
|---|---|---|
| DoEE | - | Department of Environment and Energy |
| E | - | Endangered |
| EA | - | Environmental Authority |
| EC | - | Electrical conductivity |
| EHP | - | Queensland Department of Environment and Heritage Protection |
| EIS | - | Environmental Impact Statement |
| EPA | - | Environmental Protection Agency |
| EPBC Act | - | Environment Protection and Biodiversity Conservation Act 1999 (Cth) |
| EPP | - | Environmental Protection Policy |
| ERE | - | Endangered Regional Ecosystem |
| ESA | - | Environmental Sensitive Area |
| EV | - | Environmental Values |
| g | - | gram(s) |
| GDA | - | Geocentric Datum of Australia |
| GHD | - | GHD Pty Ltd |
| GIS | - | Geographical Information System |
| GPS | - | Geographical Positioning System |
| ha | - | hectares |
| HPAL | - | High Pressure Acid Leaching |
| ISQG | - | Interim Sediment Quality Guidelines |
| JAMBA | - | Japan – Australia Migratory Bird Agreement |
| Kg | - | Kilogram(s) |
| km | - | kilometre(s) |
| $km^2$ | - | square kilometre(s) |
| L | - | Litre(s) |
| LC | - | Least Concern |
| m | - | metre(s) |
| Ma | - | Marine |

| | | |
|---|---|---|
| MDL | - | Mineral Development License |
| mg | - | milligram(s) |
| Mi | - | Migratory |
| ML | - | Mining Lease |
| MLA | - | Mining Lease Application |
| MLES | - | Matters of Local Environmental Significance |
| mm | - | millimetre(s) |
| MNES | - | Matters of National Environmental Significance |
| MSES | - | Matters of State Environmental Significance |
| mV | - | Millivolt(s) |
| n/a | - | not applicable |
| NATA | - | National Association of Testing Authorities |
| NC Act | - | Act Nature Conservation Act 1992 |
| NC | - | No concern at present |
| NCWR | - | Nature Conservation (Wildlife) Regulation 2006 |
| n.d. | - | No date |
| NL | - | Not Listed |
| NMI | - | National Measurement Institution |
| No. | - | Number |
| NRHP | - | Federal National River Health Program |
| NRM | - | Natural Resource Management |
| NT | - | Near Threatened |
| NTU | - | Nephelometric Turbidity Unit |
| NQ | - | North Queensland |
| ORP | - | Oxidisation-Reduction Potential |
| PET | - | Plecoptera, Ephemeroptera and Trichoptera |
| PMAV | - | Property Maps of Assessible Vegetation |
| QLD | - | Queensland |

| | | |
|---|---|---|
| QWQG | - | Queensland Water Quality Guidelines |
| RAD | - | Recovery Actions Database |
| RE | - | Regional Ecosystem |
| REDD | - | Regional Ecosystem Description Database |
| ROKAMBA | - | Republic of Korea – Australia Migratory Bird Agreement |
| RSF | - | Residual Storage Facility |
| SL | - | Special Least Concern |
| SPC | - | Specific Conductance |
| SPRAT | - | Species Profile and Threats Database |
| SQG | - | Sediment Quality Guidelines |
| V | - | Vulnerable |
| VM Act | - | Act Vegetation Management Act 1999 |
| VMR | - | Vegetation Management Regulation 2000 |
| WIS | - | Wetland Indicator Species |
| WoNS | - | Weeds of National Significance |
| WQO | - | Water Quality Objectives |

# AARC EXECUTIVE SUMMARY

AARC Environmental Solutions Propriety Limited was commissioned by Australian Mines Limited to conduct an aquatic flora and fauna assessment for the Sconi Battery Minerals Project.

Three aquatic surveys and one fish tissue sampling survey were conducted in the Project region to determine the aquatic ecology values at the Project site. Dry season surveys were undertaken in August 2012, June 2018, while wet season surveys were undertaken in February 2012, with fish tissue sampling undertaken in February 2013.

To assess the ecological values of flora and fauna communities intrinsically linked to aquatic ecosystems, AARC Environmental Solutions Propriety Limited undertook the following scope of works:

- A desktop review of literature and database records to identify species of conservation significance known from the Project region. This enabled these species to be targeted during the field survey component of the study;
- Undertake field survey methodologies to determine the composition of dry and wet season flora and fauna species inhabiting the riparian areas of the Project site, particularly species of conservation significance; and
- Preparation of a report to the client describing the significant aquatic ecological values found in aquatic environments relevant to the Project site and an outline of possible management strategies to reduce any foreseeable impacts associated with the proposed activities.

## SITE DESCRIPTION

The Project area consists of three tenements: the Greenvale tenement, the Lucknow tenement and the Kokomo tenement. The Project is located in the Charters Towers region approximately 225 kilometres west-northwest of Townsville in North Queensland. The Greenvale tenement is situated approximately five kilometres west-northwest of the township of Greenvale. The Lucknow tenement is located approximately two kilometres west of Greenvale. The Kokomo tenement is located approximately 50 kilometres north-east of Greenvale. Access to all sites is off the Gregory Developmental Road.

The current land use at the Project location is low intensity cattle grazing with extensive exploratory drilling activities being carried out by Nornico Propriety Limited. The Greenvale tenement is the site of a historical nickel mine and has been cleared of vegetation previously.

## FIELD SURVEY METHODS

Scoping of the Project site was conducted using aerial photography (sourced from Google Earth and Queensland Globe) and broad ground truthing. Aquatic monitoring sites were distributed so that three Control sites, three Reference sites and at least one Resource Area site at Kokomo, Greenvale and Lucknow tenements were established.

To determine the overall condition of the aquatic ecosystems occurring within the waterways associated to the Project site, a total of 10 aquatic monitoring sites were established during the survey period. Aquatic sites were assessed using the following methods, where possible:

- Riparian and aquatic vegetation analysis assessing community composition and identifying invasive weed species;
- Aquatic habitat value was assessed using the Australian River Assessment System;

- Macro-invertebrate sampling was undertaken with results analysed to provide a broad scale measure of stream health based on the 'waterbug' pollution sensitivities;
- Aquatic vertebrates were assessed, by trapping, active searching, spotlighting and incidental fauna observations;
- Erosional analysis was conducted to understand the impacts of disturbance on bank structure by external influences;
- Surface water samples were collected to identify exceedances of relevant guidelines and objective values for a range of chemical and physicochemical parameters;
- Stream sediment samples were collected and analysed for total metals and particle size distribution, to be compared with relevant guideline and objective values; and
- Fish tissue sampling was used to assess the concentration of specific contaminants in the tissue of fish within the waterways.

## SURVEY RESULTS

### Flora

A total of 188 flora species were recorded within aquatic ecosystems associated to the Project site, 49 of which are introduced species. Of the 49 invasive species identified, two are listed as Weeds of National Significance. No threatened flora species intrinsically linked to aquatic ecosystems were recorded on the site.

### Fauna

A total of 138 vertebrate fauna species were recorded during aquatic surveys, comprising 4 amphibians, 8 reptiles, 12 fish, 28 mammals and 86 birds. One species is listed as Vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* and the *Nature Conservation Act 1992*. The Northern Greater Glider (*Petauroides volans*) was recorded at BURD3 and BURD5. These two sites are located along the Burdekin River and are not within the Project area. Suitable habitat for this species may exist within the Project site. However, it is not expected that mining activities will have a significant impact on this species due to the abundance of suitable connected habitat around the Project site.

The Osprey (*Pandion haliaetus*), a Migratory listed species under the *Environmental Protection and Biodiversity Conservation Act 1999* was recorded at BURD2. This site is located on the south-western corner of the Kokomo tenement. Due to the coastal nesting habits and high mobility of this species, it is not expected that mining activity will significantly impact this species.

The Platypus (*Ornithorhynchus anatinus*) was identified during field surveys, this species is listed as Special Least Concern under the *Nature Conservation Act 1992*. Special Least Concern species are Least Concern species that have significant cultural significance. The Platypus (*Ornithorhynchus anatinus*) was recorded outside of the Project area but in times of increased flow, it may move into the Project area through connected tributaries of the Burdekin River. Disturbance to these waterways may result in a significant impact to this species.

Six introduced species were recorded during field surveys including two fish species, three mammals and one amphibian. The Spotted Tilapia (*Tilapia mariae*) and Gambusia (*Gambuzia holbrooki*) are both listed as category three, five, six and seven Restricted Biosecurity Matters under the *Biosecurity Act*

*2014*. The Wild Dog/Dingo (*Canis lupus familiaris/dingo*), European Rabbit (*Oryctolagus cuniculus*) and Feral Pig (*Sus scrofa*) were recorded in association to aquatic environments during field surveys.

Large numbers of Cane Toad tadpoles were present in the shallows of the Stenhouse Dam. The Cane toad itself in not listed as a restricted matter or an invasive biosecurity matter under the EPBC Act 1999. However, the biological effects, including lethal toxic ingestion, caused by Cane toads is listed as a "Key Threatening Process" under the *Environmental Protection and Biodiversity Conservation Act 1999*.

**Surface Water Quality**

Various exceedances of Water Quality Objectives were recorded during surface water sampling. pH, electrical conductivity and dissolved oxygen exceeded the ANZECC water quality objectives for aquatic ecosystems at more than half of the sites sampled. Exceedances of ammonia were also observed during the 2018 dry season survey at four of five sites.

**Stream Sediment Quality**

Exceedances of ANZECC (2000) Interim Sediment Quality Guidelines were recorded for a variety of parameters tested during field surveys. Chromium, Copper, Vanadium and Nickel concentrations in stream sediment were observed above the ANZECC (2000) Interim Sediment Quality Guidelines at a number of aquatic monitoring sites.

## RECOMMENDATIONS

**Management of Aquatic Ecosystems**

The following are mitigation strategies aiming to maintain and manage surface water quality:

- Minimise the physical disturbance to stream beds, banks and riparian areas;
- An erosion and sediment control plan should be created to manage erosion and sediment movement when it is not practical to avoid aquatic and riparian areas;
- Developing and implementing handling and storage procedures that decrease the probability of a spill or leak occurring;
- Developing and implementing an emergency and spill response plan to minimise the impacts of a potential spill or leak on the surrounding aquatic habitats;
- Monitoring and sampling throughout the establishment, operation, decommissioning and rehabilitation phases of the Project;
- Diversions should be designed with regards to best practice guidelines;
- Dirty water should be kept in a closed loop system;
- Install sediment traps; and
- The implementation of corrective actions immediately upon the identification of any contaminant of soils, groundwater, watercourses or storm water that have occurred as a result of activities associated with the Project.

**Management of Native Flora and Fauna Species**

- Design all watercourse crossings and other potential barriers to maintain flow and enable fish passage;

- Before conducting clearing or removal of any riparian vegetation or directly impacting stream banks, a spotter / catcher should check for potential platypus burrows. If they are known to exist at a site or are sited, all burrows should be checked by a spotter / catcher and be removed / relocated;

- Habitat clearing should only be conducted after:

    - The areas have been clearly delineated and identified to equipment operators and supervisors;

    - Habitat has been inspected for fauna species by focusing on present burrows, hollows, crevices, dead trees and bark. When present, fauna must be given time to naturally retreat or be removed by a permit holder qualified to do so; and

    - Appropriate erosion and sediment control structures are in place.

- The Staff Induction Program should contain information regarding threatened fauna and fauna, listed regional ecosystems and the habitat values associated with the local watercourses. The aim, to increase awareness of staff and ensure that care is taken with regarded to threatened species;

- A monitoring strategy should be developed for the riparian areas, particularly those listed as 'Of Concern' by DES. Results should be reported in an annual monitoring report; and

- Establish visual bird deterring devices and fencing around the RSF and evaporation ponds to ensure that migratory and water bird species do not mistake this infrastructure as water bodies.

**Management of Introduced Flora and Fauna Species**

Proposed strategies to manage introduced fauna on the Project site include:

- Implementation of a Pest Species Management Plan; and

- Implementation of a Weed Management Plan.

# 1.0 INTRODUCTION

AARC Environmental Solutions Pty Ltd (AARC) was commissioned by Australian Mines Limited (Australian Mines) to conduct an Aquatic Flora and Fauna Assessment of the proposed Sconi Battery Minerals Project (the 'Project'). Australian Mines proposes to mine and process the nickel-cobalt (Ni-Co) and scandium (Sc) deposits found within the Project area.

The Project area is made up of three separate tenements:

- The Greenvale tenement;
- The Lucknow tenement; and
- The Kokomo tenement.

## 1.1 SCOPE OF WORK

The aims of the Aquatic Ecology Assessment for the Project are to:

- A desktop review of literature and database records to identify species of conservation significance known from the Project region. This enabled these species to be targeted during the field survey component of the study;
- Undertake field survey methodologies to determine the composition of dry and wet season flora and fauna species inhabiting the riparian areas of the Project site, particularly species of conservation significance[1]; and
- Preparation of a report to the client describing the significant aquatic ecological values found in aquatic environments relevant to the Project site and an outline of possible management strategies to reduce any foreseeable impacts associated with the proposed activities.

[1] References to "species of conservation significance" or "threatened species" refer to those species listed as extinct in the wild, endangered, vulnerable or near threatened under the *Nature Conservation (Wildlife) Regulation 2006* (Qld) or extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

# 2.0 PROJECT DESCRIPTION

The Project site will comprise three mining leases (ML). Applications (MLA) will be lodged with the Queensland Government to increase the area of the currently approved MLs as follows:

- Mining Lease Application (MLA) 10368 (Greenvale) over 3,389 hectares (ha);
- MLA 10366 (Lucknow) over 302.6 ha; and
- MLA 10342 (Kokomo) over 2,087 ha.

The Project proposes to mine nickel, cobalt and scandium laterite at the former Greenvale nickel mine, as well as the Lucknow and Kokomo tenements. The Project will have a mine life of greater than 20 years and is intended to be staged, with mining at Lucknow and Greenvale first with a single processing area located at Greenvale. Kokomo is expected to be mined at a later date, commencing some 12 years later.

The Project is expected to process approximately 750,000 to 1,000,000 tonnes per annum (tpa) of ore through the High-Pressure Acid Leaching (HPAL) process plant, producing either a nickel-cobalt concentrate or metal ingots and scandium oxide.

The Project location for the HPAL process plant and infrastructure will be at the former Greenvale Nickel Mine. Ore will be mined and processed at Greenvale. Residue Storage Facilities (RSF) will be constructed at Greenvale adjacent to the HPAL process plant. Final infrastructure locations are yet to be confirmed through studies and site geotechnical investigations. Satellite ore bodies at Lucknow and Kokomo will be open-cut mined and the ore trucked to Greenvale for processing.

## 2.1 PROJECT LOCATION

The Project is located in the Charters Towers region approximately 225 kilometres (km) west-northwest of Townsville in North Queensland. The Project area consists of three separate tenements: the Greenvale tenement, the Lucknow tenement and the Kokomo tenement. The Greenvale tenement, which will hold the process plant is situated approximately 5 km west-northwest of the township of Greenvale. The Lucknow tenement is located approximately 2 km west of Greenvale and the Kokomo tenement is located approximately 50 km north-east of Greenvale. Access to all tenements is from the Gregory Developmental Road. The Greenvale tenement is accessed by travelling north off the Gregory Developmental Road along a minor road for approximately 2.5 km. The Lucknow tenement can be accessed directly off the Gregory Developmental Road to the south. Access to the Kokomo site is via the Greenvale Road to the Valley of Lagoons then onto the Lava Plains Mount Fox Road. Kokomo is located within the Valley of Lagoons between Lake Lucy and Kinrara National Park adjacent to the Burdekin River. Where not specified, references to the Project in this report refer to the three tenements of Greenvale, Lucknow and Kokomo.

Figure 1 shows the regional location of the Project area.

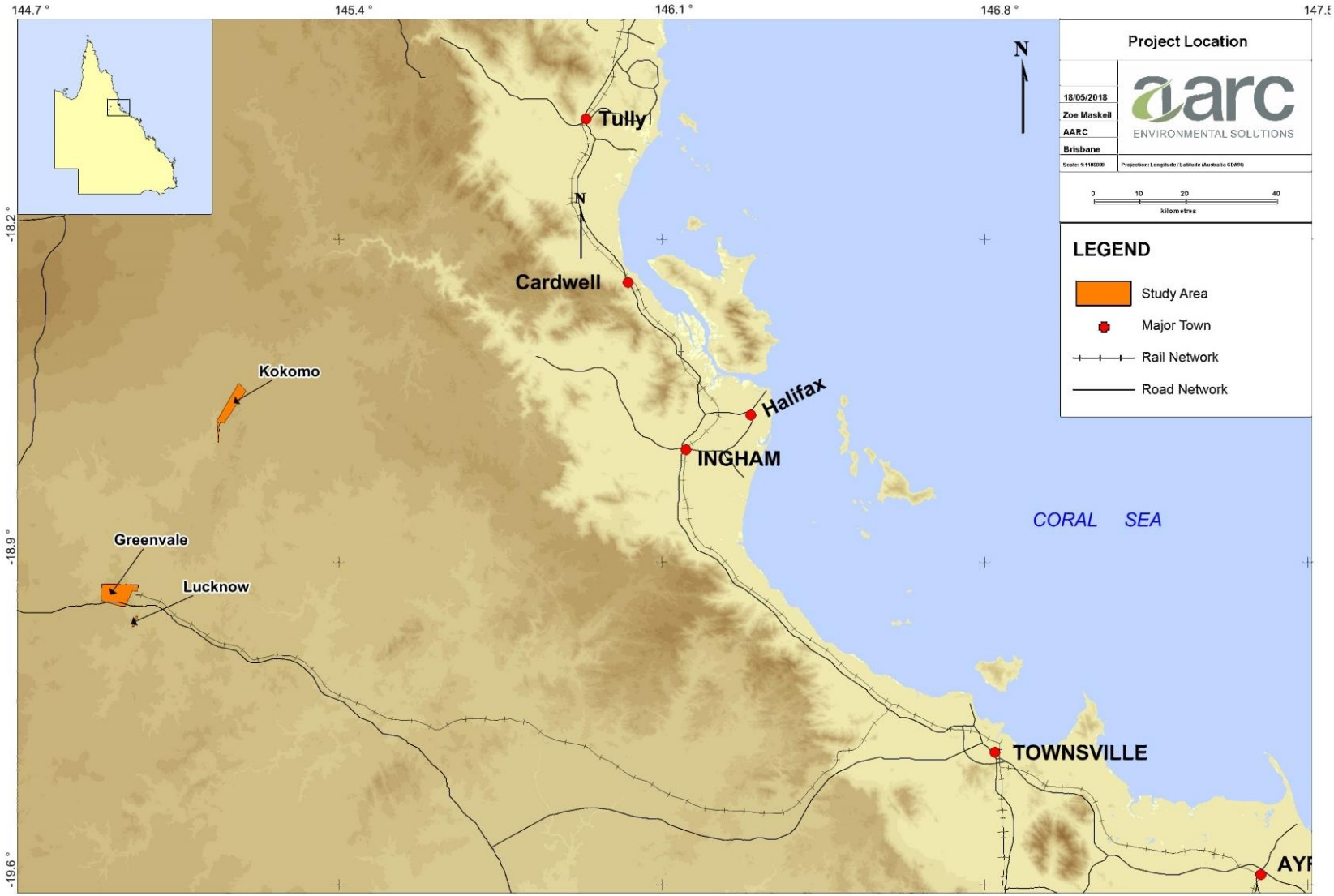


**Figure 1 Locality of the Project**

## 2.2 BIOREGION DESCRIPTION

The Project site is located in the northern section of the Burdekin River Basin within the Einasleigh Uplands Bioregion. The Einasleigh Uplands Bioregion is approximately 118,500 square kilometres ($km^2$) in size and lies across the Great Dividing Range. It is dominated by Eucalypt woodlands and is used primarily for grazing, with mining, cropping and horticulture also considered significant land uses.

The Einasleigh Uplands are geologically rich, consisting of rugged hills and ranges; alluvial and sand plains and dissected plateaus. The geological diversity is also apparent over time, with the Einasleigh Uplands home to not only the youngest rocks, but also the oldest rocks in eastern Australia (Kutt et al., 2009). Unique to the area are historic basalt flows, creating lava tunnels, such as those found at Undara Volcanic National Park. Associated with these lava flows in the south of the bioregion are springs and spring fed wetlands, home to a diversity of flora and fauna.

Special values of the Einasleigh Uplands include endemic fauna, habitat for threatened and geographically restricted flora and for arboreal mammals. The bioregion contains the upper catchments of several significant river systems that drain north into the Gulf of Carpentaria, and south and east into the Pacific Ocean. The high sections of the Great Dividing Range form part of a mesotherm archipelago of uplands through Queensland that is significant for avifauna.

The Valley of Lagoons Fauna Sanctuary lies 10 km to the southwest of the Kokomo tenement and contains numerous wetland areas. The Burdekin River runs parallel with the Kokomo tenement approximately 500 metres (m) out of the Project boundary and then continues to flow south-east approximately 5 km from the Greenvale tenement and 9 km from the Lucknow tenement.

## 2.3 NATURAL RESOURCE MANAGEMENT REGION

The Natural Resource Management Region (NRM region) is a federal land management unit, based on catchments and bioregions designated for specialised state government programmes, funding and key issues plans. The Project is located within the Burdekin NRM region. The Burdekin NRM region covers 133,400$km^2$ and encompasses the Burdekin catchment including the Belyando and Burdekin rivers. The region is typified by a humid, tropical climate with pronounced wet and dry seasons.

## 2.4 SOILS AND GEOLOGY

### 2.4.1 Geology

The Project region has a unique geological history, with historic basalt flows creating springs and spring-fed wetlands. These basalt flows are particularly relevant to the aquatic ecology on and around the Project site as large basalt caves and crevices were found in the riparian area along the Burdekin River. These basalt flows also created the Valley of Lagoons, a series of lakes formed by the damming of the Burdekin River. The bioregion includes the following land zones:

- Drainage lines and floodplains;
- Sand plains;
- Escarpments;
- Basalt plains and hills;
- Sandstone ranges;

- Hills and lowlands on metamorphic rocks; and
- Hills and lowlands on granite rocks.

### 2.4.2 Soils

Descriptions of soil and landform characteristics are based on the findings from the 'Sconi Project Soil and Land Suitability Report 2018' prepared by AARC. This report encapsulates a study conducted throughout the Project site to document the nature of the distribution of major soil types and assess their land uses.

A variety of soil types exist on the Project site from recent Quaternary alluvial flats to hills and ranges formed by Proterozoic igneous rock. The majority of the site is described as undulating pains and rises. These areas are comprised of soils such as ferrosols, sodosols and dermosols forming medium to heavy clays and sandy loams.

Alluvial flats are generally comprised of loam to fine sandy-loam surface soils grading into light clays/sandy clay-loams at variable depths. Other alluvial soil management units comprise a variety of medium to heavy, hard setting clays.

Lateritic scarps and plateaus formed vast ranges comprised of numerous soil types throughout the Project site. Hard-setting, red loams to medium-heavy clays and sharp gravels were recorded on escarpments at Kokomo and Lucknow. One small section at Kokomo comprised sandy clay loam on the surface with light clay sub-soils.

## 2.5 TOPOGRAPHY

The topography within the Project site varies with high escarpments, undulating hills and low-lying alluvial flats. Both Kokomo and Lucknow are located on mesa landforms. Lucknow has a maximum elevation of 540 metres (m) above sea level and Kokomo, 600m above sea level. The Greenvale site, at maximum, is less than 515m above sea level and has little variation in elevation across the site. The area is strongly influenced by the Burdekin River, its tributaries and floodplains.

## 2.6 CATCHMENT AREA

The Project lies within the Burdekin Basin which encompasses a large area of land including the Burdekin, Belyando and Suttor Rivers. The Burdekin catchment covers an area of 136,000km² (DNR 2002). The catchment is divided into four sub catchments, of which the Project lies within the Upper Burdekin sub catchment. The Upper Burdekin sub catchment encompasses the northern area of the Burdekin catchment and flows south into Lake Dalrymple.

## 2.7 LOCAL WATERCOURSES

The Project region is located within the Burdekin River Basin, which flows in a south-easterly direction into the Pacific Ocean at Upstart Bay, approximately 90 km south-east of Townsville. Watercourses on the Project site are small, ephemeral creeks that drain into the Burdekin River. The watercourses are ephemeral due to the local topography. Flow is restricted to heavy rainfall events, which typically occur between the months of November and March (the wet season).

The Greenvale tenement has little variation in elevation across the site being, at maximum, less than 515 metres (m) above sea level. It features several small wetland areas created by flooding of disused mine voids. Surface water flow on the Greenvale tenement is restricted to small, ephemeral, first order

watercourses. The only sources of permanent water on the Greenvale tenement are the flooded mine voids. These mine voids occupy large areas of land, holding ponded water up to 20 m deep.

Lucknow is located on a mesa with a maximum elevation of 540 m above the sea level. Surface water following rainfall rapidly drains from the cliffs of the mesa into local creeks. The creek system on the western and north-western side flows into Redbank Creek (which also collects runoff from the southern parts of Greenvale). This water eventually flows into the Burdekin River. Water flow from the eastern and southern side of the Lucknow tenement drains into Gray Creek. Gray Creek is ephemeral and eventually flows into the Burdekin River, approximately 17 km downstream of the Project site.

A series of small mesas cover the Kokomo tenement reaching 600 m above the sea level. Following rainfall, surface water rapidly drains from the top of these mesas into local creeks that drain to the Burdekin River, located 1 km away. Much of the site is composed of steep sided hills. Alluvial fans have also formed in several areas. Larger deposition areas are floodplain-like and incised channels are rare.

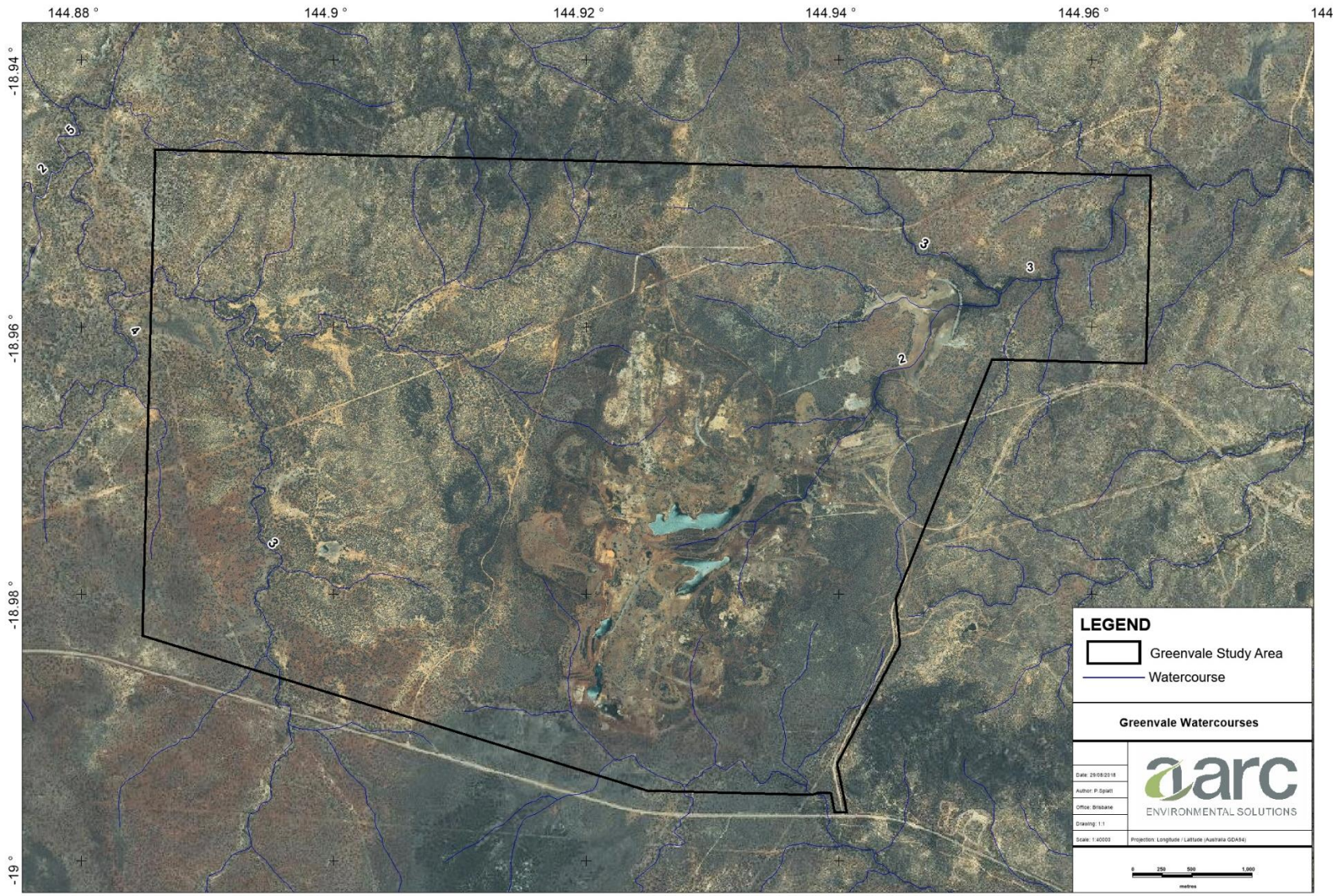


**Figure 2 Local Watercourses of the Greenvale Project Site**

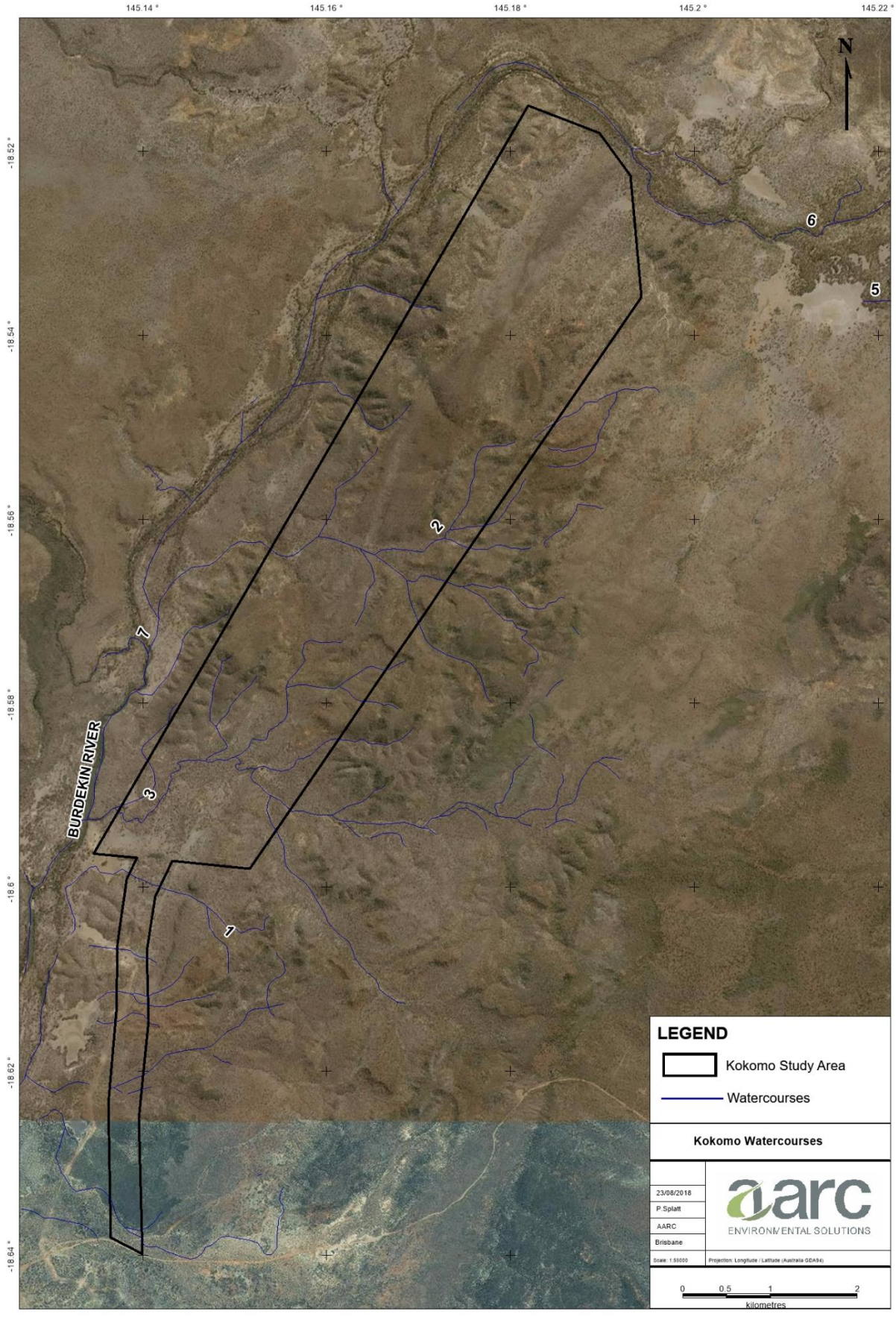


**Figure 3 Local Watercourses of the Kokomo Project Site**

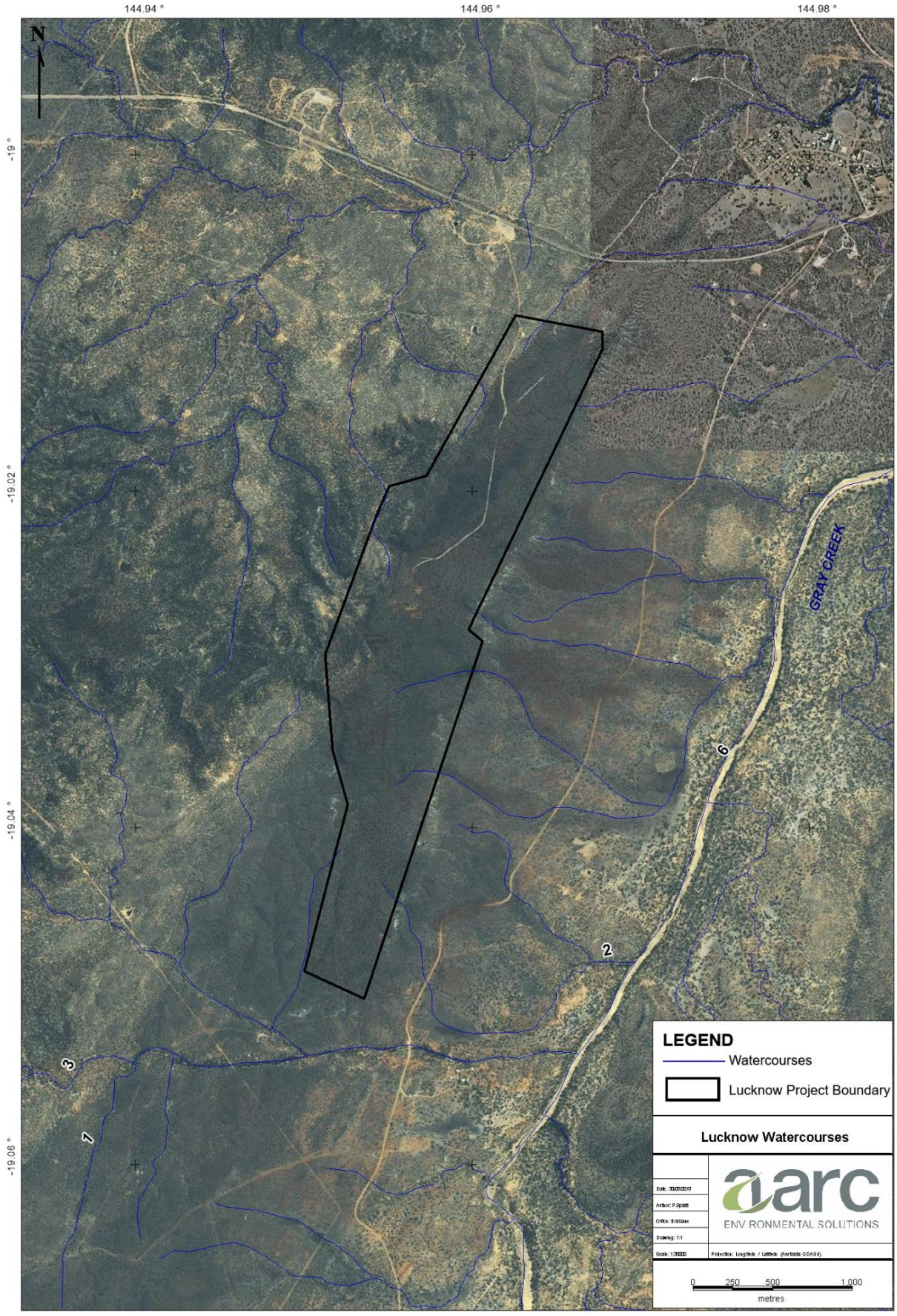


**Figure 4 Local Waterways of the Lucknow Project Site**

## 2.8 REGIONAL CLIMATE

The climate of the broader Project area is classified as semi-arid, with characteristic hot, dry summers and warm winters. The Project's geographical proximity to the east coast of Australia and position west of the Great Dividing Range results in widely unpredictable weather conditions. Through the wet season, tropical rainfall events often inundate the Project's waterways and severe storms with high winds are not uncommon. These events are juxtaposed by periods of prolonged drought and high diurnal temperatures, a result of the Project's association to the semi-arid interior of Queensland. An overview of the regional climate statistics of the Project site is provided below.

Rainfall statistics for the Project area have been sourced from the Bureau of Meteorology (BoM) rainfall statistics for Lucky Springs which is located 20 kilometres (km) to the south west of the Project. The data indicates the annual average rainfall for the region to be approximately 686.4 millimetres (mm) with the majority falling from November to March.

Long term air temperature statistics were collected from the Mount Surprise Weather Station, located approximately 100km north west of Greenvale. Maximum daily temperatures in summer average between 35.1°C and 32.3°C with overnight minimums averaging between 20.9°C and 16.1°C. In winter, average maximum temperatures range between 28.5°C and 26.5°C with minimums averaging between 10.6°C and 9.6°C.

The mean annual rainfall for the region (based on data collected from the Charters Towers Airport Weather station, station no. 034084) between 1992 and 2018 is 643.4 mm. Mean monthly rainfall recorded at this weather station since 1992 is shown in Figure 5 along with the mean monthly minimum and maximum temperatures recorded. The highest mean maximum temperature is recorded in December (34.6 °C) while the mean minimum temperature for the region is recorded in July (11.6 °C). This graph indicates the wet season occurs between November and March while dry season conditions occur between April and October.

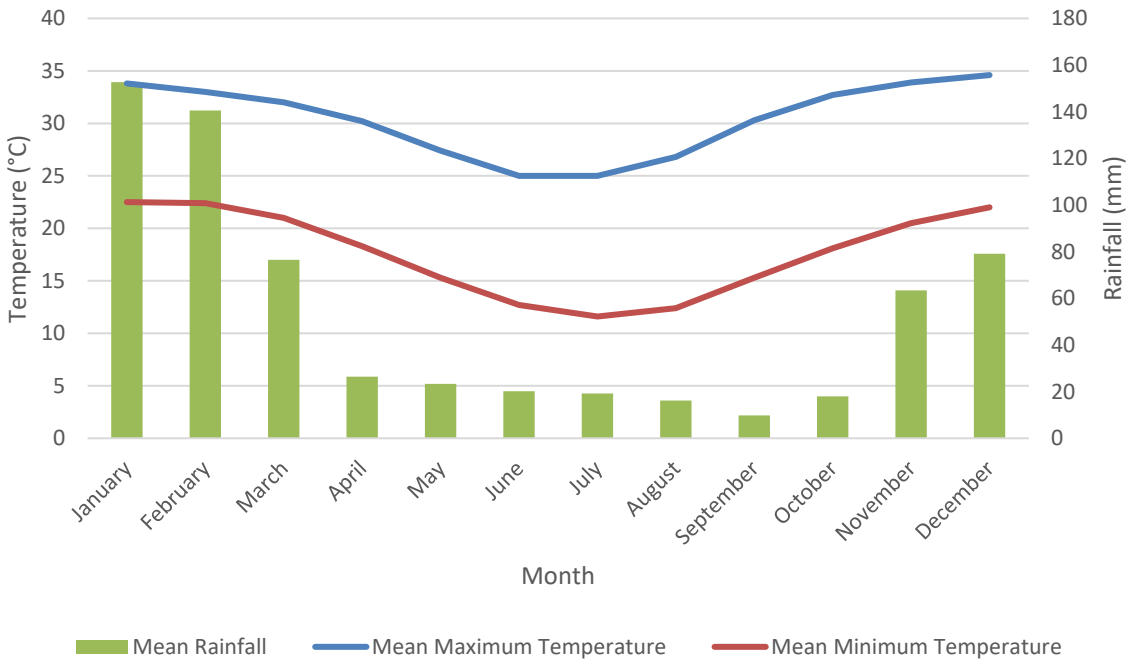


**Figure 5 Mean Temperature and Rainfall Data from the Charters Towers Weather Station**

## 2.9 CURRENT LAND USE

Land use at each site varies as exploratory activities, cropping and cattle grazing are known throughout the region. Each tenement is currently subject to moderate intensity cattle grazing with the construction of fences and paddocks throughout. An exploration drilling program is currently being undertaken throughout the Project with the construction of access tracks and drill pads. The Greenvale tenement has previously been mined and rehabilitated. Rehabilitation is generally poor, with efforts leading to a sparsely vegetated waste rock dump and open pit voids holding ponded water. Neither Kokomo or Lucknow have experienced operational mining activity and are currently in a heavily vegetated state with minimal clearing.

# 3.0 RELEVANT LEGISLATION, POLICY AND GUIDELINES

## 3.1 LEGISLATION AND POLICY

Commonwealth and State legislation relevant to the assessment of flora, fauna and biodiversity on the Project site is discussed below.

### 3.1.1 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), an action will require approval from the Federal Environment Minister if the action has, will have, or is likely to have a significant impact on a Matter of National Environmental Significance (MNES). MNES that are potentially relevant to the Project include:

- Listed threatened species and ecological communities;
- Migratory species protected under international agreements; and
- A water resource, in relation to a coal seam gas development or large coal mine.

Where the Project has the potential to significantly impact on a MNES, an EPBC Act referral may need to be prepared and submitted to the Commonwealth Department of the Environment and Energy (DoEE) for assessment.

A Referral was submitted to the then Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) in February 2012, due to the scale of the Project and due to the potential presence of marine and migratory listed fauna and threatened flora and fauna species. The decision notice from the Minister of the then DSEWPaC was the proposed action is not a controlled action, therefore no further assessment and approval under the EPBC Act was required before the Project can proceed.

### 3.1.2 *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*

The EPBC Act environmental offsets policy outlines the Australian Government's position on the use of environmental offsets under the EPBC Act. Environmental offsets can be used under the EPBC Act to maintain or enhance the health, diversity and productivity of the environment as it relates to matters protected by the EPBC Act. This policy only applies to Projects where a significant impact on a Matter of National Environmental Significance is proposed.

Environmental offsets can be applied as an approval condition under the EPBC Act for developments that have undergone assessment. They may be used when a development will result in impacts on a matter protected by the EPBC Act. Environmental offsets are not applicable to all approvals under the EPBC Act. Offsets should not be applied where the impacts of a development are considered to be minor in nature or could reasonably be mitigated. In some circumstances suitable offsets may not be available to adequately compensate for the impacts of a development and a decision on the overall acceptability of the project will need to be made.

### 3.1.3 Queensland *Nature Conservation Act 1992*

The most relevant components of the *Nature Conservation Act 1992* (NC Act) to the Project are the sections which pertain to Wildlife and Habitat Conservation. The class of wildlife[2] to which the NC Act applies includes protected wildlife, which is defined as:

- Extinct wildlife;
- Endangered wildlife;
- Vulnerable wildlife;
- Near Threatened wildlife; and
- Least Concern wildlife.

Species listed under the above classes are published in the associated *Nature Conservation (Wildlife) Regulation 2006* (NCWR). Appropriate authorisations or permits under the NC Act are required prior to clearing of listed threatened plant species, interfering with an animal breeding place, or removing protected animals unless the activity is exempt.

The NC Act defines 'threatening processes' as:

a) Threatening the survival of any protected area, area of major interest, protected wildlife, community of native wildlife or native wildlife habitat; or

b) Affecting the capacity of any protected area, area of major interest, protected wildlife, community of native wildlife or native wildlife habitat to sustain natural processes.

The NC Act is relevant to the Project should any flora or fauna species of conservation significance be found on the Project.

#### *3.1.3.1 Nature Conservation (Wildlife) Regulation 2006*

Species listed under the above threatened species classes are published in the associated *Nature Conservation (Wildlife) Regulation 2006* (NCWR). This report has considered the recent amendments made to listed threatened species in 2012.

### 3.1.4 Queensland *Vegetation Management Act 1999*

The *Vegetation Management Act 1999* (VM Act) is a part of a planning framework for the management of native vegetation across Queensland. The *Vegetation Management Regulation 2012* (VMR) prescribes the status of each of the Regional Ecosystems (REs) identified within Queensland.

The regulatory provisions of the VM Act do not apply to regulated mining activities, however, the scientific basis for biodiversity conservation is still valid and can be used to assess the conservation significance of the vegetation communities on the Project site. This includes the conservation status categories of each RE under the VM Act, which are listed below, as is the definition of Remnant Vegetation.

Endangered Regional Ecosystems:

[2] Under the *Nature Conservation Act 1992*, wildlife is defined to be any taxon of an animal, plant, protist, prokaryote or virus.

- <10% of pre-clearing extent remaining; and
- 10 - 30% of pre-clearing extent remaining and remnant <10,000 ha.

Of Concern Regional Ecosystems:

- 10 - 30% of pre-clearing distribution remains; and
- 30% of the pre-clearing extent remains and the remnant vegetation remaining is <10,000 ha.

Least Concern Regional Ecosystems:

- >30% of the pre-clearing distribution remains and remnant vegetation remaining is >10,000 ha.

Remnant Vegetation:

'Remnant Vegetation' for an area of Queensland for which there is no RE map or remnant vegetation map is any vegetation where the predominant canopy:

- covers more than 50% of the undisturbed predominant canopy;
- averages more than 70% of the vegetation's undisturbed height; and
- is composed of species characteristic of the vegetation's undisturbed dominant canopy.

### 3.1.5 Queensland *Biosecurity Act 2014*

The *Biosecurity Act 2014* provides comprehensive biosecurity measures to safeguard Queensland's economy, agricultural and tourism industries, environment and way of life, from:

a) Pests;

b) Diseases; and

c) Contaminants.

Under the *Biosecurity Act 2014,* invasive plants and animals are classified as either prohibited or restricted matters. A Prohibited matter is a biosecurity matter not found in Queensland but would have a significant adverse impact on our health, way of life, the economy or the environment if it entered the state. Prohibited matters are listed in schedule 1 of the Biosecurity Act and include:

- Diseases, viruses or parasites;
- Invasive animals and plants (e.g. pest animal or weed);
- Exotic marine animals, plants or diseases;
- Noxious fish; and
- Insect pests.

A restricted matter is a biosecurity matter that is found in Queensland and has a significant impact on human health, social amenity, the economy or the environment. Restricted matters are listed in Schedule 2 of the Act and include:

- Diseases, viruses or parasites;
- Invasive animals and plants (e.g. pest animal or weed);
- Noxious fish; and
- Insect pests.

The *Biosecurity Act* is relevant to the Project site in regard to the control and management of invasive plant and animal species.

