

GEMINI PROJECT
TERRESTRIAL ECOLOGY ASSESSMENT

PREPARED FOR
MAGNETIC SOUTH PTY LTD

SEPTEMBER 2019



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Document History and Status

Issue	Rev.	Issued To	Qty	Date	Reviewed	Approved
Draft	0.1	SG	1	09/2019	SG	SG
Final	0.2	Magnetic South	1	09/2019	PI	PI
Final	0.3	GB	1	09/2019	GB	GB

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Name of Client: Magnetic South Pty Ltd
Name of Project: Gemini Project
Title of Document: Ecology Terrestrial Assessment
Document Version: Final

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ASSESSMENT

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LIST OF ABBREVIATIONS

°C	Degrees Celsius
%	Percent
AARC	AARC Environmental Solutions Pty Ltd
ALA	Atlas of Living Australia
BCA	Biodiversity and Conservation Values report
BOM	Bureau of Meteorology
BoT	Back on Track
BVG	Broad Vegetation Group
C	Least Concern
CE	Critically Endangered
cm	Centimetre
DES	Department of Environment and Science
E	Endangered
EA	Environmental Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPC	Exploration Permit Coal
ESA	Environmental Sensitive Area
ERE	Endangered Regional Ecosystem
EVNT	Endangered, Vulnerable or Near Threatened species
GDE	Groundwater Dependent Ecosystem(s)
GDE Atlas	National Atlas of Groundwater Dependent Ecosystems
GIS	Geographical Information System
GPS	Geographical Positioning System
ha	hectares
HES	High Ecological Significance

km	kilometres
km ²	square kilometres
LC	Least Concern
m	metre(s)
mbgl	metre(s) below ground level
mAHD	metre(s) Australian height datum
Ma	Marine
Mi	Migratory
MLES	Matters of Local Environmental Significance
mm	millimetres
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	Nature Conservation Act 1992
NCWR	Nature Conservation (Wildlife) Regulation 2006
NP	National Park
NRM	Natural Resource Management
NT	Near Threatened
PMAV	Property Maps of Assessable Vegetation
RAD	Recovery Actions Database
ROM	Run of mine
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
SILO	Scientific Information for Land Owners
SL	Special Least Concern
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community
V	Vulnerable
VM Act	Vegetation Management Act 1999

VMR Vegetation Management Regulation 2000

WoNS Weeds of National Significance

1.0 INTRODUCTION

AARC Environmental Solutions Pty Ltd (AARC) was commissioned by Magnetic South Pty Ltd (Magnetic South) to prepare a terrestrial ecology assessment for the Gemini Project, located approximately 110 km east of Emerald and 125 km west of Rockhampton in the Bowen Basin of Central Queensland (Figure 1). The Project is a proposed metallurgical open-cut coal mine and associated infrastructure, producing Pulverised Coal Injection (PCI) coal Coking Coal products for export for steel production.

An assessment of the terrestrial ecological values was conducted within Exploration Permit Coal (EPC) 881 (herein referred to as the study area). This assessment forms part of the supporting studies required for the Project's approval processes.

1.1 SCOPE OF STUDY

To assess the ecological values of terrestrial ecosystems within the study area, the following scope of works was undertaken:

- Database searches to identify species of conservation significance known from the region (provided in Appendix A). These species were targeted during the field survey component of the study;
- Field surveys employing standard methodologies such as the *Terrestrial Vertebrate Fauna Survey Guidelines of Queensland* (Eyre *et al.* 2018) and *Queensland Herbarium Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland Version 4.0* (Neldner *et al.* 2017) to identify terrestrial flora and fauna species inhabiting the study area, particularly species of conservation significance¹; and
- Preparation of an assessment report describing the terrestrial ecological values identified on site, potential impacts of the Project, management strategies to minimise the impacts associated with the proposed mining activities and offset requirements.

1.2 PROJECT OVERVIEW

The main activities associated with the Project include:

- Exploration activities continuing in order to support mine planning;
- Development of a Mine Infrastructure Area (MIA) including mine offices, bathhouse, crib rooms, warehouse/stores, workshop, fuel storage, refuelling facilities, explosives magazine and sewage, effluent and liquid waste storage;
- Construction and operation of a Coal Handling Preparation Plant (CHPP) and coal handling facilities adjacent to the MIA (including Run-of-Mine (ROM) coal and, product stockpiles and rejects bin/overflow [coarse and fine rejects]);

¹ 'Species of conservation significance' or 'threatened species' when referred to within this document are references to species listed as Near Threatened, Vulnerable or Endangered under the Queensland *Nature Conservation Wildlife Regulation 2006* or Vulnerable, Endangered, Critically Endangered or Migratory under the *Environmental Protection and Biodiversity Conservation Act 1999*.

- Construction and operation of a surface conveyor from the product stockpiles to a Train Load Out (TLO) facility and rail loop connecting to the Blackwater-Gladstone Branch Rail to transport product coal to coal terminals at Gladstone for export;
- Construction of access roads from the Capricorn Highway to the MIA, and to the TLO facility;
- Installation of a raw water supply pipeline to connect to the Blackwater Pipeline network;
- Construction of a 66 kilovolt (kV) transmission line and switching/substation to connect to the existing regional network;
- Other associated minor infrastructure, plant, equipment and activities;
- Development of mine areas (open cut pits) and out-of-pit waste rock emplacements;
- Drilling and blasting of competent waste material;
- Mine operations using conventional surface mining equipment (excavators, front end loaders, rear dump trucks, dozers);
- Mining up to 1.9 Million tonnes per annum (Mtpa) ROM Coal – average 1.8 Mtpa for a construction/production period of approximately 20 years;
- Progressive placement of waste rock in:
 - Emplacements, adjacent to and near the open cut voids;
 - Mine voids, behind the advancing open cut mining operations;
- Progressive rehabilitation of waste rock emplacement areas and mined voids;
- Progressive establishment of soil stockpiles, laydown area and borrow pits (for road base and civil works). Material will be sourced from local quarries where required;
- Disposal of CHPP rejects (coarse and fine rejects) in out of pit spoil dumps, and in-pit behind the mining void;
- Progressive development of internal roads and haul roads including a causeway over Charlevue Creek to enable coal haulage and pit access; and
- Development of water storage dams and sediment dams, and the installation of pumps, pipelines, and other water management equipment and structures including temporary levees, diversions and drains.

Existing local and regional infrastructure, facilities and services would be used to support Project activities. These include the SunWater water distribution network, the Aurizon rail network, Ergon's electricity network, the Capricorn Highway, and Gladstone export coal terminals.

1.3 CURRENT LAND USE

The land within the study area is currently used for low intensity cattle grazing and resource exploration activities. The Capricorn Highway and a number of publicly gazetted roads including Charlevue, Coinda, Red Hill, Normanby, and Ellesmere roads dissect the study area.

Located directly north of the study area is the Taunton National Park (Scientific), (Taunton Nation Park), a scientific reserve under the *Land Act 1994 (Queensland)*, with the aim of protecting a population of Bridled nail-tail wallabies. A small section of the Taunton National Park of around 2.5 hectares (ha) within the study area.

1.4 LOCAL WATERWAYS AND TOPOGRAPHY

The study area lies within the Fitzroy River Basin, which encompasses an area of 142,545 square kilometres (km²) and contains the Comet, Connors, Dawson, Don, Nogoia and Mackenzie Rivers, which make up its six sub-catchment areas (BoM 2018; DES 2018a). The study area lies within the Mackenzie River sub-catchment, which covers a total area of 12,985 km², and is situated in the centre of the Fitzroy River catchment.

The major water body associated with the study area is Charlevue Creek, which traverses the study area in a north-easterly direction. This creek begins within the boundaries of Blackdown Tablelands National Park, flowing north-east before joining with Springton Creek and the Fitzroy River, eventually emptying into the Pacific Ocean approximately 46 km north of Gladstone. Stanley Creek and Springton Creek cross the study area in the north-west and south-east, respectively. These two creeks also eventually converge with the Mackenzie River. First and second order streams associated with Charlevue Creek and Springton Creek also occur in the study area. Figure 2 shows the extent and location of the waterways within the study area.

Springton Creek and Charlevue Creek are defined watercourses under the *Water Act 2000 (Queensland)*. Springton Creek and Charlevue Creek within the study area are 5th order streams. Stanley Creek is considered a 2nd order stream.

Topography of the land varies from flat to undulating, with elevation within the study area ranging between 120 metres (m) and 150 m. The landscape is influenced by Charlevue Creek, which has a lower elevation than the surrounding landscape. The topography of the study area is representative of the surrounding region.

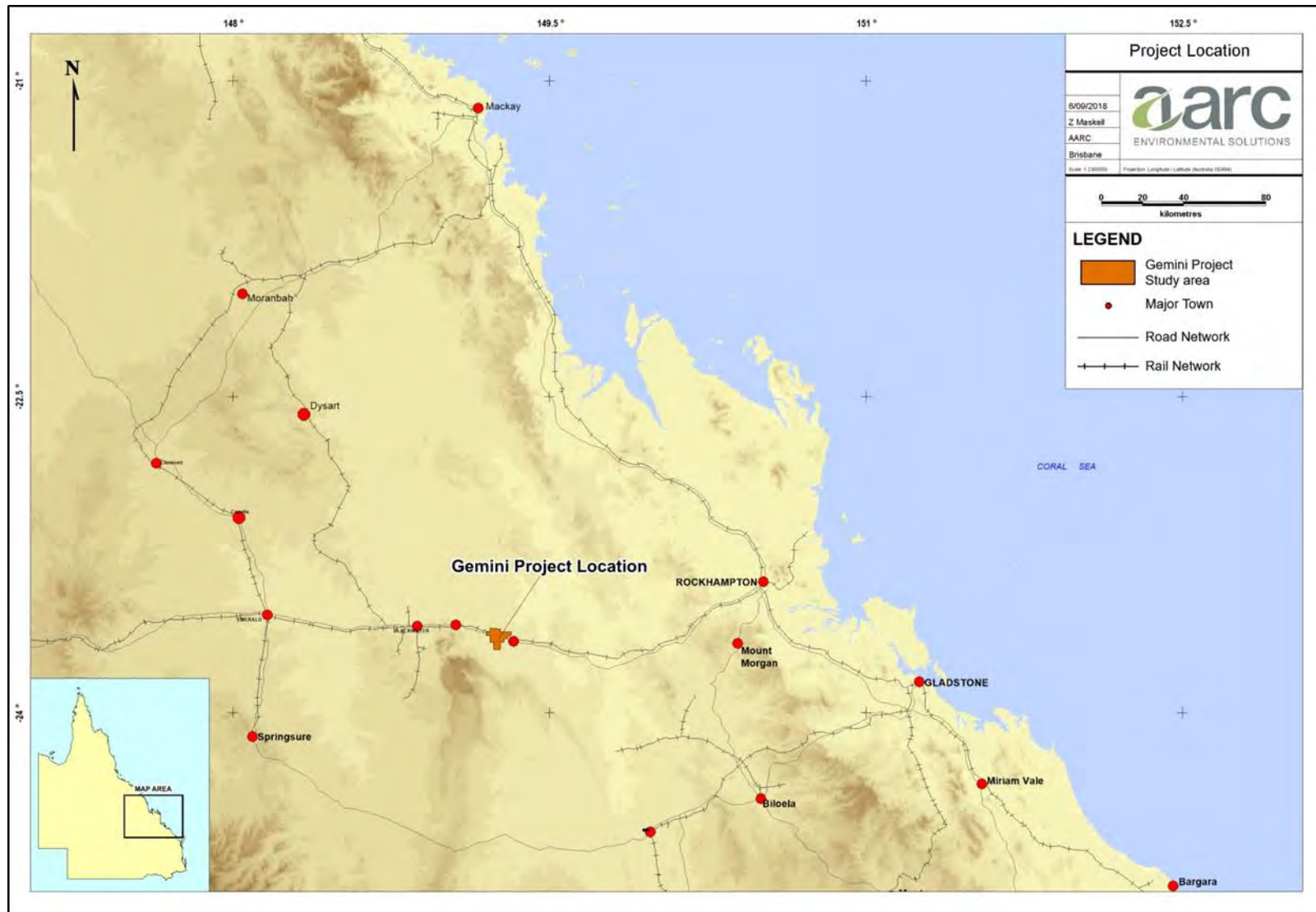


Figure 1 Project and Study Area Location

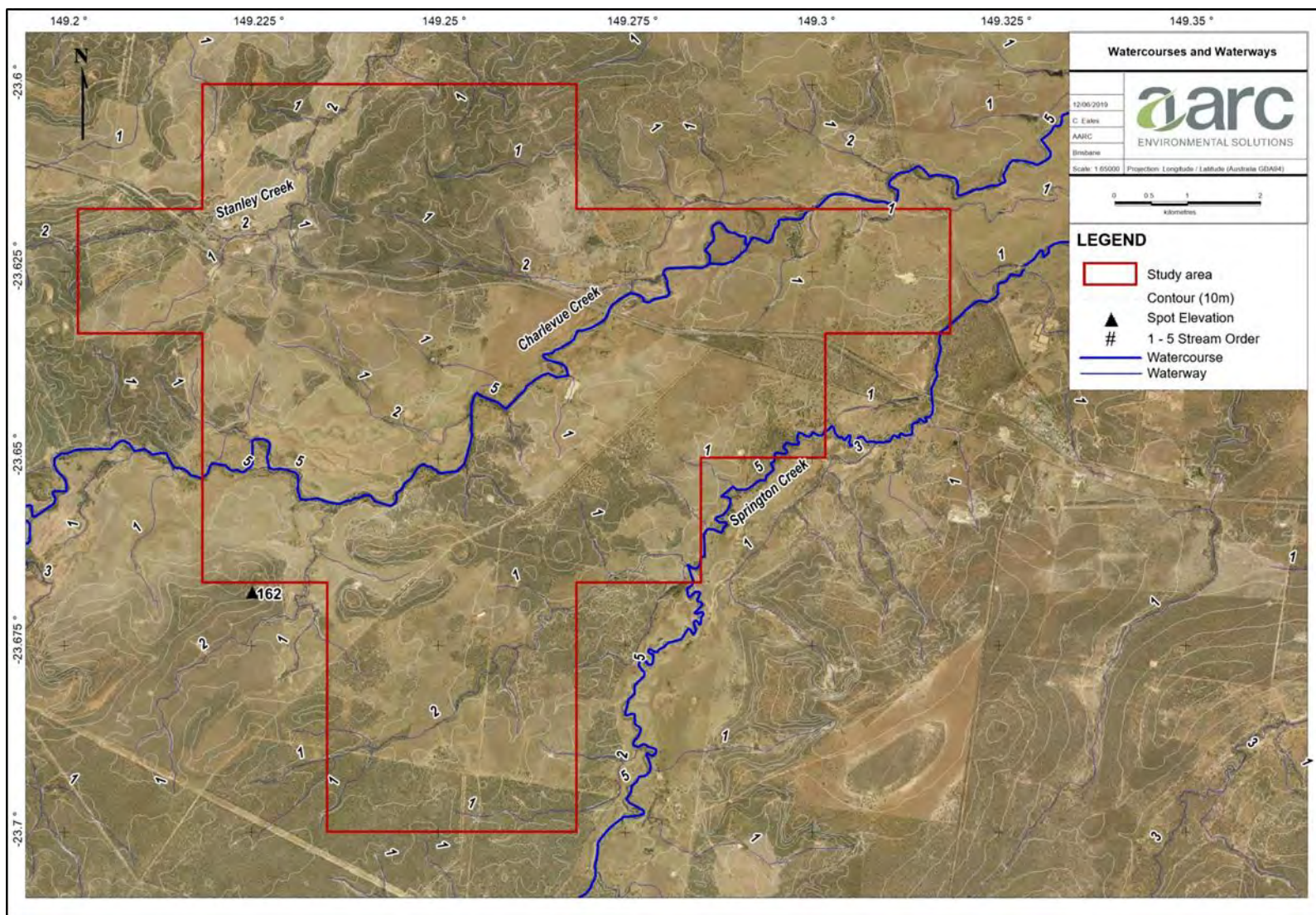


Figure 2 Waterways and topography associated with the Study Area

1.5 GEOLOGY

The geology of the region is dominated by its position within the Bowen Basin, one of Queensland's largest depositional regions, which formed through a period of rifting and subsidence lasting from the Early Permian - Mid-Triassic. The area is dominated by clastic sedimentary rocks of marine and lacustrine origin, including sandstones, conglomerates, mudstones, siltstones and coal (Geoscience Australia 2018).

The coastal and inland depositional environments which created these deposits allowed for the formation of extensive coal seams throughout the Bowen Basin, with the anoxic deposition of organic matter subsequently compacted and de-volatilised through compression and increased temperatures (Brooks & Smith 1969).

Generally, coal seams found in the east-central part of the basin contain higher quality coking coal deposits, with rank falling below coking range farther south and west (Hutton 2009). The high-quality coal measures are of Permian age, buried less than 60 m from the surface (Mutton 2003).

1.6 REGIONAL CLIMATE

The regional climate is classified as semi-arid, characterised with warm dry summers and warm winters. Climate data for the study area has been sourced from Scientific Information for Land Owners (SILO) climate database (Queensland Government), which operates by interpolating data from the Commonwealth Bureau of Meteorology (BoM) into a single point data drill.

Figure 3 shows predicted average temperature and rainfall for the area from January 1999 to July 2019. The data indicates the annual mean rainfall for the region is highest between December and March with the maximum average occurring in December (111.5 millimetres (mm)).

The hottest months typically occur between October and March while the coolest months occur between May and September. The highest mean maximum temperature typically occurs in December (34.2 degrees Celsius (°C)) and the lowest mean minimum temperature in July (8.5°C). The mean annual maximum temperature for the region is predicted to be 29.8°C and the mean annual minimum temperature is predicted to be 16°C.