### 3.1.6 Queensland *Environmental Offsets 2014*

The Queensland environmental offsets framework consists of the *Environmental Offsets Act 2014*, the *Environmental Offsets Regulation 2014* and the *Queensland Environmental Offsets Policy 2014* (DES, 2014). The offsets framework requires environmental offsets to be delivered where an activity is likely to result in a significant residual impact on a prescribed environmental matter. The *Significant Residual Impact Guideline* (DES, 2014a) is used to determine whether the residual impacts are considered to be significant.

Prescribed Environmental Matters include:

- Matters of National Environmental Significance (MNES);
- Matters of State Environmental Significance (MSES) (outlined below); and
- Matters of Local Environmental Significance (MLES).

MSES are defined in Schedule 2 of the *Environmental Offsets Regulation 2014*, and comprise:

- Regulated vegetation including:
    i. Endangered and Of Concern regional ecosystems;
    ii. Regional ecosystems that intersect areas shown as wetlands on the Vegetation Management Wetlands map;
    iii. Regional ecosystems located within a prescribed distance from the defining banks of a watercourse; or
    iv. Regional ecosystems mapped as essential habitat for endangered and vulnerable flora and fauna;
- Areas that provide connectivity and maintain ecosystem functioning;
- Mapped wetlands and watercourses including:
    i. wetland protection areas, or areas of high ecological significance as shown on the Map of referable wetlands;
    ii. high ecological value waters (as defined under the Environmental Protection (Water) Policy 2009);

- Designated precincts in a strategic environmental area under the *Regional Planning Interests Regulation 2014*;
- Protected wildlife habitat, which includes;
    - High risk areas on the flora survey trigger map;
    - Areas that contain endangered or vulnerable plants;
    - Non-juvenile koala habitat trees in certain areas of south-east Queensland;
    - Habitat for endangered, vulnerable and special least concern animals;
- Protected areas and highly protected zones of State marine parks;
- Fish habitat areas;
- Waterways providing for fish passage;
- Marine plants; and
- Legally secured offsets.

Matters of Local Environmental Significance are set out in local planning instruments.

Offsets may be delivered as a financial settlement, Proponent-driven offset (i.e. a land-based offset or Direct Benefit Management Plan) or a combination of proponent-driven offset and financial settlement offset.

### 3.1.7 *Regional Planning Interests Act 2014*

The *Regional Planning Interests Act 2014* manages the impact of resource activities and other regulated activities on areas of the State that are likely to contribute to QLDs economic, social and environmental prosperity. This act is administered by the Department of State Development, Manufacturing, Infrastructure and Planning.

The purposes of the *Regional Planning Interests Act 2014* are: to identify areas of Queensland that are of regional planning interest; to give effect to policies about matters of State interest; and to manage the impact or coexistences of resource activities and other regulated activities on areas of regional planning interest.

Elements from this Act relevant to this study include consideration of any areas identified as;

- Priority Agricultural Areas (PAA);
    - Including areas mapped as having one or more priority agricultural land uses; or other features such as a regionally significant water source (prescribed under a regulation),
- Priority Living Areas (PLA);
    - Including areas mapped to facilitate the existing area of a city/town, including allowance for future growth and provision of suitable buffers from resource activities,
- Strategic Cropping Land (SCL) areas;

- Through reference to the SCL trigger map,

- Strategic Environmental Areas (ESA);

  - Being areas that contain 1 or more environmental attributes; that are either: shown on a map in a regional plan as a strategic environmental area; or are prescribed under a regulation.

### 3.1.8 *Water Act 2000*

The main purpose of the *Water Act 2000* is to provide a clear framework for the following:

- The sustainable management of Queensland's water resources and quarry material by establishing a system for—

  - The planning, allocation and use of water; and

  - The allocation of quarry material and riverine protection;

- The sustainable and secure water supply and demand management for the south-east Queensland region and other designated regions;

- The management of impacts on underground water caused by the exercise of underground water rights by the resource sector;

- The effective operation of water authorities.

### 3.1.9 *Environmental Protection (Water) Policy 2009*

The *Environmental Protection (Water) Policy 2009* is at the centre of water quality management in Queensland and takes foundation from the National Water Quality Management Strategy. This policy identifies environmental values relevant to both aquatic ecosystems and human use. The policy also establishes water quality objectives for different Physio-Chemical indicators.

### 3.1.10 Queensland *Water Quality Guidelines 2009*

The Queensland Water Quality Guidelines (QWQG) aim to address the gaps in information addressed in the ANZECC Guidelines. The gaps addressed were:

- Specific guideline values for each region and water type; and

- Frameworks for applying the specific guideline values in these regions or water types.

Whilst there is insufficient information to provide specific guideline values for the region of the Project, the ANZECC Guidelines take precedence over the QWQG.

### 3.1.11 *Fisheries Act 1994*

This state legislation protects all aquatic ecosystems from unauthorised disturbance. The main purpose of the *Fisheries Act 1994* is to provide for –

a) The protection of fisheries;

b) The protection of marine fish;

c) The protection of marine plants; and

d) The facilitation of management plans.

The *Fisheries Act 1994* requires waterway barrier works to be assessed outside of mining lease areas as per the *Planning Act 2016* for the construction or raising of waterway barriers. Waterway barrier works can include any structures within or across waterways that have the potential to impact upon fish movement.

### 3.1.12 ANZECC Guidelines

The Australian and New Zealand Environment and Conservation Council (ANZECC) describe the aim of the guidelines as 'to provide an authoritative guide for setting water quality objectives required to sustain current, or likely future, environmental values (uses) for natural and semi-natural water resources in Australia and New Zealand' (ANZECC 2000, p. 4). The ANZECC Guidelines provide a framework to assess aquatic ecosystem health. It also provides physio-chemical trigger values which can be compared against data to provide an evaluation of the present state of a particular aquatic ecosystem.

### 3.1.13 Back on Track Species Prioritisation Framework

The "Back on Track" (BoT) species prioritisation framework is a Queensland government initiative developed to:

- Prioritise Queensland's native species to guide conservation management and recovery;
- Enable the strategic allocation of limited conservation resources for achieving greatest biodiversity outcomes; and
- Increase the capacity of government, Natural Resource Management (NRM) bodies and communities to make informed decisions by making information widely accessible.

The framework prioritises all fauna and flora species irrespective of their classification under the NC Act or EPBC Act. A series of criteria are used to prioritise each species or taxon. This allows relevant parties to identify species that are at risk and species which have the greatest chance of recovery with available resources.

The framework also identifies actions and threats common to a range of species encouraging a multi-species or landscape approach to conservation.

A "Back on Track Actions for Biodiversity Document" has been produced to address priority species and associated impacts and actions for each NRM region. A list of priority species/taxa has been developed for each NRM region and a 'Back on Track' priority ranking has been given to each. A separate priority ranking for NRM region and state wide has been given to each species. The list of Priority Species for state and NRM region can be accessed from the Back on Track Actions for Biodiversity Document or by searching the Recovery Actions Database (RAD).

### 3.1.14 Queensland Monitoring and Sampling Manual 2018

This manual was compiled by the Queensland Government to assist water monitoring and sampling efforts to ensure that monitoring data is consistent and scientifically accurate. This manual provides step-by-step instructions for aquatic sampling methods and the data sheets to be used alongside them. For the purposes of the aquatic ecology assessment for the Project, this manual provided a foundation for the methodology and sampling techniques utilised. The manual provides information regarding:

- Sampling effort design;
- Sampling water quality using physio-chemical indicators; and
- Sampling bio-indicators of water quality such as macroinvertebrates, fish and crustacean.

# 4.0 DATEABASE SEARCH AND LITERATURE REVIEW

## 4.1 LITERATURE REVIEW

A detailed literature review was undertaken prior to the commencement of initial field surveys. The literature review aimed to obtain information relevant to the Project from scientific literature and technical reports from other nearby projects. The literature review assisted AARC to further understand the regional flora, fauna and biodiversity values identified by other nearby Projects. The review of nearby projects assisted field ecologists in identifying threatened flora and fauna species found in the region and specific field techniques in the methodologies that may have help noting these species' presence. Key documents are further detailed below.

### 4.1.1 Project Reports

#### 4.1.1.1 SCONI Project Surface Water and Groundwater Evaluation (Unpublished Draft) – GHD Australia for MLM

The unpublished report by GHD compiled for the Sconi Project details the surface water site locations used in this aquatic ecology assessment. The report has also identified the existing environmental values associated with the Greenvale, Lucknow and Kokomo Resource Areas. This evaluation enabled AARC ecologists to gain a deeper understanding of the local drainage lines and areas of conservation significance identified by GHD.

Thirty surface water sites were established in this report. Control sites (n = 5), reference sites (n = 5) and MLA Run-off sites (n = 20) were established and data was to be collected over a 12-24 month period as suggested by the *Queensland Water Guidelines* (2009). For the purposes of this aquatic ecology assessment, sample sites were chosen from these thirty surface water sites.

#### 4.1.1.2 Burdekin Hydro Power Project Development Assessment Report (2012) – Stanwell Corporation Limited

This assessment summarises the findings of aquatic ecology surveys for the Burdekin Hydro Power Project. This project is within the Lower Burdekin Basin, in the Brigalow Belt Bioregion. Whilst some species found during the aquatic ecology surveys are unlikely to be directly relevant to the Project, this report suggests potential impacts and mitigation strategies that can be adapted and used to mitigate the impacts of the Project on aquatic ecosystems.

### 4.1.2 Scientific Literature

#### 4.1.2.1 Pusey, Arthington & Read (1998) Freshwater fishes of the Burdekin River, Australia: biogeography, history and spatial variation in community structure. *Environmental Biology of Fishes*

This study found a low diversity of freshwater fish species in the Burdekin River between 1989 and 1992. During the three-year study, only 25 species of fish were recorded. The authors of this paper suggest that the substantial volcanic history of the area, past climatic stress and the existence of a downstream barrier (Lake Dalrymple/ Burdekin Falls) may explain the low diversity of freshwater fish species recorded. However, despite the low levels of diversity, the species found in the Burdekin River are unique. It is not uncommon for Australian freshwater ecosystems to find low levels of species diversity due the historic tendency for periods of long isolation.

## 4.2 DATABASE SEARCHES

Database searches gather information on flora and fauna species identified in the region from previous surveys, community records and other sources. A review of such databases facilitates the formulation of specific field survey techniques to target certain flora and fauna species known from the region. The results of these database searches revealed that several flora and fauna species of conservation significance intrinsically linked to aquatic ecosystems are known from the Project region.

The following database searches were completed using a 100km buffer around central coordinates:

- EPBC Act Protected Matters Search Tool – this search identifies flora and fauna species based on distribution and potential habitat. The database only pertains to species listed under the EPBC Act; and

- Queensland Department of Environment and Science (DES) Wildlife Online Database – this database contains records of all flora and fauna collected from previous surveys, including Queensland Museum surveys as well as records from the public.

Searches were conducted using the central co-ordinates of each of the three tenements. A 100 km maximum buffer size was used for each search, in accordance with the Terms of Reference for the Project's Environmental Impact Statement (EIS). Searches were also conducted with 5 km and 25 km buffers, in order to better gauge the likelihood of species occurring on or very close to the Project site.

A central coordinate for the Project was used to search the DES's protected plants flora survey trigger map. This map identifies high risk areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location.

The DES's regulated vegetation management map and supporting map were reviewed in consultation with the Regional Ecosystem Description Database (REDD) to determine which remnant vegetation communities were mapped on the Project site. The vegetation management supporting map also shows wetlands and watercourses and any mapped Essential Habitat for threatened species.

To identify any wetland values not shown on the vegetation management wetlands map, the Queensland Wetland Mapping Database was also searched. The DES's Map of Referable Wetlands was searched to identify any Wetland Protection Areas on the Project site or surrounding region.

The DES's Environmentally Sensitive Area (ESA) mapping was consulted to identify any ESAs on the Project site. ESAs include endangered REs, national parks, state forests, Ramsar wetlands and other protected areas.

Database searches have been carried out as part of the preparation for each survey conducted in the study area, however, for the purpose of this report only the most recent database searches have been included. These database searches are posterior to the latest amendments to the EPBC Act threatened species list on May 2018 and therefore up to date with the current species taxonomy and conservation status. Database search results are included in Appendix A and summarised below.

Mapping tools provided by the Commonwealth and Queensland governments were used to generate site specific maps relating to the following environmental values:

## 4.2.1 Aquatic Flora

### 4.2.1.1 Threatened Ecological Communities

The *EPBC Act 1999* Protected Matters Search did not identify any Threatened Ecological Communities (TECs) relevant to aquatic ecosystems within the Project region.

### 4.2.1.2 Regional Ecosystems

A review of the Queensland Government Regional Ecosystem (RE) mapping indicates the Project site contains six remnant REs intrinsically linked with aquatic ecosystems. RE 9.3.4 is listed under the VM Act as 'Of Concern' while the remaining are listed as 'Least Concern'. The DES Biodiversity Status listing for each of these REs is 'Of Concern'. All REs provided by this mapping are described in Table 1 below.

**Table 1 Regional Ecosystems Associated with Aquatic Environments Mapped within the Project site**

| Regional Ecosystem | Description | Site | VM Act Status | DES Biodiversity Status |
|---|---|---|---|---|
| 9.3.1 | *Eucalyptus camaldulensis* and/or *E. tereticornis* +/- *Melaleuca* spp. +/- *Casuarina cunninghamiana* fringing woodland on channels and levees | Greenvale Lucknow | Least Concern | Of Concern |
| 9.3.4 | Permanent or seasonal wetlands frequently fringed by narrow bands of trees and shrubs including *Eucalyptus* spp. on alluvial plains | Lucknow | Of Concern | Of Concern |
| 9.3.12a | River beds and associated waterholes on major rivers and channels | Greenvale, Lucknow | Least Concern | Of Concern |
| 9.3.13 | *Melaleuca* spp., *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* fringing open forest on streams and channels | Lucknow | Least Concern | Of Concern |
| 9.3.16 | *Eucalyptus tereticornis* and/or E. *platyphylla* and/or *Corymbia clarksoniana* woodland on alluvial flats, levees and plains | Greenvale, Kokomo | Least Concern | Of Concern |
| 9.3.22a | *Eucalyptus crebra* or E. *cullenii* +/- *Corymbia* spp. open woodland on alluvial levees and terraces | Greenvale, Kokomo, Lucknow | Least Concern | Of Concern |

### 4.2.1.3 Flora Species of Conservation Significance

A protected plants flora survey trigger map was generated using co-ordinates centred on the Project site. This map is produced by generating a two-kilometre buffer around known locations of protected flora species. The search was undertaken to identify any areas at high risk of supporting protected aquatic or riparian flora species on the Project or surrounding lands. Areas shown on the map as high risk are subject to particular requirements under Queensland legislation. This search revealed there were no high-risk areas of possible protected aquatic or riparian flora species existing within the extent of the Project site.

A desktop review of relevant literature, the DoE Protected Matters Search Tool and the DES Wildlife Online database identified nine flora species associated to aquatic ecosystems to occur within the

Project region. These species and their recorded occurrence within 5 km, 25 km and 100 km of the Greenvale, Lucknow and Kokomo tenements are shown in Table 2.

**Table 2 Aquatic Flora Species of Conservation Significance Within the Project Region**

| Scientific Name | Common Name | EPBC status | NC Act status | Presence in Buffer Area | | |
|---|---|---|---|---|---|---|
| | | | | 5 km | 25 km | 100 km |
| *Aponogeton bullosus* | - | E | E | - | - | x |
| *Arytera dictyoneura* | - | NL | NT | - | - | x |
| *Cyperus cephalotes* | - | E | E | - | - | x |
| *Eleocharis retroflexa* | - | NL | E | - | - | x |
| *Oenanthe javanica* | - | NL | NT | - | - | x |
| *Paspalidium udum* | - | NL | V | - | x | x |
| *Phaius australis* | Lesser Swamp-orchid | E | E | - | - | x |
| *Phaius pictus* | - | V | V | - | - | x |
| *Phalaenopsis amabilis* subsp. *rosenstromii* | - | E | E | - | - | x |

EPBC – *Environment Protection and Biodiversity Conservation Act 1999*
NC Act – *Nature Conservation Act* 1992
X – Present within Buffer
E – Endangered
NL – Not listed
NT – Near Threatened
V – Vulnerable

#### 4.2.1.4 Back on Track Flora Species

The RAD search results identified six BoT priority flora species intrinsically linked to aquatic ecosystems which occur in the Burdekin NRM region. These species are listed in Table 3. This table identifies the BoT level of priority, NC Act and EPBC Act classifications for each species.

**Table 3 Back on Track Priority Flora Species for the Burdekin NRM Region**

| Scientific Name | Common Name | NRM BoT Priority Ranking | State BoT Priority Ranking | NC Act Status | EPBC Act Status |
|---|---|---|---|---|---|
| *Aponogeton queenslandicus* | - | High | Medium | Least Concern | Not Listed |
| *Eriocaulon carsonii* | Salt Pipewort | Critical | High | Endangered | Endangered |
| *Eryngium fontanum* | - | Critical | High | Endangered | Endangered |
| *Hydrocharis dubia* | *Frogbit* | High | Medium | Not Listed | Not Listed |
| *Hydrocotyle dipleura* | - | Critical | High | Vulnerable | Not Listed |
| *Lawrencia buchananensis* | - | High | Medium | Vulnerable | Vulnerable |

## 4.3 AQUATIC FAUNA

### 4.3.1 Aquatic Fauna Species of Conservation Significance

The EPBC Protected Matter Search and DES Wildlife Online Search indicated 15 fauna species of conservation significance were found within 100km of the Project. A 10 km search buffer was also conducted to remove the reference to rainforest and ocean endemic species identified in the larger 100 km search. These species are associated with aquatic ecosystems and have been known to utilise aquatic and riparian habitats for feeding, foraging or breeding. These species are listed in Table 4.

**Table 4 Aquatic Fauna Species of Conservation Significance Recognised by Database Searches**

| Scientific Name | Common Name | EPBC status | NCWR status | Presence in Buffer Area | | |
|---|---|---|---|---|---|---|
| | | | | 5 km | 25 km | 100 km |
| **Amphibians** | | | | | | |
| *Litoria dayi* | Australian Lace-lid | E | E | - | - | x |
| *Litoria nannotis* | Waterfall Frog | E | E | - | - | x |
| *Litoria nyakalensis* | Mountain Mistfrog | CE | E | | | x |
| *Litoria rheocola* | Common Mistfrog | E | E | - | - | x |
| *Litoria serrata* | Tapping Green Eyed Frog | NL | V | - | - | x |
| *Pseudophryne covacevichae* | Magnificent Brood Frog | V | V | - | - | x |
| *Taudactylus acutirostris* | Sharp Snouted Dayfrog | E | E | - | - | x |
| **Birds** | | | | | | |
| *Calidris canutus* | Red Knot | E | E | - | - | x |
| *Calidris ferruginea* | Curlew Sandpiper | CE | E | x | x | x |
| *Calidris tenuirostris* | Great Knot | CE | E | - | - | x |
| *Rostratula australis* | Australian Painted Snipe | E | V | x | x | x |
| **Mammals** | | | | | | |
| *Petauroides volans* | Greater Glider | V | V | x | x | x |
| *Petaurus australis* unnamed subsp. | Yellow-bellied Glider (Wet Tropics) | V | V | - | - | x |
| *Petaurus gracilis* | Mahogany Glider | E | E | - | - | x |
| **Reptiles** | | | | | | |
| *Crocodylus porosus* | Salt-water Crocodile | NL | V | - | - | x |

### 4.3.2 Back on Track Fauna Species

The RAD search results indicate two BoT priority fauna species intrinsically linked to aquatic ecosystems which occur in the Burdekin NRM region. These species are listed in Table 5. This table identifies the BoT level of priority, NC Act and EPBC Act classifications for each species. It should be noted that marine animals have been excluded from these results.

**Table 5 Back on Track Priority Fauna Species for the Burdekin NRM Region**

| Scientific Name | Common Name | NRM BoT Priority Ranking | State BoT Priority Ranking | NC Act Status | EPBC Act Status |
|---|---|---|---|---|---|
| **Birds** | | | | | |
| *Esacus magnirostris* | Beach Stone-curlew | High | High | Vulnerable | Not Listed |
| **Reptiles** | | | | | |
| *Elseya irwini* | Irwin's turtle | High | High | Least Concern | Not Listed |

### 4.3.3 Migratory and Marine Species

The EPBC Protected Matters search indicated that 33 marine and/or migratory species may potentially occur within the Project region. These species are listed in Table 6.

**Table 6 Migratory and Marine Birds Recognised through Database Searches**

| Scientific Name | Common Name | EPBC status | Presence in Buffer Area | | |
|---|---|---|---|---|---|
| | | | 5 km | 25 km | 100 km |
| **Birds** | | | | | |
| *Actitis hypoleucos* | Common Sandpiper | Mi, Ma | x | x | x |
| *Anseranas semipalmata* | Magpie Goose | Ma | x | x | x |
| *Anous stolidus* | Common Noddy | Mi, Ma | - | - | x |
| *Ardea alba* | Great Egret | Ma | x | x | x |
| *Ardea ibis* | Cattle Egret | Ma | x | x | x |
| *Calidris acuminata* | Sharp-tailed Sandpiper | Mi, Ma | x | x | x |
| *Calidris canutus* | Red Knot | Mi, Ma | - | - | x |
| *Calidris ferruginea* | Curlew Sandpiper | Mi, Ma | x | x | x |
| *Calidris melanotos* | Pectoral Sandpiper | Mi, Ma | x | x | x |
| *Calidris ruficollis* | Red-necked Stint | Mi, Ma | - | - | x |
| *Calidris tenuirostris* | Great Knot | Mi, Ma | - | - | x |

| Scientific Name | Common Name | EPBC status | Presence in Buffer Area | | |
|---|---|---|---|---|---|
| | | | 5 km | 25 km | 100 km |
| *Charadrius leschenaultii* | Greater Sand Plover | Mi, Ma | - | - | x |
| *Charadrius mongolus* | Lesser Sand Plover | Mi, Ma | - | - | x |
| *Fregata ariel* | Lesser Frigatebird | Mi, Ma | - | - | x |
| *Fregata minor* | Great Frigatebird | Mi, Ma | - | - | x |
| *Gallinago hardwickii* | Latham's Snipe | Mi, Ma | x | x | x |
| *Gallinago megala* | Swinhoe's Snipe | Mi, Ma | - | - | x |
| *Gallinago Stenhouseura* | Pin-tailed Snipe | Mi, Ma | - | - | x |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | Ma | x | x | x |
| *Heteroscelus brevipes* | Grey-tailed Tattler | Mi, Ma | - | - | x |
| *Limosa lapponica* | Bar-tailed Godwit | Mi, Ma | - | - | x |
| *Numenius madagascariensis* | Eastern Curlew | Mi, Ma | - | x | x |
| *Numenius minutus* | Little Curlew | Mi, Ma | - | - | x |
| *Numenius phaeopus* | Whimbrel | Mi, Ma | | - | x |
| *Pandion haliaetus* | Osprey | Mi, Ma | x | x | x |
| *Pluvialis squatarola* | Grey Plover | Mi, Ma | - | - | x |
| *Rostratula benghalensis (sensu lato)* | Painted Snipe | Ma | x | x | x |
| *Sternula albifrons* | Little Tern | Mi, Ma | - | - | x |
| *Tringa brevipes* | Grey-tailed Tattler | Mi | - | - | x |
| *Tringa nebularia* | Common Greenshank | Mi, Ma | x | x | x |
| *Xenus cinereus* | Terek Sandpiper | Mi, Ma | - | - | x |
| **Reptiles** | | | | | |
| *Crocodylus johnstoni* | Freshwater Crocodile | Ma | - | - | x |
| *Crocodylus porosus* | Salt-water Crocodile | Mi, Ma | - | - | x |

## 4.4 WETLAND HABITATS

Wetlands are defined as ‘areas of permanent or periodic/intermittent inundation, whether natural or artificial with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 m’ (DERM, 2010). The DES interactive Wetlands Map

database and Map of Referable Wetlands generated maps of the Project area (Appendix A). According to these maps, four wetland systems are located on the Project site:

- Multiple riverine systems including river and creek channels;
- Lacustrine wetlands, likely to be man-made lakes and flooded mine voids, located within the Greenvale Project site;
- Palustrine wetlands composed of natural wetlands and lagoons; and
- Mapped remnant vegetation that *may* include wetlands.

As the map suggests, this wetland map cannot definitively map all wetland types and targeted surveys for wetlands, particularly palustrine, need to be included in the aquatic ecology surveys. These targeted surveys are particularly important during the wet season when inundation is more likely to occur. Palustrine wetlands have been defined as vegetated non-channel environments of less than 8 hectares (DERM 2010). A palustrine wetland is an important freshwater system as many species are reliant on wetlands and the surrounding riparian habitat for breeding, foraging and use of habitat resources like hollows.

Within the Kokomo tenement, three palustrine wetlands exist in the northern extent of the Project site. According to the DES' Map of Referable wetlands, one palustrine wetland mapped within the Kokomo tenement is listed as a Wetland of High Ecological Significance (HES). Under the *Environmental Offsets Regulation 2014*, HES wetlands and their corresponding Wetland Protection Areas are identified as 'Matters of State Environmental Significance' (MSES) and may require offsetting. The extent of the wetland of HES and the Wetland Protection Area within the Kokomo tenement is outlined in Figure 6. No wetlands of ecological significance or Wetland Protection Areas were identified using database searches within the Greenvale and Lucknow tenements.

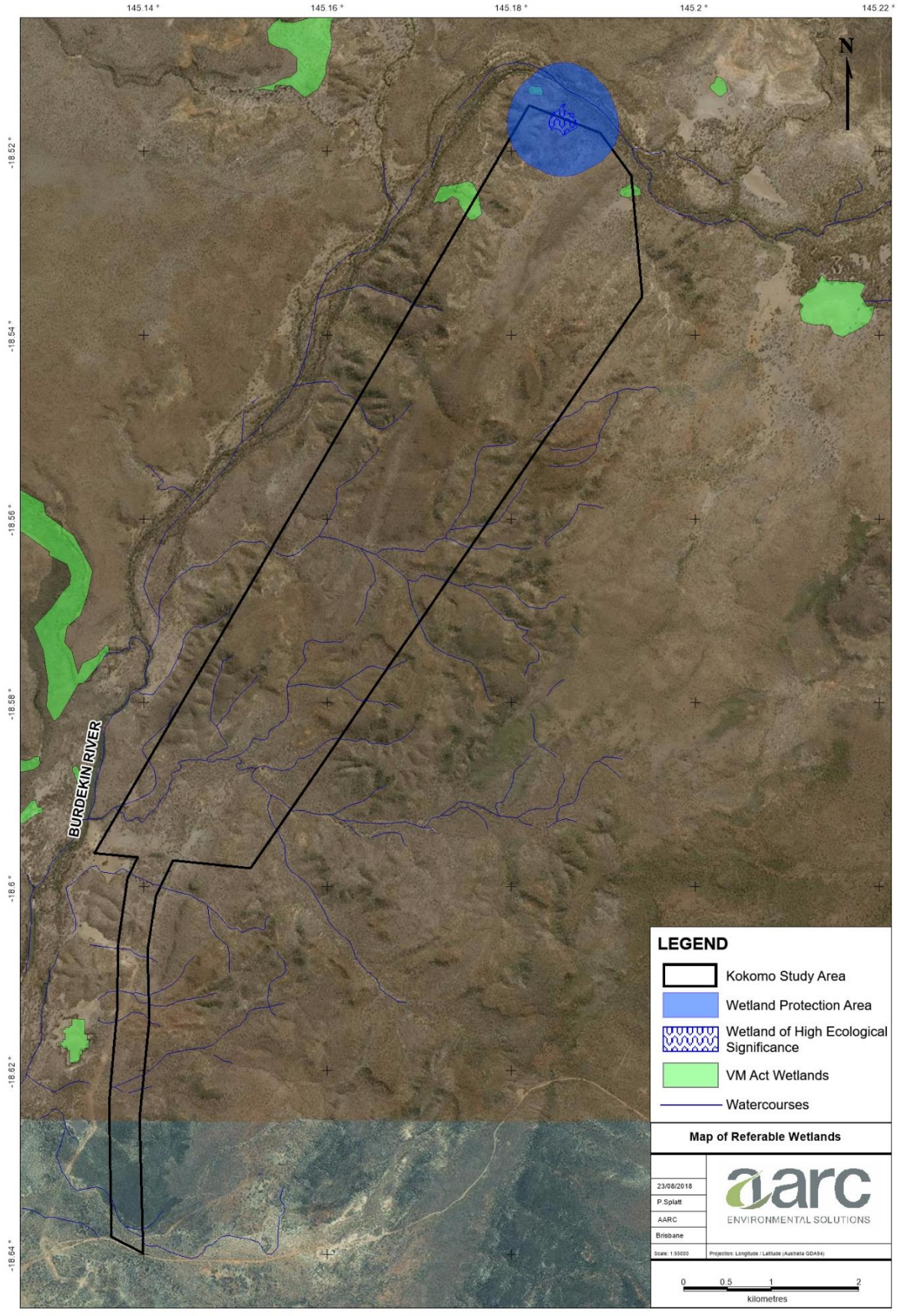


**Figure 6 Kokomo HES Wetland and Wetland Protection Area**

A list of flora and fauna taxa has been identified by DES as indicators contributing to whether a location should be determined as a wetland. Wetland Indicator Species (WIS) have adapted to living in wetlands and are dependent on them for all of their life; or a major part of their life; or for critical stages of their lifecycle, such as breeding and larval development. Plant species are included in the list if they are only recorded to naturally occur, achieve maturity and successfully reproduce in areas that experience wet conditions. Wet conditions are defined as areas where the root zone becomes periodically saturated or inundated during the growing season.

## 4.5 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally Sensitive Areas (ESA) mapping presents Category A, B, and C areas of conservation significance, including those under international agreements (e.g. Ramsar sites), fish habitat areas, declared catchment areas, Wild River nominated waterways and areas listed under the Directory of Important Wetlands. No Category A, B or C ESAs are present within or adjacent to the Investigation Area. No areas defined as World Heritage Areas, Ramsar sites, forestry areas, Wild River nominated waterways or essential fauna habitat are present within or adjacent to the Investigation Area.

## 4.6 AQUATIC CONSERVATION ASSESSMENTS (ACA)

Aquatic Conservation Assessments (ACAs) are non-social and non-economic and designed with the sole intent of identifying conservation values of wetlands at a user-defined scale. ACAs are developed using the Aquatic Biodiversity Assessment Mapping Method (AquaBAMM). AquaBAMM identifies relative wetland conservation values within a specified area (usually a catchment) using criteria, indicators and measures (CIM) that are based on a large body of national and international literature. ACAs have now been undertaken for a number of areas within Queensland. The outputs of this assessment classes the characteristics of the wetlands into five AquaScore categories. The Project occurs within the Upper Burdekin Catchment of the Great Barrier Reef study area. The following ACAs apply to the Project area:

- Aquatic Conservation Assessments (ACA), using AquaBAMM, for the riverine wetlands of the Great Barrier Reef catchment; and

- Aquatic Conservation Assessments (ACA), using AquaBAMM, for the non-riverine wetlands of the Great Barrier Reef catchment.

These wetlands are mainly those that have very high aquatic naturalness or representativeness values in combination respectively with very high/high threatened species values or very high diversity and richness values. Other combinations of very high or high values amongst the criteria may also indicate one of these wetlands.

The majority of the Kokomo tenement has an AquaScore of ‘High’ while the southern section of the Haul Road at Kokomo has an AquaScore of ‘Very High”. Wetlands that receive a score of ‘Very High’ generally have very high aquatic naturalness. Wetlands can also receive this score if they have high/very high representative values for threatened species or diversity/richness values. Greenvale and Lucknow were given AquaScores of ‘Medium’, indicating that these wetlands have varied combinations of high and medium values amongst the assessment criteria.

# 5.0 ENVIRONMENTAL VALUES AND OBJECTIVES

## 5.1.1 Environmental Values & Water Quality Objectives

Environmental Values (EVs) are defined as the qualities of water that make it suitable for supporting aquatic ecosystems and human water use (EHP, 2009). The *Queensland Water Quality Guidelines 2009* (QWQG) was used to define the Water Quality Objectives (WQOs) for the Project. The waterways of the Project area fall within the Central Coast Queensland region (QWQG, 2009) and Tropical Australia (ANZECC, 2000).

The EVs identified for waterways in the Project region are:

- Protection of aquatic ecosystem values;
- Suitability for drinking water supplies;
- Suitability for primary contact recreation;
- Suitability for secondary contact recreation;
- Suitability for visual recreation;
- Suitability for human consumers of wild or stocked fish, shellfish or crustaceans;
- Protection of cultural and spiritual values;
- Suitability for stock watering; and
- Suitability for industrial use.

EVs deemed to be relevant to the Project's defined receiving environment are aquatic ecosystem values and suitability for stock watering.

WQOs are provided in two main parts,

1. For the purposes of protecting the aquatic ecosystem EV; and
2. For EVs other than aquatic ecosystems (human use EVs such as stock watering).

The protection of aquatic ecosystem values is considered the primary mechanism to ensure the maintenance of quality of receiving environment waters. Therefore, for relevant physical and chemical stressors and toxicants the default guidelines, for lowland rivers slightly to moderately disturbed waters, were the source of water quality objectives (ANZECC 2000). For electrical conductivity, the 80th percentile of values for the relevant salinity zone was applied from the Queensland Water Quality Guidelines (DEHP 2009).

For toxicants, default (ANZECC 2000) guideline values recommended for application for slightly to moderately disturbed ecosystems provided relevant water quality objectives. Table 7, Table 8 and Table 9 provides the guideline WQOs identified for protection of the Projects aquatic ecosystem.

**Table 7 Trigger Values for Physical and Chemical Parameters**

| Parameter | WQO - Low | WQO - High |
|---|---|---|
| Ammonia N (µg/L) | - | 20 |
| Oxidised N (µg/L) | - | 60 |
| Organic N (µg/L) | - | 420 |
| Total Nitrogen (µg/L) | - | 500 |
| Filterable Reactive Phosphorus (FRP) (µg/L) | - | 20 |
| Total Phosphorus (µg/L) | - | 50 |
| Chlorophyll a (µg/L) | - | 5 |
| Dissolved Oxygen (DO) (%) | 85 | 120 |
| Turbidity (NTU) | - | 50 |
| Suspended Solids (mg/L) | - | 10 |
| pH (pH unit) | 60 | 8 |
| Conductivity (EC) (µS/cm) | - | 310 |

**Table 8 WQO for Heavy Metals and Metalloids**

| Management intent (level of protection) | Parameter | Unit | WQO |
|---|---|---|---|
| Aquatic ecosystem (for application for slightly to moderately disturbed ecosystems) for comparison against dissolved concentrations | Aluminium | µg/L | 55 |
| | Arsenic | µg/L | 13 |
| | Boron | µg/L | 370 |
| | Cadmium | µg/L | 0.2 |
| | Chromium | µg/L | 1 |
| | Copper | µg/L | 1.4 |
| | Lead | µg/L | 3.4 |
| | Manganese | µg/L | 1,900 |
| | Nickel | µg/L | 11 |
| | Zinc | µg/L | 8 |
| Stock watering – for comparison against the total concentration | Aluminium | mg/L | 5 |
| | Arsenic | mg/L | 5 |
| | Boron | mg/L | 5 |
| | Cadmium | mg/L | 0.01 |
| | Chromium | mg/L | 1 |
| | Cobalt | mg/L | 1 |
| | Copper | mg/L | 0.4 |
| | Fluoride | mg/L | 2 |
| | Lead | mg/L | 0.1 |
| | Mercury | mg/L | 0.002 |
| | Molybdenum | mg/L | 0.15 |
| | Nickel | mg/L | 1 |

| | | | |
|---|---|---|---|
| | Selenium | mg/L | 0.02 |
| | Uranium | mg/L | 0.2 |
| | Zinc | mg/L | 20 |

**Table 9 WQO Trigger Values for Macroinvertebrates**

| Parameter | WQO Trigger Value - Low | WQO Trigger Value - High |
|---|---|---|
| Taxa Richness (Composite) | 12 | 21 |
| Taxa Richness (Edge Habitat) | 23 | 33 |
| PET Taxa Richness (Composite) | 2 | 5 |
| PET Taxa Richness (Edge Habitat) | 2 | 5 |
| SIGNAL Index (Composite) | 3.33 | 3.85 |
| SIGNAL Index (Edge Habitat) | 3.31 | 4.2 |
| % Tolerant Taxa (Composite) | 25 | 50 |
| % Tolerant Taxa (Edge Habitat) | 44 | 56 |

### 5.1.2 Sediment Quality Objectives

Baseline levels of metals in sediments are important to investigate the accrual of any pollutants. Stream Sediment Quality Objectives (SQO) for the Project are adopted from the Interim Sediment Quality Guideline (ISQG) values (ANZECC & ARMCANZ, 2000) (Table 10).

**Table 10 Site Specific Sediment Quality Objectives**

| Contaminant | Sediment Quality Guideline Value - Low | Sediment Quality Guideline Value - High |
|---|---|---|
| Arsenic | 20 | 70 |
| Cadmium | 1.5 | 10 |
| Chromium | 80 | 370 |
| Copper | 65 | 270 |
| Lead | 50 | 220 |
| Nickel | 21 | 52 |
| Mercury | 0.15 | 1 |
| Zinc | 200 | 410 |

# 6.0 METHODOLOGY

An assessment of the aquatic ecological values of the Project site was undertaken using a combination of desktop and field investigations. Three aquatic ecology field surveys and one fish tissue sampling survey were carried out within the Project site.

Using standard methodologies as discussed in the following sections, the surveys involved an assessment of:

- Creek Ecology;
    - Habitat Bioassessment;
    - Impact Assessment; and
    - Macroinvertebrate Sampling.
- Surface Water Quality;
- Stream Sediment Quality;
- Aquatic Flora;
- Aquatic Fauna; and
- Fish Tissue Sampling.

## 6.1 SURVEY TIMING

The field surveys were conducted in wet and dry seasons to allow for seasonal variation in aquatic ecosystem sampling and assessment. These survey times were also planned around the presence of available water in ephemeral watercourses. The specific dates that the surveys were conducted are shown in Table 11.

**Table 11 Field Survey Dates**

| Season | Survey Type | Dates |
|---|---|---|
| Wet | Aquatic Ecology | 23rd February – 28th February 2012 |
| Dry | Aquatic Ecology | 21st August – 26th August 2012 |
| Wet | Fish Tissue Sampling | 1st February – 7th February 2013 |
| Dry | Aquatic Ecology | 21st May – 1st June 2018 – Kokomo<br>6th June - 20th June 2018 – Greenvale and Lucknow |

## 6.2 AQUATIC SURVEY SITES

Initially, site reconnaissance was undertaken to identify key riparian habitats to be targeted during the initial aquatic ecology surveys. The site reconnaissance involved using aerial maps, targeted site GPS coordinates and topographic maps to navigate around the Project site by vehicle and on foot. The sampling sites were chosen to correspond with sample sites provided in an unpublished surface water assessment conducted by GHD. The aquatic ecology assessment aimed to include three Control sites, three Reference sites and at least one Resource Area site at Kokomo, Greenvale and Lucknow. These sampling sites are detailed in Table 12. Due to site access limitations; BURD5 was relocated to ensure future access and safety of ecologists conducting the field work. Figure 7 and Figure 8 below depict the aquatic ecology sampling locations.

The Stenhouse Dam was included as an additional site in the aquatic ecology assessment as it is found within the Greenvale Project site and holds surface water through all months of the year. The Stenhouse Dam was created in 1972 as a recreation site for Greenvale Nickel Mine staff.

**Table 12 Aquatic Site Locations**

| Site Name | Reference Location | **Easting** (WGS84, Zone 55) | **Northing** (WGS84, Zone 55) |
|---|---|---|---|
| LNSW2 | North watershed to Gray Creek, sampled at Gregory Development Road. | 285,087 | 7,897,620 |
| LNSW5 | Watershed to Gray Creek | 286,604 | 7,895,148 |
| LNSW15 | Carters Mill on Gray Creek. Located downstream of Lucknow resource area | 287,320 | 7,895,280 |
| GVMSW1 | Tributary to Burdekin River and north-east watershed to Gray Creek via Stenhouse drainage line sampled at Lucky Springs | 287,058 | 7,903,564 |
| GVMSW4 | Reference site on Paddy's Creek, located to the west of the Greenvale resource area | 277,310 | 7,905,260 |
| STENHOUSE DAM | Stenhouse Dam within the Greenvale Project site which holds water throughout the year | 284,070 | 7,902,563 |
| BURD2 | Control site on Burdekin River downstream of Kokomo resource area at existing lagoon | 303,152 | 7,943,217 |
| BURD3 | Control site on Burdekin River downstream of Dry River confluence | 289,500 | 7,905,400 |
| BURD5 | Control site on Burdekin River downstream of proposed project and to the north-east of Greenvale and Lucknow Resource areas | 296,650 | 7,903,900 |
| KKSW3 | West watershed to Burdekin River. Located inside the western boundary of Kokomo resource area | 305,474 | 7,946,455 |

| Site Name | Reference Location | **Easting** (WGS84, Zone 55) | **Northing** (WGS84, Zone 55) |
|---|---|---|---|
| KKSW4 | West watershed to Burdekin River, downstream of KKSW3. | 304,070 | 7,946,201 |
| KKSW8 | Local surface run-off from reference catchment representative of Kokomo Resource Area | 305,224 | 7,943,537 |

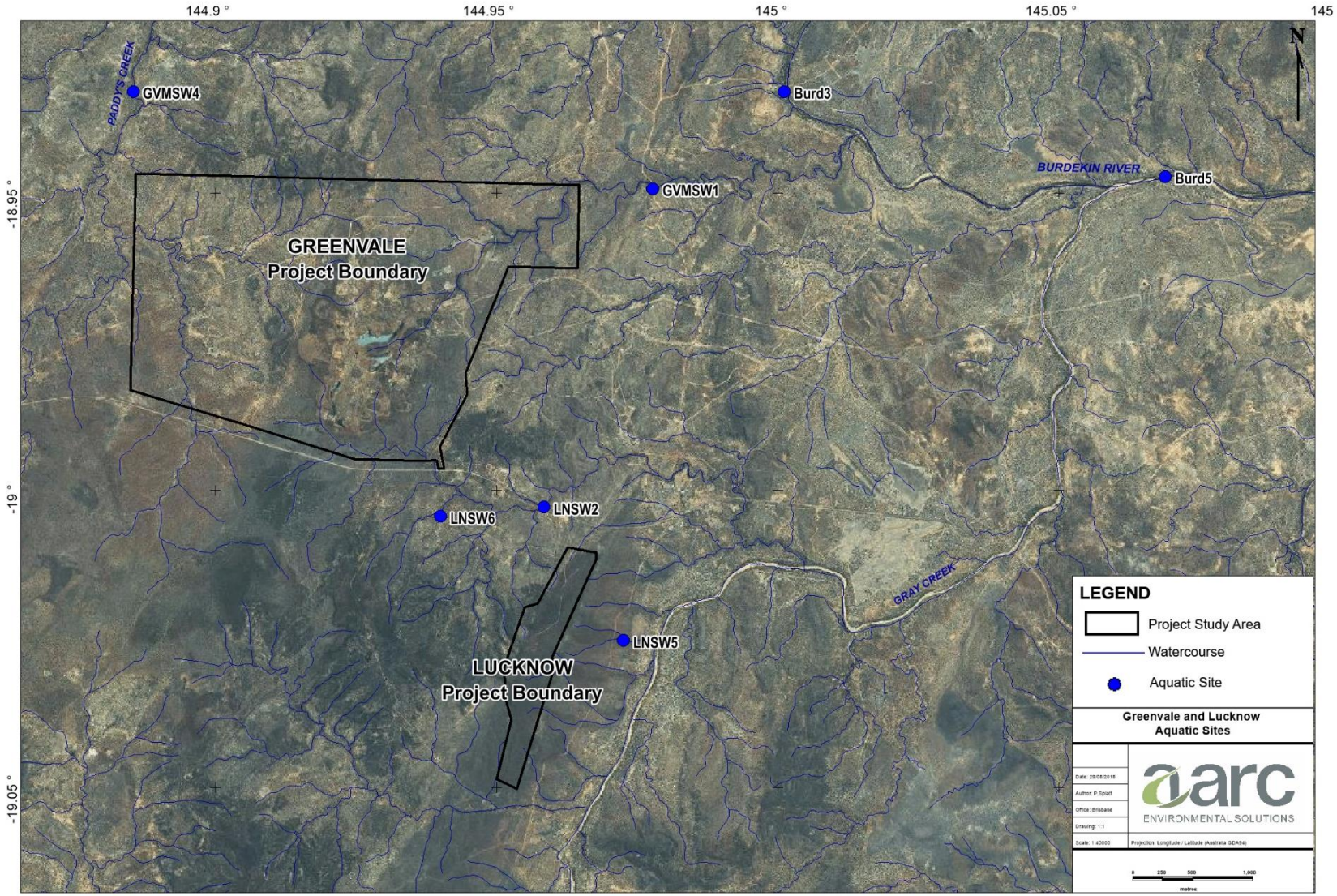


**Figure 7 Aquatic Ecology Sampling Locations at Greenvale**

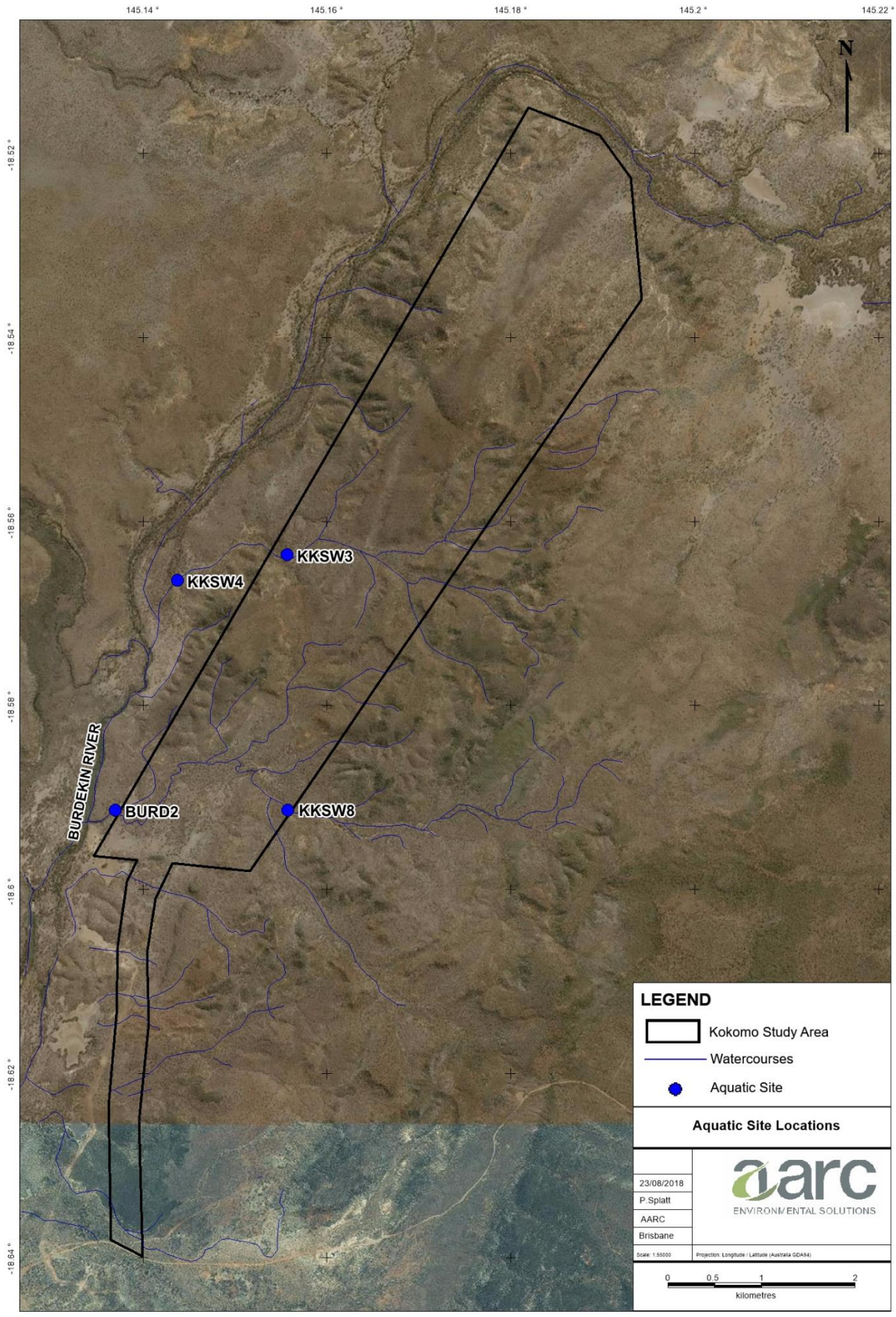


**Figure 8 Aquatic Ecology Sampling Locations at Kokomo**

## 6.3 CREEK ECOLOGY

At each site, three techniques were undertaken during the surveys including a habitat bioassessment, an impact assessment, and macroinvertebrate sampling (where possible). These techniques are discussed individually below in sections 6.3.1 to 6.3.3.

### 6.3.1 Habitat Bioassessment

A habitat assessment was performed at selected sites using a modified version of the Australian River Assessment System (AusRivAS) protocols developed by the Department of Natural Resources and Mines and Energy (Conrick and Cockayne 2001). AusRivAS is a nationally standardised method for undertaking an assessment of the biological health of inland rivers within Australia.

The assessment considers morphological characteristics of waterways only; including the broad habitat type, channel pattern, water level and flow, substrate character and cover, bed and bank stability, and riparian cover at each site. Each surveyed site was given a score out of 135, with higher numbers indicating favourable habitats generally associated with healthy waterways. Habitat assessments were completed at all of the aquatic monitoring sites during the survey period. Table 13 below provides a framework for interpreting habitat assessment scores.

**Table 13 Key to AusRivAS Habitat Assessment Scores**

| Habitat Assessment Score | Interpretation |
|---|---|
| 0 – 35 | Habitat is poor. There is limited habitat availability for in-stream fauna. There is little variation in velocity and depth of water, and the creek bed consists of a single sediment type. The water body typically consists of a small, shallow pool. Streamside vegetation, if present, consists of grasses and sedges. There is moderate to significant erosion on the banks. |
| 36 – 70 | Habitat variety is moderate. This could be due to leaf litter and other vegetation or detritus in the water, or the presence of boulders and rocks. The streamside vegetation consists mainly of grasses and sedges. There is moderate evidence of bank erosion, and the percentage of vegetative cover on the banks is less than 50%. |
| 71 – 100 | Habitat is relatively good. The bank is stable, there is variety in depth and velocity within the water body and substrate type is variable and tending towards boulders and rocks. Streamside vegetation is of trees and shrubs, adding to the bank stability. The percentage of streamside cover by vegetation is relatively high. |
| 101 – 135 | Indicates a pristine and favourable habitat. There is no bank erosion and the dominant vegetation is trees. There is great variety in depth and velocity, and the habitat is quite complex, offering many types of protection for fauna. This is usually afforded by logs and branches, leaf litter, variety in substrate type, variety in water depth, and presence of vegetation living within the water body. |

### 6.3.2 Impact Assessment

An Impact assessment was performed at eight aquatic monitoring sites using a modified version of the Australian River Assessment System (AusRivAS) protocols developed by the Department of Natural Resources and Mines (Conrick and Cockayne 2001). AusRivAS is a nationally standardised method for undertaking an assessment of the biological health of inland rivers within Australia.

The assessment considers the impact/influence of 10 different upstream activities on the waterways; including agriculture, major extractive industry, major urban areas, waste water discharge, dams/weirs, alteration to seasonal flow, alteration to riparian zone, erosion damage by stock, major geomorphological changes, and alteration activities to instream conditions and habitats. Each surveyed site was given a score out of 5 for each impact activity with a total score out of 50, with higher numbers indicating no impact of upstream activities. These results give an indication if there are visible factors that could contribute to the poor health of the river system.

### 6.3.3 Macroinvertebrate Sampling

Along a 10m stretch of the waterbody, a 250 micrometre D-frame net was used to sample macroinvertebrates at each aquatic site containing sufficient suitable aquatic habitat. This procedure targets various micro-habitats including riffles, runs, pool beds and edge/backwaters. Due to the ephemeral nature of the creeks and in the receiving environment, micro-habitats available for sampling are limited to pool beds and edge habitats. Ideally site sampling should include sampling in shallow and deep sections to target the various micro-habitats. All macroinvertebrates sampled were placed in a preservative solution and sent to an AusRivAS accredited laboratory for identification. The nets were checked thoroughly for damage before use and washed between sites to ensure no cross contamination of samples.

Data collected during this project was assessed using a range of indices including:

- Total Abundance;
- Taxa Richness;
- PET Richness;
- SIGNAL 2 Biotic Index; and
- Percentage Tolerance Taxa.

Prior to 2018, macroinvertebrate sampling was conducted in accordance with the AusRivAS sampling and assessment methodology as outlined by the Queensland *Monitoring and Sampling Manual 2009* (DES 2009). This sampling methodology is consistent with those described in the aquatic ecology assessment conducted by BMT in 2012. During aquatic field surveys in 2018, macroinvertebrate sampling was conducted in accordance with the Queensland *Monitoring and Sampling Manual 2018* (DES 2018).

## 6.4 SURFACE WATER QUALITY

Prior to 2018, water quality sampling was carried out in accordance with the Queensland *Monitoring and Sampling Manual 2009* (DES 2009). During water quality sampling events in 2018, sampling was conducted in accordance with the Queensland *Monitoring and Sampling Manual 2018* (DES 2018).

Field readings of pH, Dissolved Oxygen, Turbidity, Electrical Conductivity (EC) and Temperature were also recorded. In-situ measurements were collected using a multi-parameter water quality meter that is laboratory calibrated to the manufacturers' specifications.

Grab samples were collected at a depth of 10 to 20 centimetres (cm) where sufficient water was available. Two water sample types, one total (unfiltered) and one dissolved (field filtered) were collected when possible at each site. Water quality samples were analysed under laboratory testing conditions for the parameters listed below.

- pH;
- EC;
- Total Dissolved Solids;
- Suspended Solids;
- Turbidity;
- Sulphate;
- Arsenic;
- Beryllium;
- Barium;
- Cadmium;
- Chromium;
- Cobalt;
- Copper;
- Lead;
- Mercury;
- Nickel;
- Zinc;
- Boron;
- Manganese;
- Selenium;
- Vanadium;
- Ammonia;
- Nitrate;
- Nitrite;
- Nitrogen;
- Phosphorous;
- Petroleum hydrocarbons; and
- Fluoride.

Samples were collected in suitable sample collection bottles provided by the laboratory, with preservative added where required. All water samples were kept on ice or refrigerated during storage and transport to a National Association of Testing Authorities (NATA) accredited laboratory for analysis

## 6.5 STREAM SEDIMENT SAMPLING

Sediment quality sampling was undertaken in accordance with the Queensland Monitoring and Sampling Manual 2009. During stream sediment sampling events in 2018, sampling was conducted in accordance with the Queensland *Monitoring and Sampling Manual 2018* (DES 2018). Five sub-samples (approximately 500 grams (g)) each) of stream–bed substrate was taken at each site along a 50m transect in the river bed. Samples were collected using a non-metallic shovel. Sub-samples were mixed in a plastic bucket to obtain a composite sample (approximately 500g) then sealed in sterilised glass jars and sent to a NATA accredited laboratory for analysis of trace metals and particle size. Sediment samples were analysed for the following parameters:

- Aluminium;
- Boron;
- Cadmium;
- Chromium;
- Copper;
- Cobalt;
- Lead;
- Manganese;
- Mercury;
- Molybdenum;
- Nickel;
- Silver;
- Uranium;
- Vanadium; and
- Zinc.

## 6.6 FLORA ASSESSMENT

### 6.6.1 Aquatic and Riparian Flora Surveys

Aquatic and riparian vegetation condition, species presence and plant health were assessed at each aquatic site. For the purposes of this survey, vegetation monitoring at each site was conducted along a 100 m transect, recording aquatic and riparian species. Species that could not be identified in the field were sent to the Queensland Herbarium for identification.

## 6.7 FAUNA ASSESSMENT

### 6.7.1 Aquatic Fauna

A series of surveying techniques were employed to adequately sample the diversity of aquatic fauna within the waterways of the Project site.

#### 6.7.1.1 Box Trapping

Box traps are small rectangular traps made of a fine mesh to capture aquatic fauna. The trap has an internal bait pouch, and circular openings which aquatic animals enter through, finding it difficult to exit. With the finer mesh, and smaller openings, the Box trap is designed to retain smaller animals then the Opera House traps.

At each aquatic fauna site, three box traps are deployed from the bank of the watercourse and left for a minimum of 4 nights. The traps are spaced approximately 20 meters from each other and are checked and re-baited every day. Aquatic animals caught in traps are identified at site and released.

#### 6.7.1.2 Opera House Trapping

Opera house traps are a medium net and frame trap with funnel shaped openings. A small pouch inside the net can be equipped with bait. Aquatic animals enter through the large outside opening but find it difficult to exit from the small inside opening. The opera house traps are designed for any aquatic animal that is small enough to fit through the trap entrance, but large enough that it cannot fit through the netting.

At each aquatic fauna site, three opera house traps are deployed from the bank of the watercourse and left for a minimum of 4 nights. The traps are positioned in the water approximately 20 meters apart so they are not fully submerged, and an air pocket remains. This ensures any animals trapped inside that need to surface for oxygen (i.e. turtles) can continue to do so. Traps are checked daily, and all native captured animals identified and released. Traps are secured to the bank with rope, with the location marked with handheld GPS and flagging tape.

#### 6.7.1.3 Seine Netting

A seine net is a long net with weights attached to the bottom edge of the net and floats attached to the top of the net, so it can be correctly deployed in the water column. The net is deployed in an arc with the intention of capturing as many fish species as possible. The net is then dragged onto the bank where the species are identified and released.

Seine netting was conducted at two aquatic sites where suitable habitat was available for sampling. The net is deployed 2-3 times or until an adequate suite of aquatic fauna species have been identified.

#### 6.7.1.4 Visual Observation

At some sampling sites, visual observation was practical as pools were shallow and clear. Where possible, observing aquatic fauna assisted in identifying where traps needed to be placed and the number of species present in each pool.

### 6.7.2 Riparian Fauna

A series of surveying techniques were employed to adequately sample the diversity of riparian fauna within the waterways of the Project site.

#### 6.7.2.1 Automated camera trapping

Automated camera trapping is a less invasive method of surveying medium to large-sized fauna species. Cameras are usually attached to a tree in a position that offers an unobstructed view over a track or clearing. A bait tube constructed of a PVC pipe and filled with 'marsupial bait' and chicken necks was pegged to the ground and positioned in clear view of the camera. Motion-sensing technology in the camera picks up movement by target fauna which then triggers an automatic photographic response. This is a highly effective survey method and is now widely used instead of cage trapping (Eyre *et al.,* 2014). Automated cameras were deployed for four nights at each aquatic site during the survey period. The survey effort comprised 12 camera trap nights during the survey period.

#### 6.7.2.2 Micro-bat surveying

Micro-bats form an extremely diverse group of wildlife and the identification of individual species requires the use of specialised survey methods due to the superficial similarity of many species, their small size, and largely inaudible calls.

In order to navigate and hunt at night micro-bats use high frequency echolocation calls, most of which are above the frequency range audible to humans (i.e. ultrasound). These echolocation calls provide an opportunity to unobtrusively survey and identify micro-bats using a specialised ultrasonic recorder such as an ANABAT. During the survey event, ANABATs were strategically positioned to detect micro-bat calls at all aquatic fauna trapping sites. An ANABAT was left at each fauna trapping site for 3 nights resulting in a total of 12 trap nights. Sound recordings were sent to an experienced bat-call analyst (Balance Environmental, Toowoomba, Queensland) for interpretation.

#### 6.7.2.3 Bird surveying

A dedicated search for diurnal birds was conducted visually and aurally on mornings and afternoons at each aquatic fauna site. In addition, opportunistic diurnal searches were also conducted on foot in areas considered likely to have high avian diversity (e.g. vegetated watercourses). Diurnal bird searching was conducted over a total period of 24 hours throughout the survey period.

### 6.7.3 Fish Tissue Sampling

Fish tissue sampling was carried out during the initial surveys to produce baseline information for the fish tissue residue concentrations for the metals and metalloids associated with the project.

Fish tissue sampling was carried out using three methods to obtain specimens to sample:

- Electrofishing;
- Use of box and opera house traps; and
- Hand-held lines.

Electrofishing was carried out using the backpack unit, LR20B, provided by Smith-Root. Before commencing electrofishing, the water conductivity was measured allowing AARC ecologists to determine the settings to be adjusted on the unit. As the goal of electrofishing efforts was to obtain four samples from each site including species that inhabit different niches in the water column, once this number was met, electrofishing at a site was not continued.

Box and opera house traps were set for three consecutive nights, however in some cases, the number of samples needed per site was met earlier and these traps were removed. During the collection and

dissection of samples at a particular site, hand held lines were established using small pieces of chicken as bait. These set lines were generally active for 30 minutes.

All specimens under 7 centimetres (cm) were left whole and placed in a specimen jar with 90% ethanol. All specimens over 7cm were dissected to produce three separate tissue samples of liver, gill filament and muscle. Dissections were carried out using disposable gloves, scalpels, tweezers, scissors and a medical grade dissection board. Each of these items was washed with a detergent solution and ethanol after use or discarded. The three tissue samples from each specimen were then placed in 90% ethanol. Samples were sent to the National Measurement Institute for the analysis of metal concentrations.

# 7.0 RESULTS

## 7.1 CREEK ECOLOGY

### 7.1.1 Habitat Bioassessment

A Habitat BioAssessment was conducted at each aquatic monitoring site with water during the 2018 dry season survey. Both the Stenhouse Dam and BURD3 received a score indicative of a moderate aquatic habitat, likely due to leaf litter and other vegetation or detritus in the water, or the presence of boulders and rocks. The streamside vegetation at these sites consists mainly of grasses and sedges. There is moderate evidence of bank erosion, and the percentage of vegetative cover on the banks is less than 50%.

BURD5 and KKSW4 received a Habitat BioAssessment score of 72 and 89 respectively indicating that the habitat values of these sites are considered to be representative of a good aquatic habitat. At these sites, the bank is stable, there is variety in depth and velocity within the water body and substrate type is variable and tending towards boulders and rocks. Streamside vegetation is of trees and shrubs, adding to the bank stability. The percentage of streamside cover by vegetation is relatively high.

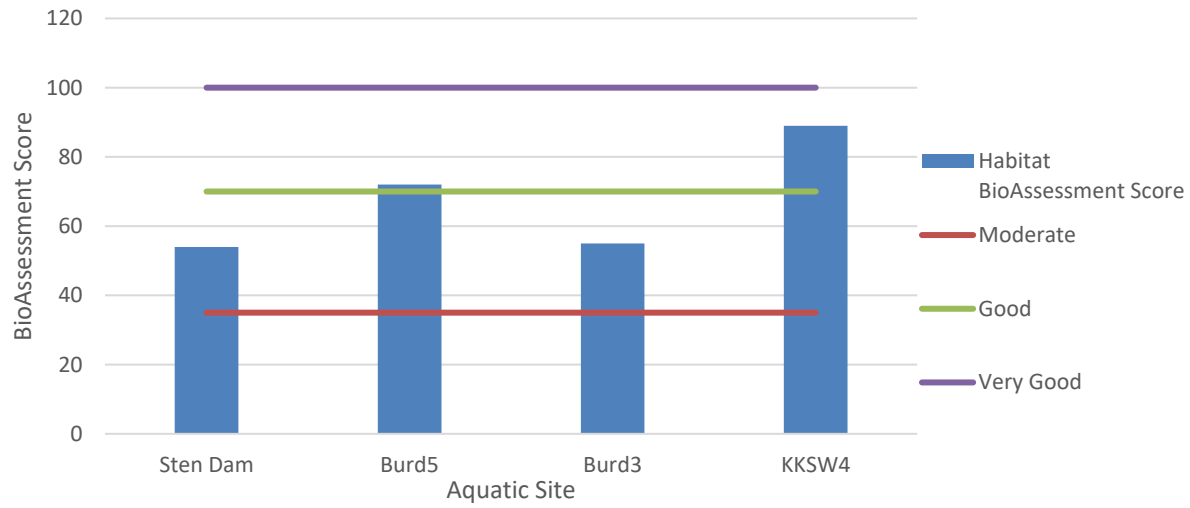


**Figure 9 Habitat BioAssessment Scores**

### 7.1.2 Impact Assessment

The impact of possible upstream influences on the biological health of the waterways of the Project site was assessed at eight aquatic monitoring sites in 2018. The results indicate that upstream influences have a minor effect on the biological health of these waterways. The Stenhouse Dam and BURD5 experienced the most notable influence from upstream activities with impact assessment scores of 28 and 38 respectively. All other sites assessed received an impact assessment score above 40 indicating that these sites are in a good condition and have little effect from upstream activities. The results of this assessment are displayed in Figure 10.

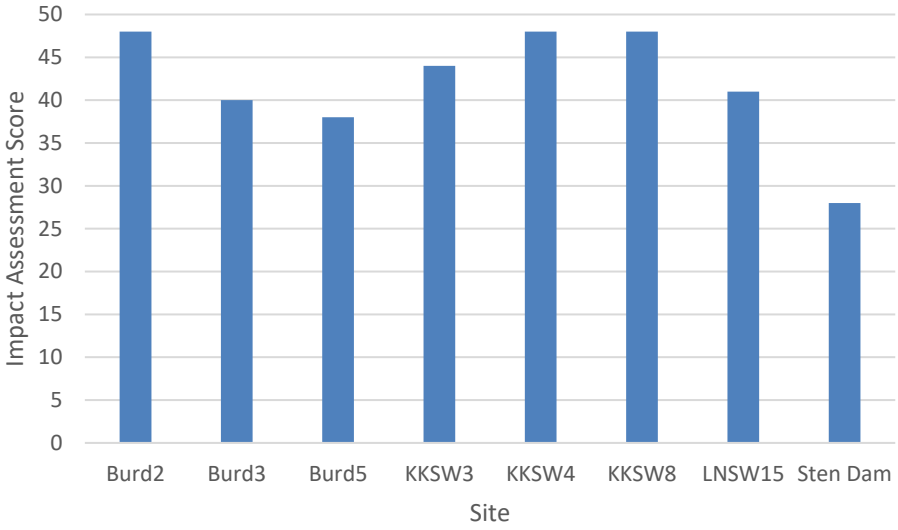


**Figure 10 Impact Assessment Scores**

### 7.1.3 Macroinvertebrate Sampling

Macroinvertebrate results from the 2018 monitoring survey have been summarised by calculating the total abundance, taxonomic richness, PET taxa richness, SIGNAL 2 scores and percent tolerant taxa for each site assessed. Where applicable, these indices have been compared to relevant WQO for macroinvertebrates in the Central Coast Queensland region (QWQG, 2009) and Tropical Australia (ANZECC, 2000). During sampling, baseline flow was present at LNSW15, KKSW3, BURD3 and BURD5. No flowing water was recorded at the Stenhouse Dam. Flow conditions can impact the abundance and richness of species found in aquatic environments. Macroinvertebrate diversity and abundance are indicators which are sensitive to upstream changes or to changes in the surrounding riparian ecosystem. Any changes to the upstream riparian or aquatic habitats are likely to be reflected in the macroinvertebrate community composition.

#### 7.1.3.1 Total Abundance

Due to severe weather conditions at the time of sampling restricting access to sites and the ephemeral nature of the waterways, only five sites were sampled for macroinvertebrates. Total abundance of macroinvertebrates varied significantly as habitat availability, stream cover and allochthonous carbon levels changed throughout the Project waterways. BURD5 was the only site sampled within both bed and edge habitats. Over 300 macroinvertebrates were sampled at BURD5 edge, while its bed habitat resulted in just over half the abundance with 155 individuals. A total of 24 individual macroinvertebrates were sampled at KKSW4. Figure 11 illustrates the total abundance across all aquatic sites sampled in 2018.

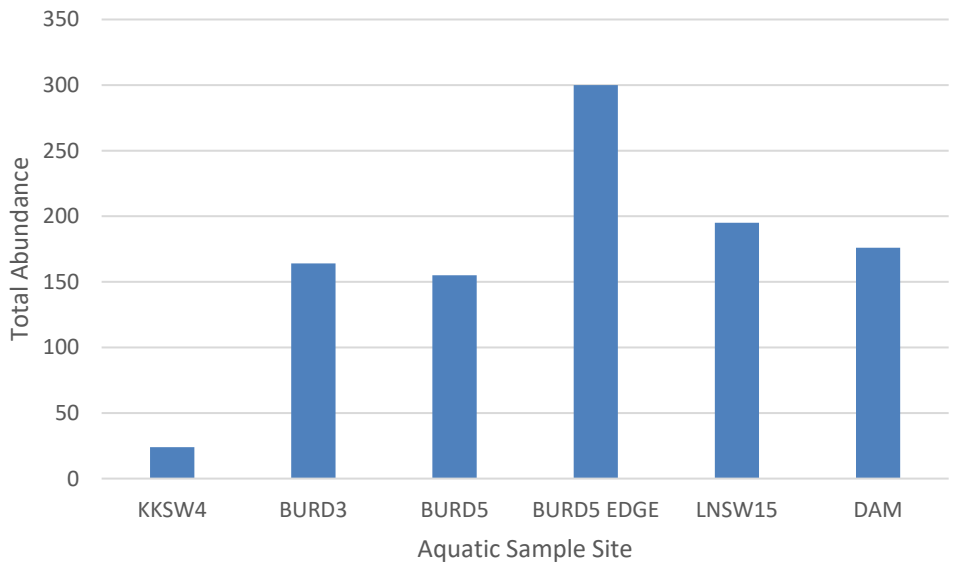


**Figure 11 Total Abundance of Macroinvertebrates**

#### 7.1.3.2 Taxonomic Richness

Taxonomic richness across the sample sites from the 2018 aquatic survey are shown in Figure 12. Two sites did not meet the lower WQO for taxonomic richness (KKSW4 and BURD5 Bed). These sites fell short of the lower WQO by a total of four and two taxa. Both BURD3 and LNSW15 received taxonomic richness values of 14 placing these sites above the lower WQO value for this index. Additionally, the Stenhouse Dam received a taxonomic richness value of 21 also placing it above the lower WQO with the highest taxonomic richness for all the bed habitats sampled in 2018.

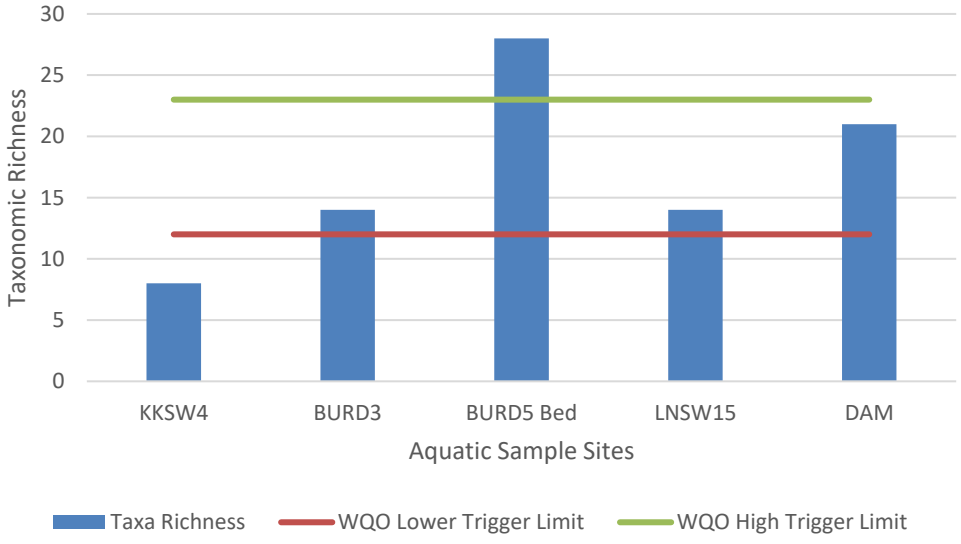


**Figure 12 Taxonomic Richness of Macroinvertebrates in Bed Habitats**

One sample was taken from an edge habitat where stream morphology provided this habitat. Taxonomic richness of the edge habitat sampled at BURD5 was 28 taxa placing this site above the upper WQO for edge habitats of 33 taxa. These results are consistent with the abundance sample results.

#### 7.1.3.3 PET Taxa Richness

The PET taxa (Plecoptera, Ephemeroptera and Trichoptera) are three orders of macroinvertebrate that are particularly sensitive to disturbance. They require favourable water quality conditions and diverse habitat to survive. PET taxa richness in ephemeral waterbodies tends to be low, due to the naturally harsh conditions in these waterways (i.e. poor water quality and low habitat diversity). However, trending declines in the number of PET taxa at a site may be an indication of pollution or poor water quality. PET taxa were identified at all of the sites sampled during this survey season. The Stenhouse Dam fell on the lower WQO limit, it is still considered within the range. The edge habitat sampled at BURD5 was above the upper limit.

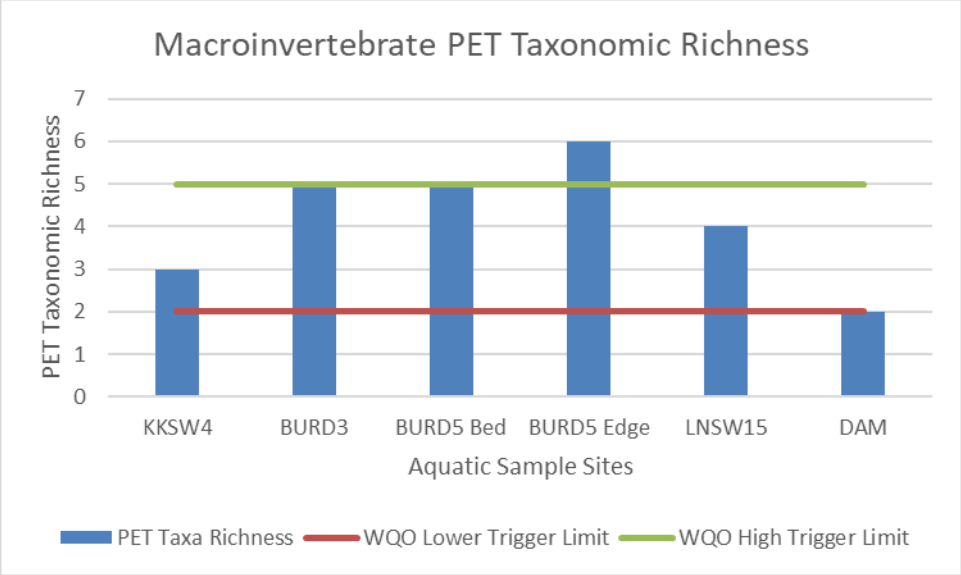


**Figure 13 PET Taxonomic Richness**

#### 7.1.3.4 SIGNAL 2 Scores

Each macroinvertebrate family is allocated a score between 1 and 10 to represent their sensitivity to specific environmental conditions and varying levels of pollution. A lower score indicates that the macroinvertebrate family can tolerate a range of environmental conditions and common forms of water pollution; while a higher grade indicates that the macroinvertebrate family is sensitive to most forms of pollution.

The SIGNAL 2 scores recorded within the 2018 aquatic survey (Figure 14, Figure 15) illustrated significant variation. The results for BURD3 and the bed habitat for BURD5 were significantly above the upper WQO. This indicates that there is a large variety of sensitive macroinvertebrates located at these sites. KKSW4 and LNS15 fell within the objective limits. The sample taken at the Stenhouse Dam was below the lower WQO indicating that the site has been exposed to either harsh environmental conditions or water pollution. Factors that can influenced results include alteration to flow conditions at the site and the ephemeral nature of the waterways. Species found in ephemeral waters largely vary with rainfall events and as flow conditions change.

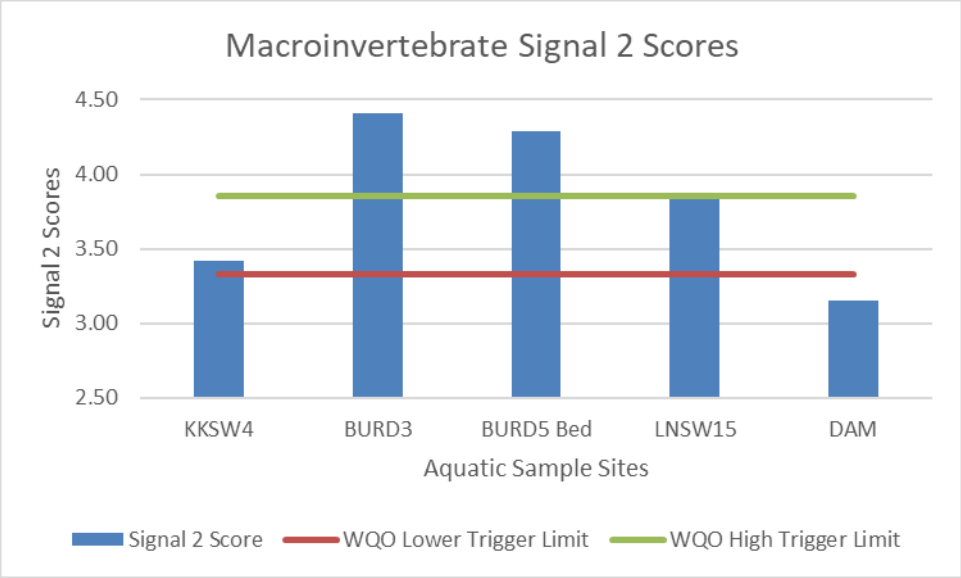


**Figure 14 SIGNAL 2 Scores for each Macroinvertebrate Sample Site**

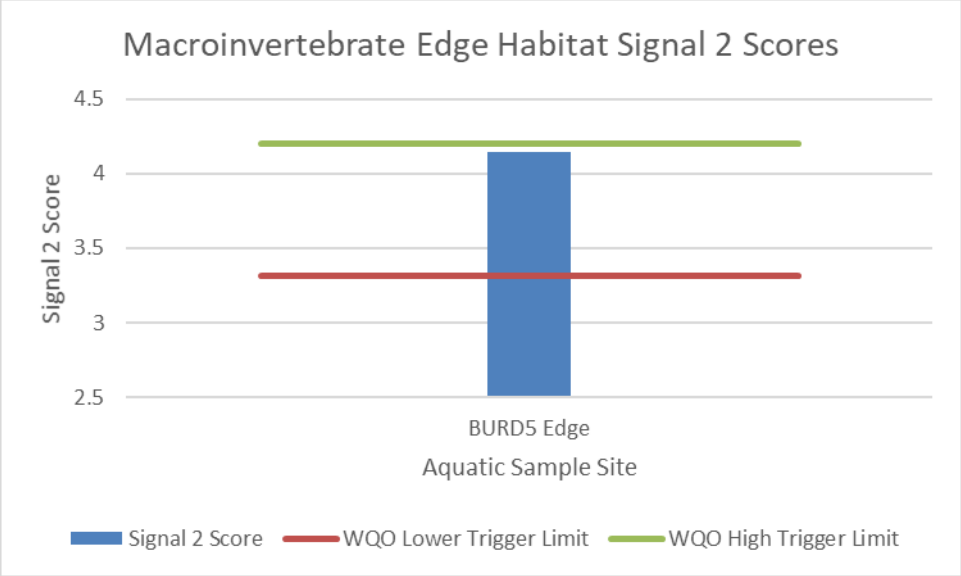


**Figure 15 Signal 2 Score for Macroinvertebrate Edge Habitat**

#### 7.1.3.5 SIGNAL 2 Bi-Plot

A SIGNAL 2 bi-plot was created for the aquatic sites to demonstrate the level of pollution and suitability of the site for macroinvertebrate habitation (Figure 16). Sites that fall into quadrant four exhibit levels of pollutants that reflect urban, industrial, or agricultural pollution. Sites in quadrant three indicate the presence of harsh physical environments or toxic pollution. Sites in quadrant two reflect waters which are high in nutrients or salinity. Sites in quadrant one are indicative of favourable water quality and minimal levels of disturbance. All sites except KKSW4 fell within quadrant 1 which is consistent with the stream water quality results for these sites (Table 16). Each site in quadrant one displays minimal levels of disturbance and exhibits favourable habitat or chemically dilute water. KKSW4 is located in quadrant 3 indicating that this site may be exposed to toxic pollution or harsh physical environments. No pollution was observed at KKSW4, therefore it is likely that harsh physical conditions have resulted in the positioning of this site in quadrant 3.

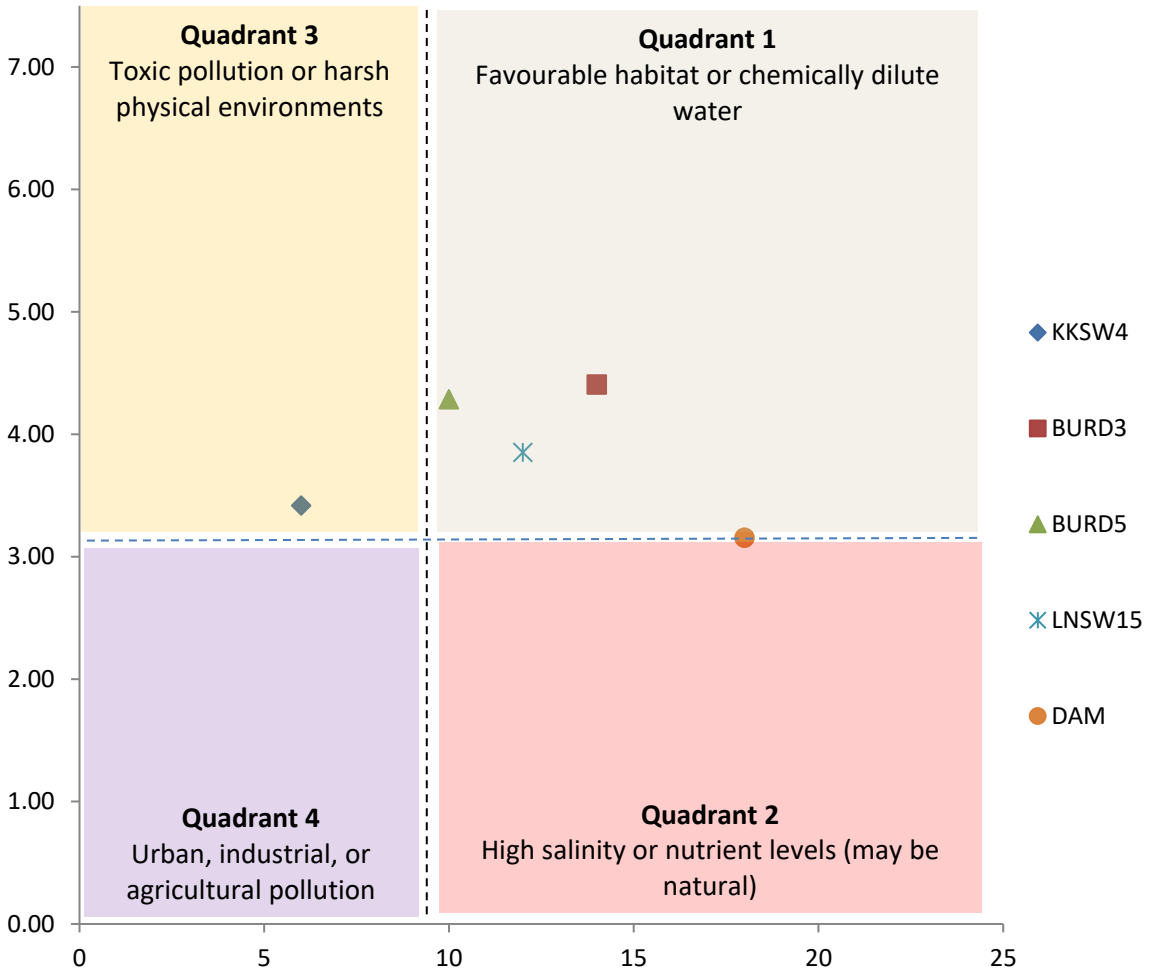


**Figure 16 SIGNAL 2 Bi-Plot**

## 7.2 SURFACE WATER QUALITY

### 7.2.1 Historic Survey Results

Surface water results from the wet and dry season of 2012 are summarised in Table 14 and Table 15 respectively. Surface water results have been compared to the ANZECC (2000) Aquatic Ecosystems Guidelines for 95% species protection for upland river systems in Tropical Australia (ANZECC Guidelines). Water quality sampling could not be completed at two sampling sites (KKSW3 and KKSW8) in the wet season due to an absence of water at the time of the survey.

A pH of 5.0 - 9.0 is ideal for aquatic ecosystem function and extremes above and below these values can be toxic to aquatic flora, fauna and invertebrate assemblages (DERM 2009). Surface water sampling during the wet season identified that pH levels at GVMSW1, GVMSW4, BURD2 and BURD5 exceeded the maximum ANZECC Guideline value of pH8. During the dry season, pH values were exceeded at all aquatic monitoring sites except for KKSW8. The pH of water determines the solubility and biological availability of chemical constituents such as nutrients (phosphorus, nitrogen, and carbon) and heavy metals (lead, copper, cadmium, etc.).

All sites during the 2012 wet season survey apart for BURD5 exceeded the relevant ANZECC Guidelines for specific conductance. During the dry season, specific conductance levels were in exceedance of the guideline values at all sites except for KKSW3. All sites exceeded the ANZECC Guidelines for dissolved oxygen in the wet season, while all but GVMSW4 exceeded the maximum guideline value of 120% in the dry season.

**Table 14 In-situ Water Quality Results from the Wet Season 2012 Aquatic Survey**

| Field Parameter | ANZECC Aquatic Ecosystems WQO | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD3 | BURD5 | BURD2 | KKSW3 | KKSW4 | KKSW8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature (°C) | - | 25.9 | 26.4 | 26.0 | 25.4 | 28.0 | 27.9 | 26.6 | - | 27.0 | - |
| pH (pH units) | 6.5 – 8.0 | 7.75 | 7.25 | 9.51 | 8.23 | 7.64 | 8.46 | 8.75 | - | 7.75 | - |
| Specific Conductance (µS/cm) | 20 - 250 | 396.1 | 401.1 | 962 | 361.3 | 353.3 | 158.6 | 316.6 | - | 554 | - |
| Oxidisation-reduction Potential (mV) | - | 8.1 | -77.8 | 55.0 | 82.7 | 66.7 | 79.7 | 57.5 | - | 25.9 | - |
| Dissolved Oxygen (%) | 90 - 120 | 28.4 | 67.4 | 79.1 | 66.4 | 33.2 | 56.7 | 75.1 | - | 26.6 | - |

Note: Red text indicates an exceedance of the ANZECC (2000) Aquatic Ecosystems Guidelines

**Table 15 In-situ Water Quality Results from the Dry Season 2012 Aquatic Survey**

| Field Parameter | ANZECC Aquatic Ecosystems WQO | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD5 | BURD2 | KKSW3 | KKSW4 | KKSW8 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature (°C) | - | 26.9 | 26.9 | 22.8 | 27.0 | 23.7 | 21.3 | 21.2 | 21.1 | 21.7 | 23.9 |
| pH (pH units) | 6.0 – 8.0 | 8.77 | 8.77 | 8.14 | 8.70 | 8.64 | 8.14 | 8.17 | 8.28 | 7.34 | 9.18 |
| Specific Conductance (µS/cm) | 310 | 799 | 799 | 1157 | 1522 | 553 | 502.4 | 297 | 517 | 922.0 | 817 |
| Oxidisation-reduction Potential (mV) | - | -65.1 | -65.1 | -137.5 | -89.1 | -98.0 | -26.1 | 94.8 | -68.2 | -68.5 | -66.4 |
| Dissolved Oxygen (%) | 85 - 120 | 65.4 | 65.4 | 41.1 | 92.8 | 62.3 | 49.7 | 44.9 | 68.2 | 49.2 | 78.0 |

Note: Red text indicates an exceedance of the ANZECC (2000) Aquatic Ecosystems Guidelines

### 7.2.2 2018 Dry Season Water Quality Results

The results from the 2018 surface water quality analysis were compared to the *Queensland Water Quality Guidelines 2009* (QWQG) Water Quality Objectives (WQOs) (Table 7, Table 8). Due to the ephemeral nature of the waterways, five aquatic monitoring sites could be sampled during this survey period; BURD3, BURD5, DAM, KKSW4 and LNSW15.

Exceedances of the WQOs are highlighted orange in the table below. The sample results indicate exceedances in a variety of physico-chemical parameters including; pH, electrical conductivity (EC) and ammonia concentrations. Analysis showed that there were no exceedances for petroleum hydro-carbons. No dissolved or total metals were found to exceed the relevant WQO at any of the aquatic sites. The pH exceedances were consistent with historic survey data, indicating that this is unlikely due to recent changes in the aquatic environment. Contrary to historical data, no exceedances of the relevant dissolved oxygen (DO) WQO were recorded indicating a temporal improvement to the waterway systems.

**Table 16 2018 Dry Season Water Quality Results and WQOs**

| Parameter | WQO | KKSW4 | BURD3 | BURD5 | STENHOUSE DAM | LNSW15 |
|---|---|---|---|---|---|---|
| **Physico-Chemical Parameters** | | | | | | |
| **pH** | **6.0 - 8** | 7.68 | 8.29 | 8.44 | 8.54 | 8.43 |
| **Temperature (°C)** | **n/a** | 16.5 | 14.6 | 14.1 | 18.4 | 12.1 |
| **EC (µS/cm)** | **<310** | 185 | 514 | 512 | 202 | 399 |
| **Suspended Solids (mg/L)** | **<10** | <5 | <5 | <5 | <5 | <5 |
| **Total Dissolved Solids (mg/L)** | **n/a** | 120 | 334 | 333 | 131 | 259 |
| **Dissolved Oxygen (DO) (%)** | **85-120%** | 95.2 | 90.5 | 92.8 | 101.4 | 90.3 |
| **Oxygen Reduction Potential (mV)** | **n/a** | 115.2 | 127.9 | 104.1 | 95.5 | 102.3 |
| **Turbidity (NTU)** | **<50** | 25.3 | 3.7 | 3.1 | 7.6 | 0.8 |
| **Sulphate as $SO_4$ - Turbidimetric (mg/L)** | **n/a** | 1 | 6 | <1 | 2 | 2 |
| **Total Nitrogen as N (mg/L)** | **<0.5** | 0.5 | 0.1 | 0.1 | 0.3 | 0.2 |
| **Fluoride (mg/L)** | **N/A** | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| **Ammonia (mg/L)** | **<0.02** | 0.03 | 0.05 | 0.02 | 0.04 | <0.01 |
| **Dissolved Metals – compared to WQO for aquatic ecosystem protection** | | | | | | |
| **Arsenic (mg/L)** | **0.013** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Boron (mg/L)** | **0.37** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| **Cadmium (mg/L)** | **0.0002** | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Chromium (mg/L)** | **0.001** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Cobalt (mg/L)** | **-** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Copper (mg/L)** | **0.0014** | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Ferrous Iron (mg/L)** | **-** | 0.27 | <0.05 | <0.05 | <0.05 | <0.05 |
| **Lead (mg/L)** | **0.0034** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

| Parameter | WQO | KKSW4 | BURD3 | BURD5 | STENHOUSE DAM | LNSW15 |
|---|---|---|---|---|---|---|
| **Manganese (mg/L)** | **1.9** | 0.008 | 0.017 | 0.020 | 0.002 | 0.004 |
| **Mercury (mg/L)** | **-** | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Nickel (mg/L)** | **0.011** | 0.003 | <0.001 | <0.001 | 0.004 | <0.001 |
| **Selenium (mg/L)** | **-** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **Vanadium (mg/L)** | **-** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **Zinc (mg/L)** | **0.008** | 0.009 | 0.007 | <0.005 | 0.013 | 0.012 |
| **Total Metals – compared to WQO for livestock drinking protection** | | | | | | |
| **Arsenic (mg/L)** | 5 | 0.002 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Beryllium (mg/L)** | - | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Barium (mg/L)** | - | 0.053 | 0.056 | 0.060 | 0.012 | 0.082 |
| **Cadmium (mg/L)** | 0.01 | 0.0003 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Chromium (mg/L)** | 1 | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Cobalt (mg/L)** | 1 | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Copper (mg/L)** | 0.4 | 0.003 | <0.001 | <0.001 | 0.001 | <0.001 |
| **Lead (mg/L)** | 0.1 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| **Manganese (mg/L)** | n/a | 0.045 | 0.032 | 0.032 | 0.028 | 0.005 |
| **Mercury (mg/L)** | 0.002 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Nickel (mg/L)** | 1 | 0.004 | 0.001 | <0.001 | 0.005 | <0.001 |
| **Selenium (mg/L)** | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **Silver (µg/L)** | n/a | <0.1 | <0.1 | 0.2 | 0.1 | <0.1 |
| **Vanadium (mg/L)** | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **Zinc (mg/L)** | 20 | 0.021 | <0.005 | <0.005 | <0.005 | <0.005 |
| **Boron (mg/L)** | 5 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| **Petroleum Hydrocarbons** | | | | | | |

| Parameter | WQO | KKSW4 | BURD3 | BURD5 | STENHOUSE DAM | LNSW15 |
|---|---|---|---|---|---|---|
| **C6 – C9 Fraction (ug/L)** | **20** | <20 | <20 | <20 | <20 | <20 |
| **C10 – C14 Fraction (ug/L)** | **100** | <50 | <50 | <50 | <50 | <50 |
| **C15 – C28 Fraction (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |
| **C29 – C36 Fraction (ug/L)** | **100** | <50 | <50 | <50 | <50 | <50 |
| **C10 – C36 Fraction (sum) (ug/L)** | **100** | <50 | <50 | <50 | <50 | <50 |
| **C6 - C10 Fraction (ug/L)** | **20** | <20 | <20 | <20 | <20 | <20 |
| **C6 - C10 Fraction minus BTEX (F1) (ug/L)** | **100** | <20 | <20 | <20 | <20 | <20 |
| **>C10 - C16 Fraction (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |
| **>C16 - C34 Fraction (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |
| **>C34 - C40 Fraction (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |
| **>C10 - C40 Fraction (sum) (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |
| **>C10 - C16 Fraction minus Naphthalene (F2) (ug/L)** | **100** | <100 | <100 | <100 | <100 | <100 |

Note: Red shading indicates an exceedance of the *Queensland Water Quality Guidelines* (*2009*) Water Quality Objective

## 7.3 STREAM SEDIMENT QUALITY

### 7.3.1 Historical Sediment Quality Results

Sediment samples were taken at each aquatic site prior to 2018 and were sent to a NATA accredited laboratory for analysis. These results are detailed in the tables below (Table 17, Table 18). The red text indicates that the specific soil parameter exceeded the relevant objective derived from the ANZECC (2000) Interim Sediment Quality Guidelines.