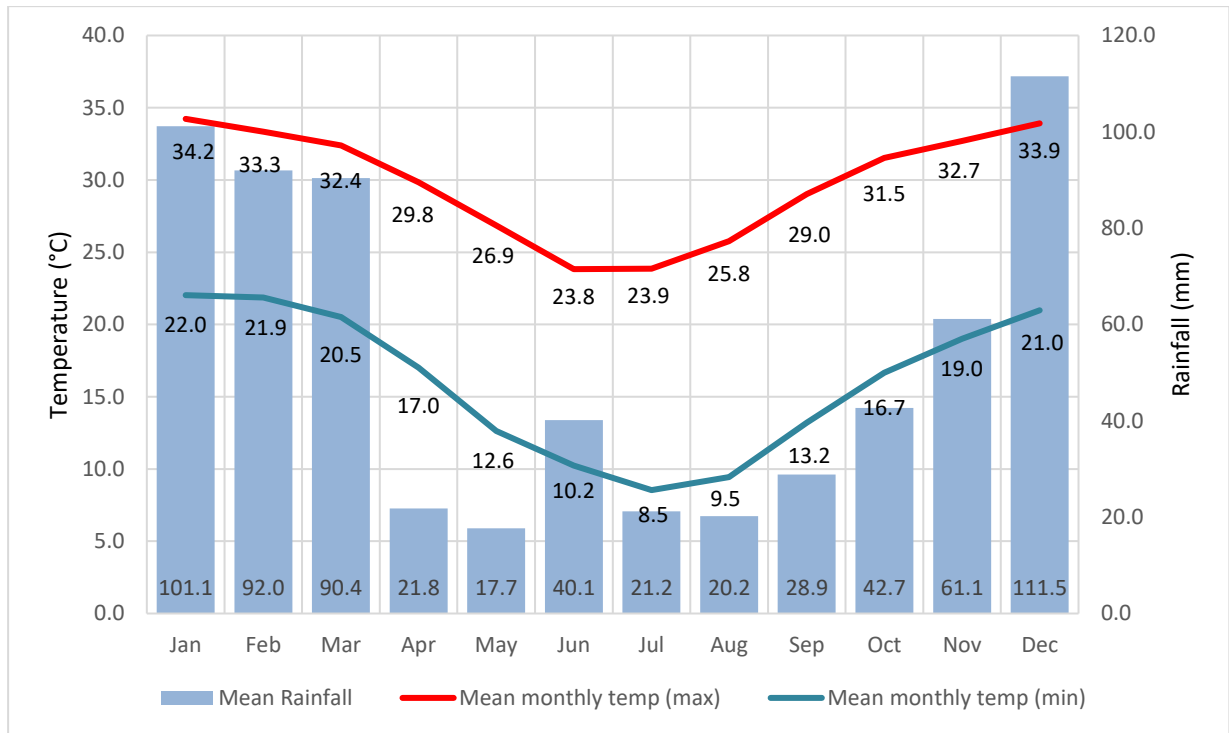


Figure 3 Mean temperature and rainfall data for the region (Source: SILO)

2.0 RELEVANT LEGISLATION AND POLICY

Commonwealth and State legislation and policies relevant to the assessment of terrestrial ecological values on the study area is discussed below.

2.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), an action requires 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).

An EPBC Referral (2010/5775) was lodged in 2010 for the Gemini Project previously known as the Dingo West Project by Dingo West Pty Ltd, which was declared 'Not a Controlled Action if undertaken in a Particular Manner' in July 2011.

The Particular Manner Decision conditions (EPBC 2010/5775) are as follows:

1. *To prevent downstream impacts to the Fitzroy River Turtle (Rheodytes leukops) the person taking the action must appropriately bund or locate pits in a manner that prevents surface water from entering the pit during a 1:1000 year flood event (as indicated in flood modelling at Attachment A).*
2. *To prevent downstream impacts to the Fitzroy River Turtle (Rheodytes leukops) the person taking the action must appropriately bund or locate dams in a manner that prevents surface water from entering or damaging the dams during a during a 1:1000 year flood event (as indicated in flood modelling at Attachment A).*

The Gemini Project complies with the Particular Manner Decision (EPBC 2010/5775). Furthermore, the level of impact to MNES have been assessed to be no greater than those described in the EPBC Referral (20105775).

The potential impact of the Project on the Fitzroy River Turtle is addressed in the Aquatic Ecology Assessment (AARC 2019).

2.2 NATURE CONSERVATION ACT 1992

The most relevant components of the Queensland *Nature Conservation Act 1992* (NC Act) to the Project, are the sections which pertain to Wildlife and Habitat Conservation. The classes of wildlife 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.

'Threatening processes' are also relevant to wildlife and habitat conservation. The NC Act defines 'threatening processes' as any process that is capable of:

- 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 for any protected flora or fauna species (as detailed in the NCWR) found in the study area.

2.2.1.1 *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 2019.

2.2.1.2 *Nature Conservation (Wildlife Management) Regulation 2006*

The *Nature Conservation (Wildlife Management) Regulation 2006* provides for the management of wildlife, other than wildlife in a protected area.

This regulation also pertains to the clearing, growing, harvesting and trading of protected plants in Queensland. As per Section 282 of the Regulation, a protected plant clearing permit for protected plants (other than in a protected area) may be required for any vegetation clearing of an area containing EVNT species (DES 2019a).

2.3 BIOSECURITY ACT 2014

The Queensland *Biosecurity Act 2014* (Biosecurity Act) provides comprehensive biosecurity measures to safeguard our economy, agricultural and tourism industries, environment and way of life, from pests (e.g. wild dogs and weeds), diseases (e.g. foot-and-mouth disease), and contaminants (e.g. lead on grazing land).

Biosecurity matters are separated into three broad categories:

- A '**prohibited matter**' is a biosecurity matter that is not found in Queensland but would have a significant adverse impact on our health, way of life, and the economy or the environment if it entered the State. Prohibited matters must be reported to Biosecurity Queensland within 24 hours and all reasonable steps taken to minimise the risks of the prohibited matter and not make the situation worse.
- A '**restricted matter**' is a biosecurity matter found in Qld and has a significant impact on human health, social amenity, the economy or the environment. Restricted matters are further broken down into seven categories, with each category placing restrictions on the dealings with the biosecurity matter or actions required to be taken to minimise the spread and adverse impact of the biosecurity matter.
- An '**other matter**' is a biosecurity matter that is not a prohibited or restricted matter. Everyone is obligated to take all reasonable and practical steps to minimise the risks associated with other biosecurity matters under their control.

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

2.4 VEGETATION MANAGEMENT ACT 1999

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

The specific criteria used to assess the VM Class of RE are defined in Table 1. '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.

Table 1 VM Class listing criteria for regional ecosystems

VM Class	Criteria
Endangered	<ul style="list-style-type: none"> • remnant vegetation is less than 10 % of its pre-clearing extent across the bioregion; or • 10–30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 ha.
Of Concern	<ul style="list-style-type: none"> • remnant vegetation is 10–30% of its pre-clearing extent across the bioregion; or • more than 30% of its pre-clearing extent remains and the remnant extent is less than 10,000 ha.
Least Concern	<ul style="list-style-type: none"> • remnant vegetation is over 30% of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 ha.

2.5 BIODIVERSITY STATUS

The Department of Environment and Science (DES) Biodiversity Status is a classification assigned to REs and is used for a range of planning and management applications. These applications include the Biodiversity Planning Assessments and the determination of environmentally sensitive areas that are used for regulation of the mining industry through provisions in the *Environmental Protection Act 1994* (EP Act).

The biodiversity status is based on an assessment of the condition of remnant vegetation in addition to the criteria used to determine the class under the VM Act; including other threatening processes, such as reduction in biodiversity; weed invasion; grazing pressures; inappropriate fire management; fragmentation; and infrastructure development.

Table 2 Biodiversity Status additional listing criteria for regional ecosystems

Biodiversity Status	Criteria in addition to VM Class listing
Endangered	<ul style="list-style-type: none"> • less than 10% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss; or • 10–30% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000ha; or • it is a rare RE subject to a threatening process.
Of Concern	<ul style="list-style-type: none"> • 10–30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.
No Concern at Present	<ul style="list-style-type: none"> • the degradation criteria listed above for ‘endangered’ or ‘of concern’ RE are not met.

2.6 QUEENSLAND ENVIRONMENTAL OFFSETS FRAMEWORK

The Queensland environmental offsets framework consists of the *Environmental Offsets Act 2014*, *Environmental Offsets Regulation 2014*, and the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018b). 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 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 (REs) that intersect areas shown as wetlands on the Vegetation Management Wetlands map;
 - iii. REs located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature; or
 - iv. REs 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; or
 - 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:
 - i. High risk areas on the flora survey trigger map;
 - ii. Areas that contain endangered or vulnerable plants;
 - iii. Non-juvenile koala habitat trees in certain areas of south-east Queensland; or
 - iv. 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.

3.0 DESKTOP ASSESSMENT

Several desktop assessments were conducted to collate information on terrestrial ecological values identified in the region. These searches include previous surveys, community records and other sources. A review of databases facilitates the formulation of specific field survey techniques to target certain flora and fauna species known from the region.

All database searches were based on either the Lot/Plan, study area, or the central coordinate point (-23.6380 149.2514), depending on the database search undertaken. Database search results can be found in Appendix A. The following database searches were undertaken:

1. Environmental Reports Online (search based on EPC boundary);
 - a. Biodiversity Planning Assessments;
 - b. Matters of State Environmental Significance, including the regulated vegetation map;
 - c. Regional Ecosystems;
2. Environmentally Sensitive Area (ESA) Mapping (search based on EPC boundary);
3. Regional Ecosystems Report (search based on EPC boundary);
4. Protected Plants Flora Survey Trigger Map (search based on central coordinate point);
5. EPBC Act Protected Matters Search Tool (PMST) (two searches based on central coordinate point with 10 km and 50 km buffers);
6. Wildlife Online Species List Request (two searches based on central coordinate point with 10 km and 50 km buffers);
 - a. Rare and Threatened Species (two searches based on central coordinate point with 10 km and 50 km buffers);
 - b. Introduced Species (search based on central coordinate point with 50 km buffer); and
7. Department of Environment and Science (DES) interactive Wetland*Maps* database and Map of Referable Wetlands;
8. Bureau of Meteorology (BoM) and Department of Natural Resources Mines and Energy (DNRME) mapping of Groundwater Dependent Ecosystems (GDEs); and
9. 'Back on Track' Species Prioritisation Framework Recovery Actions Database (RAD) for Queensland for the Fitzroy Natural Resource Management Region.

Additional resources that provide species records and related information such as the Atlas of Living Australia (ALA) and Queensland Museum were consulted where appropriate, such as to support determinations of the likelihood of individual species occurring (Appendix A).

The following sections address items of nature conservation relevant to the study area, that have been identified within the desktop assessment.

3.1 REGULATED VEGETATION

The Regulated Vegetation Management Map was consulted, and the following regulated vegetation categories have been identified within the Project:

- Category B: Remnant vegetation.
- Category C: High-value regrowth vegetation.
- Category R: Regrowth within 50 m of a watercourse or drainage feature located in Great Barrier Reef catchment areas.
- Category X: Non-remnant vegetation.

Figure 4 outlines the Endangered or Of Concern Regulated Vegetation identified as likely to occur within the study area.

3.1.1 Threatened Ecological Communities

The EPBC Act PMST identified three TECs that could potentially occur within 10 km of the study area (1 to 3), and two additional TECs potentially occurring within 50 km of the study area (4 and 5).

1. Brigalow (*Acacia harpophylla* dominant and co-dominant);
2. Coolabah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
3. Weeping Myall Woodlands;
4. Natural Grasslands of the Qld Central Highlands and the northern Fitzroy Basin; and
5. Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions.

On the 4th July 2019, the Commonwealth government amended the list of threatened species and communities protected by the EPBC Act. Amongst numerous amendments, one was considered relevant to the study area, being the listing of a new TEC:

6. Poplar Box Grassy Woodland on Alluvial Plains.

The *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (TSSC n.d.) outlines five REs in Queensland that correspond fully or partly with the Poplar box TEC. Of these, RE 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains) is mapped (desktop) as occurring within the study area. Consequently, the Poplar Box TEC has been added to the list of TECs potentially occurring within 50 km of the study area.

Each TEC, PMST type of presence and desktop assessment of likelihood of occurrence is outlined in Appendix B.

3.1.2 Regional Ecosystems

Current DES mapping identifies six remnant REs occurring within the study area (Table 3, Figure 5).

Table 3 Regional Ecosystems mapped within the study area

Regional Ecosystem	Description	VM Act Status	DES Biodiversity Status	EPBC Act
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	Poplar Box grassy woodland on alluvial plains Weeping Myall (<i>Acacia pendula</i>) Woodland
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	Of concern	
11.5.2	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	
11.5.9b	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Least concern	No concern at present	

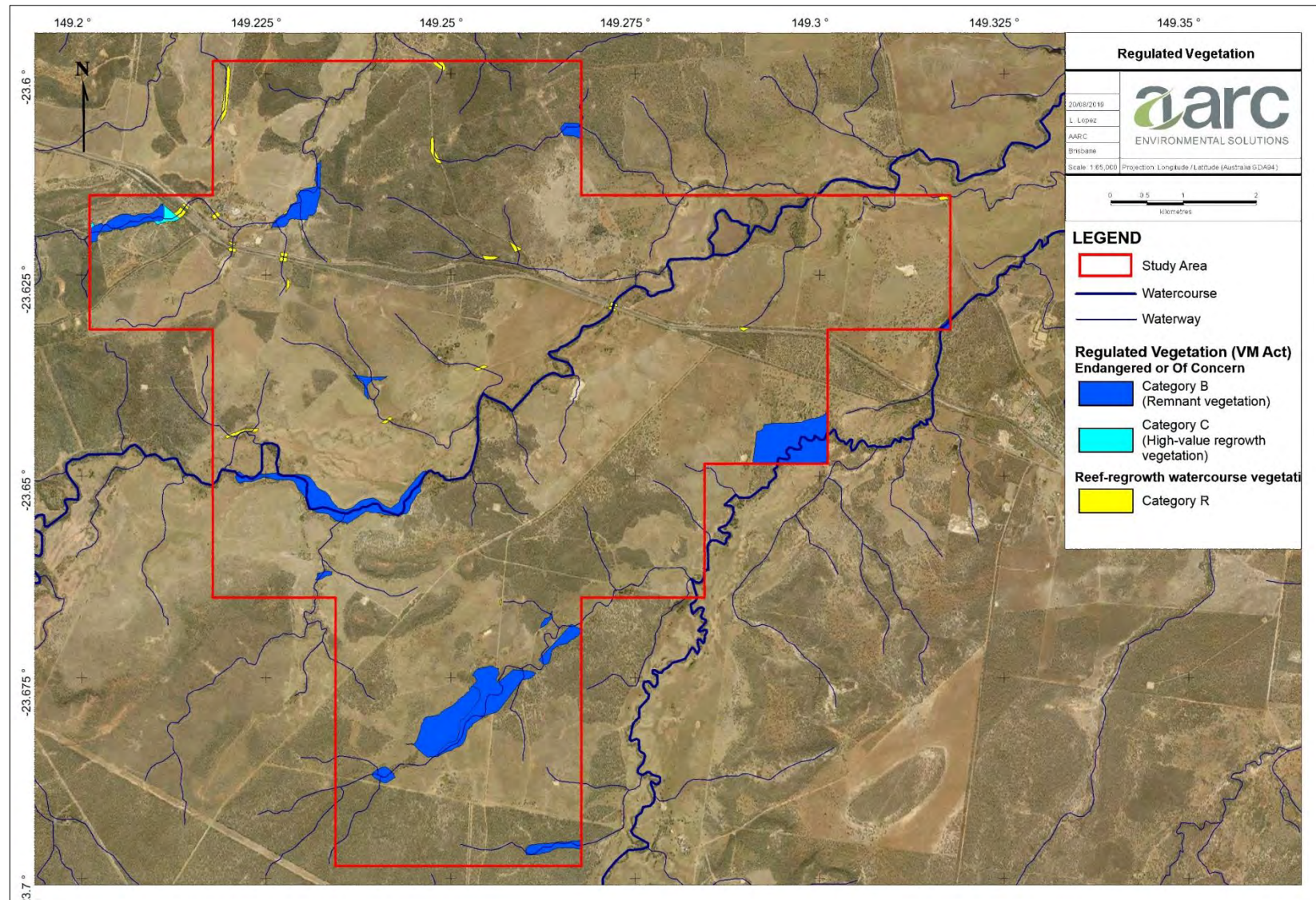


Figure 4 Regulated Vegetation (VM Act) classed as Endangered or Of Concern

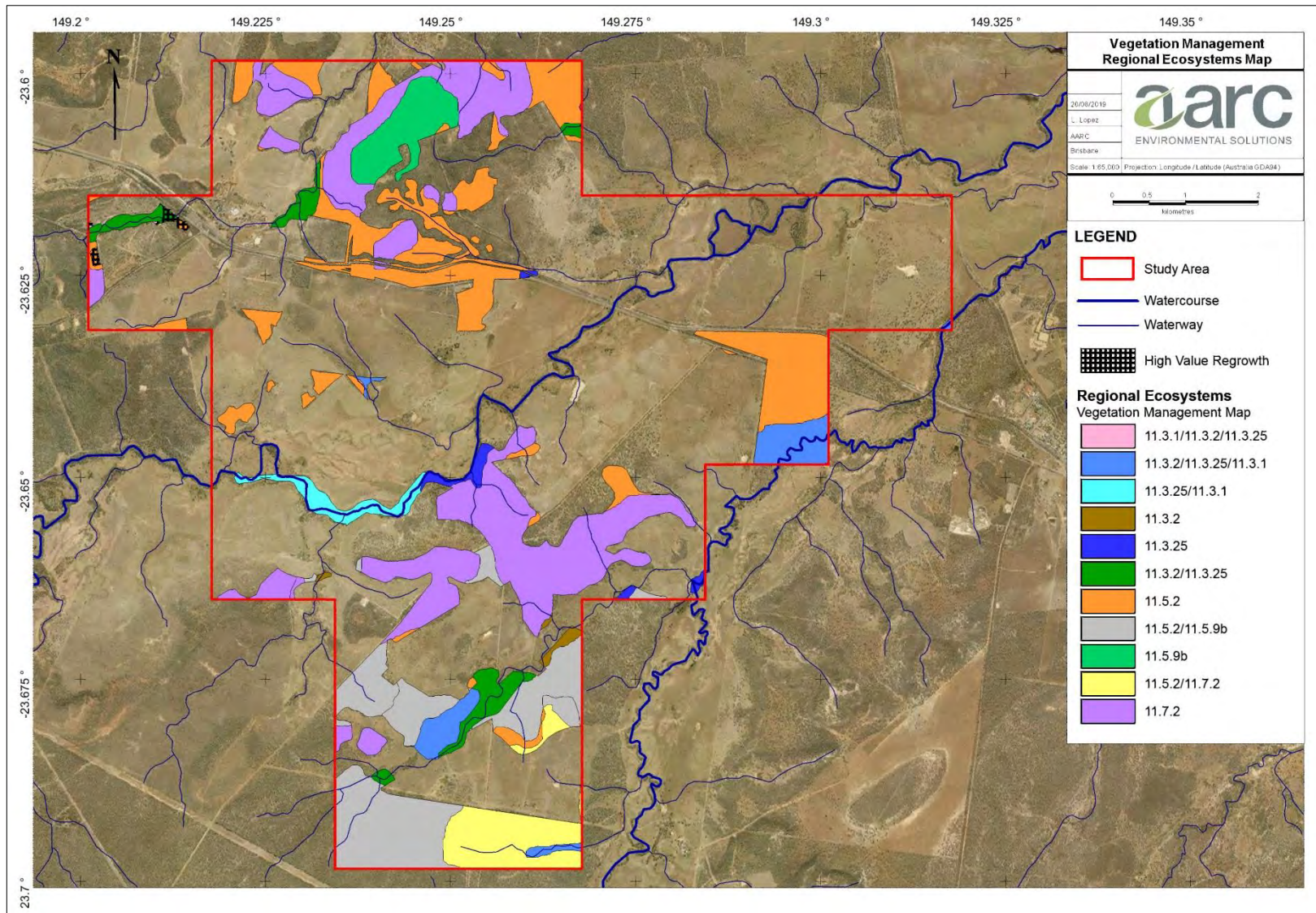


Figure 5 Regional Ecosystems Vegetation Management Map for the study area

3.2 SPECIES OF CONSERVATION SIGNIFICANCE

Species of conservation significance identified from the desktop assessment were assigned a likelihood of occurrence based on the criteria identified in Table 4. The assessment was based on the knowledge of ecologists, habitat suitability, previous surveys conducted near the study area and scientific literature.