The Project is located in an area with a geological history characterised by increased periods of volcanic activity. The sediment results show chromium, copper, vanadium and nickel are higher in concentration than SQO values across both historical season survey efforts. These results reflect the natural lateritic geology of the area and are most likely attributed to it.

In the wet season of 2012, the ANZECC SQO values for arsenic were exceeded at KKSW3 in the wet season surveys. Arsenic is a naturally occurring element and is often associated with iron oxide metals and sulphide minerals. An environment deemed chemically reduced can often lead to the chemical release of naturally occurring arsenic (Glass & Frenzel 2001). Arsenic may also be released through natural weathering (Glass & Frenzel 2001).

## Table 17 Sediment Results from February 2012 (Wet Season)

| Parameter | ANZECC (2000) SQO | | KKSW3 | | KKSW4 | | KKSW8 | | GVSW1 | | GVSW4 | | LNSW2 | | LNSW15 | | BURD 2 | | BURD3 | | BURD5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 | S1 | S2 |
| Moisture Content (%) | - | - | 22 | 20.2 | 7.9 | 24.3 | 13.3 | 9.8 | 16.9 | 8.7 | 16.3 | 7.7 | 12.8 | 8.6 | 17.3 | 22.8 | 24.3 | 22.4 | 30.8 | 18.4 | 22.6 | 22.7 |
| Arsenic (mg/L) | 20 | 70 | 19 | 30 | <5 | <5 | 11 | 10 | <5 | <5 | 8 | 6 | 10 | 8 | 5 | <5 | 9 | 10 | <5 | <5 | <5 | <5 |
| Barium (mg/L) | - | - | 160 | 80 | 20 | 60 | 160 | 430 | 20 | 50 | 540 | 130 | 220 | 140 | 40 | 30 | 90 | 90 | 100 | 70 | 50 | 50 |
| Beryllium (mg/L) | - | - | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Cadmium (mg/L) | 1.5 | 10 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Chromium (mg/L) | 80 | 370 | 158 | 176 | 8 | 60 | 53 | 43 | 94 | 65 | 171 | 175 | 220 | 99 | 32 | 40 | 50 | 59 | 34 | 30 | 31 | 31 |
| Cobalt (mg/L) | - | - | 51 | 52 | <2 | 8 | 58 | 158 | 13 | 25 | 79 | 33 | 44 | 78 | 8 | 8 | 33 | 33 | 14 | 13 | 10 | 9 |
| Copper (mg/L) | 65 | 270 | 92 | 107 | <5 | 21 | 94 | 134 | 18 | 16 | 28 | 20 | 19 | 18 | 10 | 8 | 70 | 86 | 26 | 19 | 14 | 13 |
| Lead (mg/L) | - | - | 14 | 16 | <5 | 8 | 6 | 8 | <5 | <5 | 16 | 11 | 9 | 7 | <5 | <5 | 7 | 9 | 7 | 6 | <5 | <5 |
| Manganese (mg/L) | - | - | 1540 | 1450 | 49 | 134 | 1500 | 3350 | 267 | 523 | 2720 | 961 | 1540 | 1110 | 210 | 207 | 892 | 837 | 559 | 487 | 254 | 224 |
| Nickel (mg/L) | 21 | 52 | 117 | 106 | 4 | 31 | 39 | 55 | 33 | 41 | 105 | 68 | 87 | 182 | 17 | 14 | 38 | 41 | 24 | 18 | 20 | 19 |
| Vanadium (mg/L) | -- | | 208 | 206 | 10 | 43 | 164 | 175 | 27 | 33 | 78 | 55 | 52 | 57 | 28 | 20 | 134 | 161 | 52 | 45 | 36 | 35 |
| Zinc (mg/L) | 200 | 410 | 56 | 71 | 5 | 28 | 70 | 85 | 17 | 21 | 18 | 14 | 17 | 18 | 15 | 10 | 48 | 58 | 29 | 23 | 20 | 18 |
| Mercury (mg/L) | 0.15 | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

Red text = concentration above ANZECC (2000) Low SQO
S1 = Sample 1
S2 = Sample 2

## Table 18 Sediment Results from August 2012 (Dry Season)

| Parameters | Trigger Limits | | KKSW4 | KKSW3 | KKSW8 | BURD 2 | BURD 5 | GVMS W1 | GUMSW4 | LNSW 15 | LNSW 2 | STENHOUSE DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low ISQG | High ISQG | | | | | | | | | | |
| Moisture Content (%) | - | - | 23.2 | 30.2 | 33 | 33.9 | 22.3 | 22.4 | 24.1 | 23.9 | 21.4 | 18.9 |
| Barium (mg/L) | - | - | 40 | 50 | 120 | 110 | 20 | 40 | 120 | 30 | 180 | 20 |
| Beryllium (mg/L) | 1.5 | 10 | <1 | <1 | <1 | 2 | <1 | <1 | <1 | <1 | <1 | <1 |
| Cobalt (mg/L) | 80 | 370 | 5 | 24 | 73 | 13 | 8 | 16 | 32 | 36 | 82 | 21 |
| Manganese (mg/L) | - | - | 69 | 662 | 1500 | 306 | 144 | 585 | 1020 | 639 | 1960 | 223 |
| Vanadium (mg/L) | 65 | 270 | 25 | 183 | 185 | 70 | 17 | 21 | 62 | 63 | 114 | 33 |
| Arsenic (mg/L) | - | - | <5 | 20 | 10 | 5 | <5 | <5 | <5 | <5 | 9 | <5 |
| Cadmium (mg/L) | - | - | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Chromium (mg/L) | 21 | 52 | 27 | 132 | 86 | 54 | 19 | 47 | 62 | 254 | 299 | 115 |
| Copper (mg/L) | - | - | 8 | 97 | 92 | 20 | <5 | 9 | 16 | 25 | 20 | 20 |
| Lead (mg/L) | 200 | 410 | 5 | 13 | 10 | 17 | <5 | <5 | 6 | <5 | 9 | <5 |
| Nickel (mg/L) | 0.15 | 1 | 13 | 89 | 66 | 30 | 8 | 26 | 24 | 148 | 233 | 113 |
| Zinc (mg/L) | - | - | 14 | 74 | 70 | 50 | 8 | 11 | 18 | 26 | 22 | 16 |
| Mercury (mg/L) | - | - | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

Red text = concentration above ANZECC (2000) Low SQO

### 7.3.2 2018 Stream Sediment Quality Results

The results from the 2018 sediment quality analysis are displayed below in Table 19, Table 20, and Table 21 along with the relevant low and high SQO derived from the ANZECC (2000) Interim Sediment Quality Guidelines. Orange shading highlights exceedances of the SQO (low) value, red indicates exceedances in the SQO (high). There were several exceedances for nickel levels of both the low and high SQO. Exceedances of copper and chromium were shown to be in excess of the low SQO. Aquatic site LNSW5 showed exceedances for the high SQO for both chromium and nickel by significant concentrations.

**Table 19 Sediment Total Metals and Major Ions Analysis**

| Site ID | Total Metals (mg/kg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Zinc |
| SQG-Low | 20 | 1.5 | 80 | 65 | 50 | 0.15 | 21 | 200 |
| SQG-High | 70 | 10 | 370 | 270 | 220 | 1 | 52 | 410 |
| BURD2 | 6.71 | 0.3 | 56.8 | 94.2 | 9.6 | <0.01 | 62.9 | 74.5 |
| BURD3 | 1.98 | <0.1 | 26.2 | 10.1 | 4.2 | <0.01 | 10.4 | 13.7 |
| BURD5 | 3.08 | <0.1 | 24.6 | 10.2 | 8.0 | <0.01 | 13.0 | 14.7 |
| GVMSW1 | 1.20 | <0.1 | 96.6 | 17.2 | 5.3 | <0.01 | 43.1 | 20.0 |
| GVMSW4 | 7.36 | <0.1 | 105 | 17.6 | 9.4 | <0.01 | 37.9 | 14.4 |
| KKSW3 | 15.3 | 0.1 | 169 | 82 | 14.6 | <0.01 | 97.3 | 59.3 |
| KKSW4 | 1.4 | <0.1 | 9.0 | 1.3 | 1.6 | <0.01 | 5.1 | 3.4 |
| KKSW8 | 7.37 | 0.4 | 48.4 | 125 | 9.3 | <0.01 | 74.3 | 93.3 |
| DAM | 2.53 | <0.1 | 257 | 57.9 | 1.2 | <0.01 | 174 | 21.0 |
| LNSW2 | 6.07 | <0.1 | 71.8 | 13.5 | 10.8 | <0.01 | 86.2 | 15.4 |
| LNSW5 | 2.06 | <0.1 | 598 | 38.3 | 1.1 | 0.02 | 131 | 27.6 |
| LNSW15 | 6.38 | <0.1 | 45.9 | 7.4 | 4.4 | <0.01 | 20 | 10.8 |

**Table 20 Sediment Particle Size Analysis**

| Site ID | Particle Sizing (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | +75 µm | +150 µm | +300 µm | +425 µm | +600 µm | +1.18 mm | +2.36 mm | +4.75 mm | +9.5 mm | +19.0 mm | +37.5 mm | +75 mm |
| BURD2 | 94 | 87 | 76 | 64 | 48 | 25 | 16 | 12 | 7 | <1 | <1 | <1 |
| BURD3 | 85 | 65 | 37 | 28 | 24 | 14 | 5 | 1 | <1 | <1 | <1 | <1 |
| BURD5 | 94 | 81 | 50 | 44 | 41 | 32 | 14 | 4 | <1 | <1 | <1 | <1 |
| GVMSW1 | 98 | 98 | 96 | 90 | 79 | 54 | 33 | 17 | <1 | <1 | <1 | <1 |
| GVMSW4 | 98 | 98 | 96 | 90 | 80 | 59 | 32 | 8 | <1 | <1 | <1 | <1 |
| KKSW3 | 52 | 48 | 44 | 40 | 37 | 29 | 20 | 12 | 6 | <1 | <1 | <1 |
| KKSW4 | 98 | 98 | 97 | 93 | 84 | 56 | 35 | 21 | 10 | <1 | <1 | <1 |
| KKSW8 | 95 | 92 | 79 | 66 | 53 | 37 | 27 | 17 | 11 | <1 | <1 | <1 |
| DAM | 57 | 48 | 42 | 39 | 37 | 33 | 26 | 16 | <1 | <1 | <1 | <1 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LNSW2** | 97 | 96 | 95 | 94 | 93 | 87 | 72 | 47 | 10 | <1 | <1 | <1 |
| **LNSW5** | 93 | 90 | 79 | 68 | 56 | 37 | 22 | 12 | 2 | <1 | <1 | <1 |
| **LNSW15** | 100 | 99 | 97 | 88 | 68 | 32 | 13 | 3 | <1 | <1 | <1 | <1 |

**Table 21 Sediment Particle Size Classification**

| Site ID | Classification Based on Particle Size (%) | | | |
|---|---|---|---|---|
| | Fine (<75µm) | Sand (0.06-2.00 mm) | Gravel (>2 mm) | Cobbles (>6 cm) |
| **BURD2** | 6 | 76 | 18 | <1 |
| **BURD3** | 15 | 77 | 8 | <1 |
| **BURD5** | 6 | 74 | 20 | <1 |
| **GVMSW1** | 2 | 60 | 39 | <1 |
| **GVMSW4** | 2 | 58 | 40 | <1 |
| **KKSW3** | 48 | 29 | 23 | <1 |
| **KKSW4** | 2 | 57 | 41 | <1 |
| **KKSW8** | 5 | 65 | 30 | <1 |
| **DAM** | 43 | 29 | 28 | <1 |
| **LNSW2** | 3 | 21 | 76 | <1 |
| **LNSW5** | 7 | 67 | 26 | <1 |
| **LNSW15** | <1 | 80 | 19 | <1 |

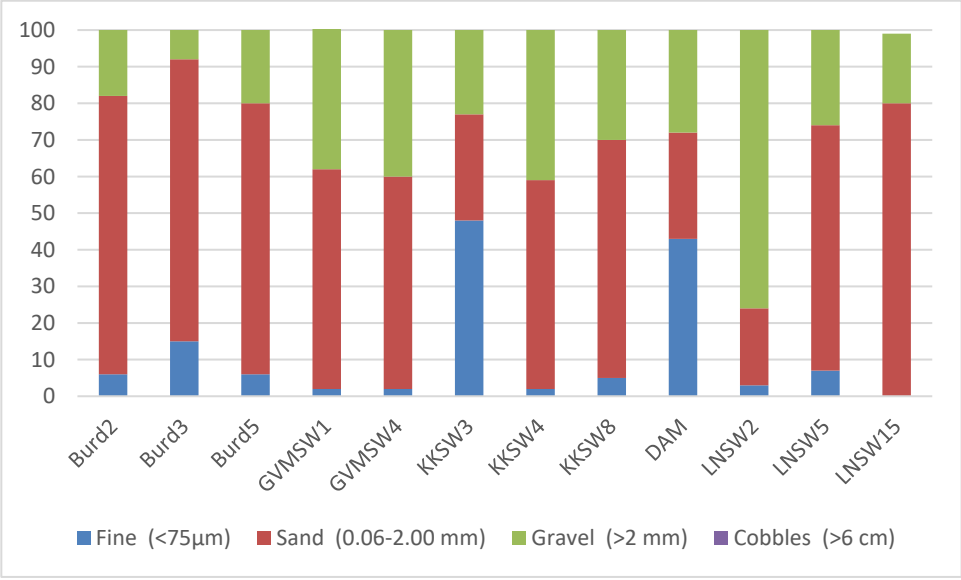


**Figure 17 Sediment Particle Size Analysis Across Aquatic sites**

## 7.4 FLORA ASSESSMENT

The aquatic ecosystems located on and around the Project are of high value to terrestrial fauna species which use these habitats for various stages of their lifecycle. Riparian areas are particularly important as they are used as natural corridors by fauna and provide ecological connections across large areas of land (DSEWPC 2012). The impacts of cattle grazing on the assemblage of riparian vegetation was evident at some sites but generally, the quality of the riparian habitats was good.

KKSW4 and BURD2 recorded the highest diversity and abundance of native species, a high percentage of groundcover and little disturbance from cattle grazing. The effects of cattle grazing were moderate at KKSW8 and KKSW3. Macrophyte presence was recorded at most sites with KKSW8 recording the greatest diversity of instream flora species.

Greenvale and Lucknow sites were impacted by cattle grazing, with BURD3 and BURD5 heavily grazed and large infestations of introduced plant species such as Mexican Poppy (*Argemone ochroleuca*). This area of the Burdekin River was lined with mature Eucalypt and Casuarina species with large numbers of hollows and overhangs. GVMSW1 and the Stenhouse Dam held the highest riparian values, as the Stenhouse Dam had large stands of mature tree species surrounding the site. GVMSW1 recorded high quality aquatic habitat likely due to the diverse range of habitat features in and along the stream, including a well-vegetated riparian area.

The vegetation community composition at the aquatic monitoring sites is characterised by four regional ecosystems. RE 9.3.1, 9.3.17, 9.3.5 and 9.3.22 are associated to riparian ecosystems and have a DES Biodiversity Status listing of 'Of Concern' and a Vegetation Management Act Class (VM Act Class) listing of 'Least Concern'.

### 7.4.1 Site Habitat Description

A comprehensive flora species list can be found in Appendix C. This species list illustrated the floristics of the riparian communities found on the Project sites. Overall, 187 flora species intrinsically linked to aquatic ecosystems were recorded during the aquatic surveys.

#### 7.4.1.1 River Red Gum Fringing Woodland

The ecological community found predominantly along watercourses associated with the Project is River Red Gum (*Eucalyptus camaldulensis*) fringing woodland (Photo Plate 1). In most cases, mature stands of this species existed with high percentages of canopy cover and many hollows providing suitable habitat for a range of species. The fringing woodland usually consists of a second tree layer strongly dominated by the River She-Oak (*Casuarina cunninghamiana*) and a third tree layer dominated by *Melaleuca sp*. (*Melaleuca leucadendra, Melaleuca viminalis*) with the occasional Sandpaper Fig (*Ficus opposita*). This ecological community is classified under the DES RE descriptions; information provided by this database is illustrated in Table 22.

This RE is particularly vulnerable to the invasion of introduced shrub and ground layer specialists. DES has recognised that 9.3.1 is particularly susceptible to invasion by Red Natal grass (*Melinis repens*), Thornapple (*Xanthium pungens*), Paddy's Lucerne (*Sida rhombifolia*) and Cobbler's Peg (*Bidens pilosa*), all of which were recorded in this community. The quality of this ecosystem differed between sites. Site specific descriptions have been compiled in Appendix B.

**Photo Plate 1 River Red Gum Fringing Woodland on the Burdekin River**

**Table 22 DES Regional Ecosystem description for the Blue Gum and River Red Gum Fringing Woodland**

| | |
|---|---|
| **Regional Ecosystem** | 9.3.1 |
| **Short Description** | *Eucalyptus camaldulensis* or *Eucalyptus tereticornis* +/- *Casuarina cunninghamiana* +/- *Melaleuca spp*. fringing woodland on channels and levees. Generally on eastern flowing rivers |
| **VM Act Class** | Least Concern |
| **Biodiversity Status** | Of Concern |
| **Sites of occurrence** | KKSW4, BURD3, BURD5, LNSW15, DAM, GVMSW1, GVMSW4, LNSW2, LNSW5, LNSW15 |

#### 7.4.1.2 River She-Oak and Blue Gum Open Woodland on Basalt Flows

This ecological community was noted at BURD2 (Photo Plate 2). Basalt boulders and bedrock were evident along the riparian areas and a large area of basalt scree was evident on the eastern bank. The vegetation differed as the Blue Gum (*Eucalyptus tereticornis*) was dominant in the first tree layer and River She-Oak and juvenile Blue Gum were co-dominant in the second tree layer. The third tree layer was co-dominant *Melaleuca viminalis* and *Melaleuca leucadendra*. The vegetation on the basalt scree differed slightly to surrounding RE with occasional Narrow-leaved Ironbark (*Eucalyptus crebra*) and Brown's Box (*Eucalyptus brownii)* present.

This ecological community is classified under the DES RE descriptions; information provided by this database is illustrated in Table 23.

This ecological community at BURD2 could be classified as having good biological health. The riparian areas were well vegetated, displaying little erosion and a variety of morphological elements were present within the stream. Detailed site-specific descriptions have been compiled in Appendix B.

**Photo Plate 2 River She-Oak and Blue Gum Open Woodland on Basalt Flows at BURD2**

**Table 23 DES Regional Ecosystem description for the River She-Oak and Blue Gum Open Woodland on Basalt Flows**

| | |
|---|---|
| **Regional Ecosystem** | 9.3.17 |
| **Short Description** | *Eucalyptus camaldulensis* or *Eucalyptus tereticornis* +/- *Melaleuca spp*. fringing woodland on channels and levees on basalt flows |
| **VM Act Class** | Least Concern |
| **Biodiversity Status** | Of Concern |
| **Sites of occurrence** | BURD2 |

#### 7.4.1.3 Brown's Box, Narrow-leaved Ironbark and Poplar Gum Open Woodland

This RE was noted at KKSW8 (Photo Plate 3). The first tree layer was dominated by Brown's Box (*Eucalyptus brownii*) and occasional Narrow-leaved Ironbark (*Eucalyptus crebra*), Poplar Gum (*Eucalyptus platyphylla*) and Clarkson's Bloodwood (*Corymbia clarksoniana*). The second tree layer was dominated by Northern Swamp Mahogany (*Lophostemon grandiflorus*) with occasional River She-

Oak and the third, dominated by Black Tea Tree (*Melaleuca bracteata*). Macrophytes (*Myriophyllum sp*. and *Azolla filiculoides*) and Sedges (*Cyperus conicus* and *Cyperus trinercis*) were abundant in and around the large pool evident at this site. The ground cover of the banks was dominated by Kangaroo Grass (*Themeda triandra*) and Black Spear Grass (*Heteropogon contortus*). This ecological community is classified under the DES RE descriptions; information provided by this database is illustrated in Table 24.

**Photo Plate 3 Brown's Box, Narrow-leaved Ironbark and Ghost Gum Open Woodland at KKSW8**

**Table 24 DES Regional Ecosystem description for Brown's Box, Narrow-leaved Ironbark and Ghost Gum Open Woodland**

| | |
|---|---|
| **Regional Ecosystem** | 9.3.5 |
| **Short Description** | *Eucalyptus brownii* open woodland to woodland +/- *Eucalyptus spp*. +/- *Corymbia spp*. on alluvial plains |
| **VM Act Class** | Least Concern |
| **Biodiversity Status** | Of Concern |
| **Sites of occurrence** | KKSW8 |

#### 7.4.1.4 Narrow-leaved Ironbark, Poplar and Dallachy's Gum Open Woodland

This RE was noted at KKSW3, a watershed to the Burdekin River (Photo Plate 4). This RE was heavily impacted by cattle movements and grazing, bank erosion and the invasion of floral pest species. The first tree layer was co-dominated by Poplar Gum (*Eucalyptus platyphylla*) and Dallachy's Gum (*Corymbia dallachiana*). Occasional Blue Gum, Moreton Bay Ash (*Corymbia tessellaris*) and Spotted Gum (*Corymbia citriodora*) with associated Clarkson's Bloodwood (*Corymbia clarksoniana*) were present in the second tree layer. Both the first and second tree layers consisted of mature stands of *Corymbia spp*. and *Eucalyptus spp*. The third tree layer was dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*) and occasional Western Silver Wattle (*Acacia decora*) and Swamp Mahogany (*Lophostemon suaveolens*). The ground layer was co-dominated by Giant Speargrass (*Heteropogon triticeus*) and Black Speargrass (*Heteropogon contortus*) with associated Grader Grass (*Themeda quadrivalus*). The ground layer in some areas was heavily disturbed and no aquatic plant species were noted in the site survey.

This ecological community is classified under the DES RE descriptions; information provided by this database is illustrated in Table 25.

**Photo Plate 4 Narrow-leafed Ironbark, Poplar and Dallachy's Gum Open Woodland at KKSW3**

**Table 25 DES Regional Ecosystem description for Narrow-leaved Ironbark, Poplar and Dallachy's Gum Open Woodland**

| | |
|---|---|
| **Regional Ecosystem** | 9.3.22 |
| **Short Description** | *Eucalyptus crebra (sens. lat.)* or *Eucalyptus cullenii* dominated woodland +/- *Corymbia spp*. or *Eucalyptus spp*. on alluvial plains |

| | |
|---|---|
| **VM Act Class** | Least Concern |
| **Biodiversity Status** | Of Concern |
| **Sites of occurrence** | KKSW3 |

### 7.4.2 Communities of Conservation Significance

All vegetation communities associated with the riparian habitats of the survey sites have a DES Biodiversity Status of 'Of Concern' and a Vegetation Management Act Class Act of 'Least Concern'.

Biodiversity status is a Queensland State Government designation used to class REs with 10 – 30% of the pre-clearing extent remaining unaffected by moderate degradation and/or biodiversity loss.

### 7.4.3 Flora Species of Conservation Significance

No flora species of conservation significance were noted during the aquatic ecology assessment for the Project.

### 7.4.4 Introduced Plant and Weed Species

Numerous introduced plant species were identified within riparian habitats located on the Project site and in local watercourses. These species are listed below in Table 26. Of use in identifying pest species was the comprehensive list of significant plant pests and diseases provided by the DAF.

Introduced plant species are classified by the Australian Government as Weeds of National Significance (WoNS) if they present a serious threat to industry, water supply, human health/safety, plant communities and/or cultural values.

Under the *Biosecurity Act 2014*, invasive plant species can be listed as a Prohibited Biosecurity Matter or a Restricted Biosecurity Matter based the threats they pose to the environment. Restricted Biosecurity matters are classified into seven categories each with different restrictions on the dealings with the matter or the required actions to be taken to minimise the spread of the species.

A total of 48 introduced flora species intrinsically linked to the aquatic environment in and around the Project site were identified during field surveys. Of these species, Velvety Tree Pear (*Opuntia tomentosa*) and Parthenium (*Parthenium hysterophorus*) are listed as WoNS. These two species are also listed as Category three Restricted Biosecurity Matters under the *Biosecurity Act 2014*.

Under the *Biosecurity Act 2014*, any category three Restricted Biosecurity Matter must not be distributed under any circumstances unless the distribution or dispersal is authorised in a regulation or under a permit.

**Table 26 Introduced Species of the Project Site**

| ***Scientific Name*** | **Common Name** | **EPBC Act Status** |
|---|---|---|
| *Ageratum houstonianum* | Blue Billy Goat Weed | NL |
| *Argemone ochroleuca* | Mexican Poppy | NL |
| *Asclepias curassavica* | Redhead Cottonbush | NL |
| *Bothriochloa pertusa* | Indian Blue Grass | NL |

| *Scientific Name* | Common Name | EPBC Act Status |
|---|---|---|
| *Bryophyllum daigremontianum* | Mother of Thousands | NL |
| *Bursaria spinosa* | Sweet Bursaria | NL |
| *Callistemon viminalis* | Weeping Bottlebrush | NL |
| *Cardamine flexuosa* | Wood Bitter-cress | NL |
| *Cenchrus ciliaris* | Buffel Grass | NL |
| *Conyza sumatrensis* | Tall Fleabane | NL |
| *Cynodon dactylon* | Couch | NL |
| *Cyperus brevifolius* | Mullumbimby Couch | NL |
| *Cyperus rotundus* | Nutgrass | NL |
| *Datura inoxia* | Downy Thornapple | NL |
| *Dichanthium annulatum* | - | NL |
| *Dichanthium aristatum* | Angleton Grass | NL |
| *Digitaria ciliaris* | Summer Grass | NL |
| *Echinochloa colona* | Awnless Barnyard Grass | NL |
| *Eclipta prostrata* | - | NL |
| *Heliotropium indicum* | Heliotrope | NL |
| *Malvastrum americanum* | Spiked Malvastrum | NL |
| *Malvastrum coromandelianum* | | NL |
| *Maytenus cunninghamii* | Yellow-berry Bush | NL |
| *Mecardonia procumbens* | - | NL |
| *Megathyrsus maximus* | Green Panic | NL |
| *Megathyrsus maximus* var. *pubiglumis* | - | NL |
| *Melinis repens* | Red Natal Grass | NL |
| *Mimosa pudica* | Sensitive Weed | NL |
| *Ocimum basilicum* | Basil | NL |
| *Opuntia tomentosa* | Velvety Tree Pear | WoNS |
| *Parthenium hysterophorus* | Parthenium | WoNS |
| *Pimelea* sp. possibly *P. haematostachya* | - | NL |
| *Polygonum aviculare* | Hogweed | NL |
| *Schoenoplectus lateriflorus* | - | NL |
| *Senna occidentalis* | Coffee Denna | NL |
| *Senna pendula* var. *glabrata* | Easter Cassia | NL |
| *Sida cordifolia* | Flannel Weed | NL |
| *Sida spinosa* | Spiked Sida | NL |
| *Solanum nigrum* | Black Nightshade | NL |
| *Solanum torvum* | Devil's Fig | NL |
| *Sonchus oleraceus* | Annual Snowthistle | NL |
| *Sporobolus jacquemontii* | American Rat's Tail Grass | NL |
| *Stylosanthes hamata* | Caribbean Stylo | NL |
| *Stylosanthes scabra* | Shrubby Stylo | NL |
| *Themeda quadrivalvis* | Grader Grass | NL |
| *Triumfetta pentandra* | - | NL |
| *Urochloa mosambicensis* | Sabi Grass | NL |
| *Vachellia farnesiana* | Mimosa | NL |

NL = Not Listed, WoNS = Weed of National Significance

## 7.5 FLORA OF CONSERVATION SIGNIFICANCE:

No threatened flora species intrinsically linked to the aquatic environment of the Project site were identified during the survey period. Although potentially suitable habitat exists on the site for a small number of threatened flora species, this and historic targeted surveys were unable to locate these species. As a result, the proposed Project is highly unlikely to impact on any aquatic/riparian flora species of conservation significance. Database searches identified seven threatened flora species associated with aquatic ecosystems within the region of the Project site. An assessment of the likelihood of these species occurring on the Project site is provided in Table 27.

**Table 27 Flora Species of Conservation Significance from the Project Region**

| *Scientific Name* Common Name | Conservation Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|
| | EPBC Act | NC Act | | |
| *Aponogeton bullosus* | E | E | This species occurs in shallow, cool, fast flowing rivers and streams usually on granite or sand surfaces. This species distribution is confined to north-eastern Queensland, from Innisfail to the Atherton Tableland (DES 2017). | **Unlikely:** Although this species was not identified during field surveys or within a 25 km buffer of the Project site, suitable habitat for this species exists in the Burdekin River up and downstream of the Project site. However, this the Project site does not fall within this species known distribution, therefore it is not expected that Project activities will have an impact on this species. |
| *Arytera dictyoneura* | - | NT | This species has been recorded throughout Queensland in semi-evergreen rainforests, granite boulder slopes and granite derived soil (DES 2018). It occurs in closed forests in the southern half of its distribution. | **Unlikely:** This species has been associated with wetlands and watercourses, however, it is typically found in rainforest habitats. This species was not recorded in the 25 km search and is therefore unlikely to be impacted by the Project. |
| *Cyperus cephalotes* | E | E | This species is known from aquatic habitats usually in association with *Salvinia* spp. (DES 2018). It occurs on floating islands in rivers with entangled roots growing in a mass of decaying vegetation. | **Unlikely:** Habitat for this species does not exist within the waterways associated with the Project site. Further, the Project does not fall within this species know distribution. The Project is not expected to significantly impact this species. |
| *Eleocharis retroflexa* | V | V | This species occurs in freshwater aquatic environments in North Eastern Queensland. It grows underwater only becoming visible above surface during June and October when it develops flowers (DES 2017). | **Unlikely:** According to the habitat description for this species, flowering coincided with the August 2012 and 2018 aquatics surveys. This species was not observed during these surveys and was not recorded within 25 km of the Project site. It is not expected that mining activity will have a significant impact on this species. |

| ***Scientific Name*** **Common Name** | **Conservation Status** | | **Habitat Description** | **Likelihood of Impact** |
|---|---|---|---|---|
| | **EPBC Act** | **NC Act** | | |
| *Oenanthe javanica* | - | NT | Aquatic plant known from Valley of Lagoons in shallow streams approximately 1m deep. Occurs in variety of wetlands including marshes, low-lying wet grounds and the sides of streams in deciduous and evergreen forests (IUCN 2016). | **Unlikely:** This species was not recorded in the 25km Search. Suitable habitat for this species may exist within the waterways associated to the Project site. However, disturbance activities within the Project site will not impact this species. It is not expected that mining activity will have a significant impact on this species. |
| *Paspalidium udum* | - | V | Endemic to Australia, but only occurs in two populations near Townsville. This species is the dominant groundcover in water-filled sink holes in rugged-basalt. Usually found in shallow water. | **Unlikely:** The Project site is not within this species distribution. Suitable habitat for this species does not exist within the Project site. It is not expected that mining activity will have a significant impact on this species. |
| *Phaius australis* Lesser Swamp-orchid | E | E | Endemic to Australia occurs in Southern Qld and Northern NSW, this species is associated with coastal wet heath/sedge land wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark (*Melaleuca leucadendra*) or Swamp Mahogany (*Eucalyptus robusta*) are found. Less commonly, the species has been found in drier forest near the coast (DES 2017). | **Unlikely:** The Project site does not occur within this species distribution. This species was not recorded in the 25 km of the Project site. Suitable habitat for this species does not exist on the Project site. It is not expected that mining activity will have a significant impact on this species. |
| *Phaius pictus* | V | V | This species occurs in north-east Queensland from the McIlwraith Range, Bloomfield River to the Kirrama Range. This species is restricted to altitudes above 600 m and is only found in rainforests (DoE 2008). | **Unlikely:** Suitable habitat for this species does not exist within the Project site. No rainforest exists within any of the tenements. It is not expected that mining activity will have a significant impact on this species. |

| *Scientific Name* Common Name | Conservation Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|
| | EPBC Act | NC Act | | |
| *Phalaenopsis amabilis* subsp. *rosenstromii* | E | E | It is known to grow in trees, rarely on rocks, in humid airy situations on sheltered slopes and in gullies, in deep gorges and close to streams in rainforests, at altitudes from 200–500 m. Population numbers and extent of occurrence are unknown. There are only a few recorded collections (Queensland Herbarium, 2008). This species has been recorded in Daintree National Park, Iron Range National Park and Mt Spec National Park (Briggs and Leigh, 1996). This species occurs within the Cape York Peninsula, Wet Tropics and Burdekin (Queensland) Natural Resource Management Region (DoE 2017). | **Possible:** Suitable habitat for this species exists within the Project site. The Project site occurs at altitudes within the range for this species. The likelihood of impact to this species is possible because the exact distribution is unknown, and habitat features which resemble that of suitable habitat for this species exist on the Project site. However, this species was not recorded during either terrestrial or aquatic ecological surveys within and around the Project site. |

Key:

| | |
|---|---|
| NL | Not listed |
| LC | Least Concern |
| NT | Near Threatened |
| V | Vulnerable |
| E | Endangered |
| CE | Critically Endangered |

## 7.6 AQUATIC FAUNA

## 7.7 FAUNA ASSESSMENT

Aquatic surveys have identified a variety of fauna species intrinsically linked to aquatic environments during the wet and dry seasons of 2012 and the dry season of 2018 aquatic ecology surveys.

### 7.7.1 Crustaceans

Aquatic invertebrates are not listed under the *Nature Conservation Act 1992* or the *Environment Protection and Biodiversity Conservation Act 1999*. This is due to the lack of knowledge about this species-rich component of Australia's fauna.

Six species of crustaceans were recorded during the aquatic ecology assessment. Sites characterised by open, slow-flowing water such as the Burdekin River and the Stenhouse Dam included yabby species such as the Red-claw Crayfish (*Cherax quadricarinatus*) and Orange-fingered Yabby (*Cherax depressus*). During the wet season surveys, a high abundance of Inland Freshwater Crabs (*Austrothelphusa transversa*) were recorded at LNSW2 and GVMSW4. This species was only captured at sites with sandy, gravel substrate and standing waters. This species was not recorded during the dry season as their mechanism of desiccation resistance involves burrowing to a depth where the soil is damp. Two shrimp species were recorded within the Burdekin River. Glass Shrimp (*Paratya australiensis*) and Indistinct Caridina (*Caridina indistincta*) were recorded at BURD2 and BURD5.

### 7.7.2 Bivalves

One species of Australian freshwater mussel (Bivalvia: Hyriidae) was recorded at two Kokomo survey sites (BURD2 and KKSW4). At BURD2, a water rat (Hydromys chrysogaster) feeding table was present and a collection of Hyridella sp. shells was evident.

### 7.7.3 Aquatic Vertebrates

A moderate diversity of fish species was recorded during the aquatic surveys within the waterways associated to the Project site. Pusey et al. (1998) recorded a low diversity of freshwater fish in their study of the Burdekin River. During this survey spanning three years, only 25 species of fish were recorded. This low diversity does not necessarily reflect the quality of the Burdekin River and its associated watercourses. Generally, Australian freshwater systems naturally experience low levels of fish diversity due to natural barriers, climatic variation, land disturbance and geological change.

Whilst it is common for small, intermittent streams to lack fish species, two sites (KKSW8 and GVMSW1) recorded clear slow flowing water and a diverse range of habitat features such as logs, macrophytes, substrates, debris and detritus (Closs et al., 2004). A large number of fish species were visible in these streams which were not heavily impacted by cattle and contained a variety of habitat features. Sites which were heavily affected by cattle grazing, such as KKSW3, recorded the lowest fish diversity due the degraded nature of the stream beds and riparian areas. The maintenance of watercourses associated with the Burdekin River is important as this major Queensland catchment is a source of water for agriculture and industry, whilst sustaining a variety of ecological communities downstream.

#### 7.7.3.1 Native Fish

Australia yields a low diversity of freshwater fish species predominantly due to its large areas of arid and semi- arid land, as well as the ephemeral nature of large areas of catchments (Allen et al. 2002). Defining freshwater fish in Australia is notably difficult, largely due to the marine ancestry of all but 4

species. As such, the definition established by the Action Plan for Freshwater Fishes (Wager & Jackson 1993) will classify fish species in this report.

Due to the ephemeral nature of the waterways present within the Project site, the overall habitat available to freshwater species is relatively low. For most of the year, the waterways on site are vastly unconnected with other aquatic habitats. This results in shallow, still pools of water, with limited refuge, breeding or feeding areas.

Overall, ten fish species were detected in the wet and dry season surveys. Eight of these species are native to Australian waters. All fish caught during the trapping efforts showed no visible signs of abnormality or disease. All sites where trapping was conducted, recorded the presence of at least one fish species.

In the wet season of 2012, the Sleepy Cod (*Oxyeleotris lineolata*) was recorded at 4 of 6 sampling sites. Three of these sampling sites were smaller watercourses. The Sooty Grunter (*Hephaestus fuliginosus*) and Spangled Perch (*Leiopotherapon unicolor*) was recorded at BURD3 and BURD5.

**Photo Plate 5 Sooty Grunter (*Hephaestus fuliginosus*) caught at BURD5**

During the dry season surveys, the Spangled Perch (*Leiopotherapon unicolor*) was recorded at 5 of 8 sampling sites. The site KKSW8 recorded the highest species diversity in the dry season survey however; at many sites (GVMSW1, LNSW2 and KKSW4) schools of small fish (greater than 50 individuals) were observed. Many of these schools consisted of more than one species of fish, generally Eastern Rainbowfish (*Melanotaenia splendida splendida*) and Purple-spotted Gudgeons (*Morgurnda adspersa*). The Purple-spotted Gudgeons were caught at sites where shallow, slow-flowing conditions existed (Photo Plate 6). At a Kokomo survey site (BURD2), a 45cm breeding Sooty Grunter (*Hephaestus fuliginosus*) was caught using a hand-held line. Where there were no available water bodies, aquatic trapping did not occur.

Five species of native fish were recorded during the dry season survey of 2018. These species included, the Sleepy Cod (*Oxyeleotris lineolata*), Eastern Rainbow Fish (*Melanotaenia splendida splendida*),

Barred Grunter (*Amniataba percoides*), Bony Bream (*Nematalosa erebi*) and one unconfirmed *Neosilurus* sp. The highest diversity and abundance of fish species recorded was in the Burdekin River where four of the five species were identified.

**Photo Plate 6 Purple-spotted Gudgeon (*Morgurnda adspersa)* noted at many survey sites**

#### 7.7.3.2 Introduced Fish

Two species of introduced fish were recorded during the aquatic field survey. Gambusia (*Gambuzia holbrooki*), a category three, five, six and seven Restricted Biosecurity Matter under the *Biosecurity Act 2014* was recorded at KKSW8 in the dry season of 2012. The Spotted Tilapia (*Tilapia mariae*), also a category three, five, six and seven Restricted Biosecurity Matter was recorded in very high numbers at KKSW4 in the dry season of 2012. These species are declared as noxious fish in Queensland and their presence in creeks or pools often leads to a significant decline in native fish species.

#### 7.7.3.3 Fish Species of Conservation Significance

No fish species of conservation significance were recorded during the wet and dry season aquatic ecology assessments for the Project.

### 7.7.4 Birds

#### 7.7.4.1 Observed Bird Species

Overall, 86 species of bird were recorded in the riparian and aquatic habitats linked to the waterways associated to the Project site. Of these species, 29 are defined by the DES as Wetland Indicator Species (WIS). The wetland indicator list includes species that breed, feed and live in or around wetlands.

Many of the bird species recorded are considered generalist species which find suitable habitat within a variety of different ecosystems. These generalist species were recorded at most sites and included the White-throated Gerygone (*Gerygone albogularis*), Australian Magpie (*Cracticus tibicen*), Australian Raven (*Corvus orru*) and Magpie-lark (*Grallina cyanoleuca*).

Species which are dependent on specific habitat features which are only available in certain ecosystems are known as specialist species. Unique habitat features, and specific environmental niches are crucial to the survival of specialist species. Specialist species include the Cotton Pygmy Goose (*Nettapus*

*coromandelianus*), Red-kneed Dotterel (*Erythrogonys cinctus*), Rainbow Bee Eater (*Merops ornatus*) and Black-winged Stilt (*Himantopus himantopus*).

Bird surveys at BURD2 recorded the highest diversity of bird species in the dry season with 38 species present during this time. Nesting Azure Kingfishers (*Alcedo azurea*) were observed in an overhanging Black Tea Tree (*Melaleuca bracteata)* on the Burdekin River and a Nankeen Night Heron (*Nycticorax caledonicus*) was seen regularly resting on the banks. All Burdekin and Kokomo sites provided valuable habitat for bird species and these sites recorded a high diversity of bird species. Pelicans (*Pelecanus conspicillatus*), Cormorants (*Phalacrocorax sp.*) and were observed at many sites with viable bodies of water. Whilst all sites had available water, larger bodies of water were highly valuable as the region is known for its high diversity of water bird species.

The Valley of Lagoons is listed in the Directory of Important Wetlands in Australia compiled by the Federal and State Governments. This nearby conglomeration of wetlands explains the diversity and abundance of species noted on the Stenhouse Dam. A large number of water birds were observed at the Stenhouse Dam including multiple individuals of Hoary-headed Grebe (*Poliocephalus poliocephalus*), Great-crested Grebe (*Podiceps cristatus*), Black Swan (*Cygnus atratus*), Comb-crested Jacana (*Irediparra gallinacea*), Red-kneed Dotterel (*Erythrogonys cinctus*), Black-fronted Dotterel (*Elseyornis melanops*) and Black-winged Stilt (*Himantopus himantopus*). Three species of cormorant were observed as well as feeding Australasian Darters. More significantly, over 100 individuals of Cotton Pygmy Goose (*Nettapus coromandelianus albipennis)* were counted on the northern side of the Stenhouse Dam.

A full list of bird species identified during the aquatic surveys is available in Appendix D.

#### 7.7.4.2 Bird Species of Conservation Significance

The Cotton Pygmy Goose (*Nettapus coromandelianus*) was recorded at the Stenhouse Dam within the Greenvale tenement. During the 2012 aquatic surveys, this species was listed as ‘Near Threatened’ under the NC Act. Its state listing has since been revoked and the Cotton Pygmy Goose is currently listed as ‘Least Concern’ under the NC Act.

One bird species recorded during the aquatic surveys is listed under the EPBC Act as ‘Migratory’. This species, the Osprey (*Pandion haliaetus*), was recorded at BURD2 during the dry season 2012 aquatic survey. BURD2 is a downstream impact site located approximately 200 m from the western side of the Kokomo tenement. This site is not within the Kokomo tenement, but its location is within connected habitat associated to the Project site. A significant impact to this species due to mining activity is unlikely as the Osprey predominantly nest in coastal habitats. This species is also highly mobile and will most likely disperse from the Project region before it is placed in danger by operational activities. Nevertheless, if this species is observed within the Project site, or a nest is identified within the Project site, the observation site should not be disturbed.

**Photo Plate 7 Cotton Pygmy Geese *(Nettapus coromandelianus albipennis*) observed on the Stenhouse Dam**

## 7.7.5 Mammals

### 7.7.5.1 Mammal Species of Conservation Significance

The Northern Greater Glider (*Petauroides volans minor*) was recorded at BURD3 and BURD5 during the 2018 dry season aquatic survey. This species is listed under the EPBC Act and the NC Act as Vulnerable. The two sites where this species was identified are outside the Project site. BURD3 is located approximately 2 km north-east of the Greenvale tenement while BURD5 is approximately 5 km east of the Greenvale tenement. These two sites are located along the Burdekin River where suitable habitat for this species exists as fringing *Eucalyptus* woodland with suitable large hollows. Similar suitable habitat exists within the Project site along the various anabranches of the Burdekin River. However, despite targeted species searches for fauna species of conservation significance, this species was not identified during aquatic and terrestrial ecological surveys within the Project site. It is possible that this species will be significantly impacted by mining activities.

A Platypus (*Ornithorhynchus anatinus*) was sighted during the 2012 dry season aquatic ecology assessment adjacent to the Kokomo site. The sighting occurred at KKSW4, where one mature platypus was observed in an anabranch of the Burdekin River. This species was noted 800m from the Project boundary. It is likely that this species would use habitat within the Project boundary because suitable habitat exists on the western edge of the Project boundary. In the wet season, this anabranch would connect with watercourses that flow east across the Kokomo Project site. The Platypus is listed as a Special Least Concern species under the NC Act. This means that consideration of the cultural significance of the species and habitat required needs to occur and where possible, conserved. Platypuses are sensitive to disturbance upstream so further consultation with DES and a Species Management Plan may be required.

#### 7.7.5.2 Microbats

Microbat species were identified by Greg Ford of Balance! Environmental Pty Ltd, through the analysis of data generated by ANABAT detectors. Overall, 16 species of microbat were recorded using watercourses associated with the Project (Table 28), none of which are listed threatened species under the NC Act or EPBC Act. The greatest diversity of species was recorded at BURD2, a site with basalt caves and a large number of hollows present. BURD3 recorded nine species of microbat in the wet season of 2012. LNSW2 recorded 12 species of microbat which is likely due to the presence of man-made structures (large concrete bridge with cracks) and a large number of viable tree hollows. Microbats generally use watercourses as flyways, areas where a sufficient gap in the canopy cover is present, enabling these species to forage. The disturbance of large, mature hollows and rocky screes such as those found at BURD 2 could affect the diversity and abundance of microbat species located in the area, as many species rely on these for roosting habitat.

**Table 28 Microbat Species recorded during the Aquatic Ecology Assessment**

| Species | Wet Season 2012 | Dry Season 2012 | | |
|---|---|---|---|---|
| | | X = positively identified<br>O = possibly present, not reliably identified<br>- = not present | | |
| **Survey Site** | **BURD3** | **BURD2** | **KKSW4** | **LNSW2** |
| *Rhinolophus megaphyllus* | - | X | - | - |
| *Chalinolobus gouldii* | X | X | X | X |
| *Chalinolobus nigrogriseus* | O | X | X | X |
| *Myotis macropus/Nyctophilus sp.* | | X | - | X |
| *Scotorepens balstoni* | O | - | - | - |
| *Scotorepens greyii/S. sanborni* | - | X | X | X |
| *Scotorepens sanborni* | X | - | - | - |
| *Scoteanax rueppellii* | O | - | X | X |
| *Vespadelus troughtoni* | - | X | - | - |
| *Miniopterus australis* | - | X | X | X |
| *Miniopterus orianae oceanensis* | X | X | X | X |
| *Chaerephon jobensis* | - | X | X | X |
| *Mormopterus beccarii* | X | X | X | O |
| *Mormopterus ridei* | X | X | X | X |
| *Saccolaimus flaviventris* | X | X | X | X |
| *Taphozous troughtoni* | - | X | - | O |

#### 7.7.5.3 Introduced Mammal Species

The Wild Dog/Dingo (*Canis lupus familiaris/dingo*), European Rabbit (*Oryctolagus cuniculus*) and Feral Pig (*Sus scrofa*) were recorded in association to aquatic environments during field surveys.

The introduced Feral Pig (S*us scrofa*) was also abundant throughout the Project. Feral pigs are omnivorous, opportunistic feeders that have a significant impact upon the Australian environment and economy. They trample and uproot the ground, damage pastures and crops, disturb sensitive riparian zones and wetlands, spread weed seeds, compete with native species, destroy habitat and prey on smaller animals. They are also known to carry diseases such as leptospirosis, Q fever and sparganosis. Feral Pig disturbance is often a hindrance to any re-vegetation/rehabilitation plans, as they will eat almost any available plant material. Riparian and floodplain disturbance from Pigs was noted both on and adjacent to the Project site.

Rabbits are considered a major agricultural and environmental pest and. This species significantly impacts on the environment by competing with native animals and causing significant soil erosion through foraging on vegetation. Rabbits also damage crops. They are highly adaptable animals and can establish populations in a wide variety of habitats. European Rabbits were observed in abundance throughout the Project site. Favourable habitat conditions and food availability are thought to be responsible for their prevalence on site.

Wild Dog/Dingos (*Canis lupus familiaris/dingo*) are also listed as restricted animals for the impacts they have upon livestock. Wild Dogs can also spread disease to domestic animals and humans. They are also known to attack pets and children.

### 7.7.6 Amphibians

Amphibians are considered to be one of the best indicators for environmental change (Tyler & Knight 2011). Four amphibian species were identified during the aquatic ecology surveys. Of these, three species are native to Australia. The Eastern Dwarf Tree Frog (*Litoria fallax*) and Floodplain Frog (*Litoria inermis*) were both present at the Stenhouse Dam. Photo Plate 8 shows an individual Floodplain Frog that was found under large clumps of sediment on the edge of mud flats bordering the northern side of the dam. Seven individuals were noted in a small area on these mudflats indicating that a high abundance of this species is likely to be present. Wilcox's Frog (*Litoria wilcoxii*) was identified in tadpole form at GVMSW1. A large number of tadpoles, possibly more than one species, were present at this site. Large numbers of tadpoles were also noted in a small pool at KKSW8. Suitable habitat for amphibian species was observed at all sites. Habitat loss and degradation is the cause of the large declines in amphibian species numbers in Australia (Environment Australia 1999).

No amphibians of conservation significance were recorded in the potential Project impact area.

**Photo Plate 8 Floodplain Frog (*Litoria inermis*) at the Stenhousehouse Dam**

#### 7.7.6.1 Introduced Amphibian Species

One introduced amphibian species, the Cane Toad (*Rhinella marina*), was found at two sites during the aquatic ecology assessment (BURD2 and Stenhouse Dam). Large numbers of Cane Toad tadpoles were present in the shallows of the Stenhouse Dam.

Cane Toads present a serious threat to native wildlife. The Cane Toad consumes a wide variety of native animals including frogs, small reptiles, mammals and birds and causes the death of native predators that consume their toxins. The Cane Toad itself in not listed as a restricted matter or an invasive biosecurity matter under the EPBC Act 1999. However, the biological effects, including lethal toxic ingestion, caused by Cane Toads is listed as a “Key Threatening Process” under the EPBC Act 1999. The Cane Toad also consumes a wide variety of native animals including frogs, small reptiles, mammals and birds and causes the death of native predators that consume their toxins.

### 7.7.7 Reptiles

Eight reptile species were identified during the aquatic ecology surveys for the Project. Four snake species including the Common Tree Snake (*Dendrlaphis punctulata*), Carpet Python (*Morelia spilota mcdowelli*), Keelback (*Tropidonophis mairii*) and Yellow-faced Whip Snake (*Demansia psammophis*) were identified in varying habitats. Additionally, four lizard species were identified within riparian habitats in association to aquatic ecosystems of the Project site. These species include, Tommy Roundhead Dragon (*Diporiphora australis*), Bynoe's Gecko (*Heteronotia binoei*), Robust Rainbow Skink (*Carlia schmeltzii*) and Open-litter Rainbow Skink (*Carlia pectoralis*). A full list of reptile species identified during field surveys is available in Appendix D.

The slough of a Keelback (*Tropidonophis mairii*) was collected on the mudflats of the Stenhouse Dam, underneath metal sheeting. The Keelback is a wetland indicator species and is often found in the riparian habitat of watercourses and water bodies such as the Stenhouse Dam.

No reptilian species of Conservation significance were recorded in the potential Project impact area.

### 7.7.8 Regional Fauna Species of Conservation Significance

Table 29 below discusses species of conservation significance that are known from the broader region and have been identified from desktop searches (Appendix A). These species were not observed on site during surveys. The assessment of potential for presence and impact on each species is based on the knowledge of ecologists, information obtained from field surveys on the Project site, previous surveys conducted on or near the Project site and scientific literature.

**Table 29 Threatened Fauna known from the Region not observed on the Project Site**

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| **Amphibians** | | | | | |
| *Litoria dayi* | Australian Lace-lid | E | E | The Australian Lace-lid occurs throughout the Wet Tropics around Paluma, Queensland. The species is found to inhabit rainforest and its margins from 0 – 1200 m above sea level (DES 2017). In montane areas, they prefer fast-flowing and rocky streams (DES 2017). | **UNLIKELY:** This species preferred habitat is not found on the Project sites. A 10km EPBC Protected Matters Buffer did not note this species. It is not expected that mining activity will have a significant impact on this species. |
| *Litoria nannotis* | Waterfall Frog | E | E | This species inhabits waterfalls and cascades of permanent fast-flowing streams. This species formerly occurred throughout the Wet Tropics around Paluma, Queensland (DES 2017). | **UNLIKELY:** This species preferred habitat is not found on the Project sites. A 10km EPBC Protected Matters Buffer did not note this species. It is not expected that mining activity will have a significant impact on this species. |
| *Litoria nyakalensis* | Mountain Mistfrog | CE | E | This species occurs across two thirds of the Wet Tropics Region from Douglas Creek near Cardwell to Alexandra Creek, Thornton Peak, north-east Queensland at altitudes from 380 m – 2010 m (DoE 2018). This species is found in upland rainforest and wet sclerophyll forest along fast-flowing streams (DoE 2018). | **UNLIKELY:** This species preferred habitat is not found on the Project sites (Dennis 2012). A 10km EPBC Protected Matters Buffer did not note this species. It is not expected that mining activity will have a significant impact on this species. |

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| *Litoria rheocola* | Common Mistfrog | E | E | The species is restricted to fast-flowing rocky creeks and streams in rainforest as well as wet sclerophyll forest (DoE 2018). The Common Mistfrog occurs in rainforests north of the Herbert River in the Wet Tropics from Lumholtz National Park to Amos Bay, with populations found from sea level to elevations of 1180 m. It has now disappeared from most sites above 400 m although the lowland populations remain secure (DES 2017). | **UNLIKELY:**<br>The Project site does not exist within this species known distribution. Additionally, suitable habitat does not exist within the Project site. It is not expected that mining activity will have a significant impact on this species. |
| *Litoria serrata* | Tapping Green Eyed Frog | NL | V | This frog species is mainly located in rainforests along the northern coast of Queensland (ALA n.d.). | **UNLIKELY:**<br>This species preferred habitat is not found on the Project sites. A 10km EPBC Protected Matters Buffer did not note this species. It is not expected that mining activity will have a significant impact on this species. |
| *Pseudophryne covacevichae* | Magnificent Brood Frog | V | V | This species occurs in habitats greater than 800m above sea level near Ravenshoe and Herberton. The species has been found around seepage areas in open eucalypt forests with an understorey comprised of *Themeda triandra*, *Xanthorrhoea sp.*, *Gahnia sp.*, *Lophostemon suaveolens*, *Allocasuarina littoralis* and *A. torulosa* (DoE 2018). | **UNLIKELY:**<br>Whilst suitable habitat is found on the Project site, it is unlikely this species will inhabit the lower elevation of the Project sites (Dennis & McDonald 2012). A 10km EPBC Protected Matters Buffer did not note this species. It is not expected that mining activity will have a significant impact on this species. |

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| *Taudactylus acutirostris* | Sharp snouted dayfrog | E | E | This species is widely distributed from Mt Graham, near Cardwell, to the Big Tableland which is approximately 30km south of Cooktown in northern Queensland.<br>This species was known to occur in small mountain streams in rainforests and wet sclerophyll forest above 300 m altitude (DoE 2018). | **UNLIKELY:**<br>This species preferred habitat is not found on the Project sites (Dennis 2012). A 10km EPBC Protected Matters Buffer did not note this species. This species is recorded as extinct in the wild. It is not expected that mining activity will have a significant impact on this species. |
| **Birds** | | | | | |
| *Calidris canutus* | Red Knot | E | E | The Red Knot inhabits a range of environment such as mudflats, sandflats and sandy beaches of sheltered coasts, estuaries, bays, inlets, lagoons and harbours (DoE 2018). They are also occasionally found on terrestrial saline wetlands near the coast such as lakes and lagoons (DoE 2018). The Red Knot is common in all the main suitable habitats around the Coast of Australia but is noticeably less in south-west Australia than elsewhere (DoE 2018). | **UNLIKELY:**<br>Preferred habitat for this species does not exist within the Project site. This species is primarily marine, feeding and nesting in coastal environments. It is not expected that mining activity will have a significant impact on this species. |

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| *Calidris ferruginea* | Curlew Sandpiper | CE | E | This species is prominently found along coastlines, though is widespread inland across majority of Queensland (DoE, 2018). Inland habitat includes ephemeral and permanent lakes, dams, waterholes and bore drains (DoE, 2018). They forage at the edge of shallow pools and can wade through water 15-60 mm deep (DoE, 2018). Whilst small numbers have been recorded living inland around ephemeral and permanent lakes, dams and bores, the majority reside along the coast roosting on dry shingle, sand, or shell beaches. | **UNLIKELY:**<br>A 10km EPBC Protected Matters Buffer did not identify this species. Suitable habitat for this species exists in small areas within the Project site. However, this species is highly mobile and is not expected to be significantly impacted by mining activity within the Project site. |
| *Calidris tenuirostris* | Great Knot | CE | E | In Australia this species is recorded to occur within 5km of the coastlines. This species is typically found in sheltered coastal habitats with large intertidal mudflats or sandflats (DoE 2018). | **UNLIKELY:**<br>A 10km EPBC Protected Matters Buffer did not note this species. Suitable habitat This species is not likely to be impacted by the Project. |
| *Rostratula australis* | Australian Painted Snipe | E | V | Found in shallow inland wetlands, either freshwater or brackish, which are either permanently or temporarily filled, scattered throughout many parts of Australia (DoE 2015). Also, this species prefers habitat with grass cover, lignum, low scrub or open timber (Office of Environment & Heritage n.d.). | **POSSIBLE:**<br>It is possible this species may occur in the watercourses/bodies associated with the Project although a 10km EPBC Protected Matters Buffer did not note this species. There is the potential for this species to be impacted by the project. If an impact on this species occurs, it is expected to be minimal. |
| **Mammals** | | | | | |

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| *Petauroides volans* | Greater Glider | V | V | This species is largely restricted to eucalypt forests and woodlands. Its range is relatively small (1-4 ha) but is larger in lower productivity forests and more open woodlands (Burbidge & Woinarski 2016). The Greater Glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria, with an elevational range from sea level to 1200 m asl. | **POSSIBLE:**<br>The sites fall within the known distribution of this species. Main fodder and habitat trees are commonly located along the waterways/river systems onsite. This species was identified at BURD3 and BURD5 which occur within proximity to the Greenvale tenement. BURD3 occurs approximately 2 km north-east of the Greenvale tenement while BURD5 occurs approximately 5 km east of the Greenvale tenement. The Burdekin River does not flow through the Greenvale tenement and similar habitat is absent within the Project site. However, due to the proximity of this species to the Project site, it is possible that mining activity will have an impact on this species. If an impact on this species occurs, it is likely to be minimal due to the absence of similar habitat and the suitability of connected habitat within the Project site. |
| *Petaurus australis* unnamed subsp. | Yellow-bellied Glider (Wet Tropics) | V | V | This species has a limited distribution, found in the wet tropics along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria (Office of Environment & Heritage n.d.). The yellow-bellied glider occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. The forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south (Office of Environment & Heritage n.d.). | **UNLIKELY:**<br>It is unlikely that this species will be found on the Project site. A 10km EPBC Protected Matters Buffer did not note this species. This species is unlikely to be impacted by the Project. |

| Scientific Name | Common Name | Status | | Habitat Description | Likelihood of Impact |
|---|---|---|---|---|---|
| | | EPBC Act | NC Act | | |
| *Petaurus gracilis* | Mahogany Glider | E | E | This species is restricted to the coastal southern Wet Tropics region of northern Queensland. The live in a narrow and highly fragmented band of low land sclerophyll forest extending around 140km from Toomulla, north of Townsville, to Tully and up to 40km inland (DES 2017). This species can be found in eucalyptus, bloodwoods and paperbark canopies and less commonly swamp mahogany and turpentine with an open mid-stratum of smaller trees and shrubs and a grassy stratum in which grass trees may be present (DES 2017). This species requires a relatively open structure for efficient gliding and tends to avoid dense vegetation (e.g. rainforests). | **UNLIKELY:**<br>It is unlikely that this species will be found on the Project site. A 10km EPBC Protected Matters Buffer did not note this species. The Project site falls outside of this species known distribution. This species is unlikely to be impacted by the Project. |
| **Reptiles** | | | | | |
| *Crocodylus porosus* | Estuarine crocodile | NL | V | The Estuarine crocodile tolerates salinity in waters from 0% (freshwater) to 3.5% (sea water). This species is found in a large variety of habitats from estuaries, creeks, lakes, inland swamps, lagoons and marshes. The species distribution ranges from Rockhampton throughout coastal Northern Territory to King Sound in Western Australia (DoE 2018). | **UNLIKELY:**<br>Potential suitable habitats were located onsite, however, the Project site is located well upstream of the Burdekin Dam, an unpassable obstacle for this species. A 10km EPBC Protected Matters Buffer did not note this species. This species is unlikely to be impacted by the Project. |

## 7.8 FISH TISSUE SAMPLING

During the fish tissue sampling effort, six species of fish were collected. During this survey, 44 individuals were taken from nine sites and sent preserved in ethanol to the National Measurement Institute (NMI) for analysis. Where possible, samples of fish species known to inhabit different niches in the water column were taken.

The results were compared to the 90$^{th}$ percentile limits listed in the Australian Food Standards Code by the Australia New Zealand Food Authority (ANZFA). These results are illustrated in Table 30. The results indicate that copper, mercury, lead and zinc levels exceeded ANZFA standards in some specimens. As this data is baseline and collected prior to disturbance, these results can be explained by naturally occurring phenomena. Copper is often retained in the tissue of fish species, particularly the liver, where a low pH exists (DERM 2012). The copper is unable to be precipitated from the fish's body in this condition, thus where higher pH readings occur often fish tissue results for copper do not exceed (DERM 2012).

Kirby, Maher & Harasti (2001) conducted a study on sea mullet in Lake Macquarie. The results from this study indicated that copper, cadmium and zinc appear to be regulated in the muscle of the sampled fish. Exposure to these trace elements often occurs due to the ingestion of benthic sediments and detritus, therefore bottom feeding species are likely to have higher concentrations of trace metals when sampled.

Zinc is an element often flagged by food standards organisations such as the ANZFA, due to the harmful effects of this element on humans when in excess. At most sites, samples from muscle, gills and liver exceeded the trigger levels set by the ANZFA. As this is baseline data, it is assumed that the levels of zinc found are naturally occurring due to the underlying laterite geology and soil composition of the area and not due to any nearby anthropogenic disturbances. This is likely as species from the Burdekin River, Gray Creek and areas unaffected by the old Greenvale Nickel Mine follow the patterns of zinc levels detected in specimens taken at the Stenhouse Dam and Redbank Creek.

## Table 30 Fish Tissue Analysis Results

| Site | Tissue Type | Metals | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Aluminium | Antimony | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Selenium | Zinc |
| **ANZFA Limits (mg/kg)** | | | | 2 | 2 | | | 2 | | 0.5 | | 0.5 | | 2 | 15 |
| STENHO USE 1A | Gill | 42 | <0.01 | <0.05 | <0.01 | 0.17 | 0.05 | 0.35 | 68 | 0.04 | 5.6 | 0.23 | 0.12 | 0.22 | 16 |
| STENHO USE 1B | Liver | 1.3 | <0.01 | <0.05 | <0.01 | 0.07 | 0.01 | 0.23 | 8.5 | 0.05 | 1.1 | 2.3 | <0.01 | 0.44 | 22 |
| STENHO USE 1C | Muscle | 0.88 | <0.01 | <0.05 | 0.06 | <0.05 | 0.1 | 7 | 17 | 0.02 | 0.69 | 1.3 | 0.03 | 1.3 | 5.6 |
| STENHO USE 2A | Gill | 110 | 0.06 | <0.05 | <0.01 | 0.58 | 0.17 | 0.87 | 170 | 3.5 | 10 | 0.01 | 0.54 | 0.25 | 22 |
| STENHO USE 2B | Liver | 5.7 | <0.01 | <0.05 | 0.07 | 0.05 | 0.28 | 81 | 440 | 0.14 | 2.3 | 0.13 | 0.07 | 0.88 | 71 |
| STENHO USE 2C | Muscle | 9.3 | 0.01 | <0.05 | 0.01 | 0.1 | 0.03 | 0.42 | 15 | 0.5 | 1.1 | 0.12 | 0.03 | 0.18 | 20 |
| STENHO USE 3A | Gill | 13 | <0.01 | <0.05 | <0.01 | 0.13 | 0.06 | 0.9 | 24 | 0.25 | 5.2 | 0.25 | 0.07 | 0.35 | 38 |
| STENHO USE 3B | Liver | 93 | 0.05 | <0.05 | <0.01 | 0.6 | 0.15 | 1.1 | 140 | 3.4 | 8.9 | 0.04 | 0.54 | 0.25 | 21 |
| STENHO USE 3C | Muscle | 1.2 | <0.01 | <0.05 | 0.15 | <0.05 | 0.16 | 5.5 | 190 | 0.02 | 2.1 | 0.09 | 0.1 | 0.76 | 20 |
| STENHO USE 4 | Whole Fish | 35 | 0.03 | <0.05 | <0.01 | 0.19 | 0.08 | 1.1 | 48 | 1.8 | 5.4 | 0.03 | 0.2 | 0.34 | 34 |
| LUCK 1 | Whole Fish | 5.4 | <0.01 | <0.05 | <0.01 | <0.05 | 0.16 | 0.86 | 28 | 0.08 | 6.7 | 0.05 | <0.01 | 0.32 | 37 |
| LUCK 2 | Whole Fish | 16 | <0.01 | 0.07 | <0.01 | 0.07 | 0.22 | 0.82 | 41 | 0.04 | 15 | 0.05 | 0.04 | 0.34 | 43 |
| LUCK 3 | Whole Fish | 63 | <0.01 | <0.05 | <0.01 | 0.21 | 0.14 | 1.4 | 100 | 0.3 | 19 | 0.05 | 0.14 | 0.49 | 54 |
| LUCK 4 | Whole Fish | 16 | <0.01 | 0.06 | <0.01 | 0.07 | 0.18 | 0.68 | 36 | 0.1 | 25 | 0.04 | 0.03 | 0.33 | 37 |
| LUCK 5 | Whole Fish | 74 | <0.01 | 0.05 | 0.01 | 0.28 | 0.3 | 1 | 93 | 0.08 | 28 | 0.04 | 0.18 | 0.37 | 34 |
| GRAY 1/1 | Whole Fish | 26 | <0.01 | <0.05 | 0.02 | 0.06 | 0.11 | 1.4 | 51 | 0.04 | 8.6 | 0.01 | <0.01 | 0.37 | 46 |
| GRAY 1/2 | Whole Fish | 170 | <0.01 | 0.07 | 0.01 | 0.28 | 0.36 | 1.3 | 190 | 0.07 | 14 | <0.01 | 0.24 | 0.19 | 17 |
| GRAY 2/1 | Whole Fish | 21 | <0.01 | <0.05 | 0.02 | <0.05 | 0.12 | 2.4 | 48 | 0.03 | 8.5 | 0.01 | 0.02 | 0.41 | 43 |
| REDBANK 1/1 | Whole Fish | 14 | <0.01 | <0.05 | 0.02 | <0.05 | 0.09 | 1.6 | 33 | 0.05 | 5.2 | <0.01 | <0.01 | 0.3 | 40 |
| BURD 1/1 | Whole Fish | 66 | <0.01 | 0.07 | <0.01 | 0.12 | 0.35 | 0.54 | 62 | <0.01 | 20 | <0.01 | 0.19 | 0.19 | 9.8 |
| BURD 1/2 | Whole Fish | 9.8 | <0.01 | 0.13 | 0.02 | <0.05 | 0.13 | 1.1 | 30 | 0.03 | 21 | 0.01 | 0.01 | 0.76 | 30 |

| Site | Tissue Type | Metals | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Aluminium | Antimony | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Selenium | Zinc |
| ANZFA Limits (mg/kg) | | | | 2 | 2 | | | 2 | | 0.5 | | 0.5 | | 2 | 15 |
| BURD 1/3 | Whole Fish | 4.7 | <0.01 | 0.1 | <0.01 | <0.05 | 0.11 | 0.69 | 18 | 0.03 | 11 | 0.01 | <0.01 | 0.67 | 29 |
| BURD 1/4 | Whole Fish | 14 | <0.01 | 0.07 | <0.01 | <0.05 | 0.09 | 1.1 | 38 | 0.02 | 9.5 | 0.02 | <0.01 | 0.52 | 50 |
| BURD 1/5A | Gill | 18 | <0.01 | <0.05 | 0.01 | 0.59 | 0.07 | 2.8 | 83 | 0.11 | 8.9 | 0.01 | <0.01 | 0.4 | 40 |
| BURD 1/5B | Liver | 11 | <0.01 | 0.11 | 0.01 | 0.06 | 0.15 | 33 | 82 | 0.02 | 5.1 | 0.04 | <0.01 | 1.3 | 20 |
| BURD 1/5C | Muscle | 28 | <0.01 | 0.05 | <0.01 | 0.33 | 0.07 | 0.99 | 45 | 0.12 | 6.7 | 0.03 | 0.04 | 0.35 | 52 |
| BURD 2/1 | Whole Fish | 68 | <0.01 | 0.13 | 0.05 | 0.17 | 0.72 | 2.3 | 220 | 0.15 | 220 | 0.02 | 0.28 | 0.43 | 55 |
| BURD 2/2 | Whole Fish | 160 | <0.01 | 0.08 | 0.02 | 0.22 | 0.4 | 0.98 | 230 | 0.08 | 53 | <0.01 | 0.23 | 0.26 | 20 |
| BURD 2/3 | Whole Fish | 260 | <0.01 | 0.12 | 0.03 | 0.39 | 0.6 | 1.5 | 370 | 0.11 | 72 | 0.01 | 0.38 | 0.31 | 25 |
| BURD 3/1A | Gill | 49 | <0.01 | <0.05 | <0.01 | 0.46 | 0.49 | 1.3 | 140 | 0.11 | 11 | <0.01 | 0.09 | 0.39 | 18 |
| BURD 3/1B | Liver | 420 | <0.01 | 0.22 | 0.04 | 0.94 | 2.9 | 15 | 660 | 0.22 | 23 | <0.01 | 0.58 | 0.85 | 17 |
| BURD 3/1C | Muscle | 29 | <0.01 | 0.05 | 0.01 | 0.38 | 0.21 | 0.71 | 46 | 0.11 | 5.1 | <0.01 | 0.03 | 0.26 | 13 |
| BURD 3/2A | Gill | 91 | <0.01 | <0.05 | <0.01 | 0.15 | 0.39 | 1.4 | 150 | 0.09 | 14 | 0.02 | 0.09 | 0.37 | 21 |
| BURD 3/2B | Liver | 58 | <0.05 | <0.25 | 0.12 | 0.13 | 4.1 | 59 | 270 | 0.09 | 13 | <0.05 | 0.12 | 1.5 | 30 |
| BURD 3/2C | Muscle | 18 | <0.01 | 0.05 | <0.01 | 0.29 | 0.16 | 0.91 | 28 | 0.03 | 6.1 | 0.01 | 0.02 | 0.27 | 23 |
| BURD 3/3 | Whole Fish | 75 | <0.01 | <0.05 | <0.01 | 0.08 | 0.14 | 0.3 | 53 | 0.02 | 6.2 | <0.01 | 0.08 | 0.11 | 7.9 |
| BURD 3/4 | Whole Fish | 100 | <0.01 | 0.09 | <0.01 | 0.1 | 0.38 | 0.39 | 48 | 0.01 | 19 | <0.01 | 0.29 | 0.13 | 7.7 |
| BURD 4/1A | Gill | 100 | <0.01 | <0.05 | <0.01 | 0.13 | 0.21 | 0.74 | 110 | 0.04 | 6.8 | <0.01 | 0.05 | 0.18 | 12 |
| BURD 4/1B | Liver | 33 | <0.05 | <0.25 | <0.05 | <0.25 | 2.8 | 31 | 90 | 0.05 | 5 | <0.05 | 0.11 | 0.76 | 15 |
| BURD 4/1C | Muscle | 32 | <0.01 | 0.06 | 0.02 | 0.37 | 0.16 | 1 | 52 | 0.06 | 5.3 | <0.01 | 0.04 | 0.23 | 20 |
| BURD 4/2 | Whole Fish | 68 | <0.01 | <0.05 | 0.02 | 0.1 | 0.23 | 0.32 | 43 | <0.01 | 19 | <0.01 | 0.15 | 0.068 | 6.4 |
| BURD 4/3 | Whole Fish | 74 | <0.01 | 0.05 | <0.01 | 0.07 | 0.21 | 0.39 | 27 | <0.01 | 9.6 | <0.01 | 0.13 | 0.17 | 7.9 |
| BURD 4/4A | Gill | 20 | <0.05 | <0.25 | 0.08 | <0.25 | 4.8 | 36 | 220 | 0.1 | 3.8 | <0.05 | <0.05 | 0.99 | 21 |

| Site | Tissue Type | Metals | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Aluminium | Antimony | Arsenic | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Mercury | Nickel | Selenium | Zinc |
| **ANZFA Limits (mg/kg)** | | | | 2 | 2 | | | 2 | | 0.5 | | 0.5 | | 2 | 15 |
| BURD 4/4B | Liver | 190 | <0.01 | 0.11 | <0.01 | 0.3 | 0.67 | 2.3 | 320 | 0.18 | 21 | <0.01 | 0.2 | 0.37 | 24 |
| BURD 4/4C | Muscle | 24 | <0.01 | 0.08 | 0.01 | 0.17 | 0.18 | 1 | 46 | 0.06 | 9.5 | 0.01 | 0.03 | 0.24 | 25 |

# 8.0 POTENTIAL IMPACTS AND MANAGEMENT STRATEGIES

## 8.1 PROJECT IMPACTS

Impacts to aquatic ecological values may potentially occur as a result of the Project construction and operation. The potential impact areas would be in areas located downstream of the Project.

No NC Act or EPBC Act listed Critically Endangered, Endangered or Vulnerable species were recorded within the Project potential impact area during the aquatic ecology surveys. Platypus, special least concern species under the NC Act, was recorded in the Burdekin River adjacent to the Kokomo tenement and may use habitat within the Project area under wet conditions. Impacts to the Platypus may result from indirect impacts to the Burdekin River or watercourses within the Kokomo Project area. The Vulnerable listed (NC Act and EPBC Act) Greater Glider was recorded in riparian habitat along the Burdekin River. Any impacts to Burdekin River riparian vegetation may impact habitat for the Greater Glider.

The Project activities described below may result in impacts to aquatic ecology values:

***Earthworks and Vehicle Movement***

- Increased erosion and the movement of sediment from watercourse crossings and earthworks in tributaries of the Burdekin River;
- Installation of temporary or permanent waterway barriers (building up river crossings for increased vehicle movement) can affect downstream water quality;
- Changes in flow conditions from haul road/vehicle access point across the Burdekin River;
- Short term reduction in water quality following river crossing construction;
- Increased sedimentation and the formation of barriers to water flow may lead to a decline in water quality and a possibility of increased algal blooms; and
- Movement of vehicles onsite, between sites and regional cities may lead to the introduction and spread of introduced flora species.

***Vegetation Clearing or Modification***

- Clearing or modifying habitat, including riparian areas and in-stream vegetation will impact diversity and abundance of species as well as water quality;
- Clearing and removal of drainage lines; and
- Changes to the natural catchment area on the Project sites can impact and reduce surface water flow in the catchment.

***Spills or Contaminant Leaks***

- Any spills or leaks of the RSF or other materials/by-products of mining activities can introduce foreign or increased levels of an element into waterways causing negative impacts on the integrity of the waterway; and

- Spills and leaks can cause the reduction in macroinvertebrate abundance and diversity, fish, waterfowl and terrestrial fauna deaths, vegetation dieback and effects on industrial and agricultural activities downstream of the point of impact.

***Noise and Dust***

- Increased noise, particularly around the Stenhouse Dam, may lead to the disruption of nesting birds and other visiting water birds; and

- Increased dust will generally decrease the quality of the air for living organisms including terrestrial vertebrates and humans.

***Rehabilitation***

- Sufficient planning and engineering are required to restore the natural profiles and geochemical nature of the land to its pre-mining condition. If this isn't restored, impacts to surface and groundwater quality in the region of the Project will likely be evident.

## 8.2 MITIGATION STRATEGIES

### 8.2.1 Management of Aquatic Ecosystems

#### 8.2.1.1 Surface Water Quality

Mitigation strategies focused on maintaining the surface water quality in the watercourses surrounding the Project emphasise the importance of minimal disturbance to stream beds, banks and riparian areas leading to increases in sediment and erosion, contamination or algal blooms. The following are mitigation strategies aiming to maintain surface water quality:

- To reduce the potential increase in erosion and sediment movement, minimise the physical disturbance to stream beds, banks and riparian areas;

- An erosion and sediment control plan should be created to manage erosion and sediment movement when it is not practical to avoid aquatic and riparian areas;

- Developing and implementing handling and storage procedures that decrease the probability of a spill or leak occurring;

- Developing and implementing an emergency and spill response plan to minimise the impacts of a potential spill or leak on the surrounding aquatic habitats;

- Continue monitoring and sampling throughout the establishment, operation, decommissioning and rehabilitation phases of the Project referring to the ANZECC Guidelines for trigger values;

- Where infrastructure interferes with a watercourse, clean water from upstream should be diverted around the infrastructure. Diversions will be designed with regards to best practice guidelines;

- Onsite water management designed to adequately segregate sediment water and mine affected waters;

- Release of water to the receiving environment via approved release points and adherence to established water release limits.;

- Sediment traps will be designed downstream of all land disturbances to remove sediment from storm water flowing off these areas;

- Mineral waste management adequate to prevent impacts from acid mine drainage, including all potentially acid forming rocks sufficiently encapsulated in non-acid forming materials; and

- The implementation of corrective actions immediately upon the identification of any contaminant of soils, groundwater, watercourses or storm water that have occurred as a result of activities associated with the Project.

#### 8.2.1.2 Aquatic and Terrestrial Flora and Fauna

Mitigation strategies focused on maintaining the diversity and abundance of flora and fauna in watercourses associated with the Project, aim to implement designs, plans, programs and procedures that increase awareness of staff to these species and cause as little disturbance to aquatic and riparian habitats as practical. The following are mitigation strategies aiming to maintain flora and fauna diversity and abundance:

- Design all watercourse crossings and other potential barrier works to avoid the creation of barriers to fish passage;

- Before conducting clearing or removal of any riparian vegetation or directly impacting stream banks, a spotter / catcher should check for potential platypus burrows. If they are known to exist at a site or are sited, all burrows should be checked by a spotter / catcher and be removed / relocated;

- Habitat clearing should only be conducted after:

    - The areas have been clearly delineated and identified to equipment operators and supervisors;

    - Habitat has been inspected for fauna species by focusing on present burrows, hollows, crevices, dead trees and bark. When present, fauna must be given time to naturally retreat or be removed by a permit holder qualified to do so; and

    - Appropriate erosion and sediment control structures are in place.

- The Staff Induction Program should contain information regarding threatened fauna and fauna, listed regional ecosystems and the habitat values associated with the local watercourses. The aim, to increase awareness of staff and ensure that care is taken with regarded to threatened species;

- A monitoring strategy should be developed for the riparian areas, particularly those listed as ‘Of Concern’ by DES. Results should be reported in an annual monitoring report; and

- Establish visual bird deterring devices and fencing around the RSF and evaporation ponds to ensure that migratory and water bird species do not mistake this infrastructure as water bodies.

### 8.2.2 Management of Introduced Species

#### 8.2.2.1 Weed Management Strategies

Three WoNS were noted during the aquatic ecology surveys. It is important to implement strategies that aim to control and manage the potential spread of these species and others not currently found in the locality of the Project. Some suggested mitigation strategies for managing weed species are:

- Implementing a weed management program focusing on:
  - Maintaining existing ground cover until activities require it to be removed;
  - Rehabilitating disturbed areas as soon as practically possible;
  - Conduct vehicle and machinery wash-downs regularly; and
  - Maintaining access roads in a weed free state where possible.
- This program should include a monitoring component where any successes of the weed management program or increases of weed species are documented.

#### 8.2.2.2 Pest Fauna Management Strategies

Five species of pest fauna were noted during the aquatic ecology surveys. The Feral Pig (*Sus scrofa*), Rabbit (Oryctolagus cuniculus) and Dog (*Canis familiaris*) were recorded within association to aquatic habitats. The Cane Toad (*Rhinella marina*) is a non-declared pest species that has had widespread impacts on native flora and fauna across northern Australia. Gambusia (*Gambusia holbrooki*) and Tilapia (*Pelmatolapia mariae*) are declared as noxious fish species and their release once captured into Queensland waterways is illegal. Mitigation strategies applicable to pest fauna species on the Project site are listed below:

- Implementation of a pest species management plan which focuses on controlling the listed pest species on the Project sites may be included in the weed management program or stand alone, and;
- Report any records of Gambusia or Tilapia to the Queensland DAF and destroy the species when caught.

## 8.3 RECOMMENDED MONITORING PROGRAM

The recommended monitoring program for the Project would consist of three components:

- Surface water monitoring;
- Monitoring of threatened species, listed REs and associated habitats;
- Weed and pest fauna monitoring.

The surface water component of the monitoring program would aim to:

- Inspect sediment and erosion control measures following wet seasons to ensure their effectiveness has not been compromised in accordance with a water management program;

- Monitor water quality in accordance with Project approvals and a Receiving Environment Monitoring Program, including assessment against applicable guideline values;

- Routinely (bi-annually at minimum) sample for macroinvertebrate assemblages and access using SIGNAL 2 bi-plots for comparison with the bi-plot generated from this assessment; and

- Routinely inspect spill containment controls and spill response kits.

The threatened species and RE component of the monitoring program would aim to:

- Monitor the effectiveness of strategies implemented aimed at discouraging birds from using the RSF and evaporation ponds. If these devices and strategies are not proving to be effective and have led to bird deaths or injury, other strategies recommended by experts or governmental departments should be used;

- Minimise the disturbance to the Stenhouse Dam and areas with mature hollow-bearing trees as to not impact the Cotton Pygmy Goose or any other waterbirds that may be utilising this habitat;

- Routinely inspecting new worksites for evidence of threatened species or species of special interest (Platypus or Northern Greater Glider); and

- Routinely visually inspect watercourses associated with the Project that are fringed by 'Of Concern' or 'Endangered' REs for dieback or any other impacts.

The weed and pest fauna component of the monitoring program would aim to:

- Routinely inspect project worksites for evidence of pest flora and fauna species;

- Manage any pest flora or fauna outbreaks as promptly as possible; and

- Maintain and update the weed and pest fauna management programs and inform staff through designated meetings of any changes.

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# Appendix A Database Searches

Australian Government
Department of the Environment and Energy

# 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.

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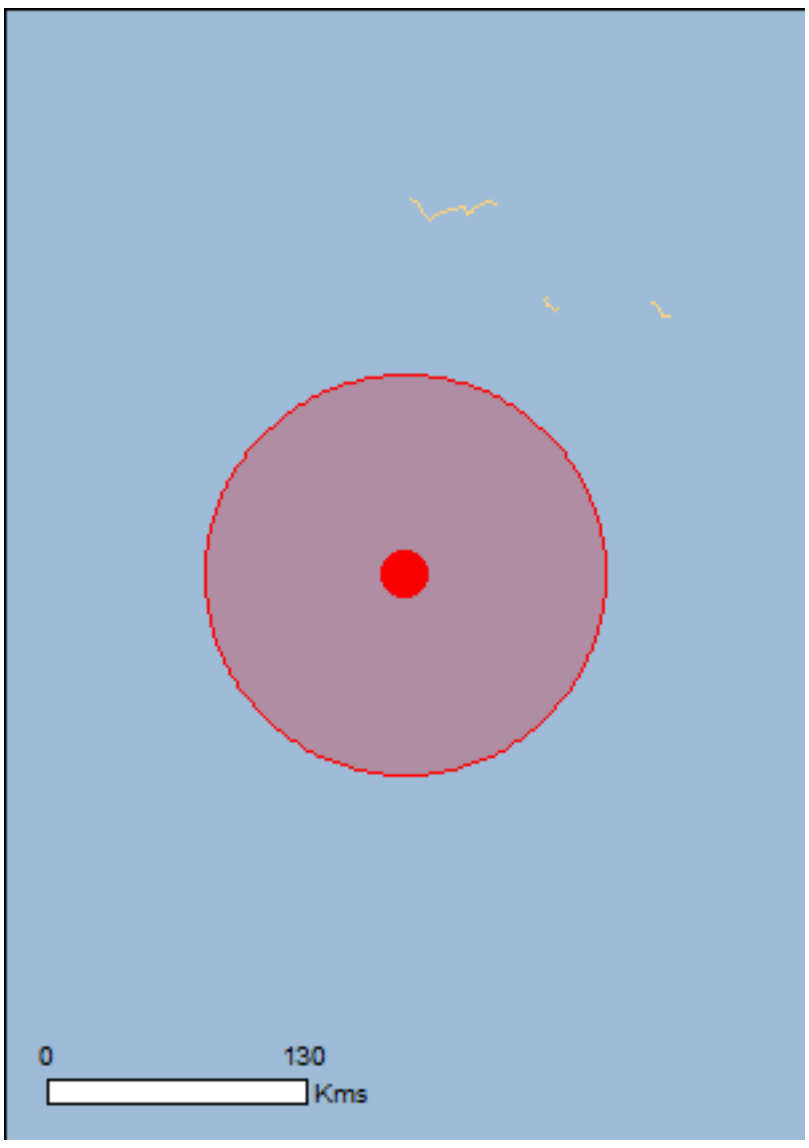
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements




Coordinates

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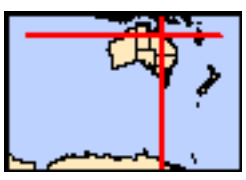

# Summary

## 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.

| | |
|---|---|
| World Heritage Properties: | 1 |
| National Heritage Places: | 2 |
| Wetlands of International Importance: | None |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 1 |
| Listed Threatened Species: | 44 |
| Listed Migratory Species: | 19 |

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. 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.

| | |
|---|---|
| Commonwealth Land: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 26 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Commonwealth Reserves Marine: | None |

## Extra Information

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

| | |
|---|---|
| State and Territory Reserves: | 19 |
| Regional Forest Agreements: | None |
| Invasive Species: | 31 |
| Nationally Important Wetlands: | 8 |
| Key Ecological Features (Marine) | None |

# Details

## Matters of National Environmental Significance

| World Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Wet Tropics of Queensland | QLD | Declared property |

| National Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Natural | | |
| Wet Tropics of Queensland | QLD | Listed place |
| Indigenous | | |
| Wet Tropics World Heritage Area (Indigenous Values) | QLD | Within listed place |

| Listed Threatened Ecological Communities | | [ Resource Information ] |
|---|---|---|

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

| Name | Status | Type of Presence |
|---|---|---|
| Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland | Endangered | Community likely to occur within area |

| Listed Threatened Species | | [ Resource Information ] |
|---|---|---|
| Name | Status | Type of Presence |
| Birds | | |
| Calidris ferruginea | | |
| Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Casuarius casuarius johnsonii | | |
| Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986] | Endangered | Species or species habitat known to occur within area |
| Erythrotriorchis radiatus | | |
| Red Goshawk [942] | Vulnerable | Species or species habitat known to occur within area |
| Erythrura gouldiae | | |
| Gouldian Finch [413] | Endangered | Species or species habitat known to occur within area |
| Neochmia ruficauda ruficauda | | |
| Star Finch (eastern), Star Finch (southern) [26027] | Endangered | Species or species habitat likely to occur within area |
| Numenius madagascariensis | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Poephila cincta cincta | | |
| Southern Black-throated Finch [64447] | Endangered | Species or species habitat known to occur within area |
| Rostratula australis | | |
| Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area |
| Tyto novaehollandiae kimberli | | |
| Masked Owl (northern) [26048] | Vulnerable | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| | | habitat likely to occur within area |
| **Frogs** | | |
| Litoria dayi<br>Australian Lace-lid, Lace-eyed Tree Frog [86707] | Endangered | Species or species habitat likely to occur within area |
| Litoria nannotis<br>Waterfall Frog, Torrent Tree Frog [1817] | Endangered | Species or species habitat likely to occur within area |
| Litoria rheocola<br>Common Mistfrog [1802] | Endangered | Species or species habitat may occur within area |
| Pseudophryne covacevichae<br>Magnificent Brood Frog [64385] | Vulnerable | Species or species habitat may occur within area |
| **Mammals** | | |
| Bettongia tropica<br>Northern Bettong [214] | Endangered | Species or species habitat likely to occur within area |
| Dasyurus hallucatus<br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat likely to occur within area |
| Dasyurus maculatus gracilis<br>Spotted-tailed Quoll (North Queensland), Yarri [64475] | Endangered | Species or species habitat likely to occur within area |
| Hipposideros semoni<br>Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180] | Vulnerable | Species or species habitat may occur within area |
| Macroderma gigas<br>Ghost Bat [174] | Vulnerable | Breeding likely to occur within area |
| Mesembriomys gouldii rattoides<br>Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620] | Vulnerable | Species or species habitat likely to occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat known to occur within area |
| Petrogale sharmani<br>Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281] | Vulnerable | Species or species habitat known to occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)<br>Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus conspicillatus<br>Spectacled Flying-fox [185] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus poliocephalus<br>Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Rhinolophus robertsi<br>Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639] | Vulnerable | Species or species habitat known to occur within area |
| Saccolaimus saccolaimus nudicluniatus<br>Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889] | Vulnerable | Species or species habitat likely to occur within area |
| **Plants** | | |

| Name | Status | Type of Presence |
|---|---|---|
| Acacia crombiei<br>Pink Gidgee [10927] | Vulnerable | Species or species habitat known to occur within area |
| Bulbophyllum globuliforme<br>Miniature Moss-orchid, Hoop Pine Orchid [6649] | Vulnerable | Species or species habitat likely to occur within area |
| Cajanus mareebensis<br>[8635] | Endangered | Species or species habitat likely to occur within area |
| Cycas cairnsiana<br>a cycad [5780] | Vulnerable | Species or species habitat likely to occur within area |
| Cycas platyphylla<br>a cycad [55796] | Vulnerable | Species or species habitat likely to occur within area |
| Dichanthium queenslandicum<br>King Blue-grass [5481] | Endangered | Species or species habitat likely to occur within area |
| Dichanthium setosum<br>bluegrass [14159] | Vulnerable | Species or species habitat known to occur within area |
| Grevillea glossadenia<br>[7979] | Vulnerable | Species or species habitat known to occur within area |
| Lindsaea pulchella var. blanda<br>[20842] | Vulnerable | Species or species habitat may occur within area |
| Macropteranthes montana<br>[9003] | Vulnerable | Species or species habitat may occur within area |
| Marsdenia brevifolia<br>[64585] | Vulnerable | Species or species habitat likely to occur within area |
| Phaius australis<br>Lesser Swamp-orchid [5872] | Endangered | Species or species habitat likely to occur within area |
| Phaius pictus<br>[22564] | Vulnerable | Species or species habitat likely to occur within area |
| Phalaenopsis amabilis subsp. rosenstromii<br>Native Moth Orchid [87535] | Endangered | Species or species habitat may occur within area |
| Tephrosia leveillei<br>[16946] | Vulnerable | Species or species habitat likely to occur within area |
| Tropilis callitrophilis<br>Thin Feather Orchid [82771] | Vulnerable | Species or species habitat may occur within area |
| Reptiles | | |
| Denisonia maculata<br>Ornamental Snake [1193] | Vulnerable | Species or species habitat may occur within area |
| Egernia rugosa<br>Yakka Skink [1420] | Vulnerable | Species or species habitat likely to occur within area |

| Listed Migratory Species [ Resource Information ] | | |
|---|---|---|
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| **Migratory Marine Birds** | | |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| **Migratory Marine Species** | | |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |
| **Migratory Terrestrial Species** | | |
| Cuculus optatus<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat may occur within area |
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat may occur within area |
| Pandion haliaetus | | |
| Osprey [952] | | Species or species habitat likely to occur within area |
| Tringa nebularia | | |
| Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | [ Resource Information ] |
|---|---|---|
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| Birds | | |
| Actitis hypoleucos | | |
| Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Anseranas semipalmata | | |
| Magpie Goose [978] | | Species or species habitat may occur within area |
| Apus pacificus | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba | | |
| Great Egret, White Egret [59541] | | Breeding known to occur within area |
| Ardea ibis | | |
| Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata | | |
| Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea | | |
| Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos | | |
| Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Cuculus saturatus | | |
| Oriental Cuckoo, Himalayan Cuckoo [710] | | Species or species habitat known to occur within area |
| Gallinago hardwickii | | |
| Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Haliaeetus leucogaster | | |
| White-bellied Sea-Eagle [943] | | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat may occur within area |
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat may occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat likely to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |
| **Reptiles** | | |
| Crocodylus johnstoni<br>Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773] | | Species or species habitat may occur within area |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |

## Extra Information

| State and Territory Reserves | [ Resource Information ] |
|---|---|
| Name | State |
| Blackbraes | QLD |
| Blackbraes | QLD |
| Craig's Pocket | QLD |
| Eagle's View | QLD |
| Forty Mile Scrub | QLD |
| Girringun | QLD |
| Girringun | QLD |
| Girringun 1 | QLD |
| Girringun 2 | QLD |
| Glen Eagle | QLD |
| Glenlofty | QLD |
| Goanna Spring | QLD |
| Kennedy Road Gravel | QLD |
| Kinrara | QLD |
| Moonstone Hill | QLD |
| Mount Rosey | QLD |
| Newcastle Range-The Oaks | QLD |
| Undara Volcanic | QLD |
| Werrington | 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<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Lonchura punctulata<br>Nutmeg Mannikin [399] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| Frogs | | |
| Rhinella marina<br>Cane Toad [83218] | | Species or species habitat known to occur within area |
| Mammals | | |
| Bos taurus<br>Domestic Cattle [16] | | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| | | habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Equus caballus<br>Horse [5] | | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| **Plants** | | |
| Acacia nilotica subsp. indica<br>Prickly Acacia [6196] | | Species or species habitat may occur within area |
| Andropogon gayanus<br>Gamba Grass [66895] | | Species or species habitat likely to occur within area |
| Annona glabra<br>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 |
| Cenchrus ciliaris<br>Buffel-grass, Black Buffel-grass [20213] | | Species or species habitat may occur within area |
| Cryptostegia grandiflora<br>Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913] | | Species or species habitat likely to occur within area |
| Eichhornia crassipes<br>Water Hyacinth, Water Orchid, Nile Lily [13466] | | Species or species habitat likely to occur within area |
| Hymenachne amplexicaulis<br>Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754] | | Species or species habitat likely to occur within area |
| Jatropha gossypifolia<br>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<br>Lantana, Common Lantana, Kamara Lantana, | | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] | | habitat likely to occur within area |
| Parkinsonia aculeata<br>Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301] | | Species or species habitat likely to occur within area |
| Parthenium hysterophorus<br>Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566] | | Species or species habitat likely to occur within area |
| Salvinia molesta<br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | | Species or species habitat likely to occur within area |
| **Reptiles** | | |
| Hemidactylus frenatus<br>Asian House Gecko [1708] | | Species or species habitat likely to occur within area |

| Nationally Important Wetlands | [ Resource Information ] |
|---|---|
| Name | State |
| Herbert River Gorge | QLD |
| Lake Lucy Wetlands | QLD |
| Minnamoolka Area | QLD |
| Poison Lake | QLD |
| Undara Lava Tubes | QLD |
| Valley of Lagoons | QLD |
| Wairuna Lake | QLD |
| Walters Plains Lake | 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

-18.96758 144.91516

# 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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# 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.