Desktop assessments to determine the likelihood of each species identified during the database searches, with potential to occur on the study area, were undertaken prior to conducting the field surveys.

Targeted searches were undertaken in the field for species identified as either being likely to occur, or having potential to occur, within the study area, based on the desktop sources. The methodology was applied again after surveys to determine the likelihood of occurrence once additional site-based information became available.

Table 4 Criteria adopted for likelihood of occurrence determination

Likelihood of Occurrence	Criteria
Unlikely	<ul style="list-style-type: none"> • Species or species habitat may occur, is likely to occur or is known to occur from the broader search area (based on database searches); but <ul style="list-style-type: none"> ○ preferred habitat has not been identified within the study area; and there are no confirmed species records within 10 km of the study area; or ○ preferred habitat occurs within the study area, but there are no confirmed species records within 50 km of the study area.
Potential	<ul style="list-style-type: none"> • Species or species habitat may occur, is likely to occur or is known to occur from the broader search area (based on database searches); and <ul style="list-style-type: none"> ○ preferred habitat occurs within the study area; but there are no confirmed species records within 10 km of the study area; however, there are confirmed species records within 50 km of the study area; or • Species indicated as likely during desktop assessment, but field surveys revealed no evidence of occurrence in the study area.
Likely	<ul style="list-style-type: none"> • Preferred habitat occurs within the study area; and confirmed species records within 10 km of the study area; however, species not yet confirmed as occurring within the study area.
Known	<ul style="list-style-type: none"> • Confirmed species records within the study area (generally as a result of subsequent field survey).

3.2.1 Flora

3.2.1.1 State and Commonwealth Listed Flora Species

The PMST and the Wildlife Online Database identified 33 Endangered, Vulnerable or Near Threatened (EVNT) flora species with potential to occur within the 50 km buffer zone (Appendix A).

Each flora species, its protection status, habitat requirements, and assessment of likelihood of occurrence is provided in Appendix C.

Out of the 33 species identified by the desktop assessment six were considered to have the potential to occur within the study area and were targeted during the field survey. These six species and their conservation status under Commonwealth and State legislation are listed in Table 5.

Table 5 Flora Species of Conservation Significance with the potential to occur within the study area

Scientific Name	EPBC status	NC Act status	Potential Presence in Buffer Area	
			10 km	50 km
<i>Bertya opposens</i>	V	LC	-	-
<i>Bertya pedicellata</i>	-	NT	-	x
<i>Cerbera dumicola</i>	-	NT	x	x
<i>Solanum adenophorum</i>	-	NT	-	x
<i>Solanum dissectum</i>	E	E	-	x
<i>Solanum elachophyllum</i>	-	E	x	x

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

NT – Near Threatened

E – Endangered

3.2.1.2 Back on Track Flora Species Prioritisation

A RAD database search identified 35 Back on Track flora species ranked as either ‘high’ or ‘critical’ from the Fitzroy NRM Region. Of these 35 species, 30 are listed as EVNT under the NC Act and 16 are listed as EVNT under the EPBC Act. A list of these species and their relevant state and Commonwealth listings is presented in Table 6.

Table 6 Back on Track Priority Flora Species for the Fitzroy NRM Region

Species Name	Common Name	Fitzroy NRM Region	State BoT Rank	NC Act Status	EPBC Act Status
<i>Apatophyllum olsenii</i>		High	High	E	V
<i>Atalaya collina</i>		High	Medium	E	E
<i>Bowenia serrulata</i>	Byfield fern	Critical	Critical	LC	-
<i>Cadellia pentastylis</i>	Ooline	Critical	Critical	E	-
<i>Capparis humistrata</i>		High	Medium	E	-
<i>Comesperma oblongatum</i>		High	High	V	V
<i>Commersonia pearnii</i>		Critical	High	E	-
<i>Cupaniopsis shirleyana</i>	Wedge-leaf tuckeroo	High	High	V	V
<i>Cycas megacarpa</i>		Critical	Critical	E	E
<i>Cycas ophiolitica</i>	Marlborough blue	Critical	Critical	E	E
<i>Eleocharis blakeana</i>		High	Medium	LC	-
<i>Eriocaulon carsonii</i>		High	High	E	E
<i>Eucalyptus pachycalyx</i> subsp. <i>waajensis</i>		High	High	E	-
<i>Eucalyptus raveretiana</i>	Black ironbox	High	High	LC	-
<i>Grevillea venusta</i>	Grevillea	High	High	V	-
<i>Hakea trineura</i>		High	High	V	V
<i>Homoranthus decumbens</i>		High	High	V	E
<i>Lissanthe brevistyla</i>		High	High	V	-

Species Name	Common Name	Fitzroy NRM Region	State BoT Rank	NC Act Status	EPBC Act Status
<i>Logania diffusa</i>		High	High	V	V
<i>Macrozamia platyrhachis</i>		Critical	Critical	E	E
<i>Macrozamia serpentina</i>		Critical	Critical	E	-
<i>Marsdenia brevifolia</i>		High	High	V	V
<i>Melaleuca groveana</i>		High	Medium	NT	-
<i>Melaleuca irbyana</i>		High	Medium	E	-
<i>Myriophyllum artesium</i>		High	High	E	-
<i>Olde-andia gibsonii</i>		Critical	Critical	E	-
<i>Olearia macdonnellensis</i>		High	High	-	V
<i>Phaius australis</i>		Critical	Critical	E	E
<i>Pisonia grandis</i>		High	High	LC	-
<i>Plectranthus graniticola</i>		High	High	V	-
<i>Rhaponticum australe</i>		High	High	V	V
<i>Rhodamnia angustifolia</i>		High	Medium	E	-
<i>Solanum adenophorum</i>		High	High	E	-
<i>Solanum dissectum</i>		High	Medium	E	E
<i>Trioncinia retroflexa</i>		Critical	High	E	-

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

E – Endangered

V – Vulnerable

NT – Near Threatened

LC – Least Concern

3.3 FAUNA

3.3.1 State and Commonwealth Listed Fauna Species

Database searches identified 29 EVNT fauna species with potential to occur within the 50 km of the study area (Appendix A).

A detailed assessment to determine the likelihood of EVNT species to occur on the study area was completed prior to conducting the field survey, for the purpose of determining targeted species and to guide field survey methodology. The detailed assessment was based on the knowledge of ecologists, habitat suitability and scientific literature. This assessment is provided in Appendix D.

The detailed assessment of likelihood of occurrence considered that 16 of the 29 species identified by the desktop assessment had the potential to occur within the study area and were targeted during the field survey. These 16 species and their conservation status under Commonwealth and State legislation are listed in Table 7.

Table 7 EVNT Fauna species with potential to occur within the study area

Scientific Name	Common Name	EPBC status	NC Act status
Amphibians			
<i>Adelotus brevis</i>	Tusked frog	-	V
Reptiles			

Scientific Name	Common Name	EPBC status	NC Act status
<i>Delma torquata</i>	Collared delma	V	V
<i>Strophurus taenicauda</i>	Golden-tailed gecko	-	NT
Birds			
<i>Calyptorhynchus lathami erebus</i>	Glossy black-cockatoo (northern)	-	V
<i>Erythrotriorchis radiatus</i>	Red goshawk	V	E
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern subspecies)	V	V
<i>Grantiella picta</i>	Painted honeyeater	V	V
<i>Lathamus discolor</i>	Swift parrot	C	E
<i>Ninox strenua</i>	Powerful owl	-	V
<i>Pedionomus torquatus</i>	Plains-wanderer	C	V
<i>Poephila cincta cincta</i>	Black-throated finch (white-rumped subspecies)	E	E
<i>Turnix melanogaster</i>	Black-breasted button quail	V	V
Mammals			
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	V	V
<i>Onychogalea fraenata</i>	Bridled nailtail wallaby	E	E
<i>Petauroides volans</i>	Greater glider	V	V
<i>Phascolarctos cinereus</i>	Koala	V	V

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

NT – Near Threatened

V – Vulnerable

C – Critically Endangered

E – Endangered

3.3.1.1 Listed Migratory and Marine Species

The EBPC PMST indicated 21 marine and/or migratory species known from 50 km of the study area (Appendix A).

The assessment of likelihood of occurrence (Appendix D) considered that nine of the 21 species had the potential to occur within the study area.

Scientific Name	Common Name	EPBC status	NC Act status
<i>Ardea alba</i>	Great egret	Ma	-
<i>Ardea ibis</i>	Cattle egret	Ma	-
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Ma, Mi	SL
<i>Chrysococcyx osculans</i>	Black-eared cuckoo	Ma	-
<i>Hirundapus caudacutus</i>	White-throated needletail	Ma, Mi	-
<i>Merops ornatus</i>	Rainbow bee-eater	Ma	-

Scientific Name	Common Name	EPBC status	NC Act status
<i>Monarcha melanopsis</i>	Black-faced Monarch	Ma, Mi	SL
<i>Motacilla flava</i>	Yellow wagtail	Ma, Mi	SL
<i>Myiagra cyanoleuca</i>	Satin flycatcher	Ma, Mi	SL

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

Ma – Marine

Mi – Migratory

SL – Special Least Concern

3.3.1.2 Back on Track Fauna Species Prioritisation

A RAD database search identified 35 Back on Track fauna species ranked as either 'high' or 'critical' from the Fitzroy NRM Region. A list of these species and their relevant State and Commonwealth listings is presented in Table 8.

Table 8 Back on Track Fauna Species from the Fitzroy NRM Region

Species Name	Common Name	Fitzroy NRM Region	State BoT Rank	NC Act Status	EPBC Act Status
Amphibians					
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	High	High	E	CE
Reptiles					
<i>Phyllurus caudiannulatus</i>	Ringed thin-tailed gecko	High	Medium	V	-
<i>Phyllurus championae</i>		Critical	Critical	LC	-
<i>Elseya albagula</i>	Southern snapping turtle	High	High	E	CE
<i>Rheodytes leukops</i>	Fitzroy River turtle	High	High	V	V
<i>Caretta caretta</i>	Loggerhead turtle	Critical	Critical	E	E
<i>Strophurus taenicauda</i>	Golden-tailed gecko	High	Medium	NT	-
<i>Acanthophis antarcticus</i>	Common death adder	High	Medium	V	-
<i>Denisonia maculata</i>	Ornamental snake	High	Medium	V	V
<i>Hoplocephalus stephensii</i>	Stephens' banded snake	High	High	LC	-
<i>Delma inornata</i>		High	High	LC	-
<i>Delma torquata</i>	Collared delma	High	High	V	V
<i>Anomalopus brevicollis</i>		High	High	LC	-
<i>Egernia rugosa</i>	Yakka skink	High	Medium	V	V
<i>Lerista allanae</i>	Allan's lerista	High	High	E	E
<i>Varanus semiremex</i>	Rusty monitor	High	High	LC	-
Birds					
<i>Erythroriorchis radiatus</i>	Red goshawk	High	High	E	V
<i>Esacus magnirostris</i>	Beach stone-curlew	High	High	V	-
<i>Stagonopleura guttata</i>	Diamond firetail	High	High	LC	-
<i>Sternula albifrons</i>	Little tern	High	High	SL	-
<i>Epthianura crocea macgregori</i>	Yellow chat (Dawson)	High	High	E	CE

Species Name	Common Name	Fitzroy NRM Region	State BoT Rank	NC Act Status	EPBC Act Status
<i>Grantiella picta</i>	Painted honeyeater	High	High	V	V
<i>Turnix melanogaster</i>	Black-breasted button quail	Critical	Critical	V	V
Mammals					
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed quoll (southern subspecies)	High	High	V	E
<i>Dugong dugon</i>	Dugong	Critical	Critical	V	-
<i>Taphozous australis</i>	Coastal sheathtail bat	High	High	NT	-
<i>Onychogalea fraenata</i>	Bridled naitail wallaby	Critical	Critical	E	E
<i>Petrogale penicillata</i>	Brush-tailed rock-wallaby	High	High	V	V
<i>Macroderma gigas</i>	Ghost bat	Critical	Critical	E	V
<i>Xeromys myoides</i>	Water mouse	Critical	High	V	V
<i>Petaurus australis australis</i>	Yellow-bellied glider (southern subspecies)	High	High	LC	-
<i>Bettongia tropica</i>	Northern bettong	Critical	Critical	E	E
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	Critical	Critical	LC	V
<i>Kerivoula papuensis</i>	Golden-tipped bat	High	Medium	LC	-
<i>Nyctophilus corbeni</i>	Eastern long-eared bat	High	Medium	V	V
Arachnids					
<i>Selenocosmia crassipes</i>		Critical	Critical	LC	-
<i>Selenotypus plumipes</i>		Critical	Critical	LC	-
Gastropods					
<i>Adclarkia dawsonensis</i>	Boggomoss snail	Critical	Critical	E	CE
<i>Billordia nicoletteae</i>		High	High	-	-
<i>Perioinsolita pokryszkoeae</i>		High	High	-	-
<i>Sphaerospira mossmani</i>		High	High	-	-
<i>Dimidarion slatyeri</i>		Critical	High	-	-

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

CE – Critically Endangered

E – Endangered

V – Vulnerable

NT – Near Threatened

LC – Least Concern

3.4 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. ESA mapping indicates that several ESAs occur within the study area (Appendix A).

A small section of (around 2.5 ha) of Taunton NP, falls within the study area, on the north west corner of the study area. This NP is identified as Category A ESA. Category B ESA, Endangered Regional Ecosystems is mapped as potentially occupying several parcels of land within the study area. These areas of Category B ESA represent the Endangered RE 11.3.1 (*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains) as a mixed polygon, as mapped by the QLD Government in Figure 5.

3.5 WETLANDS

A review of the DES interactive *WetlandMaps* database and the Map of Referable Wetlands indicated three types of waterbodies are present within the study area. Riverine wetlands have been identified in association with the Charlevue Creek. Several small riverine, palustrine and lacustrine wetlands also mapped as potentially present within the study area (Figure 6). No wetlands of national or international importance have been recorded within the study area or surrounds. One High Ecological Significance (HES) wetland occurs approximately 4 km east of the study area (Figure 6).

The Aquatic Conservation Assessments defines the study area as having a sub-catchment conservation significance of medium, indicating that these wetlands have varied combinations of high and medium values amongst the assessment criteria.

3.5.1 Groundwater Dependant Ecosystem

Groundwater Dependant Ecosystems (GDEs) are ecosystems that are reliant on groundwater for their survival; they can be solely reliant on groundwater such as ecosystems relying on aquifers or may intermittently depend on groundwater, which would be the case of riparian vegetation, particularly on ephemeral river systems (IESC 2019). GDEs are grouped according to the 'Groundwater dependant ecosystem typology framework' which separates GDEs based on their type of groundwater reliance (DSITI 2015). The three GDE types include:

- surface expression GDEs, associated with springs, both permanent and non-permanent;
- terrestrial GDEs, reliant on the sub-surface presence of groundwater and their ability to draw upon this resource; and
- subterranean GDEs, wetland systems that occur below the surface of the ground and can include aquifer ecosystems and cave ecosystems.

The BoM has developed an interactive tool for assistance in the identification of GDEs, the National Atlas of GDEs (GDE Atlas) (BoM 2019). GDE Atlas is a tool used for planning, management and development and incorporates a national dataset of GDEs throughout Australia. The GDE Atlas supplies information to support the identification of GDEs but does not provide a definitive map of GDEs. The BoM mapped both terrestrial and surface expression (aquatic) GDEs as having the potential to occur within the study area (Figure 7 and Figure 8). Within the study area high potential terrestrial GDEs were mapped in association with Charlevue Creek and Springton Creek and moderate with some of the smaller waterways.

The Department of Natural Resources, Mining and Energy (DNRME) also has developed mapping of potential GDEs throughout Queensland. No surface expression GDEs or Subterranean GDEs were mapped by DNRME as occurring or having the potential to occur within the study area. Within the study area there are several 'low-confidence' potential terrestrial GDE areas along Charlevue Creek, Springton Creek and Stanley Creek (Figure 9). According to Government RE mapping these are in association with RE 11.3.2, 11.3.25 and 11.3.1.