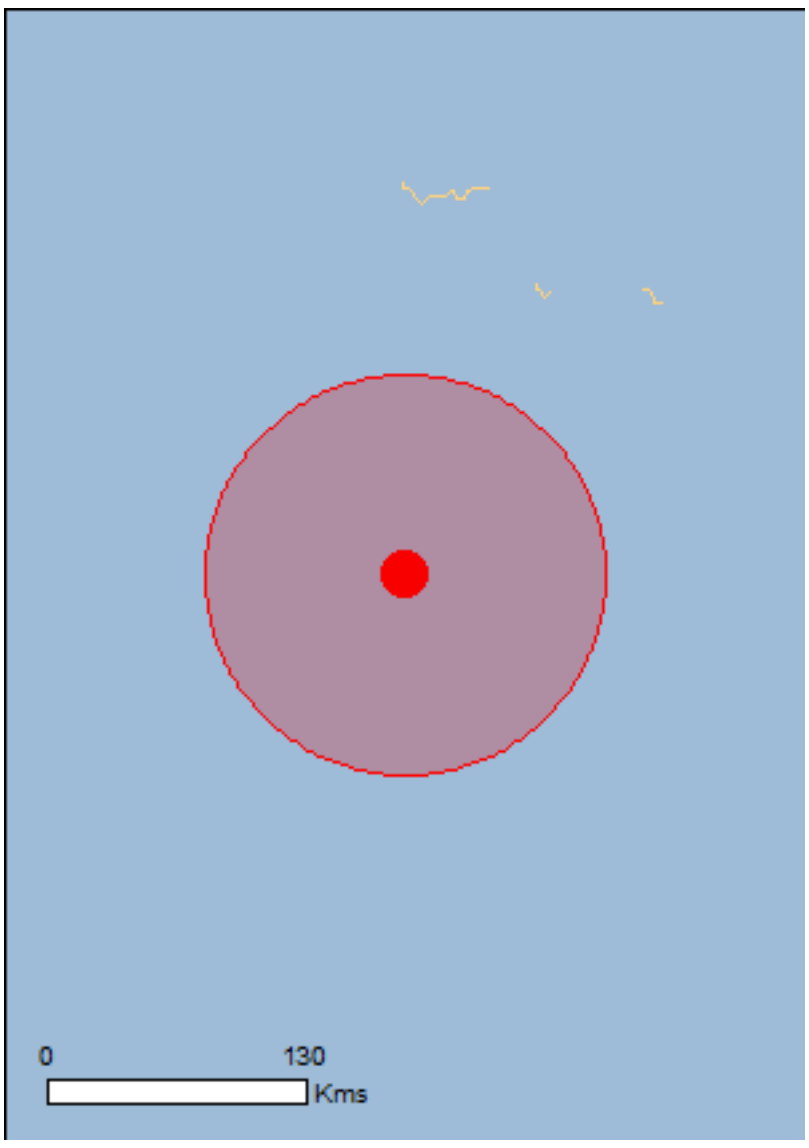
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/05/18 08:41:18


Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

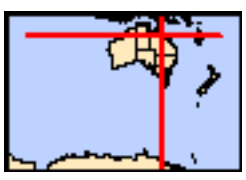
Caveat
Acknowledgements




Coordinates

Buffer: 100.0Km



# 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.

| | |
|---|---|
| World Heritage Properties: | 1 |
| National Heritage Places: | 2 |
| Wetlands of International Importance: | None |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 1 |
| Listed Threatened Species: | 44 |
| Listed Migratory Species: | 19 |

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. 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.

| | |
|---|---|
| Commonwealth Land: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 26 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Commonwealth Reserves Marine: | None |

## Extra Information

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

| | |
|---|---|
| State and Territory Reserves: | 20 |
| Regional Forest Agreements: | None |
| Invasive Species: | 31 |
| Nationally Important Wetlands: | 8 |
| Key Ecological Features (Marine) | None |

# Details

## Matters of National Environmental Significance

| World Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Wet Tropics of Queensland | QLD | Declared property |

| National Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Natural | | |
| Wet Tropics of Queensland | QLD | Listed place |
| Indigenous | | |
| Wet Tropics World Heritage Area (Indigenous Values) | QLD | Within listed place |

| Listed Threatened Ecological Communities | | [ Resource Information ] |
|---|---|---|

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

| Name | Status | Type of Presence |
|---|---|---|
| Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland | Endangered | Community likely to occur within area |

| Listed Threatened Species | | [ Resource Information ] |
|---|---|---|
| Name | Status | Type of Presence |
| Birds | | |
| Calidris ferruginea | | |
| Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Casuarius casuarius johnsonii | | |
| Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986] | Endangered | Species or species habitat known to occur within area |
| Erythrotriorchis radiatus | | |
| Red Goshawk [942] | Vulnerable | Species or species habitat known to occur within area |
| Erythrura gouldiae | | |
| Gouldian Finch [413] | Endangered | Species or species habitat likely to occur within area |
| Neochmia ruficauda ruficauda | | |
| Star Finch (eastern), Star Finch (southern) [26027] | Endangered | Species or species habitat likely to occur within area |
| Numenius madagascariensis | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Poephila cincta cincta | | |
| Southern Black-throated Finch [64447] | Endangered | Species or species habitat known to occur within area |
| Rostratula australis | | |
| Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area |
| Tyto novaehollandiae kimberli | | |
| Masked Owl (northern) [26048] | Vulnerable | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| | | habitat likely to occur within area |
| **Frogs** | | |
| Litoria dayi<br>Australian Lace-lid, Lace-eyed Tree Frog [86707] | Endangered | Species or species habitat likely to occur within area |
| Litoria nannotis<br>Waterfall Frog, Torrent Tree Frog [1817] | Endangered | Species or species habitat likely to occur within area |
| Litoria rheocola<br>Common Mistfrog [1802] | Endangered | Species or species habitat may occur within area |
| Pseudophryne covacevichae<br>Magnificent Brood Frog [64385] | Vulnerable | Species or species habitat may occur within area |
| **Mammals** | | |
| Bettongia tropica<br>Northern Bettong [214] | Endangered | Species or species habitat likely to occur within area |
| Dasyurus hallucatus<br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat likely to occur within area |
| Dasyurus maculatus gracilis<br>Spotted-tailed Quoll (North Queensland), Yarri [64475] | Endangered | Species or species habitat likely to occur within area |
| Hipposideros semoni<br>Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180] | Vulnerable | Species or species habitat may occur within area |
| Macroderma gigas<br>Ghost Bat [174] | Vulnerable | Breeding likely to occur within area |
| Mesembriomys gouldii rattoides<br>Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620] | Vulnerable | Species or species habitat likely to occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat known to occur within area |
| Petrogale sharmani<br>Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281] | Vulnerable | Species or species habitat known to occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)<br>Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus conspicillatus<br>Spectacled Flying-fox [185] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus poliocephalus<br>Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Rhinolophus robertsi<br>Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639] | Vulnerable | Species or species habitat known to occur within area |
| Saccolaimus saccolaimus nudicluniatus<br>Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889] | Vulnerable | Species or species habitat likely to occur within area |
| **Plants** | | |

| Name | Status | Type of Presence |
|---|---|---|
| Acacia crombiei<br>Pink Gidgee [10927] | Vulnerable | Species or species habitat known to occur within area |
| Bulbophyllum globuliforme<br>Miniature Moss-orchid, Hoop Pine Orchid [6649] | Vulnerable | Species or species habitat likely to occur within area |
| Cajanus mareebensis<br>[8635] | Endangered | Species or species habitat likely to occur within area |
| Cycas cairnsiana<br>a cycad [5780] | Vulnerable | Species or species habitat likely to occur within area |
| Cycas platyphylla<br>a cycad [55796] | Vulnerable | Species or species habitat likely to occur within area |
| Dichanthium queenslandicum<br>King Blue-grass [5481] | Endangered | Species or species habitat likely to occur within area |
| Dichanthium setosum<br>bluegrass [14159] | Vulnerable | Species or species habitat known to occur within area |
| Grevillea glossadenia<br>[7979] | Vulnerable | Species or species habitat known to occur within area |
| Lindsaea pulchella var. blanda<br>[20842] | Vulnerable | Species or species habitat may occur within area |
| Macropteranthes montana<br>[9003] | Vulnerable | Species or species habitat may occur within area |
| Marsdenia brevifolia<br>[64585] | Vulnerable | Species or species habitat likely to occur within area |
| Phaius australis<br>Lesser Swamp-orchid [5872] | Endangered | Species or species habitat likely to occur within area |
| Phaius pictus<br>[22564] | Vulnerable | Species or species habitat likely to occur within area |
| Phalaenopsis amabilis subsp. rosenstromii<br>Native Moth Orchid [87535] | Endangered | Species or species habitat may occur within area |
| Tephrosia leveillei<br>[16946] | Vulnerable | Species or species habitat likely to occur within area |
| Tropilis callitrophilis<br>Thin Feather Orchid [82771] | Vulnerable | Species or species habitat may occur within area |
| Reptiles | | |
| Denisonia maculata<br>Ornamental Snake [1193] | Vulnerable | Species or species habitat may occur within area |
| Egernia rugosa<br>Yakka Skink [1420] | Vulnerable | Species or species habitat likely to occur within area |

| Listed Migratory Species [ Resource Information ] | | |
|---|---|---|
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| **Migratory Marine Birds** | | |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| **Migratory Marine Species** | | |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |
| **Migratory Terrestrial Species** | | |
| Cuculus optatus<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat may occur within area |
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat may occur within area |
| Pandion haliaetus | | |
| Osprey [952] | | Species or species habitat likely to occur within area |
| Tringa nebularia | | |
| Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | [ Resource Information ] |
|---|---|---|
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| Birds | | |
| Actitis hypoleucos | | |
| Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Anseranas semipalmata | | |
| Magpie Goose [978] | | Species or species habitat may occur within area |
| Apus pacificus | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba | | |
| Great Egret, White Egret [59541] | | Breeding known to occur within area |
| Ardea ibis | | |
| Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata | | |
| Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea | | |
| Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos | | |
| Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Cuculus saturatus | | |
| Oriental Cuckoo, Himalayan Cuckoo [710] | | Species or species habitat known to occur within area |
| Gallinago hardwickii | | |
| Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Haliaeetus leucogaster | | |
| White-bellied Sea-Eagle [943] | | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat may occur within area |
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat may occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat likely to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat may occur within area |
| **Reptiles** | | |
| Crocodylus johnstoni<br>Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773] | | Species or species habitat may occur within area |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |

# Extra Information

## State and Territory Reserves [ Resource Information ]

| Name | State |
|---|---|
| Blackbraes | QLD |
| Blackbraes | QLD |
| Craig's Pocket | QLD |
| Eagle's View | QLD |
| Forty Mile Scrub | QLD |
| Girringun | QLD |
| Girringun | QLD |
| Girringun 1 | QLD |
| Girringun 2 | QLD |
| Glen Eagle | QLD |
| Glenlofty | QLD |
| Goanna Spring | QLD |
| Kennedy Road Gravel | QLD |
| Kinrara | QLD |
| Liefway | QLD |
| Moonstone Hill | QLD |
| Mount Rosey | QLD |
| Newcastle Range-The Oaks | QLD |
| Undara Volcanic | QLD |
| Werrington | 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<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Lonchura punctulata<br>Nutmeg Mannikin [399] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| **Frogs** | | |
| Rhinella marina<br>Cane Toad [83218] | | Species or species habitat known to occur within area |
| **Mammals** | | |

| Name | Status | Type of Presence |
|---|---|---|
| Bos taurus<br>Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Equus caballus<br>Horse [5] | | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| **Plants** | | |
| Acacia nilotica subsp. indica<br>Prickly Acacia [6196] | | Species or species habitat may occur within area |
| Andropogon gayanus<br>Gamba Grass [66895] | | Species or species habitat likely to occur within area |
| Annona glabra<br>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 |
| Cenchrus ciliaris<br>Buffel-grass, Black Buffel-grass [20213] | | Species or species habitat may occur within area |
| Cryptostegia grandiflora<br>Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913] | | Species or species habitat likely to occur within area |
| Eichhornia crassipes<br>Water Hyacinth, Water Orchid, Nile Lily [13466] | | Species or species habitat likely to occur within area |
| Hymenachne amplexicaulis<br>Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754] | | Species or species habitat likely to occur within area |
| Jatropha gossypifolia<br>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 |

| Name | Status | Type of Presence |
|---|---|---|
| Lantana camara<br>Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] | | Species or species habitat likely to occur within area |
| Parkinsonia aculeata<br>Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301] | | Species or species habitat likely to occur within area |
| Parthenium hysterophorus<br>Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566] | | Species or species habitat likely to occur within area |
| Salvinia molesta<br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | | Species or species habitat likely to occur within area |
| **Reptiles** | | |
| Hemidactylus frenatus<br>Asian House Gecko [1708] | | Species or species habitat likely to occur within area |

## Nationally Important Wetlands [ Resource Information ]

| Name | State |
|---|---|
| Herbert River Gorge | QLD |
| Lake Lucy Wetlands | QLD |
| Minnamoolka Area | QLD |
| Poison Lake | QLD |
| Undara Lava Tubes | QLD |
| Valley of Lagoons | QLD |
| Wairuna Lake | QLD |
| Walters Plains Lake | 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

-19.03018 144.9562

# 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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# 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.

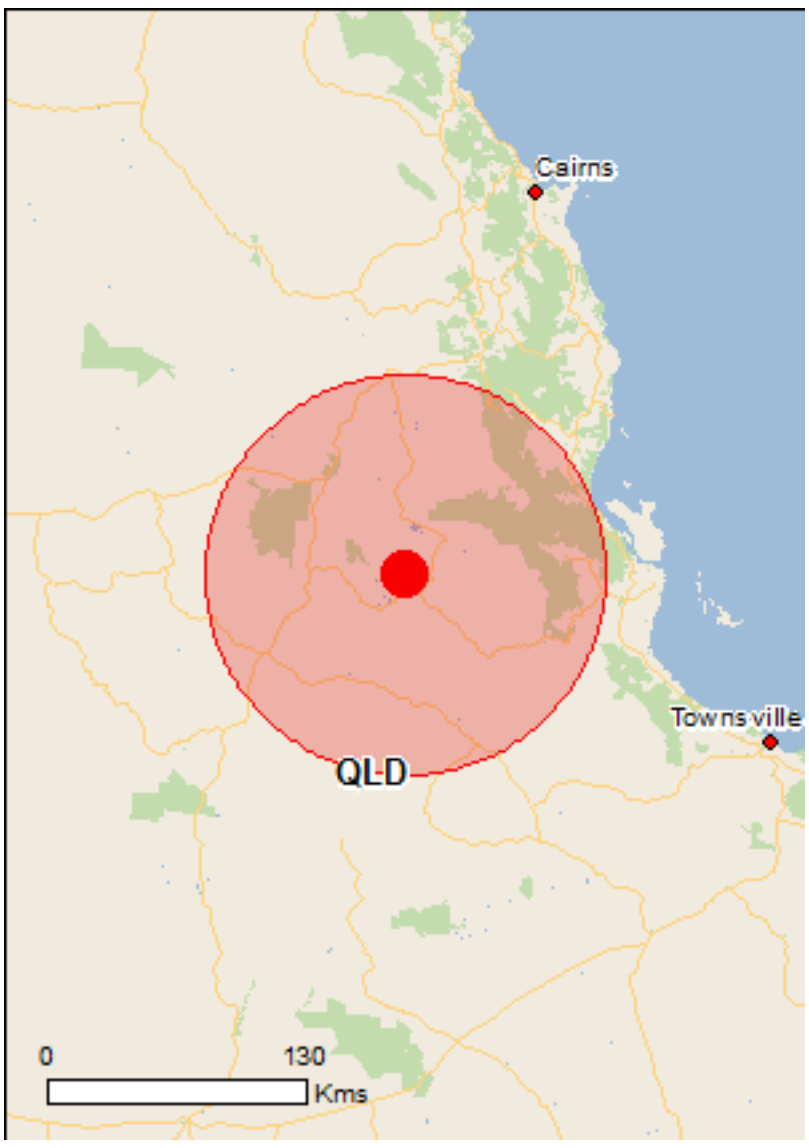
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/05/18 08:40:18


Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

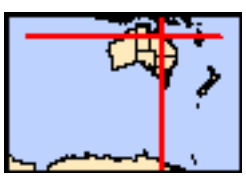
Caveat
Acknowledgements


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 100.0Km



# 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.

| | |
|---|---|
| World Heritage Properties: | 2 |
| National Heritage Places: | 3 |
| Wetlands of International Importance: | None |
| Great Barrier Reef Marine Park: | 2 |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 3 |
| Listed Threatened Species: | 91 |
| Listed Migratory Species: | 57 |

## 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.

| | |
|---|---|
| Commonwealth Land: | None |
| Commonwealth Heritage Places: | 1 |
| Listed Marine Species: | 110 |
| Whales and Other Cetaceans: | 12 |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Commonwealth Reserves Marine: | None |

## Extra Information

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

| | |
|---|---|
| State and Territory Reserves: | 33 |
| Regional Forest Agreements: | None |
| Invasive Species: | 35 |
| Nationally Important Wetlands: | 16 |
| Key Ecological Features (Marine) | None |

# Details

## Matters of National Environmental Significance

| World Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Great Barrier Reef | QLD | Declared property |
| Wet Tropics of Queensland | QLD | Declared property |

| National Heritage Properties | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Natural | | |
| Great Barrier Reef | QLD | Listed place |
| Wet Tropics of Queensland | QLD | Listed place |
| Indigenous | | |
| Wet Tropics World Heritage Area (Indigenous Values) | QLD | Within listed place |

| Great Barrier Reef Marine Park | | [ Resource Information ] |
|---|---|---|
| Type | Zone | IUCN |
| Conservation Park | CP-18-4046 | IV |
| General Use | GU-16-6004 | VI |

| Listed Threatened Ecological Communities | | [ Resource Information ] |
|---|---|---|

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

| Name | Status | Type of Presence |
|---|---|---|
| Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland | Endangered | Community likely to occur within area |
| Littoral Rainforest and Coastal Vine Thickets of Eastern Australia | Critically Endangered | Community likely to occur within area |
| Mabi Forest (Complex Notophyll Vine Forest 5b) | Critically Endangered | Community likely to occur within area |

| Listed Threatened Species | | [ Resource Information ] |
|---|---|---|
| Name | Status | Type of Presence |
| Birds | | |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Casuarius casuarius johnsonii<br>Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986] | Endangered | Species or species habitat known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Vulnerable | Species or species habitat known to occur |

| Name | Status | Type of Presence within area |
|---|---|---|
| Erythrura gouldiae<br>Gouldian Finch [413] | Endangered | Species or species habitat known to occur within area |
| Fregetta grallaria grallaria<br>White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438] | Vulnerable | Species or species habitat likely to occur within area |
| Limosa lapponica baueri<br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380] | Vulnerable | Species or species habitat known to occur within area |
| Limosa lapponica menzbieri<br>Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432] | Critically Endangered | Species or species habitat may occur within area |
| Neochmia ruficauda ruficauda<br>Star Finch (eastern), Star Finch (southern) [26027] | Endangered | Species or species habitat likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Poephila cincta cincta<br>Southern Black-throated Finch [64447] | Endangered | Species or species habitat known to occur within area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area |
| Tyto novaehollandiae kimberli<br>Masked Owl (northern) [26048] | Vulnerable | Species or species habitat known to occur within area |
| **Frogs** | | |
| Litoria dayi<br>Australian Lace-lid, Lace-eyed Tree Frog [86707] | Endangered | Species or species habitat known to occur within area |
| Litoria nannotis<br>Waterfall Frog, Torrent Tree Frog [1817] | Endangered | Species or species habitat known to occur within area |
| Litoria nyakalensis<br>Mountain Mistfrog [1820] | Critically Endangered | Species or species habitat likely to occur within area |
| Litoria rheocola<br>Common Mistfrog [1802] | Endangered | Species or species habitat known to occur within area |
| Pseudophryne covacevichae<br>Magnificent Brood Frog [64385] | Vulnerable | Species or species habitat known to occur within area |
| **Mammals** | | |
| Balaenoptera musculus<br>Blue Whale [36] | Endangered | Species or species habitat may occur within area |
| Bettongia tropica<br>Northern Bettong [214] | Endangered | Species or species habitat likely to occur within area |
| Dasyurus hallucatus<br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat known to occur within area |
| Dasyurus maculatus gracilis<br>Spotted-tailed Quoll (North Queensland), Yarri | Endangered | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| [64475] | | habitat known to occur within area |
| Hipposideros semoni<br>Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180] | Vulnerable | Species or species habitat may occur within area |
| Macroderma gigas<br>Ghost Bat [174] | Vulnerable | Breeding likely to occur within area |
| Megaptera novaeangliae<br>Humpback Whale [38] | Vulnerable | Species or species habitat known to occur within area |
| Mesembriomys gouldii  rattoides<br>Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620] | Vulnerable | Species or species habitat known to occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat known to occur within area |
| Petaurus australis Wet Tropics subspecies<br>Yellow-bellied Glider (Wet Tropics), Fluffy Glider [88022] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Petaurus gracilis<br>Mahogany Glider [26775] | Endangered | Species or species habitat likely to occur within area |
| Petrogale sharmani<br>Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281] | Vulnerable | Species or species habitat known to occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)<br>Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus conspicillatus<br>Spectacled Flying-fox [185] | Vulnerable | Species or species habitat known to occur within area |
| Pteropus poliocephalus<br>Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Rhinolophus robertsi<br>Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639] | Vulnerable | Species or species habitat known to occur within area |
| Saccolaimus saccolaimus  nudicluniatus<br>Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889] | Vulnerable | Species or species habitat known to occur within area |
| Xeromys myoides<br>Water Mouse, False Water Rat, Yirrkoo [66] | Vulnerable | Species or species habitat may occur within area |
| **Plants** | | |
| Acacia crombiei<br>Pink Gidgee [10927] | Vulnerable | Species or species habitat known to occur within area |
| Acacia purpureopetala<br>[61156] | Critically Endangered | Species or species habitat likely to occur within area |
| Alloxylon flammeum<br>Red Silky Oak, Queensland Waratah, Tree Waratah [56400] | Vulnerable | Species or species habitat known to occur within area |
| Aponogeton bullosus<br>[8299] | Endangered | Species or species habitat likely to occur |

| Name | Status | Type of Presence within area |
|---|---|---|
| Bulbophyllum globuliforme<br>Miniature Moss-orchid, Hoop Pine Orchid [6649] | Vulnerable | Species or species habitat likely to occur within area |
| Cajanus mareebensis<br>[8635] | Endangered | Species or species habitat known to occur within area |
| Canarium acutifolium<br>[23956] | Vulnerable | Species or species habitat known to occur within area |
| Carronia pedicellata<br>[24178] | Endangered | Species or species habitat likely to occur within area |
| Chingia australis<br>[24603] | Endangered | Species or species habitat may occur within area |
| Corymbia leptoloma<br>Yellowjacket [64101] | Vulnerable | Species or species habitat known to occur within area |
| Corymbia rhodops<br>[64015] | Vulnerable | Species or species habitat may occur within area |
| Cycas cairnsiana<br>a cycad [5780] | Vulnerable | Species or species habitat likely to occur within area |
| Cycas platyphylla<br>a cycad [55796] | Vulnerable | Species or species habitat likely to occur within area |
| Cyperus cephalotes<br>[10265] | Endangered | Species or species habitat may occur within area |
| Dichanthium queenslandicum<br>King Blue-grass [5481] | Endangered | Species or species habitat likely to occur within area |
| Dichanthium setosum<br>bluegrass [14159] | Vulnerable | Species or species habitat known to occur within area |
| Euphorbia carissoides<br>[12431] | Vulnerable | Species or species habitat likely to occur within area |
| Genoplesium tectum<br>Cardwell Midge Orchid [55130] | Endangered | Species or species habitat known to occur within area |
| Grevillea glossadenia<br>[7979] | Vulnerable | Species or species habitat known to occur within area |
| Homoranthus porteri<br>[55196] | Vulnerable | Species or species habitat may occur within area |
| Lastreopsis walleri<br>a fern [18229] | Vulnerable | Species or species habitat likely to occur within area |
| Lindsaea pulchella var. blanda<br>[20842] | Vulnerable | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Macropteranthes montana [9003] | Vulnerable | Species or species habitat may occur within area |
| Marsdenia brevifolia [64585] | Vulnerable | Species or species habitat likely to occur within area |
| Myrmecodia beccarii Ant Plant [11852] | Vulnerable | Species or species habitat known to occur within area |
| Phaius australis Lesser Swamp-orchid [5872] | Endangered | Species or species habitat likely to occur within area |
| Phaius pictus [22564] | Vulnerable | Species or species habitat likely to occur within area |
| Phalaenopsis amabilis subsp. rosenstromii Native Moth Orchid [87535] | Endangered | Species or species habitat may occur within area |
| Phlegmariurus filiformis Rat's Tail Tassel-fern [86551] | Endangered | Species or species habitat may occur within area |
| Phlegmariurus lockyeri [86552] | Vulnerable | Species or species habitat may occur within area |
| Phlegmariurus marsupiiformis Water Tassel-fern [86553] | Vulnerable | Species or species habitat likely to occur within area |
| Phlegmariurus tetrastichoides Square Tassel Fern [86555] | Vulnerable | Species or species habitat likely to occur within area |
| Polyphlebium endlicherianum Middle Filmy Fern [87494] | Endangered | Species or species habitat likely to occur within area |
| Prostanthera clotteniana [76165] | Critically Endangered | Species or species habitat may occur within area |
| Tephrosia leveillei [16946] | Vulnerable | Species or species habitat likely to occur within area |
| Triplarina nitchaga [64593] | Vulnerable | Species or species habitat likely to occur within area |
| Tropilis callitrophilis Thin Feather Orchid [82771] | Vulnerable | Species or species habitat known to occur within area |
| Vappodes lithocola Dwarf Butterfly Orchid, Cooktown Orchid [78893] | Endangered | Species or species habitat may occur within area |
| Zeuxine polygonoides Velvet Jewel Orchid [46794] | Vulnerable | Species or species habitat likely to occur within area |
| **Reptiles** | | |
| Caretta caretta Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Chelonia mydas | | |
| Green Turtle [1765] | Vulnerable | Breeding known to occur within area |
| Delma mitella | | |
| Atherton Delma, Legless Lizard [25931] | Vulnerable | Species or species habitat known to occur within area |
| Denisonia maculata | | |
| Ornamental Snake [1193] | Vulnerable | Species or species habitat may occur within area |
| Dermochelys coriacea | | |
| Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Egernia rugosa | | |
| Yakka Skink [1420] | Vulnerable | Species or species habitat likely to occur within area |
| Eretmochelys imbricata | | |
| Hawksbill Turtle [1766] | Vulnerable | Species or species habitat known to occur within area |
| Lepidochelys olivacea | | |
| Olive Ridley Turtle, Pacific Ridley Turtle [1767] | Endangered | Breeding likely to occur within area |
| Natator depressus | | |
| Flatback Turtle [59257] | Vulnerable | Breeding known to occur within area |
| Sharks | | |
| Carcharodon carcharias | | |
| White Shark, Great White Shark [64470] | Vulnerable | Species or species habitat may occur within area |
| Pristis pristis | | |
| Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756] | Vulnerable | Species or species habitat known to occur within area |
| Pristis zijsron | | |
| Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442] | Vulnerable | Breeding likely to occur within area |
| Rhincodon typus | | |
| Whale Shark [66680] | Vulnerable | Species or species habitat may occur within area |

## Listed Migratory Species [ Resource Information ]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|---|---|---|
| Migratory Marine Birds | | |
| Anous stolidus | | |
| Common Noddy [825] | | Species or species habitat likely to occur within area |
| Apus pacificus | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Fregata ariel | | |
| Lesser Frigatebird, Least Frigatebird [1012] | | Species or species habitat likely to occur within area |
| Fregata minor | | |
| Great Frigatebird, Greater Frigatebird [1013] | | Species or species habitat likely to occur within area |
| Sternula albifrons | | |
| Little Tern [82849] | | Species or species habitat may occur within area |
| Migratory Marine Species | | |
| Anoxypristis cuspidata | | |
| Narrow Sawfish, Knifetooth Sawfish [68448] | | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat likely to occur within area |
| Balaenoptera edeni<br>Bryde's Whale [35] | | Species or species habitat may occur within area |
| Balaenoptera musculus<br>Blue Whale [36] | Endangered | Species or species habitat may occur within area |
| Carcharodon carcharias<br>White Shark, Great White Shark [64470] | Vulnerable | Species or species habitat may occur within area |
| Caretta caretta<br>Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |
| Chelonia mydas<br>Green Turtle [1765] | Vulnerable | Breeding known to occur within area |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |
| Dermochelys coriacea<br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Dugong dugon<br>Dugong [28] | | Species or species habitat known to occur within area |
| Eretmochelys imbricata<br>Hawksbill Turtle [1766] | Vulnerable | Species or species habitat known to occur within area |
| Lamna nasus<br>Porbeagle, Mackerel Shark [83288] | | Species or species habitat may occur within area |
| Lepidochelys olivacea<br>Olive Ridley Turtle, Pacific Ridley Turtle [1767] | Endangered | Breeding likely to occur within area |
| Manta alfredi<br>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 |
| Manta birostris<br>Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995] | | Species or species habitat may occur within area |
| Megaptera novaeangliae<br>Humpback Whale [38] | Vulnerable | Species or species habitat known to occur within area |
| Natator depressus<br>Flatback Turtle [59257] | Vulnerable | Breeding known to occur within area |
| Orcaella brevirostris<br>Irrawaddy Dolphin [45] | | Species or species habitat known to occur within area |
| Orcinus orca<br>Killer Whale, Orca [46] | | Species or species habitat may occur within area |
| Pristis pristis<br>Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756] | Vulnerable | Species or species habitat known to occur within area |
| Pristis zijsron<br>Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442] | Vulnerable | Breeding likely to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Rhincodon typus<br>Whale Shark [66680] | Vulnerable | Species or species habitat may occur within area |
| Sousa chinensis<br>Indo-Pacific Humpback Dolphin [50] | | Breeding known to occur within area |
| **Migratory Terrestrial Species** | | |
| Cuculus optatus<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat likely to occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat known to occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Calidris ruficollis<br>Red-necked Stint [860] | | Roosting known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Roosting may occur within area |
| Gallinago megala<br>Swinhoe's Snipe [864] | | Roosting likely to occur within area |
| Gallinago stenura<br>Pin-tailed Snipe [841] | | Roosting likely to occur within area |
| Limosa lapponica<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Numenius minutus<br>Little Curlew, Little Whimbrel [848] | | Roosting likely to occur within area |
| Numenius phaeopus<br>Whimbrel [849] | | Roosting known to occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat known to occur within area |
| Pluvialis squatarola<br>Grey Plover [865] | | Roosting known to occur within area |
| Tringa brevipes<br>Grey-tailed Tattler [851] | | Roosting known to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Xenus cinereus<br>Terek Sandpiper [59300] | | Roosting known to occur within area |

## Other Matters Protected by the EPBC Act

| Commonwealth Heritage Places | | [ Resource Information ] |
|---|---|---|
| Name | State | Status |
| Natural | | |
| Tully Training Area | QLD | Listed place |

| Listed Marine Species | | [ Resource Information ] |
|---|---|---|
| * Species is listed under a different scientific name on the EPBC Act - Threatened Species list. | | |
| Name | Threatened | Type of Presence |
| Birds | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat known to occur within area |
| Anous stolidus<br>Common Noddy [825] | | Species or species habitat likely to occur within area |
| Anseranas semipalmata<br>Magpie Goose [978] | | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba<br>Great Egret, White Egret [59541] | | Breeding known to occur within area |
| Ardea ibis<br>Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Calidris ruficollis<br>Red-necked Stint [860] | | Roosting known to occur within area |
| Calidris tenuirostris<br>Great Knot [862] | Critically Endangered | Roosting known to occur within area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Roosting known to occur within area |
| Charadrius mongolus<br>Lesser Sand Plover, Mongolian Plover [879] | Endangered | Roosting known to occur within area |
| Cuculus saturatus<br>Oriental Cuckoo, Himalayan Cuckoo [710] | | Species or species habitat known to occur within area |
| Fregata ariel<br>Lesser Frigatebird, Least Frigatebird [1012] | | Species or species habitat likely to occur within area |
| Fregata minor<br>Great Frigatebird, Greater Frigatebird [1013] | | Species or species habitat likely to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Roosting may occur within area |
| Gallinago megala<br>Swinhoe's Snipe [864] | | Roosting likely to occur within area |
| Gallinago stenura<br>Pin-tailed Snipe [841] | | Roosting likely to occur within area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat known to occur within area |
| Heteroscelus brevipes<br>Grey-tailed Tattler [59311] | | Roosting known to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat known to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Hirundo rustica<br>Barn Swallow [662] | | Species or species habitat likely to occur within area |
| Limosa lapponica<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Monarcha trivirgatus<br>Spectacled Monarch [610] | | Species or species habitat known to occur within area |
| Motacilla cinerea<br>Grey Wagtail [642] | | Species or species habitat may occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area |
| Numenius minutus<br>Little Curlew, Little Whimbrel [848] | | Roosting likely to occur within area |
| Numenius phaeopus<br>Whimbrel [849] | | Roosting known to occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat known to occur within area |
| Pluvialis squatarola<br>Grey Plover [865] | | Roosting known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat likely to occur within area |
| Sterna albifrons<br>Little Tern [813] | | Species or species habitat may occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Xenus cinereus<br>Terek Sandpiper [59300] | | Roosting known to occur within area |
| Fish | | |
| Acentronura tentaculata<br>Shortpouch Pygmy Pipehorse [66187] | | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Bulbonaricus davaoensis<br>Davao Pughead Pipefish [66190] | | Species or species habitat may occur within area |
| Choeroichthys brachysoma<br>Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194] | | Species or species habitat may occur within area |
| Choeroichthys sculptus<br>Sculptured Pipefish [66197] | | Species or species habitat may occur within area |
| Choeroichthys suillus<br>Pig-snouted Pipefish [66198] | | Species or species habitat may occur within area |
| Corythoichthys amplexus<br>Fijian Banded Pipefish, Brown-banded Pipefish [66199] | | Species or species habitat may occur within area |
| Corythoichthys flavofasciatus<br>Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200] | | Species or species habitat may occur within area |
| Corythoichthys intestinalis<br>Australian Messmate Pipefish, Banded Pipefish [66202] | | Species or species habitat may occur within area |
| Corythoichthys ocellatus<br>Orange-spotted Pipefish, Ocellated Pipefish [66203] | | Species or species habitat may occur within area |
| Corythoichthys paxtoni<br>Paxton's Pipefish [66204] | | Species or species habitat may occur within area |
| Corythoichthys schultzi<br>Schultz's Pipefish [66205] | | Species or species habitat may occur within area |
| Cosmocampus maxweberi<br>Maxweber's Pipefish [66209] | | Species or species habitat may occur within area |
| Doryrhamphus dactyliophorus<br>Banded Pipefish, Ringed Pipefish [66210] | | Species or species habitat may occur within area |
| Doryrhamphus excisus<br>Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211] | | Species or species habitat may occur within area |
| Doryrhamphus janssi<br>Cleaner Pipefish, Janss' Pipefish [66212] | | Species or species habitat may occur within area |
| Festucalex cinctus<br>Girdled Pipefish [66214] | | Species or species habitat may occur within area |
| Festucalex gibbsi<br>Gibbs'  Pipefish [66215] | | Species or species habitat may occur within area |
| Halicampus dunckeri<br>Red-hair Pipefish, Duncker's Pipefish [66220] | | Species or species habitat may occur within area |
| Halicampus grayi<br>Mud Pipefish, Gray's Pipefish [66221] | | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Halicampus macrorhynchus<br>Whiskered Pipefish, Ornate Pipefish [66222] | | Species or species habitat may occur within area |
| Halicampus mataafae<br>Samoan Pipefish [66223] | | Species or species habitat may occur within area |
| Halicampus nitidus<br>Glittering Pipefish [66224] | | Species or species habitat may occur within area |
| Halicampus spinirostris<br>Spiny-snout Pipefish [66225] | | Species or species habitat may occur within area |
| Hippichthys cyanospilos<br>Blue-speckled Pipefish, Blue-spotted Pipefish [66228] | | Species or species habitat may occur within area |
| Hippichthys heptagonus<br>Madura Pipefish, Reticulated Freshwater Pipefish [66229] | | Species or species habitat may occur within area |
| Hippichthys penicillus<br>Beady Pipefish, Steep-nosed Pipefish [66231] | | Species or species habitat may occur within area |
| Hippichthys spicifer<br>Belly-barred Pipefish, Banded Freshwater Pipefish [66232] | | Species or species habitat may occur within area |
| Hippocampus bargibanti<br>Pygmy Seahorse [66721] | | Species or species habitat may occur within area |
| Hippocampus histrix<br>Spiny Seahorse, Thorny Seahorse [66236] | | Species or species habitat may occur within area |
| Hippocampus kuda<br>Spotted Seahorse, Yellow Seahorse [66237] | | Species or species habitat may occur within area |
| Hippocampus planifrons<br>Flat-face Seahorse [66238] | | Species or species habitat may occur within area |
| Hippocampus zebra<br>Zebra Seahorse [66241] | | Species or species habitat may occur within area |
| Micrognathus andersonii<br>Anderson's Pipefish, Shortnose Pipefish [66253] | | Species or species habitat may occur within area |
| Micrognathus brevirostris<br>thorntail Pipefish, Thorn-tailed Pipefish [66254] | | Species or species habitat may occur within area |
| Microphis brachyurus<br>Short-tail Pipefish, Short-tailed River Pipefish [66257] | | Species or species habitat may occur within area |
| Nannocampus pictus<br>Painted Pipefish, Reef Pipefish [66263] | | Species or species habitat may occur within area |
| Phoxocampus diacanthus<br>Pale-blotched Pipefish, Spined Pipefish [66266] | | Species or species habitat may occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Siokunichthys breviceps<br>Softcoral Pipefish, Soft-coral Pipefish [66270] | | Species or species habitat may occur within area |
| Solegnathus hardwickii<br>Pallid Pipehorse, Hardwick's Pipehorse [66272] | | Species or species habitat may occur within area |
| Solenostomus cyanopterus<br>Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183] | | Species or species habitat may occur within area |
| Solenostomus paegnius<br>Rough-snout Ghost Pipefish [68425] | | Species or species habitat may occur within area |
| Solenostomus paradoxus<br>Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184] | | Species or species habitat may occur within area |
| Syngnathoides biaculeatus<br>Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279] | | Species or species habitat may occur within area |
| Trachyrhamphus bicoarctatus<br>Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280] | | Species or species habitat may occur within area |
| Trachyrhamphus longirostris<br>Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281] | | Species or species habitat may occur within area |
| **Mammals** | | |
| Dugong dugon<br>Dugong [28] | | Species or species habitat known to occur within area |
| **Reptiles** | | |
| Acalyptophis peronii<br>Horned Seasnake [1114] | | Species or species habitat may occur within area |
| Aipysurus duboisii<br>Dubois' Seasnake [1116] | | Species or species habitat may occur within area |
| Aipysurus eydouxii<br>Spine-tailed Seasnake [1117] | | Species or species habitat may occur within area |
| Aipysurus laevis<br>Olive Seasnake [1120] | | Species or species habitat may occur within area |
| Astrotia stokesii<br>Stokes' Seasnake [1122] | | Species or species habitat may occur within area |
| Caretta caretta<br>Loggerhead Turtle [1763] | Endangered | Species or species habitat known to occur within area |
| Chelonia mydas<br>Green Turtle [1765] | Vulnerable | Breeding known to occur within area |
| Crocodylus johnstoni<br>Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773] | | Species or species habitat may occur within area |
| Crocodylus porosus<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area |

| Name | Threatened | Type of Presence |
|---|---|---|
| Dermochelys coriacea<br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Disteira kingii<br>Spectacled Seasnake [1123] | | Species or species habitat may occur within area |
| Disteira major<br>Olive-headed Seasnake [1124] | | Species or species habitat may occur within area |
| Enhydrina schistosa<br>Beaked Seasnake [1126] | | Species or species habitat may occur within area |
| Eretmochelys imbricata<br>Hawksbill Turtle [1766] | Vulnerable | Species or species habitat known to occur within area |
| Hydrophis elegans<br>Elegant Seasnake [1104] | | Species or species habitat may occur within area |
| Hydrophis mcdowelli<br>null [25926] | | Species or species habitat may occur within area |
| Hydrophis ornatus<br>Spotted Seasnake, Ornate Reef Seasnake [1111] | | Species or species habitat may occur within area |
| Lapemis hardwickii<br>Spine-bellied Seasnake [1113] | | Species or species habitat may occur within area |
| Laticauda colubrina<br>a sea krait [1092] | | Species or species habitat may occur within area |
| Laticauda laticaudata<br>a sea krait [1093] | | Species or species habitat may occur within area |
| Lepidochelys olivacea<br>Olive Ridley Turtle, Pacific Ridley Turtle [1767] | Endangered | Breeding likely to occur within area |
| Natator depressus<br>Flatback Turtle [59257] | Vulnerable | Breeding known to occur within area |
| Pelamis platurus<br>Yellow-bellied Seasnake [1091] | | Species or species habitat may occur within area |

| Whales and other Cetaceans | | [ Resource Information ] |
|---|---|---|
| Name | Status | Type of Presence |
| Mammals | | |
| Balaenoptera acutorostrata<br>Minke Whale [33] | | Species or species habitat may occur within area |
| Balaenoptera edeni<br>Bryde's Whale [35] | | Species or species habitat may occur within area |
| Balaenoptera musculus<br>Blue Whale [36] | Endangered | Species or species habitat may occur within area |
| Delphinus delphis<br>Common Dophin, Short-beaked Common Dolphin [60] | | Species or species habitat may occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Grampus griseus<br>Risso's Dolphin, Grampus [64] | | Species or species habitat may occur within area |
| Megaptera novaeangliae<br>Humpback Whale [38] | Vulnerable | Species or species habitat known to occur within area |
| Orcaella brevirostris<br>Irrawaddy Dolphin [45] | | Species or species habitat known to occur within area |
| Orcinus orca<br>Killer Whale, Orca [46] | | Species or species habitat may occur within area |
| Sousa chinensis<br>Indo-Pacific Humpback Dolphin [50] | | Breeding known to occur within area |
| Stenella attenuata<br>Spotted Dolphin, Pantropical Spotted Dolphin [51] | | Species or species habitat may occur within area |
| Tursiops aduncus<br>Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418] | | Species or species habitat likely to occur within area |
| Tursiops truncatus s. str.<br>Bottlenose Dolphin [68417] | | Species or species habitat may occur within area |

## Extra Information

| State and Territory Reserves | [ Resource Information ] |
|---|---|
| Name | State |
| Alcock | QLD |
| Craig's Pocket | QLD |
| Djilgarin | QLD |
| Edmund Kennedy | QLD |
| Forty Mile Scrub | QLD |
| Girramay | QLD |
| Girringun | QLD |
| Girringun | QLD |
| Girringun 1 | QLD |
| Girringun 2 | QLD |
| Glen Eagle | QLD |
| Glenlofty | QLD |
| Goanna Spring | QLD |
| Jalum | QLD |
| Kinrara | QLD |
| Kirrama | QLD |
| Koombooloomba | QLD |
| Koombooloomba | QLD |
| Koombooloomba South | QLD |
| Liefway | QLD |
| Mahogany Glider | QLD |
| Melaleuca | QLD |
| Messmate | QLD |
| Mount Rosey | QLD |
| Murray Upper Wetlands | QLD |
| Range View | QLD |
| Ravenshoe 1 | QLD |

| Name | State |
|---|---|
| Tully Falls | QLD |
| Tully Gorge | QLD |
| Undara Volcanic | QLD |
| Yabullum | QLD |
| Yourka | QLD |
| Yourka Reserve | 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<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Lonchura punctulata<br>Nutmeg Mannikin [399] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| **Frogs** | | |
| Rhinella marina<br>Cane Toad [83218] | | Species or species habitat known to occur within area |
| **Mammals** | | |
| Bos taurus<br>Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Capra hircus<br>Goat [2] | | Species or species habitat likely to occur within area |
| Equus caballus<br>Horse [5] | | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|---|---|---|
| Feral deer | | |
| Feral deer species in Australia [85733] | | 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 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 |
| Vulpes vulpes | | |
| Red Fox, Fox [18] | | 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 |
| Andropogon gayanus | | |
| Gamba Grass [66895] | | Species or species habitat likely to occur within area |
| Annona glabra | | |
| Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311] | | Species or species habitat likely to occur within area |
| Cabomba caroliniana | | |
| Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] | | Species or species habitat likely to occur within area |
| Cenchrus ciliaris | | |
| Buffel-grass, Black Buffel-grass [20213] | | Species or species habitat may occur within area |
| Cryptostegia grandiflora | | |
| Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913] | | 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 Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] | | 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 |

| Name | Status | Type of Presence within area |
|---|---|---|
| Salvinia molesta<br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | | Species or species habitat likely to occur within area |
| Senecio madagascariensis<br>Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | | Species or species habitat likely to occur within area |
| Vachellia nilotica<br>Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351] | | Species or species habitat likely to occur within area |
| **Reptiles** | | |
| Hemidactylus frenatus<br>Asian House Gecko [1708] | | Species or species habitat likely to occur within area |

| Nationally Important Wetlands | [ Resource Information ] |
|---|---|
| Name | State |
| Blencoe Falls - Blencoe Creek | QLD |
| Edmund Kennedy Wetlands | QLD |
| Great Barrier Reef Marine Park | QLD |
| Herbert River Floodplain | QLD |
| Herbert River Gorge | QLD |
| Hinchinbrook Channel | QLD |
| Innot Hot Springs | QLD |
| Lake Lucy Wetlands | QLD |
| Minnamoolka Area | QLD |
| Poison Lake | QLD |
| Tully River - Murray River Floodplains | QLD |
| Undara Lava Tubes | QLD |
| Valley of Lagoons | QLD |
| Wairuna Lake | QLD |
| Walters Plains Lake | QLD |
| Yuccabine Creek | 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

-18.54926 145.17334

# 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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Canberra ACT 2601 Australia
+61 2 6274 1111

Queensland Government

# Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -18.9758
Longitude: 144.9283
Distance: 100
Email: llopez@aarc.net.au
Date submitted: Thursday 17 May 2018 10:18:28
Date extracted: Thursday 17 May 2018 10:20:16

The number of records retrieved = 57

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | amphibians | Hylidae | *Litoria nannotis* | waterfall frog | | E | E | 52/3 |
| animals | amphibians | Hylidae | *Litoria serrata* | tapping green eyed frog | | V | | 70/13 |
| animals | amphibians | Hylidae | *Litoria dayi* | Australian lacelid | | E | E | 8/6 |
| animals | amphibians | Hylidae | *Litoria rheocola* | common mistfrog | | E | E | 22/5 |
| animals | birds | Accipitridae | *Erythrotriorchis radiatus* | red goshawk | | E | V | 1 |
| animals | birds | Casuariidae | *Casuarius casuarius johnsonii (southern population)* | southern cassowary (southern population) | | E | E | 42 |
| animals | birds | Columbidae | *Geophaps scripta scripta* | squatter pigeon (southern subspecies) | | V | V | 3 |
| animals | birds | Estrildidae | *Poephila cincta cincta* | black-throated finch (white-rumped subspecies) | | E | E | 11 |
| animals | birds | Estrildidae | *Erythrura gouldiae* | Gouldian finch | | E | E | 3 |
| animals | birds | Falconidae | *Falco hypoleucos* | grey falcon | | V | | 1 |
| animals | birds | Psittacidae | *Cyclopsitta diophthalma macleayana* | Macleay's fig-parrot | | V | | 46 |
| animals | birds | Rostratulidae | *Rostratula australis* | Australian painted snipe | | V | E | 3/2 |
| animals | birds | Scolopacidae | *Calidris ferruginea* | curlew sandpiper | | E | CE | 1 |
| animals | mammals | Dasyuridae | *Sminthopsis archeri* | chestnut dunnart | | NT | | 1/1 |
| animals | mammals | Dasyuridae | *Dasyurus maculatus gracilis* | spotted-tailed quoll (northern subspecies) | | E | E | 1 |
| animals | mammals | Hipposideridae | *Hipposideros diadema reginae* | diadem leaf-nosed bat | | NT | | 6 |
| animals | mammals | Macropodidae | *Dendrolagus lumholtzi* | Lumholtz's tree-kangaroo | | NT | | 2 |
| animals | mammals | Macropodidae | *Petrogale sharmani* | Sharman's rock-wallaby | | V | V | 39/33 |
| animals | mammals | Megadermatidae | *Macroderma gigas* | ghost bat | | E | V | 4 |
| animals | mammals | Petauridae | *Petaurus gracilis* | mahogany glider | | E | E | 8/1 |
| animals | mammals | Phascolarctidae | *Phascolarctos cinereus* | koala | | V | V | 25 |
| animals | mammals | Pseudocheiridae | *Petauroides volans* | greater glider | | V | V | 106/1 |
| animals | mammals | Pseudocheiridae | *Petauroides volans minor* | northern greater glider | | V | V | 385/3 |
| animals | mammals | Pteropodidae | *Pteropus conspicillatus* | spectacled flying-fox | | V | V | 4 |
| animals | mammals | Rhinolophidae | *Rhinolophus philippinensis* | greater large-eared horseshoe bat | | E | V | 1/1 |
| animals | mammals | Vespertilionidae | *Murina florium* | tube-nosed insectivorous bat | | V | | 1 |
| animals | reptiles | Crocodylidae | *Crocodylus porosus* | estuarine crocodile | | V | | 1 |
| animals | reptiles | Elapidae | *Acanthophis antarcticus* | common death adder | | V | | 2 |
| animals | reptiles | Pygopodidae | *Delma mitella* | Atherton delma | | NT | V | 2 |
| animals | reptiles | Scincidae | *Lerista vanderduysi* | leaden-bellied fine-line slider | | V | V | 4/1 |
| animals | reptiles | Scincidae | *Ctenotus monticola* | Atherton ctenotus | | V | | 2/2 |
| animals | reptiles | Scincidae | *Lygisaurus rococo* | Chillagoe litter-skink | | NT | | 4 |
| animals | reptiles | Scincidae | *Lerista ameles* | limbless fine-lined slider | | V | | 6/2 |
| animals | reptiles | Scincidae | *Lerista hobsoni* | Hobson's fine-line slider | | V | | 4/3 |
| plants | cycads | Cycadaceae | *Cycas desolata* | | | V | | 4/4 |
| plants | cycads | Cycadaceae | *Cycas cairnsiana* | | | V | V | 8/8 |
| plants | cycads | Cycadaceae | *Cycas platyphylla* | | | V | V | 3/3 |
| plants | higher dicots | Apiaceae | *Oenanthe javanica* | | | NT | | 1/1 |
| plants | higher dicots | Byttneriaceae | *Commersonia reticulata* | | | V | | 5/5 |
| plants | higher dicots | Euphorbiaceae | *Croton magneticus* | | | V | | 1/1 |
| plants | higher dicots | Mimosaceae | *Acacia crombiei* | pink gidgee | | V | V | 2/2 |
| plants | higher dicots | Mimosaceae | *Acacia tingoorensis* | | | V | | 5/5 |
| plants | higher dicots | Myrtaceae | *Leptospermum pallidum* | | | NT | | 10/10 |

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| plants | higher dicots | Myrtaceae | *Kunzea truncata* | | | E | | 1/1 |
| plants | higher dicots | Rubiaceae | *Oldenlandia polyclada* | | | NT | | 1/1 |
| plants | higher dicots | Sapindaceae | *Arytera dictyoneura* | | | NT | | 2/2 |
| plants | lower dicots | Convolvulaceae | *Ipomoea saintronanensis* | | | V | | 20/19 |
| plants | lower dicots | Solanaceae | *Solanum angustum* | | | E | | 2/2 |
| plants | monocots | Cyperaceae | *Carex breviscapa* | | | V | | 1/1 |
| plants | monocots | Orchidaceae | *Goodyera viridiflora* | | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Corybas cerasinus* | | | NT | | 4/4 |
| plants | monocots | Orchidaceae | *Phaius australis* | | | E | E | 1/1 |
| plants | monocots | Orchidaceae | *Rhomboda polygonoides* | | | V | V | 2/2 |
| plants | monocots | Orchidaceae | *Habenaria hymenophylla* | rainforest habenaria | | NT | | 2/1 |
| plants | monocots | Poaceae | *Paspalidium udum* | | | V | | 2/2 |
| plants | monocots | Poaceae | *Dichanthium queenslandicum* | | | V | E | 1/1 |
| plants | monocots | Poaceae | *Lepturus minutus* | | | V | | 10/10 |

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.

Queensland Government

# Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -19.0301
Longitude: 144.9561
Distance: 100
Email: llopez@aarc.net.au
Date submitted: Thursday 17 May 2018 10:31:34
Date extracted: Thursday 17 May 2018 10:40:07

The number of records retrieved = 56

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | amphibians | Hylidae | *Litoria serrata* | tapping green eyed frog | | V | | 77/13 |
| animals | amphibians | Hylidae | *Litoria dayi* | Australian lacelid | | E | E | 8/6 |
| animals | amphibians | Hylidae | *Litoria rheocola* | common mistfrog | | E | E | 22/5 |
| animals | amphibians | Hylidae | *Litoria nannotis* | waterfall frog | | E | E | 55/3 |
| animals | birds | Casuariidae | *Casuarius casuarius johnsonii (southern population)* | southern cassowary (southern population) | | E | E | 49 |
| animals | birds | Columbidae | *Geophaps scripta scripta* | squatter pigeon (southern subspecies) | | V | V | 3 |
| animals | birds | Estrildidae | *Erythrura gouldiae* | Gouldian finch | | E | E | 3 |
| animals | birds | Estrildidae | *Poephila cincta cincta* | black-throated finch (white-rumped subspecies) | | E | E | 12 |
| animals | birds | Falconidae | *Falco hypoleucos* | grey falcon | | V | | 2 |
| animals | birds | Psittacidae | *Cyclopsitta diophthalma macleayana* | Macleay's fig-parrot | | V | | 45 |
| animals | birds | Rostratulidae | *Rostratula australis* | Australian painted snipe | | V | E | 7/2 |
| animals | birds | Scolopacidae | *Calidris ferruginea* | curlew sandpiper | | E | CE | 1 |
| animals | insects | Lycaenidae | *Hypochrysops apollo apollo* | Apollo jewel (Wet Tropics subspecies) | | V | | 5 |
| animals | mammals | Dasyuridae | *Dasyurus maculatus gracilis* | spotted-tailed quoll (northern subspecies) | | E | E | 1 |
| animals | mammals | Dasyuridae | *Sminthopsis archeri* | chestnut dunnart | | NT | | 1/1 |
| animals | mammals | Hipposideridae | *Hipposideros diadema reginae* | diadem leaf-nosed bat | | NT | | 6 |
| animals | mammals | Macropodidae | *Petrogale sharmani* | Sharman's rock-wallaby | | V | V | 39/33 |
| animals | mammals | Macropodidae | *Dendrolagus lumholtzi* | Lumholtz's tree-kangaroo | | NT | | 2 |
| animals | mammals | Megadermatidae | *Macroderma gigas* | ghost bat | | E | V | 4 |
| animals | mammals | Petauridae | *Petaurus gracilis* | mahogany glider | | E | E | 13/1 |
| animals | mammals | Phascolarctidae | *Phascolarctos cinereus* | koala | | V | V | 25 |
| animals | mammals | Pseudocheiridae | *Petauroides volans minor* | northern greater glider | | V | V | 353/3 |
| animals | mammals | Pseudocheiridae | *Petauroides volans* | greater glider | | V | V | 74/1 |
| animals | mammals | Pteropodidae | *Pteropus conspicillatus* | spectacled flying-fox | | V | V | 4 |
| animals | mammals | Rhinolophidae | *Rhinolophus philippinensis* | greater large-eared horseshoe bat | | E | V | 1/1 |
| animals | mammals | Vespertilionidae | *Murina florium* | tube-nosed insectivorous bat | | V | | 1 |
| animals | reptiles | Crocodylidae | *Crocodylus porosus* | estuarine crocodile | | V | | 1 |
| animals | reptiles | Elapidae | *Acanthophis antarcticus* | common death adder | | V | | 2 |
| animals | reptiles | Pygopodidae | *Delma mitella* | Atherton delma | | NT | V | 2 |
| animals | reptiles | Scincidae | *Lerista vanderduysi* | leaden-bellied fine-line slider | | V | V | 3 |
| animals | reptiles | Scincidae | *Ctenotus monticola* | Atherton ctenotus | | V | | 2/2 |
| animals | reptiles | Scincidae | *Lygisaurus rococo* | Chillagoe litter-skink | | NT | | 4 |
| animals | reptiles | Scincidae | *Lerista ameles* | limbless fine-lined slider | | V | | 4/2 |
| animals | reptiles | Scincidae | *Lerista hobsoni* | Hobson's fine-line slider | | V | | 6/4 |
| plants | cycads | Cycadaceae | *Cycas desolata* | | | V | | 4/4 |
| plants | cycads | Cycadaceae | *Cycas cairnsiana* | | | V | V | 8/8 |
| plants | cycads | Cycadaceae | *Cycas platyphylla* | | | V | V | 3/3 |
| plants | higher dicots | Apiaceae | *Oenanthe javanica* | | | NT | | 1/1 |
| plants | higher dicots | Asteraceae | *Glossocardia orthochaeta* | | | E | | 1/1 |
| plants | higher dicots | Byttneriaceae | *Commersonia reticulata* | | | V | | 4/4 |
| plants | higher dicots | Euphorbiaceae | *Croton magneticus* | | | V | | 1/1 |
| plants | higher dicots | Mimosaceae | *Acacia tingoorensis* | | | V | | 5/5 |
| plants | higher dicots | Mimosaceae | *Acacia crombiei* | pink gidgee | | V | V | 2/2 |

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| plants | higher dicots | Myrtaceae | *Kunzea truncata* | | | E | | 1/1 |
| plants | higher dicots | Myrtaceae | *Leptospermum pallidum* | | | NT | | 10/10 |
| plants | higher dicots | Rubiaceae | *Oldenlandia polyclada* | | | NT | | 1/1 |
| plants | higher dicots | Sapindaceae | *Arytera dictyoneura* | | | NT | | 2/2 |
| plants | lower dicots | Convolvulaceae | *Ipomoea saintronanensis* | | | V | | 7/7 |
| plants | lower dicots | Solanaceae | *Solanum angustum* | | | E | | 2/2 |
| plants | monocots | Cyperaceae | *Carex breviscapa* | | | V | | 1/1 |
| plants | monocots | Orchidaceae | *Corybas cerasinus* | | | NT | | 4/4 |
| plants | monocots | Orchidaceae | *Phaius australis* | | | E | E | 1/1 |
| plants | monocots | Orchidaceae | *Rhomboda polygonoides* | | | V | V | 2/2 |
| plants | monocots | Poaceae | *Dichanthium queenslandicum* | | | V | E | 1/1 |
| plants | monocots | Poaceae | *Paspalidium udum* | | | V | | 2/2 |
| plants | monocots | Poaceae | *Lepturus minutus* | | | V | | 4/4 |

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.

Queensland Government

# Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -18.5493
Longitude: 145.1733
Distance: 100
Email: llopez@aarc.net.au
Date submitted: Thursday 17 May 2018 10:17:28
Date extracted: Thursday 17 May 2018 10:20:22

The number of records retrieved = 129

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | amphibians | Hylidae | *Litoria dayi* | Australian lacelid | | E | E | 99/47 |
| animals | amphibians | Hylidae | *Litoria nyakalensis* | mountain mistfrog | | E | CE | 9/9 |
| animals | amphibians | Hylidae | *Litoria rheocola* | common mistfrog | | E | E | 105/21 |
| animals | amphibians | Hylidae | *Litoria nannotis* | waterfall frog | | E | E | 112/12 |
| animals | amphibians | Hylidae | *Litoria serrata* | tapping green eyed frog | | V | | 176/31 |
| animals | amphibians | Myobatrachidae | *Pseudophryne covacevichae* | magnificent broodfrog | | V | V | 45 |
| animals | amphibians | Myobatrachidae | *Taudactylus acutirostris* | sharp snouted dayfrog | | PE | EX | 13/5 |
| animals | birds | Accipitridae | *Erythrotriorchis radiatus* | red goshawk | | E | V | 8 |
| animals | birds | Burhinidae | *Esacus magnirostris* | beach stone-curlew | | V | | 40 |
| animals | birds | Cacatuidae | *Calyptorhynchus lathami erebus* | glossy black-cockatoo (northern) | | V | | 1 |
| animals | birds | Casuariidae | *Casuarius casuarius johnsonii (southern population)* | southern cassowary (southern population) | | E | E | 484/5 |
| animals | birds | Charadriidae | *Charadrius mongolus* | lesser sand plover | | E | E | 5 |
| animals | birds | Charadriidae | *Charadrius leschenaultii* | greater sand plover | | V | V | 8 |
| animals | birds | Columbidae | *Geophaps scripta scripta* | squatter pigeon (southern subspecies) | | V | V | 2 |
| animals | birds | Estrildidae | *Poephila cincta cincta* | black-throated finch (white-rumped subspecies) | | E | E | 8 |
| animals | birds | Estrildidae | *Erythrura gouldiae* | Gouldian finch | | E | E | 2 |
| animals | birds | Falconidae | *Falco hypoleucos* | grey falcon | | V | | 1 |
| animals | birds | Psittacidae | *Cyclopsitta diophthalma macleayana* | Macleay's fig-parrot | | V | | 117/5 |
| animals | birds | Scolopacidae | *Calidris ferruginea* | curlew sandpiper | | E | CE | 1 |
| animals | birds | Scolopacidae | *Calidris tenuirostris* | great knot | | E | CE | 2 |
| animals | birds | Scolopacidae | *Numenius madagascariensis* | eastern curlew | | E | CE | 11/1 |
| animals | birds | Scolopacidae | *Limosa lapponica baueri* | Western Alaskan bar-tailed godwit | | V | V | 7/1 |
| animals | birds | Turnicidae | *Turnix olivii* | buff-breasted button-quail | | E | E | 2 |
| animals | birds | Tytonidae | *Tyto novaehollandiae kimberli* | masked owl (northern subspecies) | | V | V | 3 |
| animals | insects | Lycaenidae | *Hypochrysops apollo apollo* | Apollo jewel (Wet Tropics subspecies) | | V | | 11 |
| animals | mammals | Dasyuridae | *Dasyurus maculatus gracilis* | spotted-tailed quoll (northern subspecies) | | E | E | 9/3 |
| animals | mammals | Delphinidae | *Orcaella heinsohni* | Australian snubfin dolphin | | V | | 9 |
| animals | mammals | Dugongidae | *Dugong dugon* | dugong | | V | | 2 |
| animals | mammals | Hipposideridae | *Hipposideros diadema reginae* | diadem leaf-nosed bat | | NT | | 7 |
| animals | mammals | Macropodidae | *Dendrolagus lumholtzi* | Lumholtz's tree-kangaroo | | NT | | 10 |
| animals | mammals | Macropodidae | *Petrogale sharmani* | Sharman's rock-wallaby | | V | V | 45/34 |
| animals | mammals | Megadermatidae | *Macroderma gigas* | ghost bat | | E | V | 2 |
| animals | mammals | Petauridae | *Petaurus gracilis* | mahogany glider | | E | E | 182/8 |
| animals | mammals | Petauridae | *Petaurus australis unnamed subsp.* | yellow-bellied glider (northern subspecies) | | V | V | 13 |
| animals | mammals | Phascolarctidae | *Phascolarctos cinereus* | koala | | V | V | 26/1 |
| animals | mammals | Potoroidae | *Bettongia tropica* | northern bettong | | E | E | 33/1 |
| animals | mammals | Pseudocheiridae | *Petauroides volans* | greater glider | | V | V | 18/1 |
| animals | mammals | Pseudocheiridae | *Petauroides volans minor* | northern greater glider | | V | V | 359/3 |
| animals | mammals | Pteropodidae | *Pteropus conspicillatus* | spectacled flying-fox | | V | V | 21 |
| animals | mammals | Vespertilionidae | *Murina florium* | tube-nosed insectivorous bat | | V | | 9 |
| animals | reptiles | Cheloniidae | *Chelonia mydas* | green turtle | | V | V | 3 |
| animals | reptiles | Crocodylidae | *Crocodylus porosus* | estuarine crocodile | | V | | 18 |

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | reptiles | Elapidae | *Acanthophis antarcticus* | common death adder | | V | | 2 |
| animals | reptiles | Pygopodidae | *Delma mitella* | Atherton delma | | NT | V | 2 |
| animals | reptiles | Scincidae | *Lygisaurus rococo* | Chillagoe litter-skink | | NT | | 4 |
| animals | reptiles | Scincidae | *Lerista ameles* | limbless fine-lined slider | | V | | 7/3 |
| animals | reptiles | Scincidae | *Lerista storri* | Chillagoe fine-lined slider | | V | | 3/2 |
| animals | reptiles | Scincidae | *Ctenotus monticola* | Atherton ctenotus | | V | | 2/2 |
| plants | club mosses | Lycopodiaceae | *Phlegmariurus filiformis* | | | E | E | 1/1 |
| plants | club mosses | Lycopodiaceae | *Phlegmariurus marsupiiformis* | | | V | V | 1/1 |
| plants | club mosses | Lycopodiaceae | *Phlegmariurus phlegmarioides* | | | V | | 3/3 |
| plants | club mosses | Lycopodiaceae | *Phlegmariurus tetrastichoides* | | | V | V | 1/1 |
| plants | cycads | Cycadaceae | *Cycas desolata* | | | V | | 4/4 |
| plants | ferns | Cyatheaceae | *Cyathea celebica* | | | NT | | 1/1 |
| plants | ferns | Dicksoniaceae | *Calochlaena villosa* | | | NT | | 1/1 |
| plants | ferns | Dipteridaceae | *Dipteris conjugata* | | | NT | | 3/3 |
| plants | ferns | Dryopteridaceae | *Lastreopsis walleri* | | | V | V | 1/1 |
| plants | ferns | Dryopteridaceae | *Dryopteris hasseltii* | | | NT | | 2/2 |
| plants | ferns | Dryopteridaceae | *Dryopteris wattsii* | | | V | | 2/2 |
| plants | ferns | Hymenophyllaceae | *Hymenophyllum pallidum* | | | NT | | 1/1 |
| plants | ferns | Thelypteridaceae | *Chingia australis* | | | E | E | 1/1 |
| plants | ferns | Thelypteridaceae | *Pneumatopteris costata* | | | NT | | 5/5 |
| plants | ferns | Vittariaceae | *Antrophyum plantagineum* | | | NT | | 2/2 |
| plants | higher dicots | Apiaceae | *Oenanthe javanica* | | | NT | | 2/2 |
| plants | higher dicots | Asteraceae | *Glossocardia orthochaeta* | | | E | | 1/1 |
| plants | higher dicots | Burseraceae | *Canarium acutifolium var. acutifolium* | | | V | V | 7/7 |
| plants | higher dicots | Byttneriaceae | *Commersonia reticulata* | | | V | | 6/6 |
| plants | higher dicots | Combretaceae | *Dansiea elliptica* | | | NT | | 1/1 |
| plants | higher dicots | Droseraceae | *Drosera adelae* | | | NT | | 6/6 |
| plants | higher dicots | Euphorbiaceae | *Euphorbia carissoides* | | | V | V | 1/1 |
| plants | higher dicots | Euphorbiaceae | *Croton magneticus* | | | V | | 1/1 |
| plants | higher dicots | Fabaceae | *Dioclea hexandra* | | | V | | 2/2 |
| plants | higher dicots | Mimosaceae | *Acacia crombiei* | pink gidgee | | V | V | 2/2 |
| plants | higher dicots | Mimosaceae | *Acacia longipedunculata* | | | NT | | 7/4 |
| plants | higher dicots | Mimosaceae | *Acacia tingoorensis* | | | V | | 5/5 |
| plants | higher dicots | Myrtaceae | *Homoranthus porteri* | | | V | V | 2/2 |
| plants | higher dicots | Myrtaceae | *Leptospermum pallidum* | | | NT | | 10/10 |
| plants | higher dicots | Myrtaceae | *Waterhousea mulgraveana* | | | V | | 1/1 |
| plants | higher dicots | Myrtaceae | *Kunzea truncata* | | | E | | 1/1 |
| plants | higher dicots | Myrtaceae | *Melaleuca sylvana* | | | E | | 3/3 |
| plants | higher dicots | Myrtaceae | *Corymbia leptoloma* | | | V | V | 11/11 |
| plants | higher dicots | Myrtaceae | *Sphaerantia discolor* | Tully penda | | V | | 12/12 |
| plants | higher dicots | Myrtaceae | *Triplarina nitchaga* | | | V | V | 5/5 |
| plants | higher dicots | Polygalaceae | *Comesperma praecelsum* | | | V | | 1/1 |
| plants | higher dicots | Proteaceae | *Lasjia grandis* | | | V | | 2/2 |
| plants | higher dicots | Rubiaceae | *Hedyotis novoguineensis* | | | E | | 7/7 |
| plants | higher dicots | Rubiaceae | *Myrmecodia beccarii* | | | V | V | 18/5 |
| plants | higher dicots | Rubiaceae | *Oldenlandia polyclada* | | | NT | | 1/1 |

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| plants | higher dicots | Sapindaceae | *Dodonaea uncinata* | | | NT | | 16/16 |
| plants | higher dicots | Sapindaceae | *Arytera dictyoneura* | | | NT | | 3/3 |
| plants | higher dicots | Sapindaceae | *Diploglottis pedleyi* | | | NT | | 2/2 |
| plants | higher dicots | Sparrmanniaceae | *Corchorus subargenteus* | | | V | | 19/10 |
| plants | higher dicots | Sterculiaceae | *Firmiana papuana* | lacewood | | V | | 1/1 |
| plants | lower dicots | Apocynaceae | *Marsdenia brevifolia* | | | V | V | 6/6 |
| plants | lower dicots | Aristolochiaceae | *Pararistolochia praevenosa* | | | NT | | 3/3 |
| plants | lower dicots | Convolvulaceae | *Ipomoea saintronanensis* | | | V | | 21/20 |
| plants | lower dicots | Lauraceae | *Endiandra globosa* | ball-fruited walnut | | NT | | 2/2 |
| plants | lower dicots | Lauraceae | *Endiandra bellendenkerana* | | | NT | | 1/1 |
| plants | lower dicots | Linderniaceae | *Torenia polygonoides* | | | V | | 1/1 |
| plants | lower dicots | Menispermaceae | *Carronia pedicellata* | | | E | E | 4/4 |
| plants | lower dicots | Monimiaceae | *Steganthera australiana* | | | NT | | 1/1 |
| plants | lower dicots | Solanaceae | *Solanum hamulosum* | | | E | | 1/1 |
| plants | lower dicots | Solanaceae | *Solanum angustum* | | | E | | 4/4 |
| plants | lower dicots | Solanaceae | *Solanum graniticum* | | | E | | 1/1 |
| plants | monocots | Aponogetonaceae | *Aponogeton bullosus* | | | E | E | 4/4 |
| plants | monocots | Arecaceae | *Livistona drudei* | Halifax fan palm | | V | | 2/2 |
| plants | monocots | Arecaceae | *Arenga australasica* | | | V | | 8/8 |
| plants | monocots | Costaceae | *Cheilocostus potierae* | | | E | | 11/11 |
| plants | monocots | Cyperaceae | *Eleocharis retroflexa* | | | V | V | 1/1 |
| plants | monocots | Cyperaceae | *Carex breviscapa* | | | V | | 2/2 |
| plants | monocots | Orchidaceae | *Corybas abellianus* | nodding helmet orchid | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Dendrobium callitrophilum* | cypress orchid | | V | V | 1/1 |
| plants | monocots | Orchidaceae | *Phaius pictus* | | | V | V | 1/1 |
| plants | monocots | Orchidaceae | *Diuris oporina* | northern white donkeys tails | | NT | | 3/3 |
| plants | monocots | Orchidaceae | *Phaius australis* | | | E | E | 3/2 |
| plants | monocots | Orchidaceae | *Corybas cerasinus* | | | NT | | 4/4 |
| plants | monocots | Orchidaceae | *Habenaria rumphii* | | | NT | | 2/2 |
| plants | monocots | Orchidaceae | *Eulophia bicallosa* | | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Genoplesium tectum* | | | E | E | 1/1 |
| plants | monocots | Orchidaceae | *Didymoplexis pallens* | crystal bells | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Goodyera viridiflora* | | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Habenaria xanthantha* | | | NT | | 1/1 |
| plants | monocots | Orchidaceae | *Crepidium flavovirens* | | | V | | 1/1 |
| plants | monocots | Orchidaceae | *Peristylus banfieldii* | | | E | | 3/3 |
| plants | monocots | Orchidaceae | *Rhomboda polygonoides* | | | V | V | 2/2 |
| plants | monocots | Orchidaceae | *Habenaria hymenophylla* | rainforest habenaria | | NT | | 2/1 |
| plants | monocots | Orchidaceae | *Bulbophyllum globuliforme* | | | NT | V | 1/1 |
| plants | monocots | Poaceae | *Lepturus minutus* | | | V | | 9/9 |
| plants | monocots | Poaceae | *Paspalidium udum* | | | V | | 1/1 |

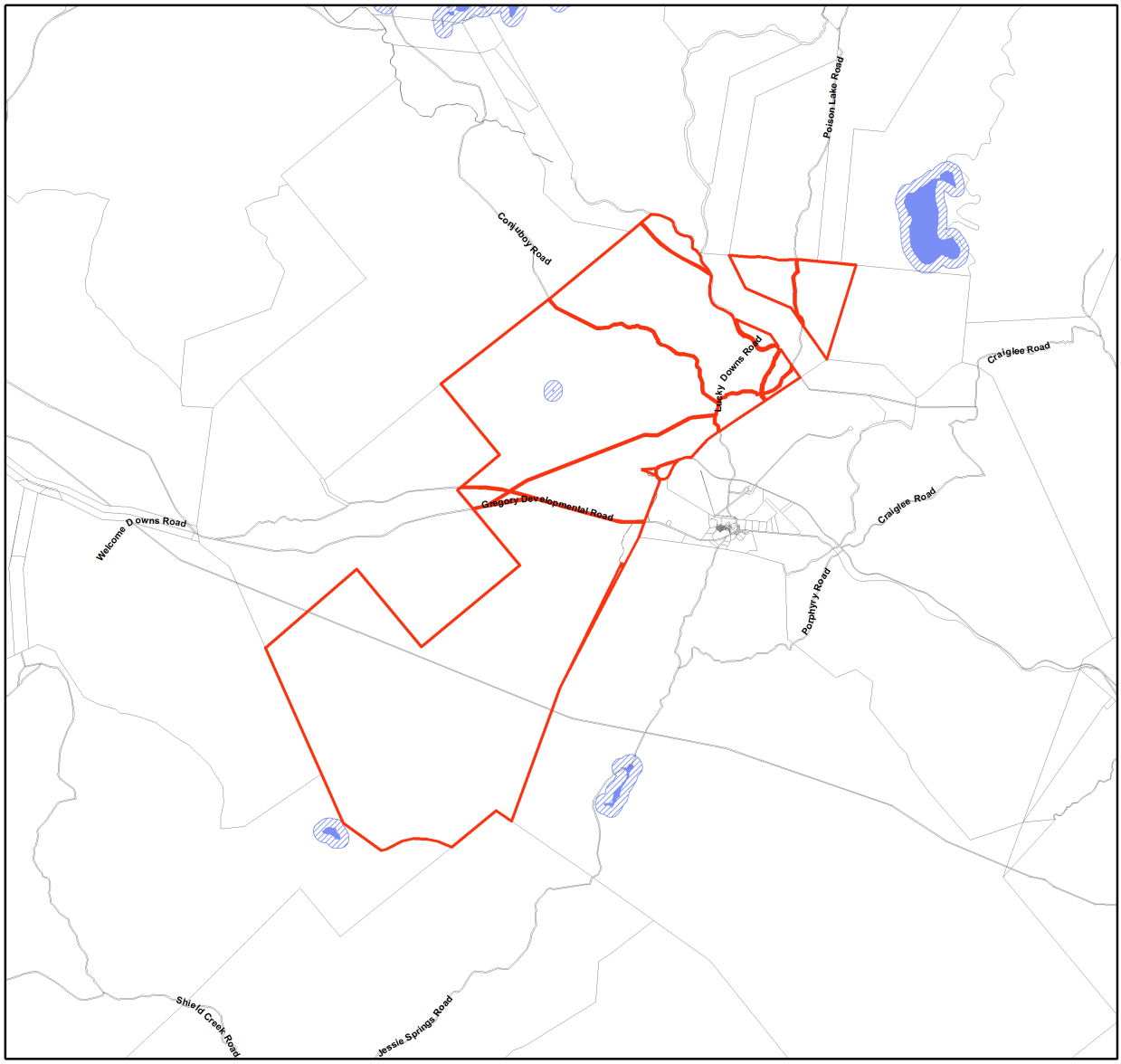
CODES

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).

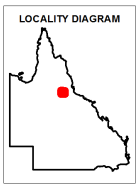
Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.




# Map of Referable Wetlands
# Wetland Protection Areas

Lot and Plan
Cadastral Boundary
Wetland Protection Areas
Wetland
Trigger Area

LOCALITY DIAGRAM



N

Note:
This map shows the location of wetland protection areas which are defined under the Environmental Protection Regulation 2008. Within wetland protection areas, certain types of development involving high impact earthworks are made assessable under Schedule 3 of the Sustainable Planning Regulation 2009.

The Department of State Development, Manufacturing, Infrastructure and Planning is the State Assessment Referral Agency (SARA) under Schedule 7 of the Sustainable Planning Regulation 2009 for assessable development involving high impact earthworks within wetland protection areas. The Department of Environment and Science is a technical agency.

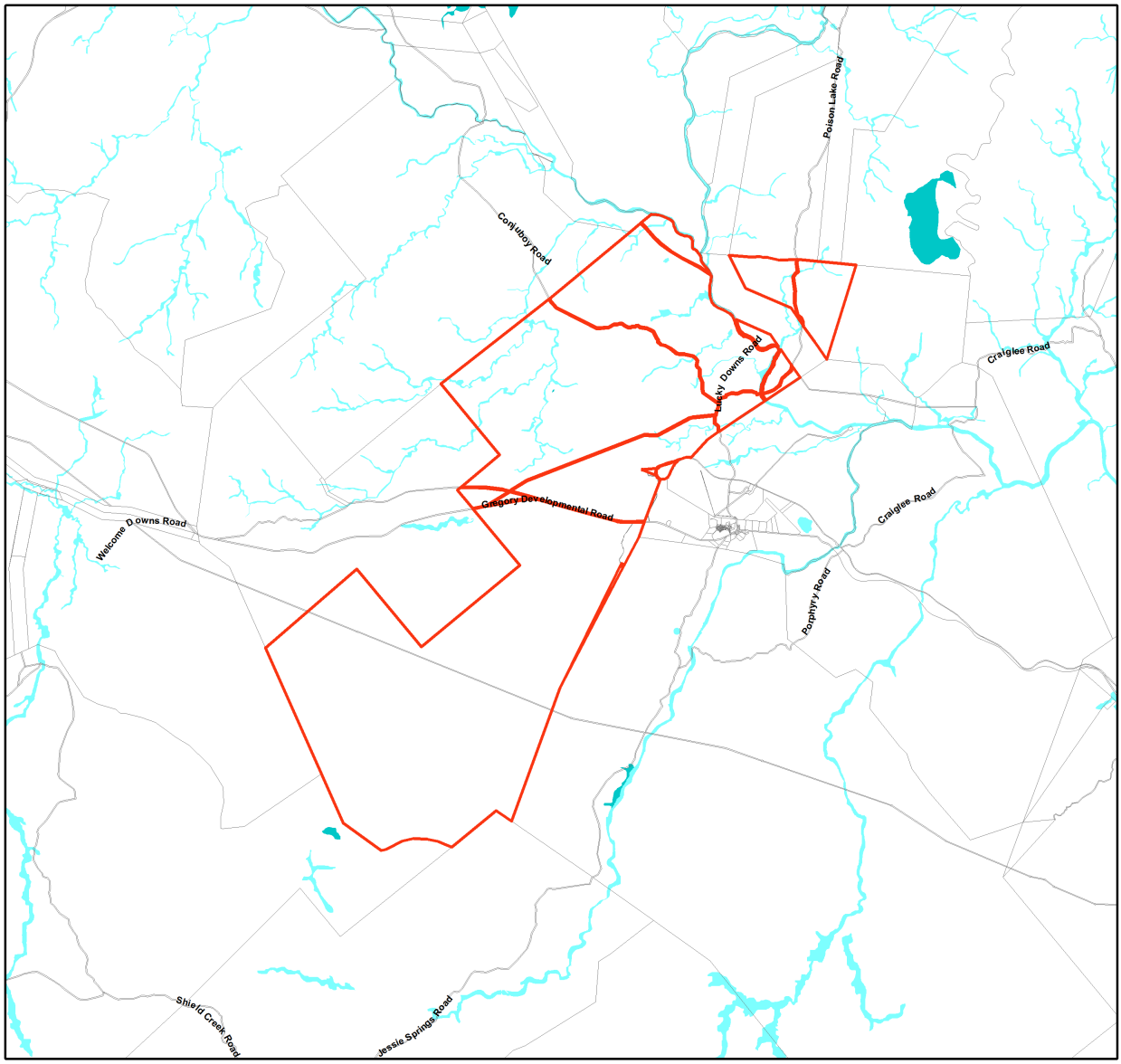
The policy outcome and assessment criteria for assessing these applications are described in the State Development Assessment Provisions (SDAP) *Module 11: Wetlands and wild rivers.*

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

0 3300 6600 9900 13200 16500 m

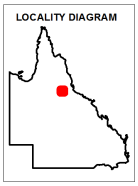
This product is projected into GDA 1994 MGA Zone 55




# Map of Referable Wetlands for the Environmental Protection Act 1994

Lot and Plan
Cadastral Boundary
HES Wetland
GES Wetland

LOCALITY DIAGRAM



N

Note:
This map shows the location of wetlands on the Map of Referable Wetlands which are defined under the Environmental Protection Regulation 2008.

Wetlands are assessed for ecological significance using the environmental values for wetlands in section 81A of the Environmental Protection Regulation 2008. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values.

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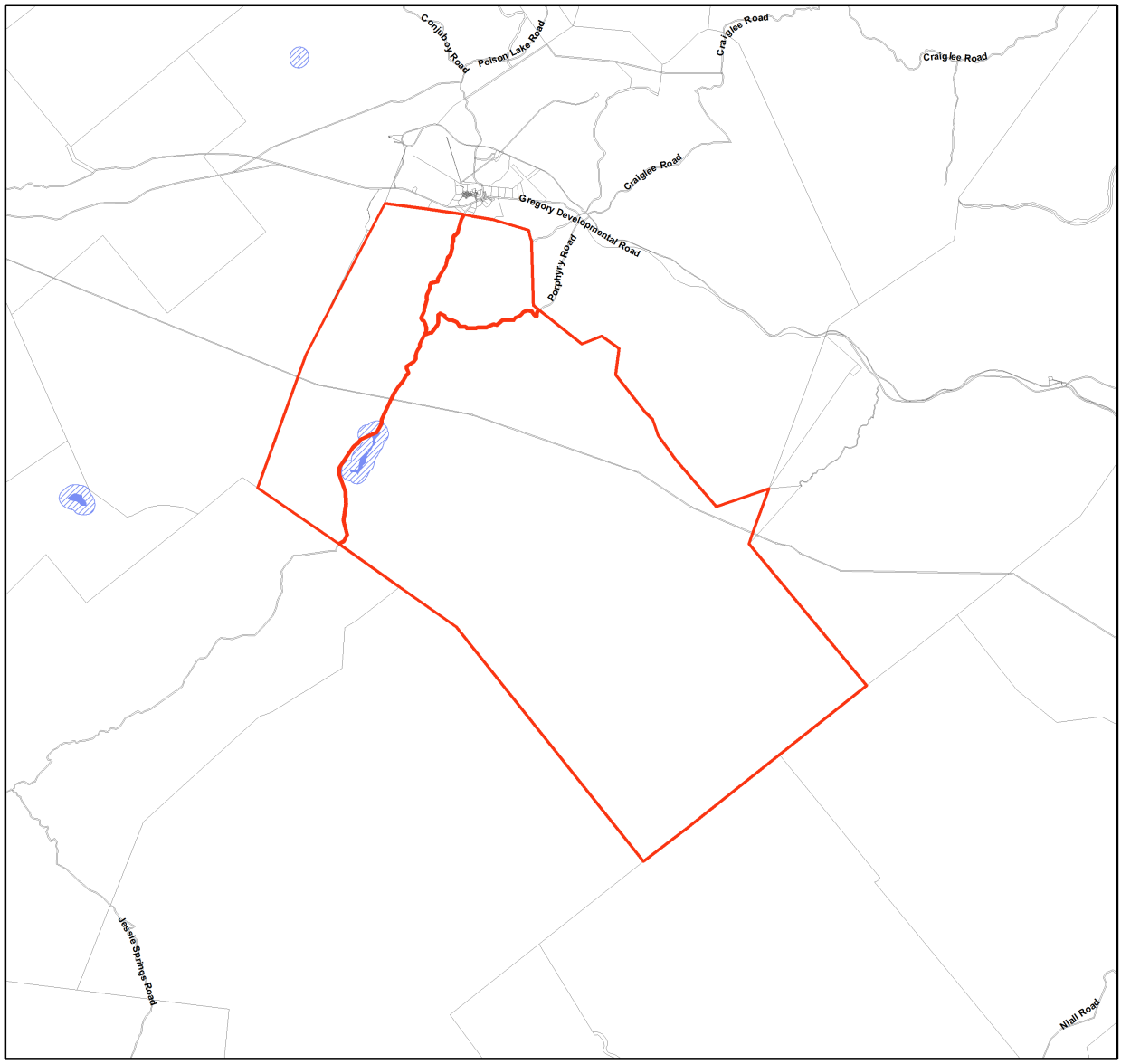
0 3300 6600 9900 13200 16500 m

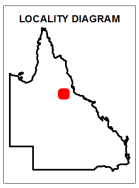
This product is projected into GDA 1994 MGA Zone 55




# Map of Referable Wetlands
# Wetland Protection Areas

Lot and Plan
Cadastral Boundary
Wetland Protection Areas
Wetland
Trigger Area

LOCALITY DIAGRAM



N

Note:
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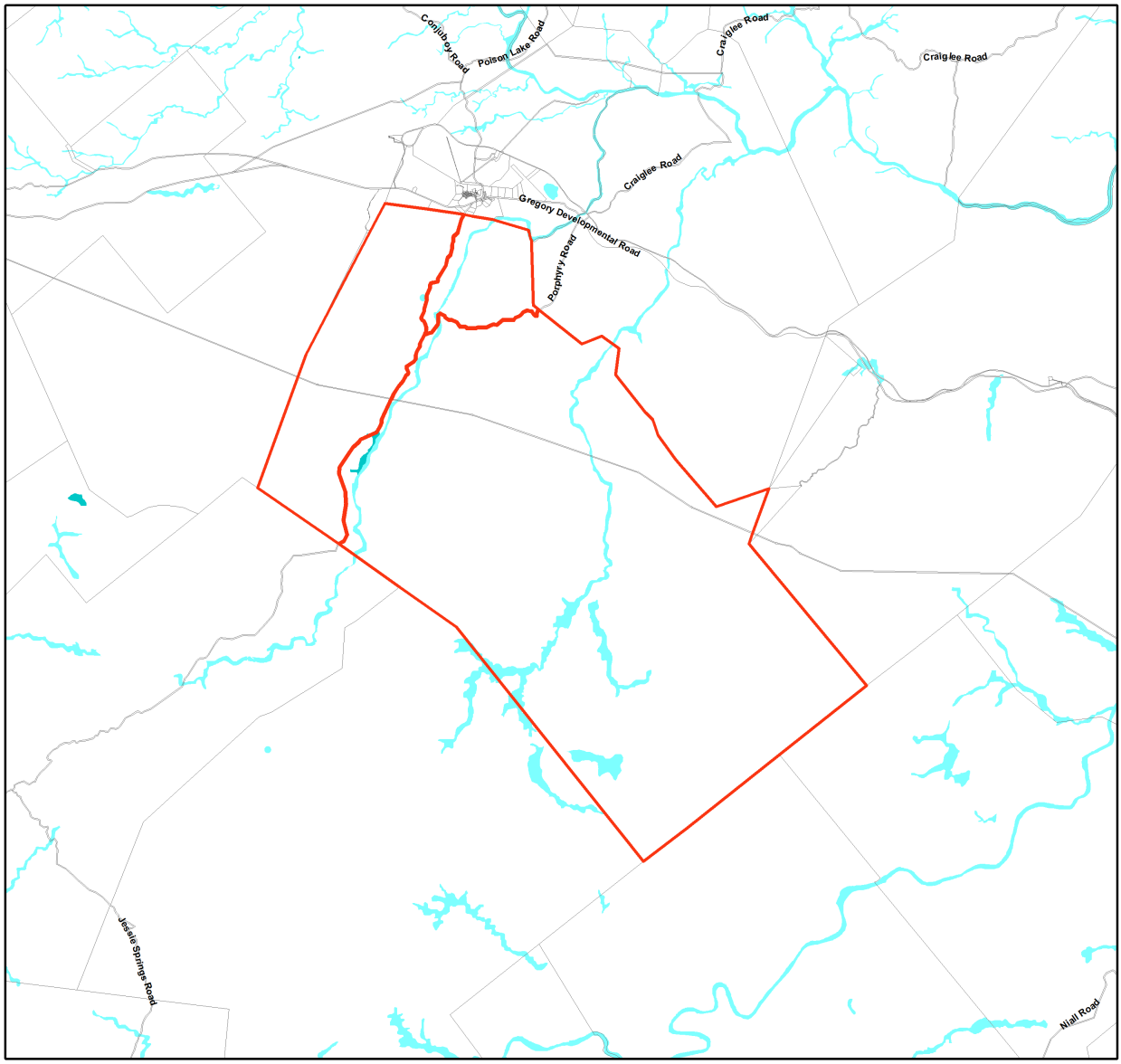
0 3300 6600 9900 13200 16500 m

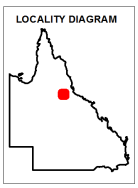
This product is projected into GDA 1994 MGA Zone 55




# Map of Referable Wetlands for the Environmental Protection Act 1994

- Lot and Plan
- Cadastral Boundary
- HES Wetland
- GES Wetland

LOCALITY DIAGRAM



N

Note:
This map shows the location of wetlands on the Map of Referable Wetlands which are defined under the Environmental Protection Regulation 2008.

Wetlands are assessed for ecological significance using the environmental values for wetlands in section 81A of the Environmental Protection Regulation 2008. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values.

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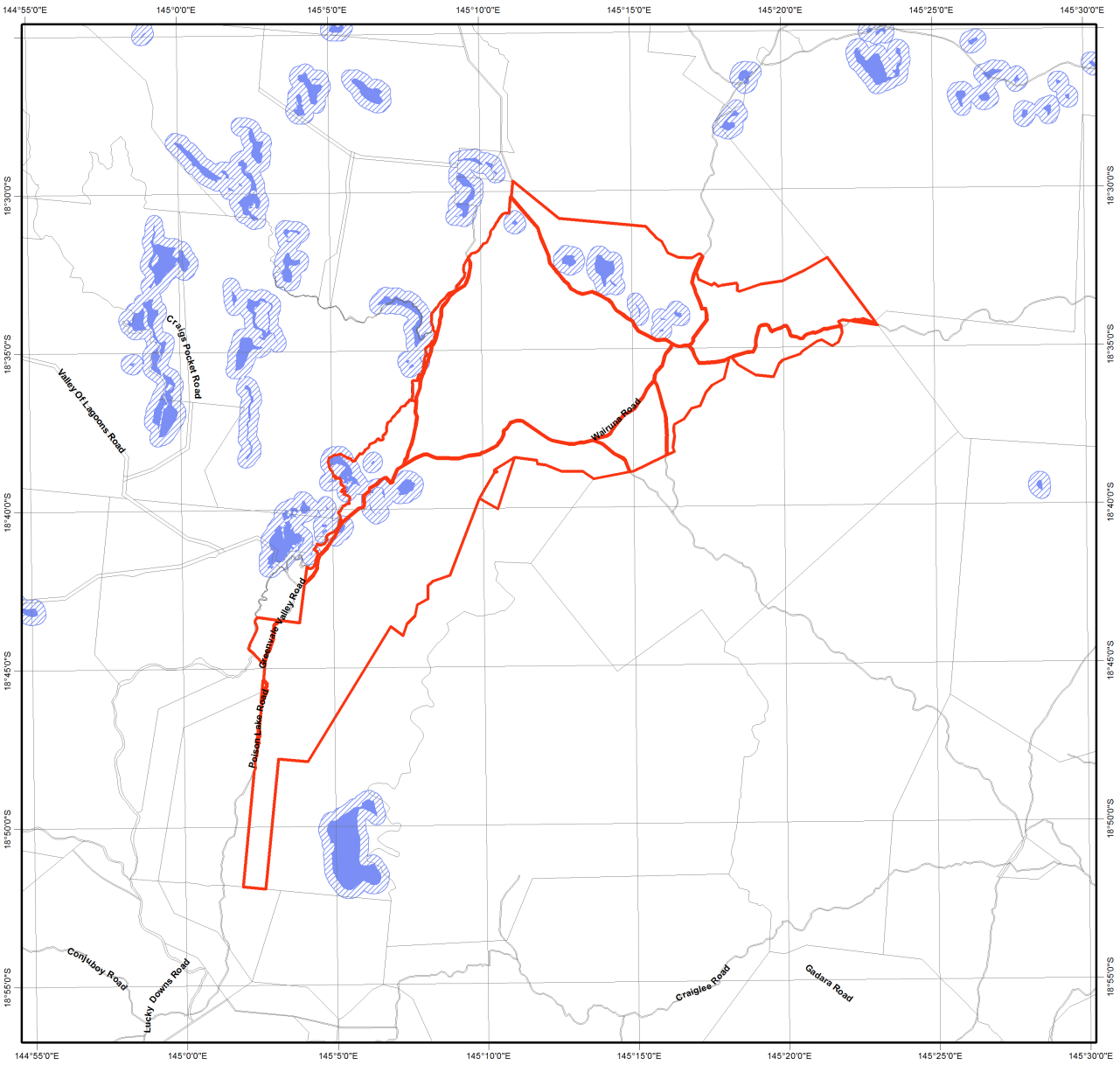
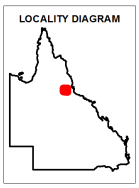
0 3300 6600 9900 13200 16500 m

This product is projected into GDA 1994 MGA Zone 55




# Map of Referable Wetlands
# Wetland Protection Areas

Lot and Plan
Cadastral Boundary
Wetland Protection Areas
Wetland
Trigger Area




N

Note:
This map shows the location of wetland protection areas which are defined under the Environmental Protection Regulation 2008. Within wetland protection areas, certain types of development involving high impact earthworks are made assessable under Schedule 3 of the Sustainable Planning Regulation 2009.