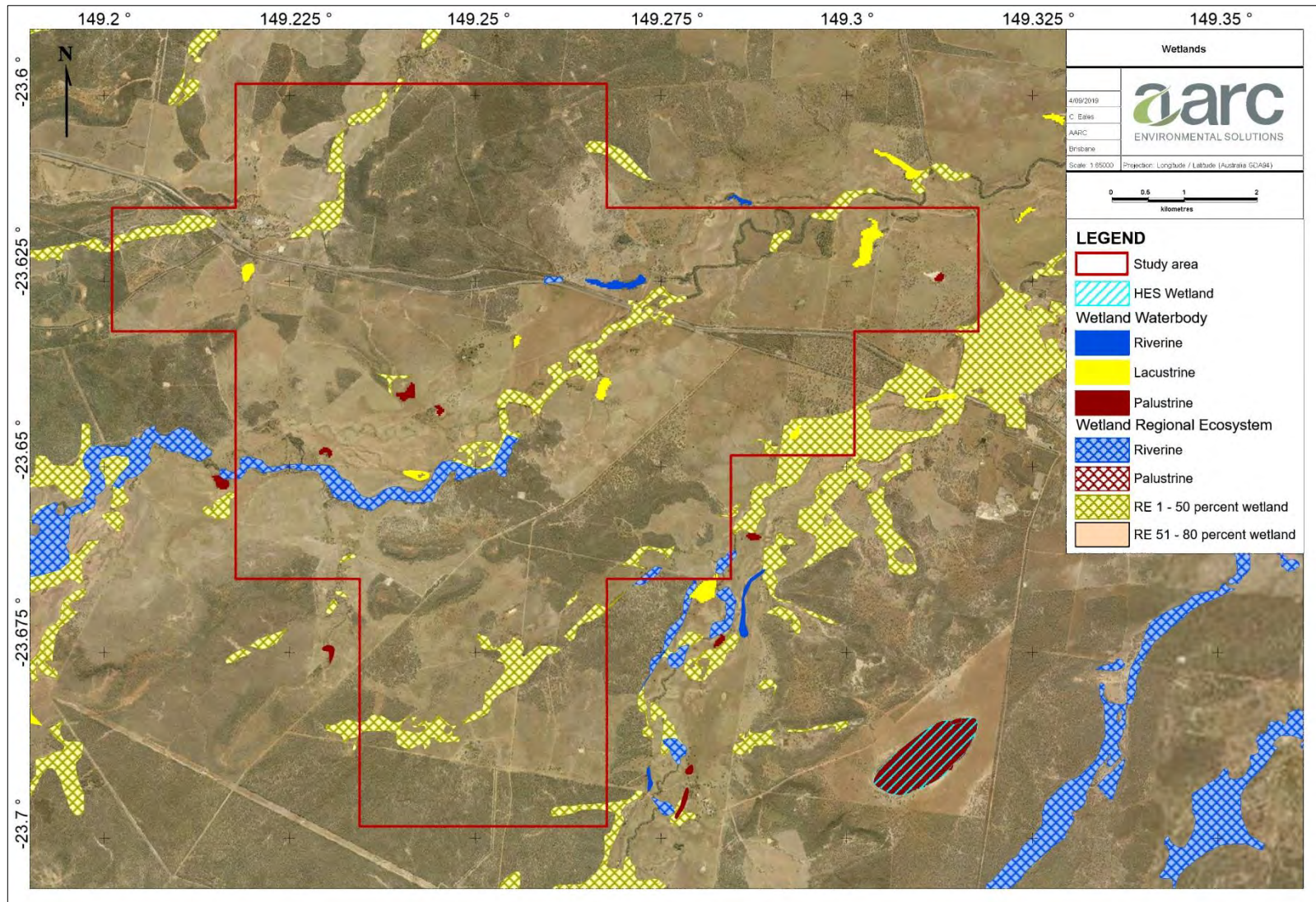


Figure 6 Wetland Habitats

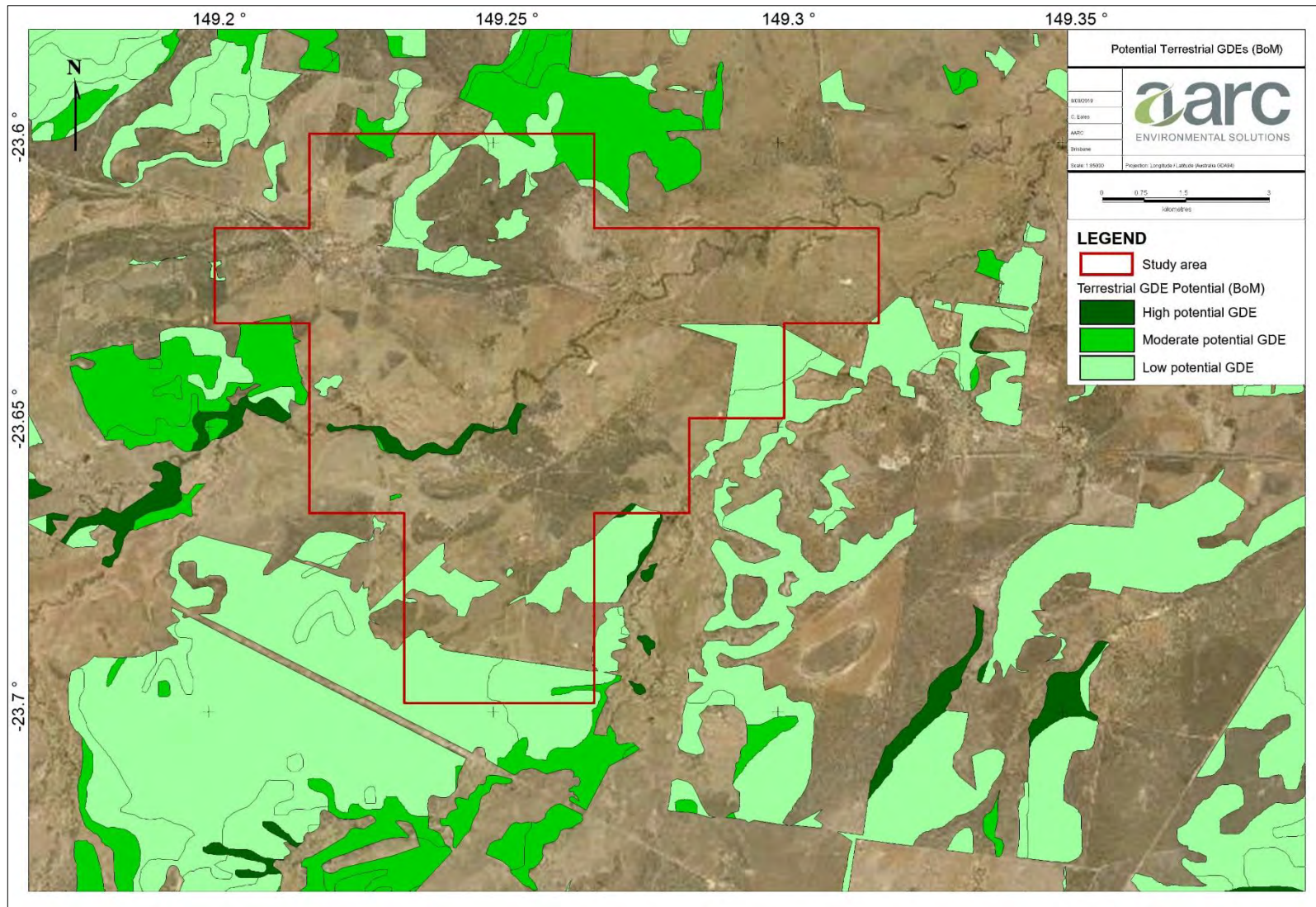


Figure 7 Potential Terrestrial GDEs (BoM)

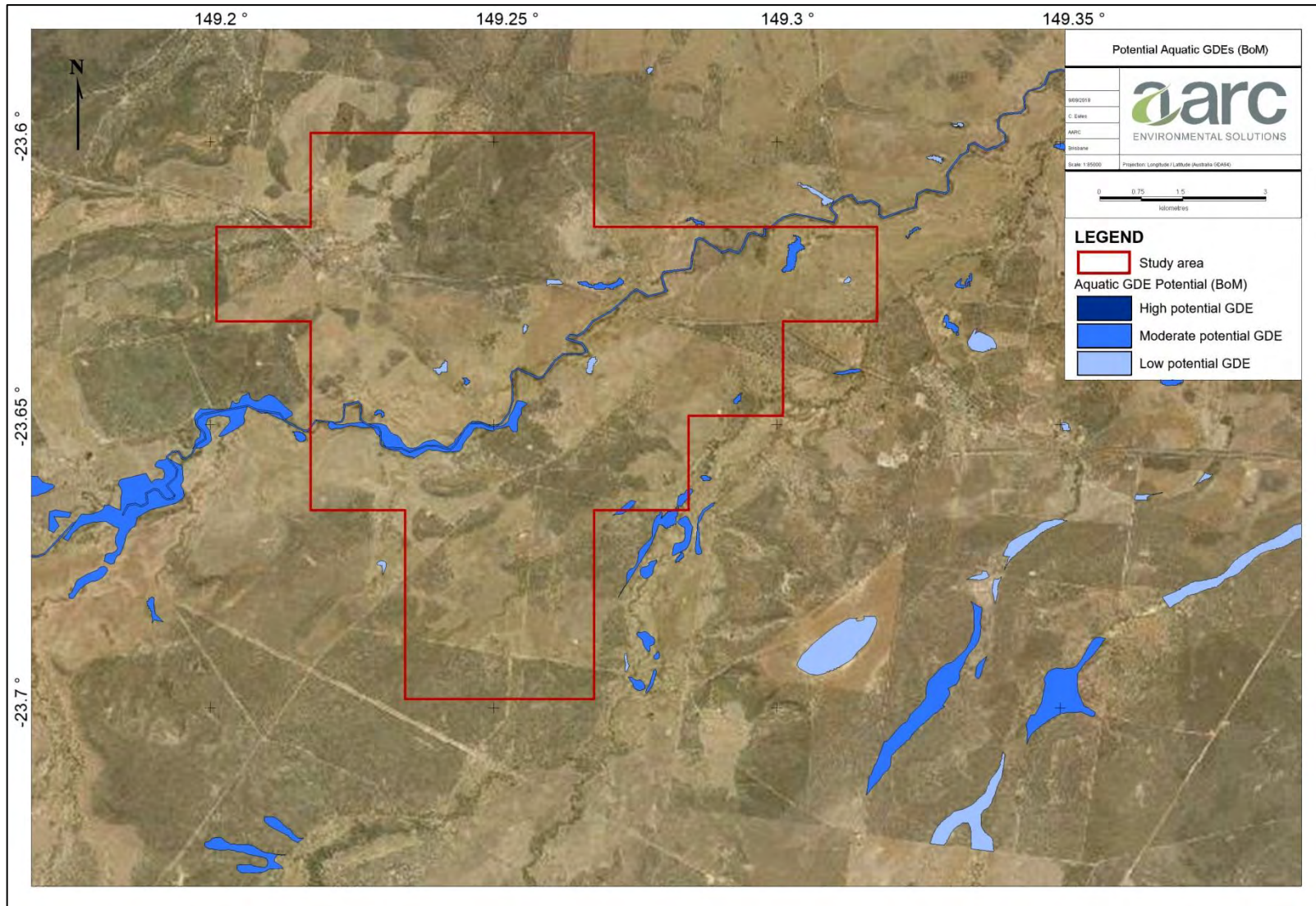


Figure 8 Potential Aquatic GDEs (BoM)

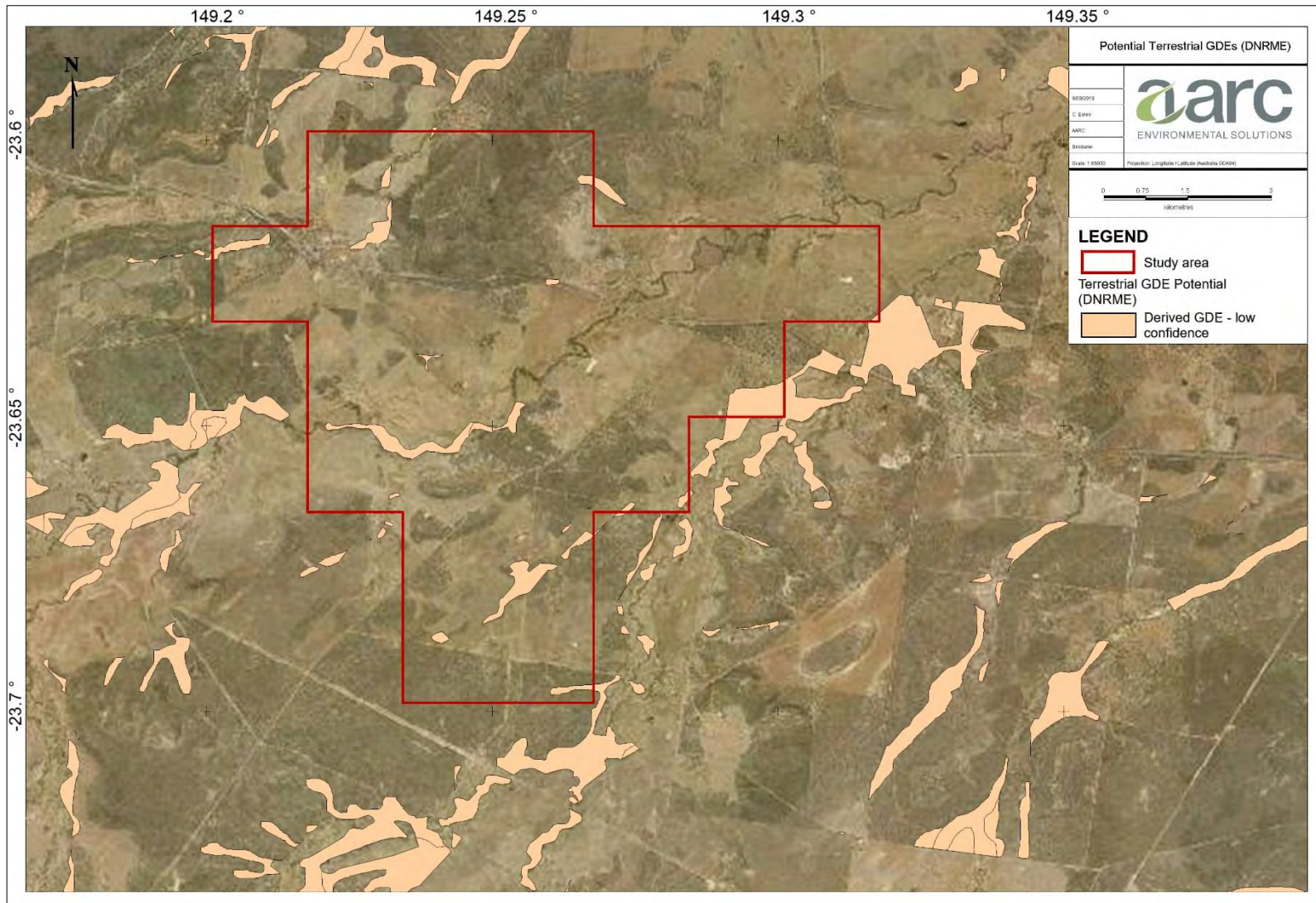


Figure 9 Potential Terrestrial GDEs (DNRME)

4.0 METHODOLOGY

4.1 BIOREGION

The study area is located within the Brigalow Belt bioregion. This bioregion occupies over a fifth of Queensland; from Townsville in the north to near the border of New South Wales in the south. The Brigalow Belt bioregion is characterised by Brigalow (*Acacia harpophylla*) woodland but presents other vegetation such as semi evergreen vine thickets, dry eucalypt woodlands and native Bluegrass (*Dichanthium* sp) grasslands. Due to the size of Brigalow Belt bioregion, it covers a broad climatic gradient as well as a diversity of soils and topography, the Brigalow Belt hosts a high diversity flora and fauna (Young et al 1999; McFarland et al. 1999 cited in DES 2018c).

As a result of agricultural and development activities, most of the relatively undisturbed areas is confined to the rugged parts of the landscape with less development value (DES 2018c), parks and reserve areas.

4.2 FIELD SURVEY GUIDELINES

Field surveys have been undertaken since 2017 covering a range of seasonal and climatic conditions. Over the study period several updates to existing survey guideline material occurred, as well as the introduction of entirely new material.

At the time of reporting the material that has guided methodology is as follows:

- *Site examination for threatened and endangered plant species* (Goff, Dawson & Rochow 1982);
- *Management of endangered plants* (Cropper 1993);
- *Survey guidelines for Australia's threatened bats* (DoEE 2010a);
- *Survey guidelines for Australia's threatened birds* (DoEE 2010b);
- *Survey guidelines for Australia's threatened mammals* (DoEE 2011a);
- *Survey guidelines for Australia's threatened reptiles* (DoEE 2011b);
- *Survey Standards: Greater Glider, Petauroides volans* (MacHunter, Brown, Loyn & Lumsden 2011);
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (V3.0)* (Eyre et al. 2018);
- *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (V5.0)* (Neldner et al. 2019); and

4.3 SURVEY SEASONALITY

Survey timing was selected in accordance with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland V3.0* (Eyre et al. 2018). These guidelines recommend that fauna surveys within the Brigalow Belt bioregion should be conducted during spring to early summer (i.e. September to mid-November) and during autumn (i.e. March to mid-May).

The autumn survey should be undertaken after summer as the temperatures decrease but before the onset of cold winter nights. This coincides with another active period including dispersal and migration of many species (Eyre *et al.* 2018). The first and third ecological survey for the study area was undertaken during autumn, from the 4th - 12th May 2017 and from the 16th - 23rd February 2018.

The spring season timing provides ideal survey conditions as temperatures begin to rise and a peak in vertebrate activity is observed with the commencement of the breeding period for many species (Eyre *et al.* 2018). The second survey was undertaken during spring, from the 18th - 30th September 2017.

A fourth survey targeting Microchiroptera bat species and vegetation mapping took place from the 22nd - 29th March 2018, meeting the requirements for the *Survey Guidelines for Australia's Threatened Bats* (DoEE 2010a).

The final surveys to finalise the vegetation mapping took place on the 1st, 2nd and 19th August 2019.

Autumn 2017 Survey

Mild conditions were recorded on the study area during the May 2017 ecology survey according to data obtained with SILO and personal observations. Throughout the survey period, a total of 20.2 mm of rainfall was recorded within the region, however, within the study area the rain was only registered on the evening of the 9th and during the day on the 10th. Maximum daily temperatures were slightly lower than average for the study area's locality reaching only 28.5°C and dropping to 11°C at night.

Spring 2017 Survey

No rainfall was registered during the spring survey period. There was some fluctuation on the temperature throughout the fieldwork, with the highest temperature of 38.5°C recorded and a minimum temperature of 13°C in the region.

Autumn 2018 Surveys

Hot and wet conditions were recorded on the study area (SILO) during the autumn 2018 Ecology survey. Throughout the survey period, 61.5 mm of rainfall was recorded within the region, with most of the rainfall in the study area registered on the 20th February. Maximum daily temperatures reached 35.5°C, dropping to 19.5°C at night.

During the second autumn 2018 survey (consistent on targeted micro-bat and vegetation mapping survey) the conditions were mild, with 6.1 mm of rainfall registered in the region. Maximum temperatures of 34.5°C reached on the 28th of March and minimum temperatures reached 18°C.

Winter Surveys 2019

No rainfall was registered during the spring survey period. The field observations recorded as overcast the 1st of August and sunny and warm the 2nd and the 19th of August. The temperatures registered during the day in the region reached 29°C as maximum and 20°C as the minimum.

4.4 FLORA

The flora survey regime was designed to meet the following objectives:

1. Obtain a detailed floristic summary of the study area through the compilation of a flora species list;

2. Define distinct vegetation communities and compile detailed descriptions of the floristic assemblages in each community;
3. Detect and identify EVNT flora species and threatened ecological communities; and
4. Produce a comprehensive site vegetation map at a 1:10,000 scale.

Plants species were identified using several taxonomic keys, field guides and online reference material. For any plant species that could not be identified in the field, a sample was collected and sent to the Queensland Herbarium.

4.4.1 Vegetation Mapping and Community Description

Methods used to produce a vegetation map and define communities were in accordance with those described in *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (V5.0)* (Neldner *et al.* 2019). Version 1.0 of this document was first released by the Qld Herbarium in 1999, with further additions and refinement to the methodology documented in subsequent versions (2004, 2005, 2017, 2019). Field mapping and community description was undertaken in accordance with the version of this guideline that was current at the time of each flora survey.

All RE's are described in this consolidated report in accordance with the Qld RE Description Database (REDD) (DES 2019c). The use of the terms 'remnant' and 'non-remnant vegetation' are as per the definitions of the VM Act. Neldner *et al.* (2019) describes four levels of floristic sampling, two of which were utilised in the study area assessment and defined below.

Secondary Transects: were used for classification and detailed descriptions of regional ecosystems and vegetation communities. Each site consisted of a 50 m long transect specifically marked using a Global Positioning System (GPS) at the start and end points, each accompanied by a photograph taken with a viewpoint of the transect. Foliage projection cover was measured along the transect and calculated as a percentage. Percentage composition of each ground cover species was recorded in five 1 m x 1 m quadrats located at 10 m intervals along the transect line. Within the 50 m x 10 m plot, each species present was recorded including relative abundance within each stratum, height of each stratum, and stem density (for woody stems only). Species representative of the community but located outside of the plot were also recorded. Where a plant could not be positively identified to species level, a voucher specimen was collected for identification by the Qld Herbarium.