The Department of State Development, Manufacturing, Infrastructure and Planning is the State Assessment Referral Agency (SARA) under Schedule 7 of the Sustainable Planning Regulation 2009 for assessable development involving high impact earthworks within wetland protection areas. The Department of Environment and Science is a technical agency.

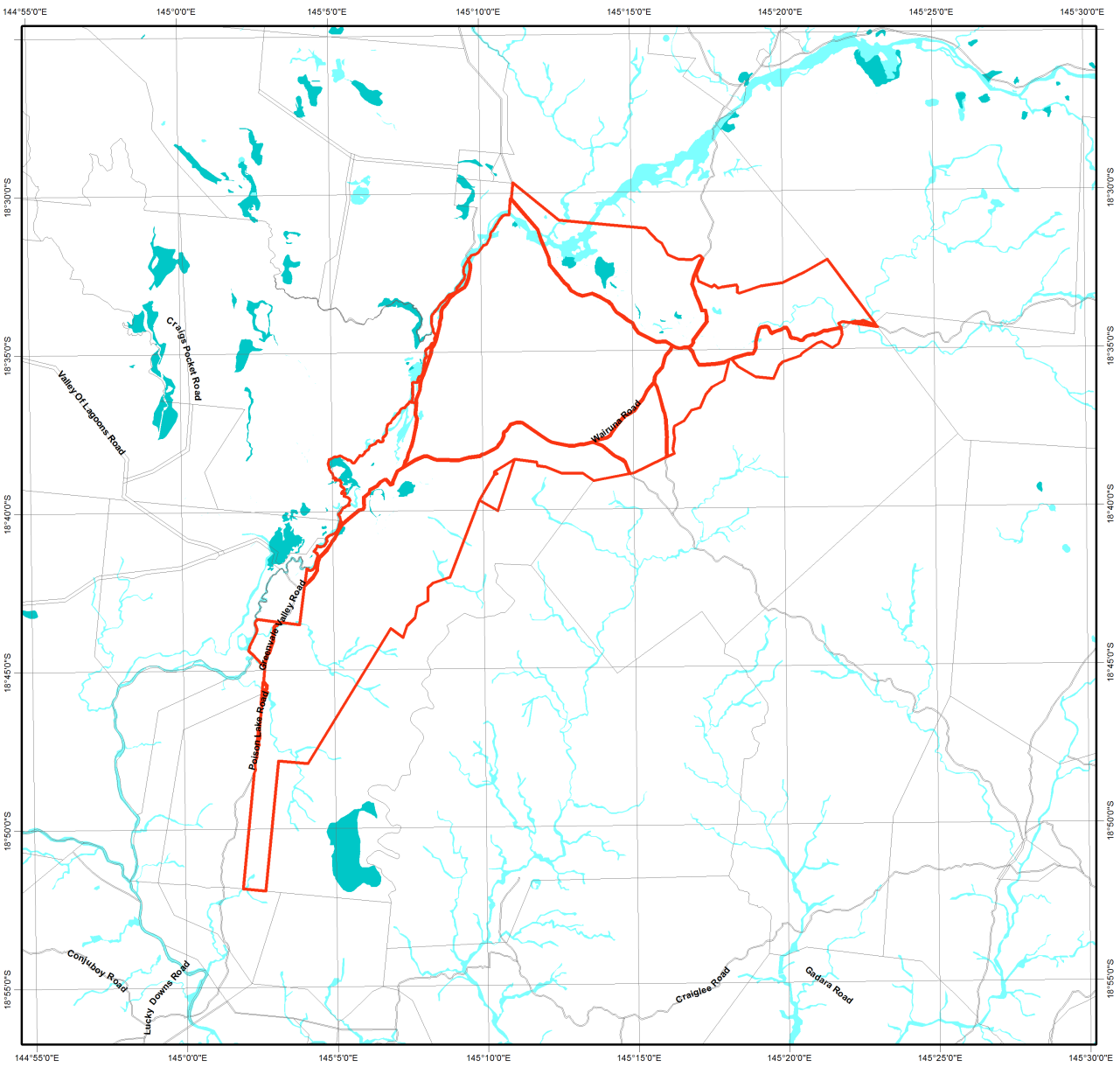
The policy outcome and assessment criteria for assessing these applications are described in the State Development Assessment Provisions (SDAP) *Module 11: Wetlands and wild rivers.*

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

0 3300 6600 9900 13200 16500 m

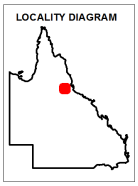
This product is projected into GDA 1994 MGA Zone 55




# Map of Referable Wetlands for the Environmental Protection Act 1994

Lot and Plan
Cadastral Boundary
HES Wetland
GES Wetland

LOCALITY DIAGRAM



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Note:
This map shows the location of wetlands on the Map of Referable Wetlands which are defined under the Environmental Protection Regulation 2008.

Wetlands are assessed for ecological significance using the environmental values for wetlands in section 81A of the Environmental Protection Regulation 2008. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values.

This map is produced at a scale relevant to the size of the lot on plan identified and should be printed at A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science, email planning.support@des.qld.gov.au.

0 3300 6600 9900 13200 16500 m

This product is projected into GDA 1994 MGA Zone 55

# Appendix B Site Descriptions

| | |
|---|---|
| Site Name | BURD2 |
| Associated Project Site | Kokomo |
| Site Description | This site was located on the Burdekin River, off the Project site. The Burdekin River is a slow flowing, permanent water course. The surface water was odourless and opaque green. |
| Stream Order | 4 |
| AUSRIVAS Habitat Assessment Score | 88 |
| AUSRIVAS Evaluation | This site provides good habitat for aquatic fauna with an abundance of overhangs, logs, fallen timer, varied bank slopes, sand slugs and well-vegetated riparian areas. Little substrate was evident at the site however, the western bank showed little sediment erosion and two sand slugs, both of which were used by WIS birds during the survey. Over hanging trees provided favourable nesting habitat for Azure Kingfishers (*Alcedo azurea*) and Brown Honeyeaters (*Lichmera indistincta*). During the wet season, bank slumping and scouring was observed. However, during the dry season little bank erosion was evident as basalt scree was contiguous to the water edge. |
| Riparian Vegetation | 9.3.1 Blue Gum and River Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | BURD3 |
| Associated Project Site | Greenvale and Lucknow |
| Site Description | This site was located on the Burdekin River, off the Project site and downstream from Kokomo. The surface water was odourless and clear. |
| Stream Order | 4 |
| AUSRIVAS Habitat Assessment Score | 92 |
| AUSRIVAS Evaluation | This section of the Burdekin River was fast flowing, however there were sand and gravel bars enabling the creation of shallow, slow flowing areas. Banks were stable; some erosion was present likely due to the movement of cattle. Logs, fallen branches and the submerged bases of riparian trees were present at this site. Many water birds were observed using the overhanging trees and sandy bars, such as the Pelican (*Pelecanus conspicillatus)*, Darter (*Anhinga novaehollandiae*) and Cormorant species (*Phalacrocorax sp.)*. |
| Riparian Vegetation | 9.3.1 Blue Gum and River Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | BURD5 |
| Associated Project Site | Greenvale and Lucknow |
| Site Description | This site was located on the Burdekin River, off the Project site and downstream from Kokomo. The surface water was odourless and clear. |
| Stream Order | 4 |
| AUSRIVAS Habitat Assessment Score | 94 |
| AUSRIVAS Evaluation | This section of the Burdekin River provided a variety of different habitats as the movement of water differed at many points along this site. Areas of slow moving, shallow water were present below exposed bedrock and fast moving water flowed east along a deep channel. Riffles were present along the edges of this watercourse where bars and exposed bedrock changed the movement of water. The bedrock created good habitat for aquatic vertebrates with large weathered holes forming protection from the flow of the river. Fallen logs and overhanging branches proved to be habitat for aquatic vertebrates and bird species. Riparian areas showed the effects of cattle grazing; however mature stands of Blue Gum and River Red Gum were present along the entirety of riparian areas at this site. |
| Riparian Vegetation | 9.3.1 Blue Gum and River Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | GVMSW1 |
| Associated Project Site | Greenvale |
| Site Description | This site was located near the Greenvale site, in a tributary of the Burdekin River. The surface water was odourless and clear. |
| Stream Order | 2 |
| AUSRIVAS Habitat Assessment Score | 75 |
| AUSRIVAS Evaluation | This tributary provided a variety of habitat for aquatic vertebrate species. The tributary was slow flowing, clear water with low turbidity. Coarse gravelly substrate was present with numerous logs, branches and sand slugs present along the watercourse. Purple-spotted Gudgeons and Eastern Rainbowfish were observed using macrophytes near logs. The riparian areas were well vegetated with disturbance from cattle mostly noted along small tracks and near the road. A large percentage of the banks featured forbs, sedges, rushes and shrubs creating overhangs such as *Fimbristylis siberiana* and *Lomandra longifolia*. There were small riffles in areas of fallen timber and leaf litter. The pools varied in depth, with the larger pools providing suitable habitat for numerous fish species and aquatic macroinvertebrates. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | GVMSW4 |
| Associated Project Site | Greenvale |
| Site Description | This site is located on a semi-permanent watercourse located to the north-west of the Greenvale site. This site is located on Paddy's Creek. |
| Stream Order | 2 |
| AUSRIVAS Habitat Assessment Score | 55 |
| AUSRIVAS Evaluation | This ephemeral watercourse featured highly eroded banks and riparian areas impacted by cattle grazing. A large area of the ground cover in the riparian corridor was infested with Buffel grass (*Cenchrus ciliaris*). The banks were unstable with greater than 60% erosion on one side slope. The aquatic habitat was reasonable in the wet season, with submerged logs, tree roots, gravel and detritus. In the dry season, the single pool that existed at this site appeared to have large amounts of detritus and leaf litter, with water appearing opaque with a large plume and a slick on the surface. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | KKSW3 |
| Associated Project Site | Kokomo |
| Site Description | This site is located on an ephemeral drainage line to the Burdekin River. This site is within the Project boundary. |
| Stream Order | 2 |
| AUSRIVAS Habitat Assessment Score | 35 |
| AUSRIVAS Evaluation | This site was heavily degraded, with high levels of bank erosion and Buffel grass (*Cenchrus ciliaris*) infestations present along banks and riparian areas. This site is located within the Project boundary. Large mature Dallachy's Gum (*Eucalyptus dallachiana*) and Poplar Gum (*Eucalyptus platyphylla*) dominated this drainage line with the first tree layer recorded at over 40m. The ground and shrub layer was heavily infested with Angleton Grass (*Dichanthium aristatum)*, Grader Grass (*Themeda quadrivalis*) and False Mallow (*Malvastrum coromendelianum*). The stream bed and banks had been heavily disturbed by cattle, with 90's of the stream bed directly impacted by cattle movements. The water was opaque and turbid, with orange sediments and large plumes visible. When sampled in both surveys, large stagnant pools existed along the watercourse. |
| Riparian Vegetation | 9.3.22 Narrow-leafed Ironbark, Poplar and Dallachy's Gum Open Woodland |

| | |
|---|---|
| Site Name | KKSW4 |
| Associated Project Site | Kokomo |
| Site Description | The site was located west of the Kokomo Project boundary on a permanent tributary to the Burdekin River. |
| Stream Order | 3 |
| AUSRIVAS Habitat Assessment Score | 85 |
| AUSRIVAS Evaluation | This site featured an approximately 10m wide, slow-flowing watercourse with a variety of important aquatic habitat features such as submerged logs, fallen timber, large submerged root systems and overhanging shrub and ground layer vegetation. The water at this site was clear with a slight plume when disturbed. The quality of this watercourse is reflected in the presence of a Platypus (*Ornithorhynchus anatinus*), a species highly sensitive to changes in its freshwater habitat. Traps placed in areas with a high density of logs and fallen timber yielded the most fish individuals, illustrating the importance of these habitat features for refugia to fish species. This site displayed good quality aquatic and riparian habitat, with little disturbance to banks and stream beds. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | KKSW8 |
| Associated Project Site | Kokomo |
| Site Description | This site is located at an ephemeral drainage line to the Burdekin River within the Kokomo Project boundary. |
| Stream Order | 3 |
| AUSRIVAS Habitat Assessment Score | 92 |
| AUSRIVAS Evaluation | This site was found to be flowing in both wet and dry season surveys, with clear water and sandy sediments, providing suitable habitat for a range of small fish species. During both wet and dry season surveys, large schools of Eastern Rainbowfish were evident as well as a significant number of Purple-spotted Gudgeons (*Morgurnda adspersa*). A number of habitat features indicative of good aquatic habitat were located at this site such as submerged logs, bank overhangs, aquatic macrophytes and sedges, sand bars, cobbles, pebbles, sand and riffles. Significant natural bank erosion was evident on one side of the watercourse were ground cover wasn't as prevalent due to cattle grazing. The other riparian area was stable and featured good ground cover and some mature trees and shrub species. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | Stenhouse Dam |
| Associated Project Site | Greenvale |
| Site Description | This site, a man-made lake, is an important habitat feature for wetland species such as the Cotton Pygmy Goose (*Nettapus coromandelianus*). Whilst the riparian areas surrounding the lake are heavily disturbed by cattle, the diversity of species recorded at this site suggests it is a significant feature for both aquatic and terrestrial species. The lake features large areas of macrophytes such as Pondweed (*Potamogeton sp*.), a known source of food for the Cotton Pygmy Goose. There are numerous hollows and dense tree stands that provide great nesting and roosting habitat for a range of birds, microbats and marsupials. |
| Wetland Classification | Lacustrine - Lake |
| AquaBAMM Assessment Score | Assessment not undertaken |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland and 9.12.1a |

| | |
|---|---|
| Site Name | LNSW2 |
| Associated Project Site | Lucknow and Greenvale |
| Site Description | This site is located on Redbank Creek near its most western intersection with the Gregory Development Road. This local watercourse that is associated with both the Greenvale and Lucknow Project sites. |
| Stream Order | 2 |
| AUSRIVAS Habitat Assessment Score | 75 |
| AUSRIVAS Evaluation | This ephemeral stream featured large stagnant pools in both the wet and dry season surveys. The riparian vegetation is dominated by *Casurina cunninghamiana* with occasional *Eucalyptus tereticornis* providing large hollows as suitable habitat for microbat and bird species. The stagnant pools at this site were seen to contain larger fish species than other sites with medium-sized Barred Grunters (Amniataba percoides) observed. The banks are moderably stable due to a dense cover of native and introduced ground cover species such as *Lomandra longifolia*. Sediment was predominantly rubble, gravel and slightly undercut banks were present. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | LNSW5 |
| Associated Project Site | Lucknow |
| Site Description | Watershed to Gray Creek, located directly east of the Lucknow Project site. |
| Stream Order | 2 |
| AUSRIVAS Habitat Assessment Score | 86 |
| AUSRIVAS Evaluation | This site featured one large stagnant pool created by the erosion of sediment around tree roots. This watercourse is highly ephemeral and was only sampled in the dry season survey. This pool featured a variety of good habitat features however, no species were observed using this pool. It is likely that this pool is a remnant of the wet season rainfall and if sampled during the wet season, greater number of pools at this site would have been found. The water was clear to green and sediment predominantly sand and gravel. Tree roots and fallen timber provided suitable habitat for fish species. Naturally occurring high banks indicate that this watercourse flows rapidly into Gray Creek following a rainfall event, little erosion from nearby cattle grazing existed in the creek due to the protection of these high banks. This site featured a good number of hollows and dense canopy cover. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

| | |
|---|---|
| Site Name | LNSW15 |
| Associated Project Site | Lucknow |
| Site Description | A site directly on Gray Creek and located downstream of Lucknow resource area. |
| Stream Order | 3 |
| AUSRIVAS Habitat Assessment Score | 92 |
| AUSRIVAS Evaluation | Despite the lack of flowing water during wet and dry season surveys, this highly ephemeral creek had habitat features and a morphology that provide suitable aquatic and terrestrial habitat for a variety of species. Riparian areas are predominantly covered by vegetation with shrubs forming a dense layer, a habitat feature that explains the abundance of birds at this site. The banks were moderately stable with small, infrequent areas of erosion. Habitat features which would provide sufficient shelter to aquatic species when inundated include rubble, gravel, temporary pools, large depressions in the creek bed protected by submerged logs and overhangs. |
| Riparian Vegetation | 9.3.1 Blue Gum and Red Gum Fringing Woodland |

# Appendix C Flora Species List

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Amaranthaceae | *Alternanthera nodiflora* | Common Joyweed | NL | NL | |
| Annonaceae | *Annona* sp. | | NL | NL | X |
| Apiaceae | *Diosypurus humilis* | | NL | NL | |
| Apocynaceae | *Asclepias curassavica* | Redhead Cottonbush | NL | NL | X |
| Apocynaceae | *Carissa ovata* | Currant Bush | NL | NL | |
| Apocynaceae | *Carissa lanceolata* | Conkerberry | NL | NL | |
| Asparagaceae | *Eustrephus latifolius* | Wombat Berry | NL | NL | |
| Asteraceae | *Ageratum houstonianum* | Blue Billy Goat Weed | NL | NL | X |
| Asteraceae | *Cyanthillium cinereum* | Vernonia | NL | NL | |
| Asteraceae | *Parthenium hysterophorus* | Parthenium Weed | NL | NL | Class 2 |
| Asteraceae | *Eclipta prostrata* | | NL | NL | |
| Asteraceae | *Conyza sumatrensis* | Tall Fleabane | NL | NL | |
| Asteraceae | *Sonchus oleraceus* | Annual Snowthistle | NL | NL | |
| Boraginaceae | *Heliotropium indicum* | Heliotrope | NL | NL | X |
| Boraginaceae | *Trichodesma zeylanicum* | Camel bush | NL | NL | |
| Boraginaceae | *Trichodesma zeylanicum* var. *zeylanicum* | Camel Bush | NL | NL | |
| Brassicaceae | *Cardamine flexuosa* | | NL | NL | |
| Caesalpiniaceae | *Senna pendula* var. *glabrata* | Easter Cassia | NL | NL | X |
| Campanulaceae | *Wahlenbergia* sp. | | NL | NL | |
| Casuarinaceae | *Casuarina cunninghamiana* | River Sheoak | NL | NL | |
| Celastraceae | *Maytenus cunninghamii* | Yellow-berry Bush | NL | NL | |
| Celastraceae | *Maytenus* sp. probably *M. cunninghamii* | | NL | NL | |

C

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Convolvulaceae | *Ipomoea argillicola* | | NL | NL | |
| Convolvulaceae | *Ipomoea polymorpha* | Silky Cow-vine | NL | NL | |
| Convolvulaceae | *Jacquemontia paniculata* var. *tomentosa* | | NL | NL | |
| Cyperaceae | *Cyperus rotundus* | Nutgrass | NL | NL | X |
| Cyperaceae | *Fimbristylis sieberiana* | | NL | NL | |
| Cyperaceae | *Schoenoplectus lateriflorus* | | NL | NL | |
| Cyperaceae | *Cyperus difformis* | Rice Sedge | NL | NL | |
| Cyperaceae | *Eleocharis geniculata* | Spike-rush | NL | NL | |
| Cyperaceae | *Cyperus brevifolius* | Mullumbimby Couch | NL | NL | |
| Cyperaceae | *Cyperus trinervis* | | NL | NL | |
| Cyperaceae | *Scleria brownii* | | NL | NL | |
| Cyperaceae | *Cyperus conicus* | | NL | NL | |
| Erythroxylaceae | *Erythroxylum australe* | | NL | NL | |
| Euphorbiaceae | *Phyllanthus virgatus* | | NL | NL | |
| Euphorbiaceae | *Euphorbia tannesis* subsp. *Eremophila* | | NL | NL | |
| Euphorbiaceae | *Antidesma parvifolium* | | NL | NL | |
| Euphorbiaceae | *Breynia oblongifolia* | Coffee Bush | NL | NL | |
| Fabaceae | *Cajanus scarabaeoides* | | NL | NL | |
| Fabaceae | *Crotalaria medicaginea* | Trefoil Rattlepod | NL | NL | |
| Fabaceae | *Indigofera linnaei* | Birdsville Indigo | NL | NL | |
| Fabaceae | *Rhyncosia minima* | | NL | NL | |
| Fabaceae | *Stylosanthes hamata* | Caribbean Stylo | NL | NL | X |
| Fabaceae | *Senna occidentalis* | Coffee Senna | NL | NL | X |

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Fabaceae | *Flemingia lineata* | | NL | NL | |
| Fabaceae | *Flemingia parviflora* | | NL | NL | |
| Fabaceae | *Acacia holosericea* | Candelabra Wattle | NL | NL | |
| Fabaceae | *Acacia decora* | Golden Wattle | NL | NL | |
| Fabaceae | *Stylosanthes scabra* | | NL | NL | |
| Fabaceae | *Glycine tabacina* | | NL | NL | |
| Fabaceae | *Cajanus reticulatus* | | NL | NL | |
| Fabaceae | *Acacia victoriae* | Bramble Wattle | NL | NL | |
| Hemerocallidaceae | *Dianella longifolia* | Flax-lily | NL | NL | |
| Hydrocharitaceae | *Najas tenuifolia* | Australian Naiad | NL | NL | |
| Juncaceae | *Juncus usitatus* | Common Rush | NL | NL | |
| Lamiaceae | *Basilicum polystachyon* | Musk Basil | NL | NL | |
| Lamiaceae | *Ocimum basilicum* | Basil | NL | NL | X |
| Lomandraceae | *Lomandra longifolia* | Spiny-headed Mat-rush | NL | NL | |
| Lythraceae | *Ammannia multiflora* | Jerry-jerry | NL | NL | |
| Malvaceae | *Grewia retusifolia* | Dog's Balls | NL | NL | |
| Malvaceae | *Hibiscus meraukensis* | Bush Hibiscus | NL | NL | |
| Malvaceae | *Malvastrum coromandelianum* | Spiked Malvastrum | NL | NL | |
| Malvaceae | *Abutilon oxycarpum* | Flannel Weed | NL | NL | |
| Malvaceae | *Sida cordifolia* | Flannel Weed | NL | NL | |
| Malvaceae | *Sida spinosa* | | NL | NL | X |
| Menyanthaceae | *Nymphoides indica* | Water Snowflake | NL | NL | |
| Mimosaceae | *Mimosa pudica* | Sensitive Weed | NL | NL | X |
| Mimosoideae | *Acacia simsii* | Sim's Wattle | NL | NL | |

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Moraceae | *Ficus opposita* | Sandpaper Fig | NL | NL | |
| Myrtaceae | *Corymbia citriodora* | Lemon-scented Gum | NL | NL | |
| Myrtaceae | *Corymbia clarksoniana* | Bloodwood | NL | NL | |
| Myrtaceae | *Corymbia tessellaris* / *Eucalyptus tessellaris* | Moreton Bay Ash | NL | NL | |
| Myrtaceae | *Eucalyptus brownii* | Brown's Box | NL | NL | |
| Myrtaceae | *Eucalyptus camaldulensis* | River Red Gum | NL | NL | |
| Myrtaceae | *Eucalyptus crebra* | Narrow-leaved Ironbark | NL | NL | |
| Myrtaceae | *Eucalyptus platyphylla* | Poplar Gum | NL | NL | |
| Myrtaceae | *Eucalyptus tereticornis* | Forest Red Gum | NL | NL | |
| Myrtaceae | *Leptospermum petersonii* | Lemon-scented Teatree | NL | NL | |
| Myrtaceae | *Melaleuca bracteata* | Black Tea Tree | NL | NL | |
| Myrtaceae | *Melaleuca fluviatilis* | | NL | NL | |
| Myrtaceae | *Melaleuca leucadendra* | Weeping Paperbark | NL | NL | |
| Myrtaceae | *Melaleuca trichostachya* | River Paper Bark | NL | NL | |
| Myrtaceae | *Melaleuca viminalis* | Weeping Bottlebrush | NL | NL | |
| Myrtaceae | *Callistemon viminalis* | Weeping Bottlebrush | NL | NL | |
| Myrtaceae | *Lophostemon grandiflorus* | | NL | NL | |
| Myoporaceae | *Eremophila bignoniiflora* | Dogwood | NL | NL | |
| Orchidaceae | *Geodorum densiflorum* | Ground Orchid | NL | NL | |
| Papaveraceae | *Argemone ochroleuca* | Mexican Poppy | NL | NL | X |

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Phyllanthaceae | *Flueggea virosa* subsp. *melanthesoides* | | NL | NL | |
| Picrodendraceae | *Petalostigma pubescens* | Quinine Tree | NL | NL | |
| Pittosporaceae | *Busaria spinosa* | Sweet Bursaria | NL | NL | |
| Pittosporaceae | *Bursaria spinosa* | | NL | NL | |
| Poaceae | *Aristida calycina* var. *praealta* | | NL | NL | |
| Poaceae | *Bothriochloa pertusa* | Indian Bluegrass | NL | NL | X |
| Poaceae | *Cenchrus ciliaris* | Buffel Grass | NL | NL | X |
| Poaceae | *Chionachne cyathopoda* | River Grass | NL | NL | |
| Poaceae | *Cynodon dactylon* | Couch | NL | NL | |
| Poaceae | *Digitaria brownii* | Cotton Panic Grass | NL | NL | |
| Poaceae | *Digitaria ciliaris* | Summer Grass | NL | NL | X |
| Poaceae | *Echinochloa colona* | Awnless Barnyard Grass | NL | NL | |
| Poaceae | *Enneapogon nigricans* | Niggerheads | NL | NL | |
| Poaceae | *Heteropogon contortus* | Black Speargrass | NL | NL | |
| Poaceae | *Heteropogon triticeus* | Giant Speargrass | NL | NL | X |
| Poaceae | *Megathyrsus maximus* var. *pubiglumis* | | NL | NL | X |
| Poaceae | *Melinis repens* | Red Natal Grass | NL | NL | X |
| Poaceae | *Mnesithea rottboellioides* | | NL | NL | |
| Poaceae | *Setaria surgens* | | NL | NL | |
| Poaceae | *Sporobolus jacquemontii* | American Rat's Tail Grass | NL | NL | Class 2 |
| Poaceae | *Themeda quadrivalvis* | Grader Grass | NL | NL | X |
| Poaceae | *Themeda triandra* | Kangaroo Grass | NL | NL | |
| Poaceae | *Urochloa mosambicensis* | Sabi Grass | NL | NL | X |

C

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Poaceae | *Panicum trichoides* | | NL | NL | |
| Poaceae | *Dichanthium annulatum* | | NL | NL | |
| Poaceae | *Dichanthium aristatum* | Angleton Grass | NL | NL | X |
| Poaceae | *Panicum larcomianum* | (Razor grass feathery head) | NL | NL | |
| Poaceae | *Paspalidium distans* | Spreading Panic-grass | NL | NL | |
| Poaceae | *Chrysopogon fallax* | Golden Beard Grass | NL | NL | |
| Poaceae | *Eragrostis elongata* | | NL | NL | |
| Poaceae | *Paspalum distichum* | Water Couch | NL | NL | |
| Poaceae | *Bothriochloa decipiens* | Pitted Bluegrass | NL | NL | |
| Polygonaceae | *Persicaria barbata* | Smartweed | NL | NL | |
| Polygonaceae | *Polygonum aviculare* | Hogweed | NL | NL | |
| Potamogetonaceae | *Potamogeton* sp. | | NL | NL | |
| Rhamnaceae | *Alphitonia excelsa* | Red Ash | NL | NL | |
| Rubiaceae | *Psydrax forsteri* | | NL | NL | |
| Rubiaceae | *Psydrax saligna* | | NL | NL | |
| Rutaceae | *Geijera salicifolia* | Axegapper | NL | NL | |
| Santalaceae | *Santalum lanceolatum* | Northern Sandalwood | NL | NL | |
| Sapindaceae | *Cupaniopsis anacardioides* | Beach Tamarind | NL | NL | |
| Sapindaceae | *Alectryon connatus* | | NL | NL | |
| Sapindaceae | *Atalaya hemiglauca* | Cattle Bush | NL | NL | |
| Scrophulariaceae | *Mecardonia procumbens* | | NL | NL | |
| Solanaceae | *Datura inoxia* | Downy Thornapple | NL | NL | X |
| Solanaceae | *Solanum torvum* | Devil's Fig | NL | NL | X |

C

| Family | Species Name | Common Name | EPBC Act | NC Act | WoNS |
|---|---|---|---|---|---|
| Solanaceae | *Solanum nigrum* | Black Nightshade | NL | NL | |
| Thymelaeaceae | *Pimelea haematostachya* | | NL | NL | |
| Thymelaeaceae | *Pimelea haematostachya* | | NL | NL | X |
| Tiliaceae | *Triumfetta pentandra* | | NL | NL | |
| Verbenaceae | *Phyla nodiflora* | Carpet Weed | NL | NL | X |

Note:
WoNS – weeds of National Significance
Class 2 – is a species listed as a Class 2 biosecurity matter under Queensland *Biosecurity Act 2014.*

# Appendix D Fauna Survey Results

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| **Amphibians** | | | | | | | | | | | | | | | | | | | | | |
| Bufonidae | *Rhinella marina* | Cane Toad | NL | NL | | | | | | | | X | | | | | | | | | X |
| Hylidae | *Litoria fallax* | Eastern Dwarf Tree Frog | NL | NL | X | | | X | | | | X | | | | | | | | | X |
| Hylidae | *Litoria inermis* | Floodplain Frog | NL | NL | | | | | | | | | | | | | | | | | X |
| Hylidae | *Litoria wilcoxii* | Wilcox's Frog | NL | NL | | | | | | | | | | X | | | | | | | |
| **Crustaceans** | | | | | | | | | | | | | | | | | | | | | |
| Atyidae | *Caridina indistincta* | Indistinct Caridina | NL | NL | | | | | | | | X | | | | | | | | | |
| Atyidae | *Paratya australiensis* | Glass Shrimp | NL | NL | | | X | | | | | X | | | | | | | | | X |
| Parastacidae | *Cherax depressus* | Orange-fingered Yabby | NL | NL | | | | | | | | X | | | | | | | | | |
| Parastacidae | *Cherax quadricarinatus* | Red-claw Yabby | NL | NL | | X | | | | | | X | | | | | X | | | | X |
| Potamonidae | *Austrothelphusa transversa* | Inland Freshwater Crab | NL | NL | | | | X | | | X | | | | | | | | X | | |
| **Fish** | | | | | | | | | | | | | | | | | | | | | |
| Atherinidae | *Craterocephalus stercusmuscarum* | Flyspecked Hardyhead | NL | NL | | | | | | | | | | | | | | | X | | |
| Eleotridae | *Morgurnda adspersa* | Purple-spotted Gudgeon | NL | NL | | | | | | | | | | X | | | | X | | | |

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Eleotridae | *Hypseleotris spp.* | Midgley's Carp Gudgeon | NL | NL | | | | | | | | | | | | | X | | | | |
| Eleotridae | *Oxyeleotris lineolata* | Sleepy Cod | NL | NL | | X | | X | | X | X | | | | | | | | | | |
| Eleotridae | *Hephaestus fuliginosus* | Sooty Grunter | NL | NL | | X | X | | X | | | X | | | | | | | | | |
| Melanotaeniidae | *Melanotaenia splendida splendida* | Eastern Rainbow Fish | NL | NL | X | | | | | | | | X | X | | | | X | | | X |
| Poeciliidae | *Gambuzia holbrooki* | Gambusia | NL | NL | X | | | | | | | | | | | | | X | | | |
| Terapontidae | *Leiopotherapon unicolor* | Spangled Perch | NL | NL | X | X | X | | | | | | | X | | | X | X | X | | X |
| Terapontidae | *Amniataba percoides* | Barred Grunter | NL | NL | | | | | | | | | | | | | | | | | X |
| **Mammals** | | | | | | | | | | | | | | | | | | | | | |
| Canidae | *Canis familiaris* | Dog | I | I | | | | | | | | | | | X | | | | | | X |
| Leporidae | *Oryctolagus cuniculus* | Rabbit | I | I | | | | | | | | | | | | | | | | | X |
| Macropodidae | *Macropus giganteus* | Eastern Grey Kangaroo | NL | NL | | | | | | | | | | | | | | | | | X |
| Macropodidae | *Macropus robustus* | Common Wallaroo | NL | NL | | | | | | | | X | | | | | | | | | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Macropodidae | *Aepyprymnus rufescens* | Rufous Bettong | NL | NL | | | | | | | | | | | | | | | | | X |
| Macropodidae | *Macropus parryi* | Whiptail Wallaby | NL | NL | | | | | | | | X | | | | | | X | | | |
| Muridae | *Hydromys chrysogaster* | Water Rat | NL | NL | X | | | | | | | X | | | | | | | | | X |
| Ornithorhynchidae | *Ornithorhynchus anatinus* | Platypus | NL | NL | X | | | | | | | | | | | | X | | | | |
| Petauridae | *Petauroides volans* | Greater Glider | NL | NL | | | | | | | | | | | | | | | | | |
| Phalangeridae | *Trichosurus vulpecula* | Brushtail Possum | NL | NL | | | | | | | | | | | | | | | X | | |
| Suidae | *Sus scrofa* | Pig | I | I | | | | X | | | | | | X | | | | | | | |
| Tachyglossidae | *Tachyglossus aculeatus* | Echidna | NL | NL | | | | | | | | | | | | | | | | | |
| **Reptiles** | | | | | | | | | | | | | | | | | | | | | |
| Agamidae | *Diporiphora australis* | Tommy Roundhead Dragon | NL | NL | | | | | | | | | | | | | | X | | | |
| Colubridae | *Dendrelaphis punctulata* | Green Tree Snake | NL | NL | | | | | | | | X | | | | | X | | | | |
| Colubridae | *Tropidonophis mairii* | Keelback | NL | NL | X | | | | | | | | | | | | | | | | X |
| Elapidae | *Demansia psammophis* | Yellow-faced Whip Snake | NL | NL | | | | | | | | | | | | | | | | X | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Geckonidae | *Heteronotia binoei* | Bynoe's Gecko | NL | NL | | | | | | | | | | | | | | | | | X |
| Pythonidae | *Morelia spilota mcdowelli* | Carpet Python | NL | NL | | | | | | | | | | | | | | X | | | |
| Scincidae | *Carlia schmeltzii* | Skink sp. | NL | NL | | | | | | | | | | | | | | | | | X |
| Scincidae | *Carlia pectoralis* | Skink sp. | NL | NL | | | | | | | | | | | | | | | | X | |
| **Birds** | | | | | | | | | | | | | | | | | | | | | |
| Acanthizidae | *Gerygone albogularis* | White-throated Gerygone | NL | NL | | | | | | | | X | | X | X | X | X | | | | |
| Acanthizidae | *Smicrornis brevirostris* | Weebill | NL | NL | | | | | | | | | X | | | | X | X | | | |
| Accipitridae | *Aviceda subcristata* | Pacific Baza | NL | NL | | | | | | | | | | | | | | | | | X |
| Accipitridae | *Milvus migrans* | Black Kite | NL | NL | | | | | | | | | | | | | | | | | X |
| Accipitridae | *Pandion haliaetus* | Osprey | Ma, Mi | NL | | | | | | | | X | | | | | | | | | |
| Accipitridae | *Haliastur sphenurus* | Whistling Kite | Ma | NL | | | | | | | | X | X | X | | X | | | | | X |
| Accipitridae | *Aquila audax* | Wedge-tailed Eagle | NL | NL | | | | | | | | | | | | X | | X | | | |
| Alcedinidae | *Ceyx azureus* | Azure Kingfisher | NL | NL | X | | | | | | | X | | | | | | | | | |
| Anatidae | *Anas superciliosa* | Pacific Black Duck | NL | NL | X | | | | | | | | | | X | | X | | | | X |
| Anatidae | *Anas gracilis* | Grey Teal | NL | NL | X | | | | | | | | | | | | | | | | X |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Anatidae | *Cygnus atratus* | Black Swan | NL | NL | X | | | | | | | | | | | | | | | | X |
| Anatidae | *Aythya australis* | Hardhead | NL | NL | X | | | | | | | | | | | | | | | | X |
| Anatidae | *Nettapus coromandelianus* | Cotton Pygmy Goose | NL | NT | X | | | | | | | | | | | | | | | | X |
| Anhingidae | *Anhinga novaehollandiae* | Australasian Darter | NL | NL | X | | | | | | | X | | | | | X | | | | X |
| Ardeidae | *Ardea modesta* | Great Egret | Ma, Mi | NL | X | | | | | | | | | | | | | | | | X |
| Ardeidae | *Egretta novaehollandiae* | White-faced Heron | NL | NL | X | | | | | | | | | | | | X | | | | |
| Ardeidae | *Nycticorax caledonicus* | Nankeen Night Heron | Ma | NL | X | | | | | | | X | | | | | | | | | |
| Artamidae | *Cacatua roseicapilla* | Galah | NL | NL | | | | | | | | X | X | | | | | | | X | |
| Artamidae | *Cracticus nigrogularis* | Pied Butcherbird | NL | NL | | | | | | | | X | X | | | | | | | | |
| Artamidae | *Cracticus torquatus* | Grey Butcherbird | NL | NL | | | | | | | | | | | | X | | | | | |
| Artamidae | *Artamus leucorynchus* | White-breasted Woodswallow | NL | NL | | | | | | | | X | X | | | | | | | | |
| Artamidae | *Strepera graculina* | Pied Currawong | NL | NL | | | | | | | | X | X | | X | | X | | | | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Artamidae | *Gymnorhina tibicen / Cracticus tibicen* | Australian Magpie | NL | NL | | | | | | | | | X | | | | | | | | X |
| Cacatuidae | *Vanellus miles* | Masked Lapwing | NL | NL | | | | | | | | | X | | | | | | | | X |
| Cacatuidae | *Cacatua galerita* | Sulphur-crested Cockatoo | NL | NL | | | | | | | | X | | | X | | X | | | | |
| Campephagidae | *Coracina papuensis* | White-bellied Cuckoo Shrike | Ma | NL | | | | | | | | X | | | | | X | | X | | |
| Campephagidae | *Coracina novaehollandiae* | Black-faced Cuckoo Shrike | Ma | NL | | | | | | | | | | | | | | | | | X |
| Charadriidae | *Erythrogonys cinctus* | Red-kneed Dotterel | NL | NL | X | | | | | | | | | | | | | | | | X |
| Charadriidae | *Elseyornis melanops* | Black-fronted Dotterel | NL | NL | X | | | | | | | | | | | | | | | | X |
| Columbidae | *Geopelia striata* | Peaceful Dove | NL | NL | | | | | | | | | X | X | | | X | | | | |
| Columbidae | *Ocyphaps lophotes* | Crested Pigeon | NL | NL | | | | | | | | X | X | | X | | X | | | | |
| Columbidae | *Struthidea cinerea* | Apostlebird | NL | NL | | | | | | | | X | | X | | X | | | | | X |
| Columbidae | *Phaps chalcoptera* | Common Bronzewing | NL | NL | | | | | | | | | | | | | | | | | X |
| Corcoracidae | *Corvus orru* | Australian Raven | NL | NL | | | | | | | | X | X | | X | | | | X | | |
| Corvidae | *Centropus phasianinus* | Pheasant Coucal | NL | NL | | | | | | | | X | | X | X | | X | | X | | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Cuculidae | *Grallina cyanoleuca* | Magpie-lark | Ma | NL | | | | | | | | | X | | | | | | | | X |
| Cuculidae | *Chrysococcyx minutillus* | Little Bronze Cuckoo | Ma | NL | | | | | | | | | X | | | | | X | | | |
| Dromaiidae | *Dacelo leachii* | Blue-winged Kookaburra | NL | NL | | | | X | | | | X | | | | | | | | | X |
| Estrildidae | *Taeniopygia bichenovii* | Double-barred Finch | NL | NL | | | | | | | | | X | | | | | | | | |
| Falconidae | *Falco cenchroides* | Nankeen Kestrel | NL | NL | | | | | | | | X | | | | | | | | | |
| Halcyonidae | *Dacelo novaeguineae* | Laughing Kookaburra | NL | NL | | | | X | | | | X | X | | | | | | X | | |
| Halcyonidae | *Grus rubicunda* | Brolga | NL | NL | | | | | | | | | X | | | | | | | | |
| Halcyonidae | *Todiramphus sanctus* | Sacred Kingfisher | Ma | NL | | | | | | | | X | X | | | | | | | | X |
| Gruidae | *Entomyzon cyanotis* | Blue-faced Honeyeater | NL | NL | | | | | | | | X | X | | | X | | | X | | |
| Jacanidae | *Irediparra gallinacea* | Jcomb-crested Jacana | NL | NL | X | | | | | | | | | | | | | | | | X |
| Locustellidae | *Megalurus timoriensis* | Tawny Grassbird | NL | NL | | | | | | | | | | | | X | | X | | | |
| Maluridae | *Malurus melanocephalus* | Red-backed Fairywren | NL | NL | | | | | | | | | | | | | X | | X | | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Meliphagidae | *Philemon corniculatus* | Noisy Friarbird | NL | NL | | | | | | | | X | X | X | | X | X | X | X | | X |
| Meliphagidae | *Philemon citreogularis* | Little Friarbird | NL | NL | | | | | | | | X | X | | | | | X | | | X |
| Meliphagidae | *Manorina melanocephala* | Noisy Miner | NL | NL | | | | | | | | X | | X | X | X | X | | | X | |
| Meliphagidae | *Myzomela sanguinolenta* | Scarlet Honeyeater | NL | NL | | | | | | | | X | | | X | | X | X | | | |
| Meliphagidae | *Lichmera indistincta* | Brown Honeyeater | NL | NL | | | | | | | | X | X | | | X | | X | | | |
| Meliphagidae | *Lichenostomus flavus* | Yellow Honeyeater | NL | NL | | | | | | | | | X | | | | | | | | |
| Meliphagidae | *Lichenostomus unicolor* | White-gaped Honeyeater | NL | NL | | | | | | | | | X | | | | | | | | |
| Meliphagidae | *Melithreptus albogularis* | White-throated Honeyeater | NL | NL | | | | | | | | X | X | X | | X | X | X | X | | |
| Monarchidae | *Myiagra rubecula* | Leaden Flycatcher | NL | NL | | | | | | | | X | | | | | | | X | | |
| Nectariniidae | *Dicaeum hirundinaceum* | Mistletoebird | NL | NL | | | | | | | | X | X | | | X | | | | | |
| Oriolidae | *Oriolus sagittatus* | Olive-backed Oriole | NL | NL | | | | | | | | | | | X | | X | | X | | |
| Oriolidae | *Sphecotheres vieilloti* | Australasian Figbird | NL | NL | | | | | | | | | X | | | X | X | | | | |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Otididae | *Platycercus adscitus* | Pale-headed Rosella | NL | NL | | | | | | | | X | | | | | X | | | | |
| Pachycephalidae | *Pachycephala rufiventris* | Rufous Whistler | NL | NL | | | | | | | | X | | | | | | | | | |
| Pelecanidae | *Pelecanus conspicillatus* | Pelican | Ma | NL | X | | | | | | | | X | | | | | | | | X |
| Phalacrocoracidae | *Phalacrocorax carbo* | Great Cormorant | NL | NL | X | | | | | | | X | X | | | | X | | | | X |
| Phalacrocoracidae | *Phalacrocorax sulcirostris* | Little Black Cormorant | NL | NL | X | | | | | | | X | X | | | | X | | | | X |
| Phalacrocoracidae | *Phalacrocorax varius* | Pied Cormorant | NL | NL | X | | | | | | | | | | | | | | | | X |
| Phalacrocoracidae | *Microcarbo melanoleucos* | Little Pied Cormorant | NL | NL | X | | | | | | | | | | | | | | | | X |
| Phasianidae | *Coturnix ypsilophora* | Brown Quail | NL | NL | | | | | | | | X | | | | | X | | | | |
| Podicipedidae | *Tachybaptus novaehollandiae* | Australasian Grebe | NL | NL | X | | | | | | | | | | | | | | | | X |
| Podicipedidae | *Podiceps cristatus* | Great Crested Grebe | NL | NL | X | | | | | | | | | | | | | | | | X |
| Podicipedidae | *Poliocephalus poliocephalus* | Hoary-headed Grebe | NL | NL | X | | | | | | | | | | | | | | | | X |
| Pomatostomidae | *Pomatostomus temporalis* | Grey-crowned Babbler | NL | NL | | | | | | | | | | | | | | | | | X |

D

| Family | Species Name | Common Name | Conservation Status | | | BURD3 | BURD5 | LNSW2 | LNSW15 | GVMSW1 | GVMSW4 | BURD2 | BURD5 | GVMSW1 | GVMSW4 | KKSW3 | KKSW4 | KKSW8 | LNSW2 | LNSW5 | DAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EPBC Act | NC Act | WIS | | | | | | | | | | | | | | | | |
| Psittacidae | *Aprosmictus erythropterus* | Red-winged Parrot | NL | NL | | | | | | | | | X | X | | | | | | | X |
| Psittacidae | *Pardalotus striatus* | Striated Pardalote | NL | NL | | | | | | | | X | X | X | X | | X | X | | | |
| Psittacidae | *Trichoglossus haematodus* | Rainbow Lorikeet | NL | NL | | | | | | | | X | X | | | X | X | | | | |
| Psittacidae | *Trichoglossus chlorolepidotus* | Scaly-breasted Lorikeet | NL | NL | | | | | | | | | | | | X | | | | | |
| Recurvirostridae | *Himantopus himantopus* | Black-winged Stilt | Ma | NL | X | | | | | | | | | | | | | | | | X |
| Rhipiduridae | *Rhipidura leucophrys* | Willie Wagtail | NL | NL | | | | | | | | X | | | | | X | | | | |
| Rhipiduridae | *Rhipidura albiscapa* | Grey Fantail | NL | NL | | | | | | | | X | X | | | X | X | X | X | | |

Note:
NL – indicates the species is not listed as a species of conservation significance under the relevant State or Commonwealth legislation.
I – indicates the species is an introduced species.
WIS – refers to wetland indicator species

D