Quaternary Sites: are rapid vegetation assessments primarily used to verify regional ecosystem / vegetation community mapping. Each site consisted of a rapid assessment of the vegetation within an approximately 20 m by 20 m plot. Data collected included marking the GPS location, taking photographs, recording the dominant species in the characteristic stratum as well as stratum height. Soil and landform data was recorded to confirm land zone, as many REs can only be differentiated by the land zone they occur on, due to their floristic assemblage descriptions being virtually identical.

Flora was sampled in autumn, spring and winter season to best account for both annual and perennial species assemblages. Sampling was undertaken at a minimum density of 25 observations per 100 ha to complete mapping at the 1:10,000 scale. Subsequently, the flora sites were projected on a Geographical Information System (GIS), and used in conjunction with satellite images, aerial photographs, topographical and geological maps to effectively produce a ground verified vegetation map.

A total of 28 secondary transects and over 1000 quaternary sites were sampled across the study area. The locations of all the flora secondary transects and quaternary sites are shown in Figure 10.

4.4.2 Targeted Searches for Species of Conservation Significance

To gain an understanding of each EVNT species, preferred habitat and ecology, several resources were consulted to pre-determine habitat to be targeted during the field surveys. This included, but was not limited to:

- Commonwealth Listing Advice;
- Commonwealth Approved Conservation Advice;
- Species Profile and Threats Database (SPRAT); and
- WetlandInfo: Plants, Animals, Soils, Water and More Search Tool.

The predominant survey technique utilised for targeted species across the cumulative survey effort was the 'timed meander' technique (Cropper 1993; Goff 1982). This technique involved traversing suitable habitat in a random manner so as to maximise the coverage of habitat and the encounter rate of different species. For any EVNT plants observed the location recorded using a GPS. If there was any uncertainty in identification of a species, a representative voucher specimen was collected for identification by the Queensland Herbarium in accordance with the Herbarium procedures (DSITI 2016).

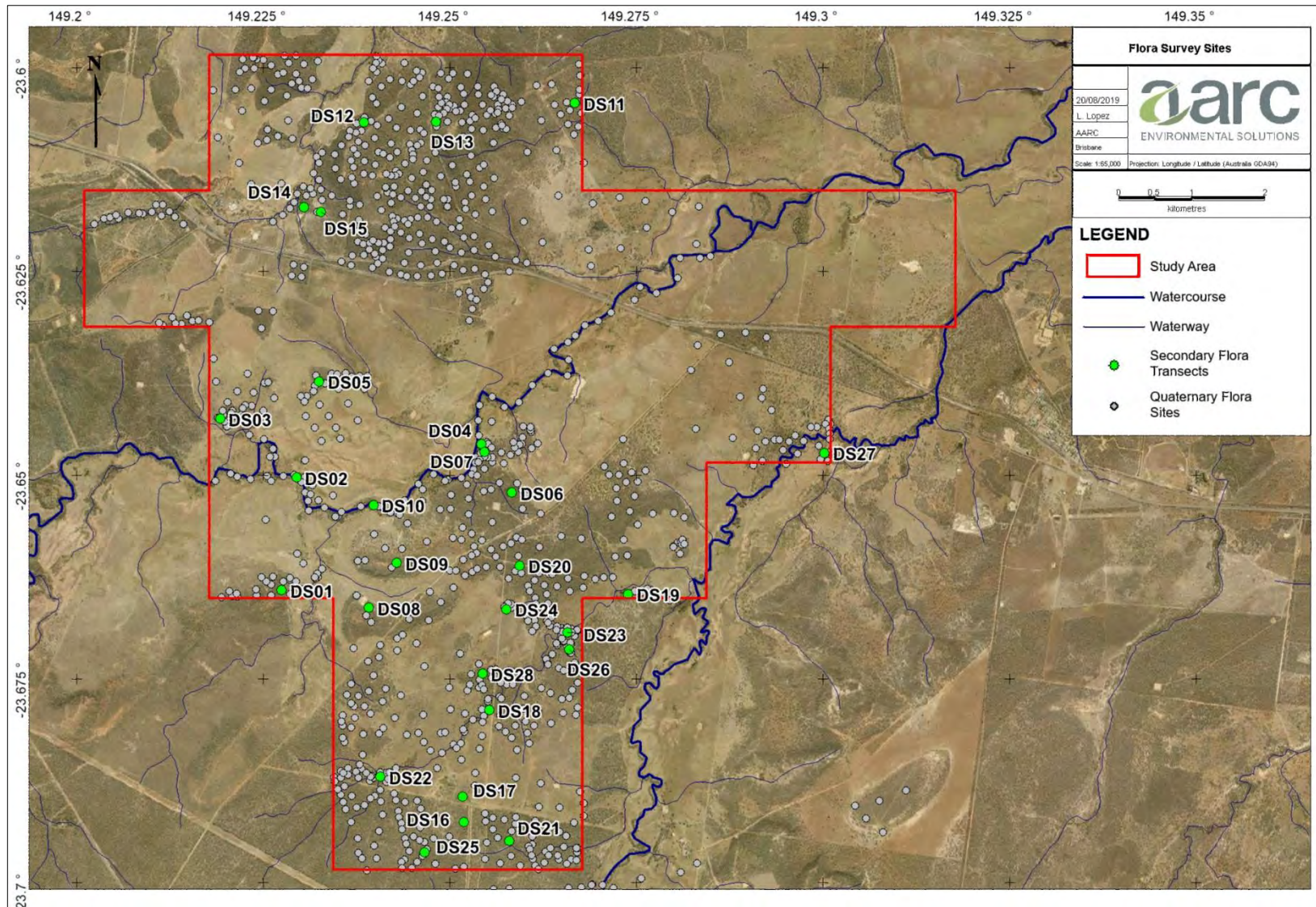


Figure 10 Gemini Project flora survey sites

4.5 FAUNA

4.5.1 Fauna Trapping Sites and Survey Locations

Site scoping was conducted prior to each survey by undertaking a desktop assessment to determine habitat types of the intended study area in accordance with survey objectives. Examination of satellite imagery, topographical features, broad vegetation group (BVG) guided the location of baseline fauna trapping efforts ensuring adequate distribution across, and representation of fauna habitat types. Preferred habitat of targeted species was identified in the same manner to locate targeted trapping and survey effort in suitable locations.

Vehicle-based reconnaissance was carried out, where possible, to assist in locating suitable survey sites, maximising the representative vegetation and fauna habitat survey coverage. This also aided in targeting habitats potentially occupied by species of conservation significance. Vegetation communities optimal for installing fauna sites were then surveyed on foot to allow further ecological familiarisation and comprehensive survey coverage.

The fauna survey methodology employed for the study area was based on the *Survey Guidelines for Australia's Threatened Bats* (DoEE 2010a) and the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland V2.0* (Eyre *et al.* 2014) which was the current version at the time of all surveys. The survey was conducted in compliance with AARC's scientific purposes permit and animal ethics approval. All fauna trapping efforts were conducted over four consecutive nights (unless otherwise stated).

All fauna survey locations are illustrated in Figure 7 and Figure 8 and described in Table 7. The detection techniques employed at each site is defined in Appendix E, and for descriptions of each technique refer to Section 4.5.2. Total survey effort undertaken during each survey is detailed in Table 9, and total survey effort accumulated across all surveys is summarised in Table 10.

Sampling of vertebrate fauna was conducted primarily along transects established in each of the major fauna habitat types and at changes in vegetation community groups. During all surveys, observations of species outside the specific fauna study locations but within the survey area were noted as incidental observations.

Many fauna species, notably frogs and reptiles, do not have widely accepted common names. Scientific names for species often change with taxonomic revisions. For the purpose of this report, all nomenclature used will follow that used in the ALA database (ALA 2019).

4.5.2 Fauna Survey Sites

Fauna sampling was conducted amongst representative areas of the main habitat types on the study area site to maximise the potential for sampling all wildlife present:

- Habitat type 1: Woodlands dominated *Eucalyptus crebra* (Narrow-leaved red ironbark) frequently with *Corymbia spp.* or *Callitris spp.* on flat to undulating plains.
- Habitat type 2: Low woodlands to tall shrublands dominated by *Acacia spp.* on residuals. Species include *A. shirleyi* (Lancewood) and *A. rhodoxylon* (Rosewood).
- Habitat type 3: Open forests and woodlands dominated by *Eucalyptus tereticornis* (Blue gum) fringing drainage lines.
- Habitat type 4: Woodlands dominated by *Eucalyptus populnea* (Poplar box) on alluvium, sand plains and foot slopes of hills and ranges

A total of 15 full fauna survey sites, 8 harp trap sites and 3 mist nets were established across the study area during the ecology survey period.

Descriptions and photos of the survey sites are provided in Appendix E whereas all fauna survey locations indicating the habitat type where they were located and targeted micro-bat trapping sites are shown in Figure 11.

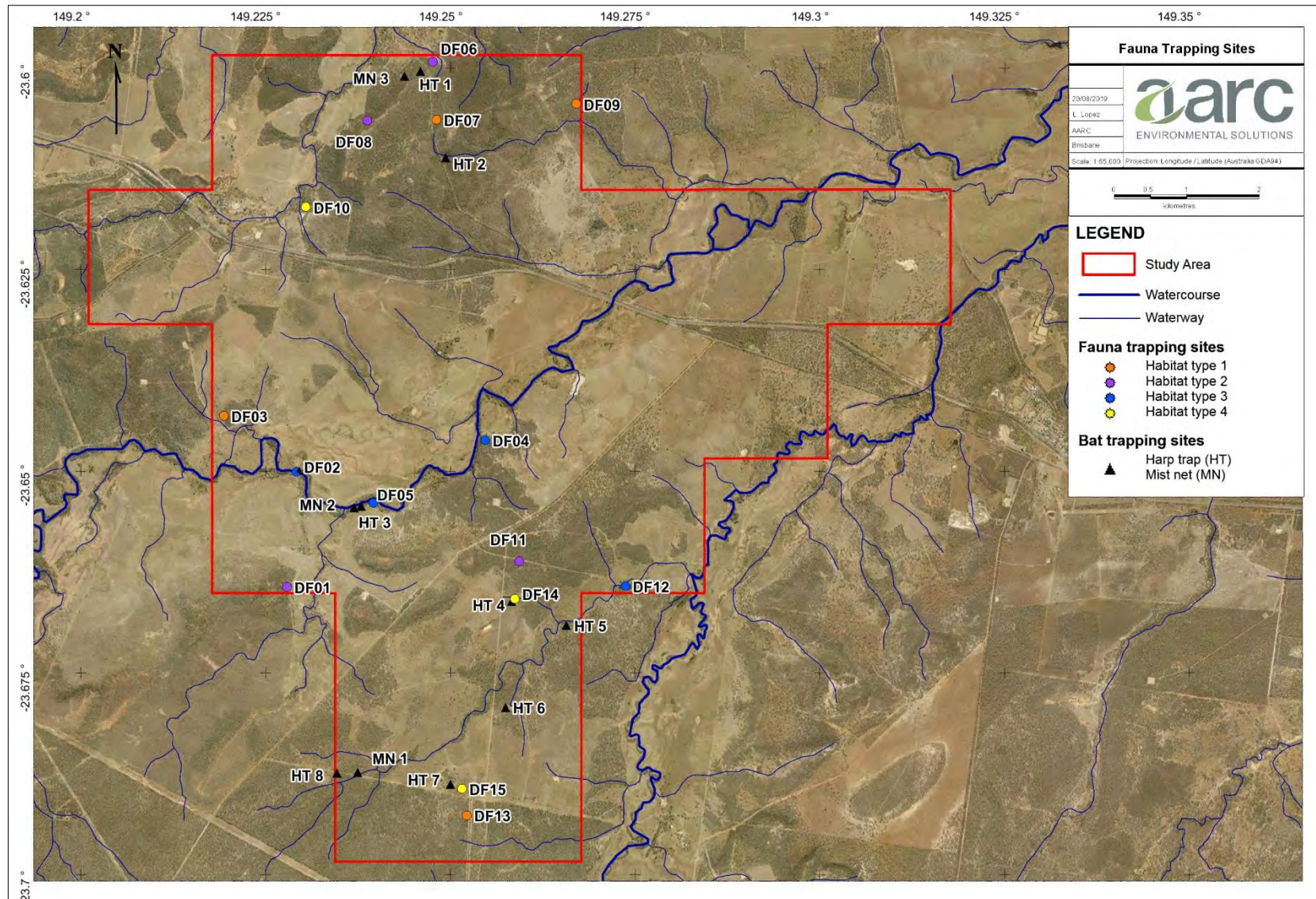


Figure 11 Gemini Project Fauna sites

4.5.3 Detection Techniques

A description of the techniques employed to survey the fauna occurring on the study area site (unless otherwise stated in the site description in Appendix E) is provided below:

Elliott trapping

Elliott traps are aluminium boxes with doors triggered by a floor treadle that are used to target small ground-dwelling mammals inhabiting the study area site. Traps were baited with a mixture of oats, peanut butter, and vanilla essence (referred to here-in as 'mammal bait'). At each site, two parallel lines each with 10 Elliott traps were placed at 10 m intervals. Alternatively, where fauna sites were established in linear riparian habitats, traps were positioned at 10 m intervals along a single central transect. Traps were strategically positioned under shrubs or beside logs to reduce exposure of trapped animals to the sun, wind and rain and maximise trap success.

Automated Camera Trapping

Automated camera trapping is a less invasive method of surveying medium and large-sized nocturnal terrestrial 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 with PVC and filled with bait (on this occasion chicken necks), is pegged to the ground and positioned in clear view of the camera. Motion-sensing technology in the camera detect movement and trigger a photographic response. This is a highly effective survey method and is now widely used instead of cage trapping (Eyre *et al.* 2018). Automated cameras were deployed for four nights at all fauna survey locations during the survey period.

Pitfall Trapping

To target small ground-dwelling taxa (e.g. reptiles, mammals and amphibians), a pitfall trap line was established at all fauna sites. Each line consisted of a 30 centimetre (cm) tall drift fence running along the ground and crossing the middle of four 20 litre buckets buried flush with the soil surface. Each pitfall trapping line was constructed in a T-shape design with 45 m of drift fence and buckets placed at approximately 7.5 m intervals. The bottom edge of each drift fence was buried to guide target animals towards the buckets. A small amount of soil, vegetation litter, a damp sponge and a small plastic pipe were placed in the bottom of each bucket to provide shelter and moisture for captured wildlife.

Funnel Trapping

Funnel traps are elongated box-shaped traps made of wire and fine mesh. Six funnel traps were positioned at each fauna site in order to catch medium and large-sized terrestrial reptiles, snakes and some species of medium-sized skinks, dragons and geckos. Funnel traps were also set with a damp sponge and covered with hessian bags to provide shelter and moisture for captured wildlife. Where pitfall trapping lines were established at a fauna site, funnel traps were placed at the end of each drift fence. In the absence of a pitfall line, funnel traps were placed in suitable habitat along fallen timber or rocky outcrops throughout the fauna site (100 by 100 m plot).

Microbat Surveying

Micro-bats (Microchiropterans) 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.

The QLD Government *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland v3.0* recommended method for bat survey is the use of a bat recorder (i.e. ANABAT). These are automated

devices that record the echolocation calls of microbat species. The majority of microbat species in Australia can be identified from a species specific 'call signature'. However, there is a small selection of species that cannot be reliably identified to species level by call signature. The *Nyctophilus* genus has several species in Australia and cannot be identified further than the genus level. Corben's long-eared bat (*Nyctophilus corbeni*) is listed as Vulnerable under both the EPBC Act and the NC Act. The distribution of *Nyctophilus corbeni* overlies much of central Queensland, including the study area.

A Long-eared bat (*Nyctophilus* sp.) was detected via echolocation records on the study area during surveys but could not be identified to species level. Ecologists completed a targeted micro-bat survey in order to correctly identify the *Nyctophilus* species to adequately satisfy the *Survey Guidelines for Australia's Threatened Bats* (DoEE 2010a). This targeted micro-bat survey utilised Harp Traps and Mist Nets in addition to ANABAT recorder.

The use of the following methodology was conducted in accordance with the *Survey Guidelines for Australia's Threatened Bats* and the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et. al 2018). These fauna survey methods were only adopted for the specialised Micro-bat 2018 autumn survey conducted by AARC ecologists.

ANABAT Recorders

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 through the use of a specialised ultrasonic recorders. During the survey event, bat call detection devices (i.e. Songmeter or ANABAT recorder) were strategically positioned to detect micro-bat calls at all fauna trapping sites. A bat call detector was left at each site for a minimum of 3 nights. This specialised micro-bat survey was utilised during all terrestrial surveys. A bat call detector was left at each site for 3 nights, and bat call analysis performed by Greg Ford of Balance Environmental (Appendix G).

Mist Net

Mist nets are more versatile than harp traps and can be used in a wider variety of habitat types and locations to capture bats, including open areas. The mist net consisted of fine monofilament net approximately 12 m wide by 5 m tall with a mesh size of 19 mm and was held in tension using rope rigging between two trees. The height of the net is divided into 'benches' or 'shelves', each with a loose pocket of netting that helps entangle the captured bats.

A single Mist Net was deployed at three locations over the second autumn survey. They were generally set several hours after sunset, these nets remained raised for a minimum of 1 hour at each survey site. The position of each Mist Net was marked using a handheld GPS. Photographs of each of these sites were taken with a digital camera and site data (such as vegetation type, weather conditions and habitat condition) was recorded.

Harp Trap

Harp trapping is employed for resolving the presence of species whose calls cannot be separated or identified using bat detectors, such as the *Nyctophilus* genus, and for collecting abundance and demographic information such as sex, age or breeding condition, which cannot be determined from call echolocation. Harp traps consisted of two or three banks of vertically strung nylon lines held in a rigid aluminium frame above a large calico holding bag and mounted on adjustable legs. Harp traps are most suited to restricted flyways in well vegetated areas, such as along creeks and tracks, preferably placed where fringing vegetation abuts the trap edges on both sides and above. Bats flying along a flyway are

typically unable to detect the lines and get caught between the banks of nylon line and slide down into the large, plastic-lined cloth holding bag, where the bats are unable to climb out.

A single two bank harp trap was deployed at eight sites. Traps were deployed for four nights per site. They were set up shortly before dusk each night and packed up either at dawn or in the early morning. Traps were checked several hours after dusk and again before dawn each night. The position of each trap was marked with a handheld GPS. Photographs of each trap site were taken with a digital camera and site data (such as vegetation type, weather conditions and habitat condition) was recorded.

Bird Surveying

Dedicated searches for birds was conducted visually and aurally during early mornings during peak avian activity. A dedicated search for diurnal birds was conducted visually and aurally at each fauna site. A minimum of one hour of bird surveying per fauna site was conducted in the early morning or late afternoon when bird activity was highest. In addition, opportunistic diurnal searches were also conducted on foot in areas considered likely to have high avian diversity (e.g. vegetated watercourses or dams), or likely to contain cryptic or threatened bird species.

Spotlighting

Spotlighting was carried out in the early evenings (before midnight) during all surveys to maximise encounter rate of nocturnal wildlife such as night birds and arboreal mammals primarily active at night. Two spotlighting techniques were employed:

1. Foot traverses: Dedicated spotlighting events were undertaken on foot at each fauna site. Searches were undertaken over two events where possible, one within the first hour following nightfall, and one after the first hour. Two ecologists randomly traversed the area with spotlights and binoculars, and wherever possible, bark crevices and tree hollows were examined. A slow walking speed (approximately 1 km per hour) was maintained across the length of the survey area to fully facilitate intensive listening and thorough visual searching.
2. Vehicle searches: During any driving on the study area after dark, spotlighting was conducted by the passenger/s from the slow-moving vehicle, to maximise study area coverage that cannot be achieved with foot traverses alone. Spotlights were used to scan trackside vegetation for arboreal and ground-dwelling wildlife.

Call Playback

Several nocturnal bird species are highly cryptic; occurring in naturally low population densities, are wide-ranging, and call infrequently. Detection rates are typically low without solicitation in the form of playback of pre-recorded calls to elicit a response (Kavanagh and Peake 1993; Debus 1995). Detectability of smaller nocturnal bird species such as the Southern Boobook *Ninox novaeseelandiae* and Australian owl nightjar (*Aegotheles cristatus*), and the arboreal marsupial Yellow-bellied glider (*Petaurus australis*) also increase with playback of large owl calls. Smaller, cryptic arboreal species such as Squirrel glider (*P. norfolcensis*) and Sugar glider (*P. breviceps*) can also respond to owl call playback.

Call playback is undertaken prior to spotlighting foot traverses to minimise the chance of spooking species capable of leaving the area undetected. A series of species call would be selected depending on the surrounding habitat suitability, and each would be played for three minutes, followed by a two-minute listening period, with the cycle repeated three times for each species. Calls were played using a megaphone and loud enough so that the softest call could be heard 100-200 m away. Following the completion of all playback cycles, the area would then be spotlighted as described above.

Habitat Searching

To further enhance the likelihood of detecting small cryptic species, dedicated diurnal searches were conducted at each fauna site. This was spread over several events, two per site, during the survey period. Additional habitat searches were carried out during trap checks and while doing the flora surveys. Searches were typically undertaken during the late morning, allowing for reptile activity to increase with rising temperatures, but before the maximum heat of the day. Searching techniques involve the careful rolling of rocks and logs, rustling through leaf litter, and peeling back of exfoliating bark from standing trees. For targeted reptile species, dedicated searches were conducted opportunistically when preferred habitat was encountered (e.g. Gilgai formations or dense ground debris).

Evidence of wildlife was also searched for during these surveys' identification of tracks, scats and other signs of occupation (e.g. tree trunk scratches). For scats not identifiable in the field, they were collected and sent to a scat analysis expert (Barbara Triggs) for identification of the species responsible for the scat and/or where possible, the identification of prey species material present in predator scats.

Incidental Recordings

Throughout each survey period, ecologists were traversing the study area on foot and by vehicle every day for numerous hours whilst conducting routine survey activities (e.g. driving between sites, checking traps, vegetation surveys etc.). The ecologists remained alert and would record numerous wildlife species as observed or heard during the survey period. As with the habitat searches, this included signs or evidence of wildlife, and included constant vigilance for raptor nests. All areas of the study area have been visited by ecologists throughout the surveys.

4.5.4 Fauna Survey Effort

Survey effort undertaken during each survey event is detailed in Table 9 for each fauna sampling technique.

Table 9 Survey effort

Sampling Technique	Survey Effort				
	Autumn Survey 2017	Spring Survey 2017	Autumn Survey 2018	Micro-bat Survey 2018	Total Survey effort
Elliott Trapping	4 sites x 20 traps x 4 nights = 320 trap nights	6 sites x 20 traps x 4 nights = 480 trap nights	5 sites x 20 traps x 4 nights = 400 trap nights	-	1,200 TTN
Automated Camera Trapping	4 sites x 1 camera x 4 nights = 16 trap nights	6 sites x 1 camera x 4 nights = 24 trap nights	5 sites x 1 camera x 4 nights = 20 trap nights	-	60 TTN
Pitfall Trapping	4 sites x 4 pitfalls x 4 nights = 64 trap nights	6 sites x 4 pitfalls x 4 nights = 96 trap nights	5 sites x 4 pitfalls x 4 nights = 80 trap nights	-	240 TTN
Funnel Trapping	4 sites x 6 funnels x 4 nights = 96 trap nights	6 sites x 6 funnels x 4 nights = 144 trap nights	5 sites x 6 funnels x 4 nights = 120 trap nights	-	360 TTN
ANABAT	(3 sites x 1 bat detector x 3 nights) + (1 site x 1 bat detector x 2 nights) = 11 trap nights	(3 sites x 1 bat detector x 3 nights) + (1 site x 1 bat detector x 2 nights) + (1 site x 1 bat detector x 4 nights) = 15 trap nights	4 sites x 1 bat detector x 3 nights = 12 trap nights	-	38 TTN
Harp Trapping	-	-	2 sites x 1 harp x 4 nights = 8 trap nights	8 sites x 1 harp x 7 nights = 56 trap nights	64 TTN
Mist Netting	-	-	-	3 sites x 1 mist net = 3 trap nights	3 TTN
Call Playback (CPB) (30 minutes per session 2 sessions)	4 sites x 5 CPB x 2 nights = 40 CPB	6 sites x 4 CPB x 2 nights = 48 CPB	(4 sites x 4 CPB x 2 nights) + (1 site x 3 CPB x 1 night) + (1 site x 4 CPB x 1 night) = 39 CPB	-	127 CPB
Bird Surveying (60 minutes per session 2 sessions)	8 person hours at fauna sites 15 person hours of opportunistic bird surveying	12 person hours at fauna sites 20 person hours of opportunistic bird surveying	10 person hours at fauna sites 15 person hours of opportunistic bird surveying	-	80 TPH
Spotlighting (30 minutes per session 2 sessions)	4 person hours at fauna sites 4 person hours of opportunistic spot lighting	6 person hours at fauna sites 5 person hours of opportunistic spot lighting	5 person hours at fauna sites 5 person hours of opportunistic spot lighting	-	29 TPH
Habitat Searching (60 minutes per session 2 sessions)	8 person hours at fauna sites 12 person hours of opportunistic habitat searching	12 person hours at fauna sites 15 person hours of opportunistic habitat searching	10 person hours at fauna sites 10 person hours of opportunistic habitat searching	-	67 TPH

TTN: Total trap nights
TPH: Total person hours

5.0 FLORA RESULTS AND DISCUSSION

5.1 FLORA SURVEY RESULTS

A total of 207 flora species were identified in the study area. One flora species listed as Near Threatened under the NC Act but not listed under the EPBC Act, was observed on the Central East of the study area; *Cerbera dumicola*. A total of 33 introduced species were recorded on the study area, of which five are listed as weed species under the Queensland Biosecurity Act and/or classified by the Australian Government as a Weed of National Significance (WoNS). All four are listed as Restrictive Invasive plants for Queensland and only three of them are also classified as WoNS; Parthenium weed (*Parthenium hysterophorus*) and Velvety tree pear (*Opuntia tomentosa*). A full flora list for the study area is provided in Appendix H. Weed species fact sheets for these species are attached in Appendix J.

Six vegetation communities classed as Remnant Vegetation as defined by the VM Act were identified on the study area during the field surveys. The vegetation communities have been mapped when possible as homogeneous polygons with the exception of some “mixed polygons” which consisted of two or more vegetation communities that were mapped together due to the impracticability in clearly delineating each RE.

Associations within the communities reflect different vegetation structures and compositions, which occur on different geophysical locations. Table 10 outlines the RE characteristic of each vegetation community, where applicable, as well as a short description of the vegetation present. A description is provided in Sections 5.1.1 to 5.1.7 whilst Figure 12 shows the distribution of vegetation communities on the study area.

Analysis of the vegetation communities recorded within the study area confirm that none meet the condition thresholds to constitute a TEC, listed as threatened at the national level (see Section 5.3.1).

Table 10 Vegetation Community Overview

Vegetation Community	Regional Ecosystem	Community Description
VC 1	11.5.2	Narrow-leaved ironbark and Clarkson’s bloodwood woodland with a sparse shrub layer on sand plains.
VC 2	11.7.2	Lancewood (<i>Acacia shirleyi</i>) and/or Rosewood (<i>Acacia rhodoxylon</i>) woodland on lateritic duricrust.
VC 3	11.3.25	Blue gum (<i>Eucalyptus tereticornis</i>) with <i>Bauhinia</i> spp. and <i>Casuarina cunninghamiana</i> fringing woodland on drainage features.
VC 4	11.3.2	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains.
VC 5	11.5.2/11.3.25	Mixed polygon where the dominant vegetation community was VC 1 (<i>Eucalyptus crebra</i> and <i>Corymbia clarksoniana</i> woodland) but along ephemeral creeks and with an important presence of Blue gums.
VC 6	11.3.25/11.3.2/11.5.2	Mixed polygon as a result of combination of VC 3 with elements of VC 4 and some elements of VC 1 due to edge effect.
Non-Remnant	NA	Non-remnant vegetation

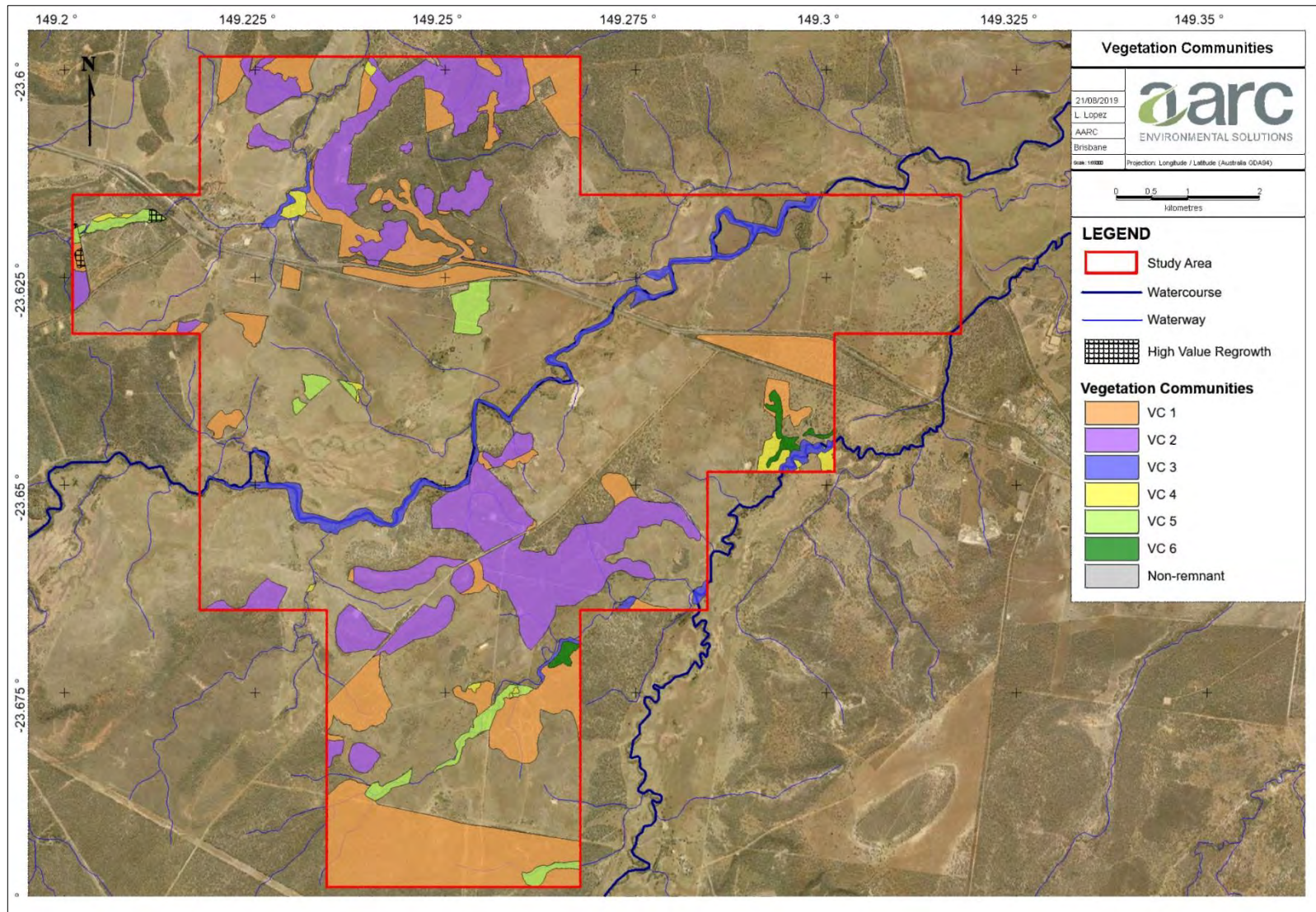


Figure 12 Vegetation Communities within the study area

5.1.1 VC 1: Narrow-leaved ironbark and Clarkson’s bloodwood woodland with a sparse shrub layer on sand plains

VC 1 consists of Narrow-leaved ironbark (*Eucalyptus crebra*) and Clarkson's bloodwood (*Corymbia clarksoniana*) woodland with a sparse shrub layer on sand plains and is consistent with RE 11.5.2. *Allocasuarina luehmannii* is dominant in some sandy patches throughout the study area.

VC 1 is the most abundant vegetation community, covering a total of 872.23 ha (12.02%) of the study area. Table 11 provides a summary of community structure and corresponding conservation status.

Table 11 Vegetation Community 1 Profile

Associated Regional Ecosystem	11.5.2: <i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces
Extent within Project	872.23 ha
Remnant Status	Remnant and 2.71 ha mapped as High Value Regrowth
EPBC Act	Not listed
VM Act Status	Least Concern
Biodiversity Status	No concern at present
Tree Layer	<i>Eucalyptus crebra</i> and <i>Corymbia clarksonia</i> (12 - 14 m) and occasionally <i>Allocasuarina luehmannii</i> dominant on the tree layer. <i>Alphitonia excelsa</i> and <i>Petalostigma pubescens</i> are dominant in a smaller tree layer.
Shrub Layer	The 0.5 m to 2 m tall shrub layer is normally dominated by <i>Erythroxylum australe</i> , <i>Petalostigma pubescens</i> , <i>Psyrax johnsonii</i> and <i>Carissa spinarum</i> .
Ground Layer	The ground layer is typically dominated by <i>Cleistochloa</i> sp. (Duaringa K.B.Adison 42), <i>Eragrostis lacunaria</i> , <i>Aristida calycina</i> , <i>Aristida caput-medusae</i> , and sometimes exotics such as <i>Melinis repens</i> and <i>Urochloa mosambicensis</i> .
Structure Category	Sparse
Biosecurity Act and/or WoNS Weed Species	<i>Opuntia tomentosa</i>
Crown Cover (%)	Average of 60% canopy cover
Ground Cover (%)	On average, bare ground comprised 29% of the total area, whilst organic litter comprised 60%



Photo Plate 1 Ironbark and Bloodwood woodland on sand plains

Conservation Value

No species of conservation significance were recorded in this vegetation community.

The following exotic species were recorded in VC 1 during the ecology surveys: Velvety tree pear (*Opuntia tomentosa*), Red natal grass (*Melinis repens*), Paddy's lucerne (*Sida rhombifolia*) and Green panic (*Megathyrsus maximum*). Velvety Tree Pear is classified as a WoNS.

Vegetation Condition and Habitat Value

RE 11.5.2 is listed as Least Concern under the VM Act and the DES's Biodiversity Status. The extent of this community in reserve areas is low (DES 2019c).

VC 1 presents patches of regrowth vegetation throughout the study area. Areas that have been subjected to past disturbance such as fire, dieback and selective logging now hold coloniser species. Patches of *Acacia cretata* and *Acacia rhodoxylon* young trees of about 1.5-2m dominate the shrub layer across the study area (Photo Plate 2).



Photo Plate 2 VC 1 regrowth patch with *Acacia* spp.

5.1.2 VC 2: Lancewood (*Acacia shirleyi*) and/or Rosewood (*Acacia rodoxylon*) woodland on lateritic duricrust

VC 2 consists of *Acacia* monospecific woodland on lateritic soil, mainly Lancewood (*Acacia shirleyi*) and Rosewood (*Acacia rodoxylon*). It occurs around rocky areas in the North of the study area but also on flat lateritic areas in the centre and south, covering approximately 734.23 ha (10.12%) of the study area. This community occurs on lateralised mesa slopes, breakaways, scree slopes and remnant colluvium. A summary of VC 2 is presented below in Table 12.

Table 12 Vegetation Community 2 Profile

Associated Regional Ecosystem	11.7.2: <i>Acacia spp.</i> woodland on Cainozoic lateritic duricrust. Scarp retreat zone.
Extent within the study area	734.23 ha
Remnant Status	Remnant
EPBC Act	Not listed
VM Act Status	Least Concern
Biodiversity Status	Of Concern
Tree Layer	<i>Eucalyptus crebra</i> as occasional emergent tree with <i>Acacia shirleyi</i> or <i>Acacia rhodoxylum</i> monospecific dominant in the tree layer.
Shrub Layer	Very sparse shrub layer with dominance of <i>Acacia rhodoxylum</i> , <i>Erythroxylum australe</i> , <i>Alstonia constricta</i> , <i>Psydrax forsteri</i> and <i>Carissa spinarum</i> .
Ground Layer	The ground layer is typically dominated by <i>Entolasia stricta</i> (D), <i>Calyptochloa gracilima</i> (D), <i>Aristida caput-medusae</i> (D) and <i>Paspalidium caespitosum</i> (D).
Structure Category	Sparse
Biosecurity Act and/or WoNS Weed Species	None
Crown Cover (%)	Average of 70% canopy cover
Ground Cover (%)	On average, bare ground comprised 15.5% of the total area, whilst organic litter comprised 65%

D – Dominant



Photo Plate 3 Lancewood woodland within the study area

Conservation Value

Cerbera dumicola, listed as NT under the NC Act was recorded in two locations within the study area, both of them associated with VC 2. Section 5.3 below discusses this listed species in further detail.

The following exotic species were recorded in VC 2 during the ecology surveys: Sabi grass (*Urochloa mosambicensis*), *Sida cordifolia*, Red natal (*Melinis repens*), *Malvastrum americanum* and Shrubby stylo (*Stylosanthes scabra*).

Vegetation Condition and Habitat Value

RE 11.7.2 is listed as Least Concern under the VM Act and the DES's Biodiversity Status. The extent of this community in reserve areas is low (DES 2019c).

VC 2 presents different degrees of disturbance thorough the study area. As per VC 1, areas that have been subjected to past fire, dieback and selective logging. Rosewood has been targeted for logging due to its high value as fence post. Lancewood, on the other hand, has been left relatively undisturbed due to its value stabilising the soil in an area highly susceptible to erosion. *Acacia rhodoxylon* young and thin trees of about 1.5-2m can be found in patches across the study area.

5.1.3 VC 3: Blue gum (*Eucalyptus tereticornis*) with *Bauhinia* spp. and *Casuarina cunninghamiana* fringing woodland on drainage features

This community is located along Charlevue Creek and other ephemeral creeks within the study area. It covers approximately 143.74 ha, close to 2% of the study area, and occurs on alluvial plains. Table 13 provides a detailed description of VC 3. Occasional small patches of *Corymbia tessellaris* or *Eucalyptus populnea* were present on adjacent alluvial floodplains.

Table 13 Vegetation Community 3 Profile

Associated Regional Ecosystem	11.3.25: <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines.
Extent within Project	143.74 ha
EPBC Act	Not listed
VM Act Status	Least Concern
Biodiversity Status	Of Concern
Tree Layer	<i>Eucalyptus tereticornis</i> dominant species with occasional <i>Eucalyptus crebra</i> , <i>Eucalyptus populnea</i> , <i>Corymbia tessellaris</i> and <i>Corymbia clarksoniana</i> . In a lower tree layer, the dominant species are <i>Bauhinia carronii</i> and <i>Cassia brewsterii</i> and occasionally <i>Melaleuca nervosa</i> would be the dominant species.
Shrub Layer	The 0.5 m to 2 m tall shrub layer is normally dominated by <i>Carissa spinarum</i> , <i>Terminalia oblongata</i> , <i>Melaleuca nervosa</i> and <i>Alphitonia constricta</i> .
Ground Layer	The ground layer is typically dominated by <i>Dichantium sericeum</i> (D), <i>Megathyrsus maximus</i> (D), <i>Cenchrus ciliaris</i> (D), <i>Urochloa mosambicensis</i> (D) and <i>Bothriochloa ewartiana</i> (D).
Structure Category	Mid-dense

Biosecurity Act and/or WoNS Weed Species	<i>Cryptostegia grandiflora</i> , <i>Parthenium hysteropus</i> and <i>Opuntia tomentosa</i>
Crown Cover (%)	Average of 58% canopy cover
Ground Cover (%)	On average, bare ground comprised 8.5% of the total area, whilst organic litter comprised 53%

D – Dominant



Photo Plate 4 Blue gum (*Eucalyptus tereticornis*) woodland along the Charlevue Creek

Conservation Value

No species of conservation significance were recorded within VC 3.

The weed species Rubber vine (*Cryptostegia grandiflora*), Parthenium weed (*Parthenium hysteropus*) and Velvety tree pear (*Opuntia tomentosa*) were recorded in this community, along the Charlevue Creek.

Introduced species Buffel grass (*Cenchrus ciliaris*), Green panic (*Megathyrsus maximus*), Sabi grass (*Urochloa mosambicensis*) *Sida cordifolia*, *Malvastrum americanum* and *Bidens pilosa* were recorded in VC 3. Buffel grass and Green panic were occasionally recorded as the dominant species in the ground layer.

Vegetation Condition and Habitat Value

RE 11.3.25 is listed as Least Concern under the VM Act and Of Concern under DES's Biodiversity Status. The extent of this RE in reserves is low (DES 2019c).

Often associated with regional ecosystems 11.3.2 and 11.3.4, elements of which such as *Corymbia tessellaris* and *Eucalyptus populnea* may occur on adjacent alluvial plains. In highly cleared areas, in particular north of the Capricorn Highway, a narrow fringe of riparian vegetation is often the only surviving woody vegetation and it is not mapped as remnant in the Government vegetation map. This RE is impacted by grazing pressure and edge effects, where the dominant ground layer is dominated by the exotic pasture species that grow in the grazing area.

The presence of large, remnant, hollow-bearing trees such as *Eucalyptus tereticornis* provides important denning and breeding habitat for a variety of arboreal mammals and birds.

5.1.4 VC 4: Poplar box (*Eucalyptus populnea*) woodland on alluvial plains

This community is located in small patches within the study area. It covers approximately 36.52 ha (0.5%) of the study area on alluvial soils. Table 14 provides a summary of conservation status and vegetative structure for VC 4.

Table 14 Vegetation Community 4 Profile

Associated Regional Ecosystem	11.3.2: <i>Eucalyptus populnea</i> woodland on alluvial plains.
Extent within Project	36.52 ha
EPBC Act	Analysis of this vegetation (Section 5.3.1) confirms that VC4 does not meet the condition thresholds to constitute a TEC.
VM Act Status	Of Concern
Biodiversity Status	Of Concern
Tree Layer	Tree layer dominated by <i>Eucalyptus populnea</i> (in some occasions <i>E. melanophloia</i>) (12-14m), with occasional <i>Corymbia dallachiana</i> , <i>C. clarksoniana</i> and <i>C. tessellaris</i> .
Shrub Layer	Very spare shrub layer dominated by <i>Atalaya hemiglauca</i> , <i>Archidendropsis basaltica</i> , <i>Flindersia dissosperma</i> , <i>Carissa spinarum</i> (dominant in the lower shrub layer) and occasionally <i>Alphitonia excelsa</i> .
Ground Layer	The ground layer is typically dominated by <i>Bothriochloa ewartiana</i> , <i>Aristida calycina</i> , <i>Aristida perniciosus</i> (D), <i>Eragrostis sororia</i> , <i>Eragrostis lacunaria</i> , <i>Cynodon dactylon</i> , <i>Urochloa mosambicensis</i> (D), <i>Heteropogon contortus</i> (D) and <i>Themeda triandra</i> ,
Structure Category	Sparse
Biosecurity Act and/or WoNS Weed Species	<i>Harrisia martini</i> and <i>Vachellia farnesiana</i>
Crown Cover (%)	Average of 53% canopy cover
Ground Cover (%)	On average, bare ground comprised 12.5% of the total area, whilst organic litter comprised 34%

D - Dominant



Photo Plate 5 Poplar box (*Eucalyptus populnea*) woodland on alluvial plains

Conservation Value

No species of conservation significance were recorded within VC 4.

The exotic species Sabi grass (*Urochloa mosambicensis*), *Sida cordifolia*, Shrubby stylo (*Stylosanthes scabra*), Red natal (*Melinis repens*), *Malvastrum americanum*, *Bidens pilosa*, Mimosa bush (*Vachellia farnesiana*) and Harrisia cactus (*Harrisia martinii*) were recorded in VC 4.

VC4 is most consistent with RE 11.3.2, which is an associated RE of the Poplar box grassland on alluvial plains and Weeping myall woodland TEC. None of these TECs were identified within the study area. A summary of the survey effort to determine the presence of both TECs is detailed in Section 5.3.1.

Vegetation Condition and Habitat Value

RE 11.3.2 is classified as Of Concern under the VM Act and Of Concern at present under DES's Biodiversity Status. The extent of this RE in reserves is low.

VC 4 was only present in small patches within the study area, some of them too small to map. This community presented evidence of edge effect with exotic pasture species such as *Urochloa mosambicensis* occasionally dominating the ground layer. Regrowth of VC 4 was recorded in the south of the study area and along Cooina road, in the middle of the study area. Recruitment of Poplar box was observed across the study area, with sections within VC 4 of very young and thin trunks.

5.1.5 VC 5: Mixed polygon: Ironbark, Bloodwood and Blue gum woodland along ephemeral creeks

VC 5 is limited to small patches within the study area and consist on a combination of VC 1 with elements of VC 3 (Blue gums, 20% of the vegetation community) due to the presence of ephemeral drainage features in the vicinity of VC 1. *Melaleuca nervosa* is occasionally present as dominant species on the tree and shrub layers. It covers approximately 96.71 ha (1.33%) of the study area.

VC 5 is illustrated in Photo Plate 6.

Conservation Value

No species of conservation significance were recorded within VC 5. The same exotic pasture species recorded in VC 1 where observed in the ground layer of this community throughout the study area.

Vegetation Condition and Habitat Value

This community was only present in three patches within the study area, where it was not possible to separate the vegetation into two defined communities. There is evidence of edge effect, where exotic pasture species are present in the groundcover. Regrowth of VC 5 was similar to the regrowth of VC 1, with the same pioneer *Acacia* spp. as described before. Both RE's, 11.5.2 and 11.3.25 are classified as Least Concern under the VM Act but while RE 11.5.2 is classified as Least Concern under the DES's Biodiversity Status, RE 11.3.25 is classified as Of Concern. The extent of these REs in reserves is low (DES 2019c).



Photo Plate 6 VC 5 – RE 11.5.2/11.3.25

5.1.6 VC 6: Mixed polygon: Blue gum, Poplar box and Ironbark woodland along ephemeral creeks

VC 6 is located in small patches within the study area and consist on a combination of VC 3 (Blue gums) along several small ephemeral drainage channels, with elements of VC 4 (Poplar box), present in the alluvial plains between the channels and VC 1 (Ironbark) due to edge effect. VC 6 covers a total of 21.83 ha (0.3%) of the study area.

VC 5 is illustrated in Photo Plate 7.

Conservation Value

No species of conservation significance occurred within VC 6.

Habitat Value

VC 6 was only present in two patches within the study area, where it was not possible to separate the vegetation into three defined communities. As per VC 5, there is evidence of edge effect, with exotic pasture species present in the groundcover and occasionally dominant. The RE classification for the three REs present is as follows: 11.3.25 is listed as Least Concern under the VM Act and Of Concern under DES's Biodiversity Status; 11.3.2 is listed as Of Concern under the VM Act and the DES's Biodiversity Status; and 11.5.2 is listed as Least Concern under the VM Act and the DES's Biodiversity Status. The extent of these RE in reserves is low (DES 2019c).



Photo Plate 7 VC 6 – RE 11.3.25/11.3.2/11.5.2

5.1.7 Non-remnant and Regrowth Vegetation

Non-remnant regrowth vegetation is present in areas that have been disturbed by human activities, such as logging and preparation for grazing through the entire study area. There are numerous patches of regrowth vegetation, including areas that are mapped as remnant in the Vegetation Management Regional Ecosystem Map but have been assessed as non-remnant as a result of the field surveys.

This vegetation is not classed as remnant vegetation, therefore is not defined by an RE.

There is one large patch of vegetation north of the study area mapped as remnant which vegetation consists on *Acacia* spp regrowth. According to local knowledge (farmers) around six years ago there was a fire that affected the north part of the EPC, the area north of the Capricorn Highway. As a result of that fire, there is regrowth across all the vegetation communities, especially VC 1 and VC 4. A large patch of woodland originally mapped as 11.5.9b is now categorised as non-remnant vegetation. This particular area presents only an extremely sparse tree layer (*Eucalyptus crebra* and *Corymbia clarksoniana*) and a dense shrub layer of pioneer *Acacia* spp. mainly *Acacia cretata*.



Photo Plate 8 Non-remnant *Acacia* spp regrowth

The areas of the study area not mapped in Figure 12 are mainly pasture land with more or less evidence of regrowth, or dead vegetation. This regrowth corresponds with early stages of V4, V1 or V2. Regrowth of *Acacia cretata* is especially abundant within several vegetation communities, such V1, but also in pasture area. Evidence of burning and ring barking has been recorded through these pasture areas.

The ground layer of the non-remnant vegetation is dominated by exotic pasture grasses such as Buffel grass (*Cenchrus ciliaris*), Indian bluegrass (*Bothriochloa pertusa*), Sabi grass (*Urochloa mosambicensis*) and Red natal grass (*Melinis repens*).

5.2 WEEDS OF MANAGEMENT CONCERN

A total of 33 introduced species were identified onsite. The exotic pasture grasses dominate the ground layer of the study area, particularly in cleared areas. A range of other exotic grasses and forbs are also

present across the study area in low to moderate abundance. A complete list of the flora species, indicating their native or introduced status can be found in Appendix H.

Three of these introduced species are classed as WoNS; Parthenium weed (*Parthenium hysterophorus*), Rubber vine (*Cryptostegia grandiflora*) and Velvety tree pear (*Opuntia tomentosa*). Introduced plant species are classified by the Commonwealth Government as WoNS if they present a serious threat to industry, water supply, human health/safety, plant communities and/or cultural values.

The above mentioned three species, together with Harrisia cactus (*Harrisia martinii*) are similarly classed as Restricted Invasive Species under the Biosecurity Act (DAF 2018).

Vachellia farnesiana, also found in the study area, is not a prohibited or restricted invasive plant under the Biosecurity Act. However, by law, everyone has a general biosecurity obligation (GBO) to take reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control (DAF 2016).

Weed species of management concern found in the study area are listed in Table 15. All species present are known to occur commonly throughout the broader region.

Table 15 Weed species of management concern identified on the study area

Scientific name	Common name	WoNS Status	Biosecurity Act 2014 Category 3
<i>Harrisia martinii</i>	Harrisia cactus	-	x
<i>Cryptostegia grandiflora</i>	Rubber vine	Yes	x
<i>Opuntia tomentosa</i>	Velvety tree pear	Yes	x
<i>Parthenium hysterophorus</i>	Parthenium	Yes	x
<i>Bryophyllum sp</i>	Mother of millions	-	x
<i>Vachellia farnesiana</i> *	Mimosa bush	-	-

Note: * Considered a noxious weed of management concern.

Category 3: A person must not distribute the invasive plant either by sale or gift, release it into the environment.



Photo Plate 9 *Cryptostegia grandiflora* identified on the study area

5.3 FLORA OF CONSERVATION SIGNIFICANCE

5.3.1 Threatened Ecological Communities not identified on the study area

Brigalow (*Acacia harpophylla* dominant and co-dominant)

The Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC comprises patches of vegetation in which *Acacia harpophylla* is one of the most abundant tree species. The tree layer may be dominated by *Acacia harpophylla* or have a co-dominant presence with other species such as Belah (*Casuarina cristata*) and other species of *Acacia* or *Eucalyptus*. Within Queensland, the Brigalow TEC is consistent with 16 RE described by the Queensland Herbarium, including RE 11.3.1, originally mapped within the study area.

A patch must meet the following condition thresholds to be considered the Brigalow TEC:

- The patch is 0.5 ha or more in size; and
- Exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m), that is representative of the patch.

Despite being mapped as present along the Charlevue and Springton Creeks in association with RE 11.3.1, Brigalow (*Acacia harpophylla*) was only recorded within the study area as a few individual stands. Two trees were recorded along the Charlevue Creek and a small patch with six trees was recorded on the bank of Springton Creek, close to the eastern boundary of the study area.

The sparse Brigalow individuals do not form a clear vegetation community, not reaching dominance in the canopy nor the minimum size of 0.5 ha specified as condition thresholds to qualify as Brigalow TEC.

Weeping myall (*Acacia pendula*) Woodland

Weeping myall woodlands often occur as monotypic stands generally 4 – 12 m high in which Weeping myall trees are the sole or dominant overstorey species. Other canopy species such as Western rosewood (*Alectryon oleifolius* subsp. *elongatus*), Poplar box (*Eucalyptus populnea*), or Black box (*Eucalyptus largiflorens*) may occur in association with this community.

Within Queensland, this community is known to occur in association with two REs including RE 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains) and 11.3.28 (*Eucalyptus coolabah* +/- *Casuarina cristata* open woodland on alluvial plains). Of the extent of these REs throughout Queensland, it is estimated that only 5% supports the Weeping myall woodlands community. Most patches of the TEC are less than 1 or 2 ha in area.

This TEC has been previously described as potentially occurring on the study area based on the mapping of Poplar box woodlands on alluvial plains (11.3.2), has been ground-truthed as non-remnant based on the negligible canopy cover. However, due to the cycles of senescence that affect the dominant species Weeping myall, the criteria used to assess a vegetation community includes canopy cover as sparse as 5% and dominated by living, dead or defoliated Weeping myall trees (DEWHA 2009). As a result, additional survey effort was employed in this area, to identify any dead and/or defoliated trees. This area was dominated by *Acacia cretata* regrowth, confirming the absence of Weeping myall woodland TEC on the study area.

Poplar box Grassy Woodland on Alluvial Plains

Assessments of the RE 11.3.2 present within the study area (VC 4) have concluded that the TEC Poplar box Grassy Woodland is not present within the study area.

To be listed as TEC, the Poplar box in alluvial plains is to meet certain thresholds, such as size and vegetation condition. The following thresholds have been sourced from the *Draft Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (TSSC n. d.):

Class A Highest Quality

- **Category A1:** Patch equal or larger than 1 ha: The patch has little or no perennial weeds and a diverse native understorey. 90% or more of the perennial vegetation cover is native species **and** with 30 or more native plant species in the ground layer per ha.
- **Category A2:** Patch equal or larger than 5 ha. A large patch with low perennial weeds and diverse native understorey. 70% or more of the perennial vegetation cover is ground layer is native **and** with 30 or more native plant species in the ground layer per ha.
- **Category A3:** Patch equal or larger than 5 ha. A large patch with high quality habitat features. 10 trees per ha that either are large (30 cm or more in diameter at breast height) and/or have developed hollows **and** smaller trees, saplings or seedlings suggesting of periodic recruitment **and** with 20 or more native plant species in the ground layer per ha.

Class B Moderate Quality

- A large patch with moderate quality native understorey. 50% of perennial vegetation cover in ground layer is native **and** 20 or more native plant species per ha in the ground layer **or** 10 trees per ha that either are large (30 cm or more in diameter at breast height) and/or have developed hollows

VC 4 does not meet the threshold to constitute a TEC due to the size of the patches and poor condition of the community with a high presence of exotic pastures, occasionally dominant. Some trees recorded from the largest patch of VC 4 within the study area were larger than 30cm in diameter at breast height, however, some sections of the same patch presented younger and smaller specimens, not meeting the average of 10 or more per ha.

5.3.2 Flora Species of Conservation Significance Identified on the Study Area

Targeted searches across the study area detected the presence of one flora species of conservation significance in several of the seasonal surveys, *Cerbera dumicola* (Photo Plate 10). This species is listed as NT under the NC Act.

Cerbera dumicola is a shrub or small tree growing to 4 m high (DES 2018b). The species occurs across a range of habitats in central and southern Queensland. This species is associated with a range of vegetation communities such as sandstone hills in open *Eucalyptus umbra* subsp. *carnea*; woodlands of *Acacia shirleyi* with *Corymbia dolichocarpa*; acidic soils in mine rehabilitation area; woodland of *A. catenulata* and *A. shirleyi* with *E. thozetiana* on a slope of sand/clay soil; semi-deciduous notophyll-microphyll vine forest of *Brachychiton australis*, *Gyrocarpus americanus*, *Flindersia australis*, *Pleiogynium timorense*, *Drypetes deplanchei* and *Sterculia quadrifida* on rhyolite hillslopes; open-woodland of *E. melanophloia* with occasional *Acacia shirleyi*, *E. populnea* and *E. brownii*; semi-evergreen vine thicket with *Corymbia citriodora* and *Corymbia aureola emergens*; woodland of *A. rhodoxylon* on brown, sandy loam; and in *Corymbia tessellaris* - *Acacia aneura* open woodland (DES 2018b).

Cerbera dumicola has been severely impacted by land clearing with extensive fragmentation of its original habitat. While it can be very common at some of its known localities, many of the remnant populations comprise few individuals. It is likely to be more widespread than is currently known as these eucalypt dominated woodlands are poorly surveyed in southern Queensland. Threatening processes include:

- Land clearing for agriculture, which has undoubtedly been the main reason in the past for reductions in the area of occupancy, number of populations, number of individuals. Many populations are in areas mapped as 'non-remnant vegetation', hence are still able to be cleared; and
- Land clearing for mining. Several populations have been recorded from mining leases in the central highlands coalfields and are presumed lost (DES 2018b).

Cerbera dumicola has been identified during the vegetation surveys in two very localised rocky areas associated with vegetation community VC 2 and VC 1 (on an ecotone with VC 2) (Figure 14). This species was not identified elsewhere in the study area, within similar habitat types, during targeted searches.

The species is regionally abundant, having been recorded outside of the study area on multiple occasions (AVH 2019).

It is not expected that the proposed Project will impact on the known *Cerbera dumicola* individuals due to their location. The species has been recorded at the boundary of the study area and adjacent to areas of existing disturbance. Suitable habitat is extensive throughout the local area including immediately east of the study area.



Photo Plate 10 *Cerbera dumicola* at the study area

5.3.3 Flora Species of Conservation Significance Not Identified on the Study Area

Table 16 below discusses EVNT species that are known from the broader region and have been identified from desktop searches but 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 study area, previous surveys conducted on or near the study area and scientific literature. This assessment revealed that of the four species previously assessed with potential to occur within the study area, three were considered unlikely to occur within the study area.

Table 16 Flora Species of Conservation Significance not identified on the study area

Scientific Name Common Name	Status		Likelihood of Occurrence Post Survey
	EPBC Act	NC Act	
<i>Bertya opposens</i>	V	C	<u>Potential</u> The study area contained suitable habitat. However, there are no records of the species within 50 km of the study area and the species was not identified during the field survey. It is therefore considered unlikely the Project will impact on this species.
<i>Bertya pedicellata</i>	-	NT	<u>Potential</u> The study area contained suitable habitat. However, the species was not identified during the field survey, it is considered unlikely the Project will impact on this species.
<i>Solanum adenophorum</i>	-	V	<u>Unlikely</u> The study area did not contain suitable habitat for this species in the form of cracking clay soils and Brigalow woodland. The species was not detected during the field survey, indicating potential for Project impact to be low.
<i>Solanum dissectum</i>	E	E	<u>Unlikely</u> The study area did not contain suitable habitat for this species in the form of cracking clay soils and Brigalow woodland. The species was not detected during the field survey, indicating potential for Project impact to be low.
<i>Solanum elachophyllum</i>	-	E	<u>Unlikely</u> The study area did not contain suitable habitat for this species in the form of cracking clay soils. Further, the species was not detected during the field survey, indicating potential for Project impact to be low.

EPBC – Environment Protection and Biodiversity Conservation Act 1999

NC Act – Nature Conservation Act 1992

CE – Critically Endangered

NT – Near Threatened

V – Vulnerable

E – Endangered

C – Least Concern

5.4 WETLANDS

Field surveys concluded that all the potential lacustrine and palustrine wetlands within the study area (Figure 6) are either not present or have been identified as artificial (farm) dams. The only wetlands confirmed within the study area in accordance to the DES interactive *WetlandMaps* database are riverine wetlands and have been mapped as VC 3, VC 5 and VC 6.

Outside the study area, there is a large palustrine wetland (approximately 82 ha in area) located about 4 km to the east of the boundary. This wetland, identified as HES, is not connected to the study area through any waterbodies or watercourses and does not occur on the same drainage system that flow through the study area. This wetland has been identified as Category X vegetation under the Regulated Vegetation The pre-clearing Government RE mapping (Appendix A) of this wetland identified it as RE 11.3.27. RE 11.3.27 is described as freshwater wetland; with variable vegetation compositions including; open water with or without aquatic species and fringing sedge lands and eucalypt woodlands (DES 2019c). Current Government mapping and field inspections of the mapped wetlands identify the

vegetation as non-remnant. No water was observed during the site inspection (Photo Plate 11). Assessment of potential impact to this wetland as an MSES have been addressed in Section 9.1.3.

Field surveys concluded that all the potential lacustrine and palustrine wetlands identified within the study area from desktop searches (Figure 6) are either not present or have been identified as artificial (farm) dams. The only natural wetlands within the study area are riverine wetlands associated with riparian and vegetation along Charlevue Creek and have been mapped as VC 3, VC 5 and VC 6 (Figure 12).

Outside the study area, there is a large palustrine wetland (approximately 82 ha in area) located about 4 km to the east of the boundary. This wetland, identified as High Ecological Significance (HES) under the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*, is not connected to the study area through any waterbodies or watercourses. Current Government mapping and field inspections of the mapped wetlands identified the vegetation as non-remnant. Field assessment identified the presence of flora species known to inhabit wetland environments. No water was observed during the site inspection.



Photo Plate 11 *Melaleuca spp.* dominated HES wetland

5.4.1 Groundwater Dependent Ecosystems

The above-mentioned wetlands have the potential to be partially dependent on groundwater (BoM 2019). Within the study area high potential terrestrial Groundwater Dependent Ecosystems (GDEs) and moderate potential aquatic GDEs were identified by database searches in association with Charlevue Creek and Springton Creek. Moderate potential terrestrial GDEs were also mapped in association with some of the smaller waterways.

The groundwater within the study area has been assessed and the bores located in close proximity of Charlevue Creek show a below surface depth of groundwater of 8.77 meters below ground level (mbgl)

while Springton Creek has a below surface depth of groundwater of 11.19 mbgl. The bores within the study area along the associated tributaries have a groundwater depth of over 16 mbgl. Based on the known rooting depth of dominant tree species, the assessment concluded that the potential GDEs within the study area are in only riverine ecosystems located in close proximity to Charlevue Creek and Springton Creek have potential dependency on groundwater.

Wetland habitats identified within the study area are mapped in Figure 13.

The HES wetland located 4 km to the east of the study area is also potentially groundwater dependant; however, it is noted that this wetlands isare ephemeral and does not hold water throughout the year.

Assessment of the GDEs has been addressed in Section 7.1.5 of this report.

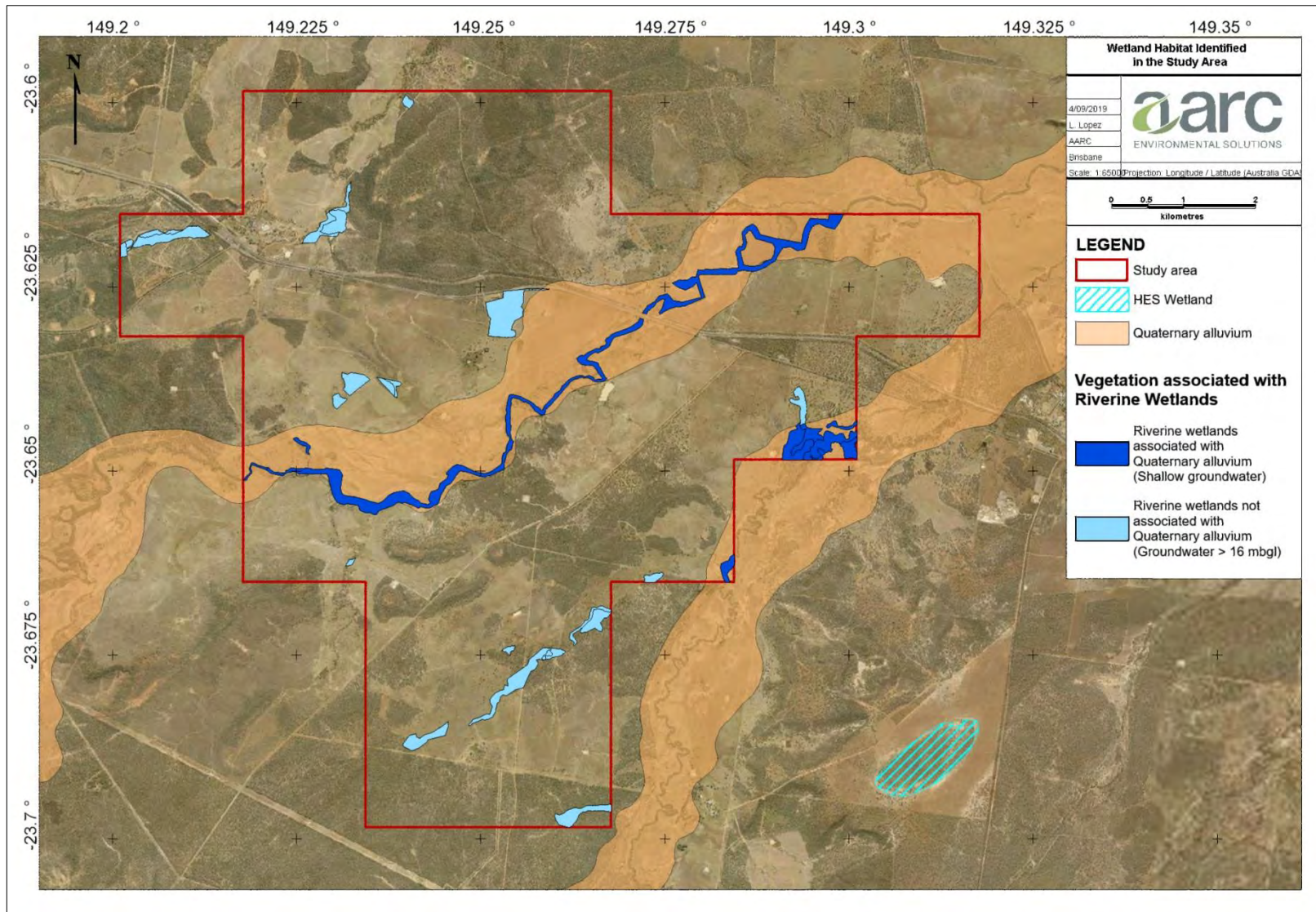


Figure 13 Wetland Habitats Identified in the Study Area

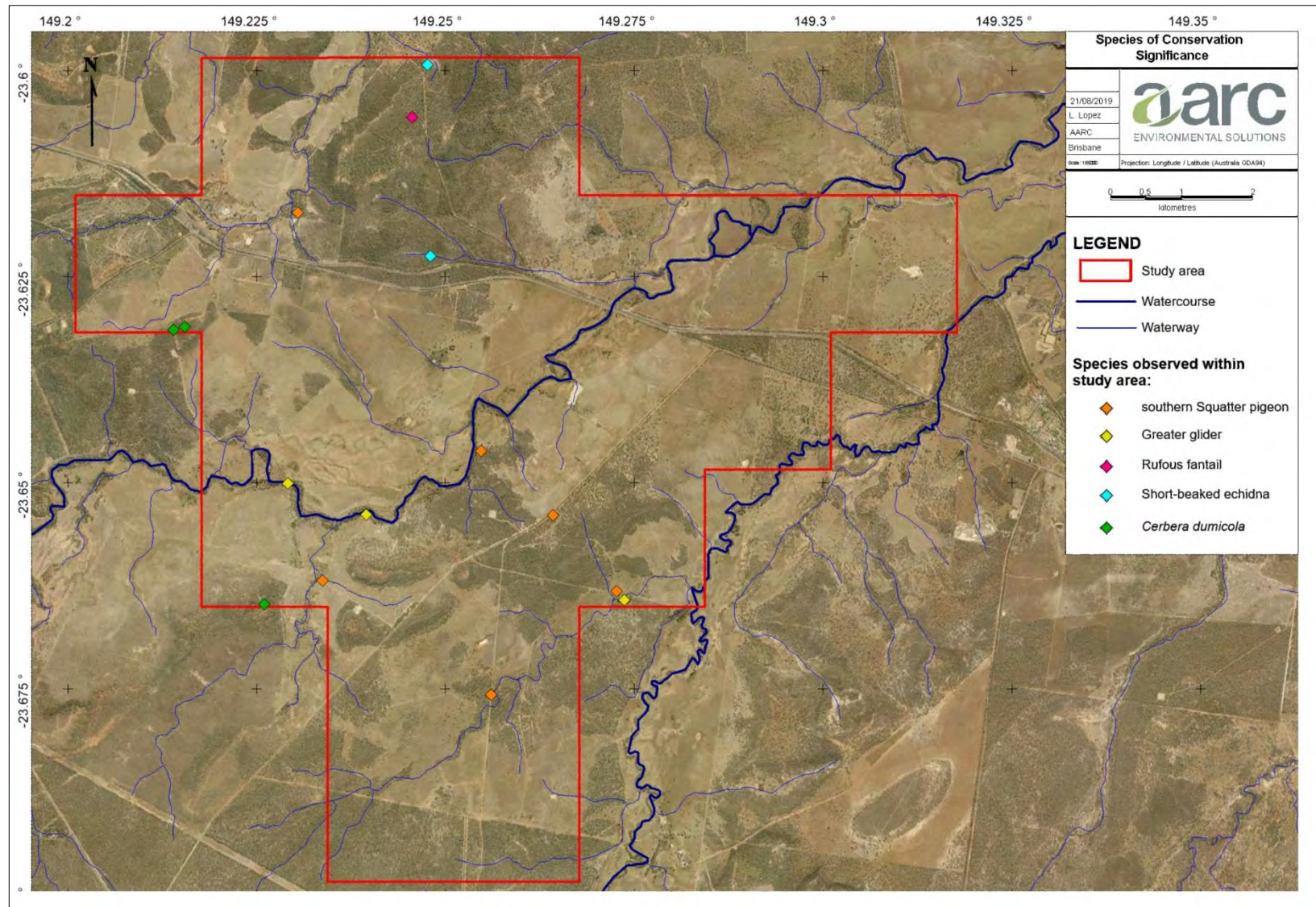


Figure 14 Species of Conservation Significance observed within the study area

6.0 FAUNA RESULTS AND DISCUSSION

6.1 FAUNA SURVEY RESULTS

A total of 145 vertebrate species were positively identified on the study area during the surveys, comprising 8 amphibians, 83 birds, 33 mammals and 21 reptiles. Six of these species are introduced. One migratory and marine species and one marine species were recorded during the survey. Two threatened fauna species were observed on site. A complete list of the fauna species recorded on the study area is included in Appendix I.

During the conduction of the aquatic ecology assessment (AARC 2019), a number of vertebrate fauna species were recorded in the study area. These are detailed in the aquatic ecology assessment. One species recorded by the aquatic ecology survey was not recorded by the terrestrial ecology survey, namely the Keelback snake (*Tropidonophis mairii*), which was identified along Charlevue Creek.

6.1.1 Amphibians

Habitat Values

The species recorded within the study area are well adapted to the habitats identified, with permanent water sources and areas subject to seasonal inundation. These species employ periods of dormancy to contend with drier, less favourable conditions. Habitat variation and suitability increase in response to increased rainfall during the wet season (November - March) providing viable breeding opportunities.

The amphibian species identified are all common species and impacts from the Project are likely to be localised with minimal effects to broader populations.

Observed Species

A total of 8 amphibian species were recorded during the surveys, comprising seven native species and the introduced Cane toad (*Rhinella marina*). The Cane toad is listed as an invasive biosecurity matter under the revised version of the Biosecurity Act and are a major pest species that compete for food with native species.

The native species recorded on site were Ornate burrowing frog (*Platyplectrum ornatum*), Common green tree frog (*Litoria caerulea*) Photo Plate 12, Naked tree frog (*Litoria rubella*), Broad-palmed frog (*Litoria latopalmata*), Bumpy rocket frog (*Litoria inermis*), Salmon-striped frog (*Limnodynastes salmini*) and Spotted grass frog (*Limnodynastes tasmaniensis*).



Photo Plate 12 Common green tree frog (*Litoria caerulea*) observed at DF02

Amphibians of Conservation Significance

No amphibian species of conservation significance were observed on the study area during field surveys. However, the Tusked frog (*Adelotus brevis*) has been identified as potentially occurring within the study area due to the proximity of its known range and the presence of suitable habitat (such as dams).

6.1.2 Reptiles

Habitat Values

The study area provided a variety of habitat types such as vegetated drainage features, woodlands to open forests and rocky areas to promote reptile diversity. This included several microhabitats such as tree hollows, fallen timber, dense leaf litter, soil cracks and rock crevices which provide shelter from extreme climates, protection from aerial predators and as habitat for hunting and foraging for food.

Observed Species

A total of 21 reptile species were recorded within the study area during the field surveys, all of which are listed in Appendix I.

The suite of reptiles occurring on the study area included seven species of skink and one species of legless lizard. These species include the Eastern striped skink (*Ctenotus robustus*), Elegant snake-eyed skink (*Cryptoblepharus pulcher*), Shaded litter rainbow-skink (*Carlia munda*), South-eastern morethia skink (*Morethia boulengeri*), Fire-tailed skink (*Morethia taeniopleura*), the Orange-flanked Rainbow skink (*Carlia rubigo*) and Burton's legless lizard (*Lialis burtonis*).

Five gecko species were identified on the study area, including the Eastern stone gecko (*Diplodactylus vittatus*), Dubious dtella (*Gehyra dubia*), Bynoe's Gecko (*Heteronotia binoei*), Box-patterned gecko (*Lucasium steindachneri*) (Photo Plate 13) and the Prickly knob-tailed gecko (*Nephrurus asper*).



Photo Plate 13 *Box-patterned gecko (Lucasium steindachneri)* observed at DF09

Field surveys also detected the presence of three dragon species, Bearded dragon (*Pogona barbata*), Tommy roundhead (*Diporophora australia*) and Freckled monitor (*Varanus tristis orientalis*).



Photo Plate 14 *Freckled monitor (Varanus tristis orientalis)* observed at DF10

Six snake species namely the Black headed python (*Aspidites melanocephalus*), Eastern brown snake (*Pseudonaja textilis*), Pale-headed snake (*Hoplocephalus bitorquatus*) (Photo Plate 15), Carpentaria snake (*Cryptophis boschmai*), Yellow-faced whip snake (*Demansia psammophis*) and Orange-naped snake (*Furina ornata*) were recorded within the study area.



Photo Plate 15 Pale-headed snake (*Hoplocephalus bitorquatus*) observed at DF01

Reptile Species of Conservation Significance

No reptiles of conservation significance were observed on the study area during the survey period. Database searches identified seven reptile species of conservation significance within the region. The habitat requirements and likelihood of each conservation significance species occurring on the study area are described in Appendix D.

6.1.3 Birds

Habitat Values

Avian assemblages are generally determined by factors such as food sources (e.g. fruit, nectar, seeds, and insects), as well as a mosaic of habitat structures such as grasses, thick understorey, mid-storey and canopy vegetation (i.e. vertical habitat complexity). Generally, the more food sources available and the more complex the structure of the vegetation, the more diverse the avifauna will be.

Food sources across the study area comprised seeds, fruit, nectar, insects and vertebrate prey items (or carrion). The diversity of forage resources available in the surveyed habitats suggests that the Project can support a variety of native avian species.

Observed Species

A total of 83 bird species were observed on the study area. Most species observed were common species representative of the dry woodland habitat dominating the study area, however, two species of conservation significance were identified in the study area during the survey period. These species are discussed in more detail in Section 6.3. A full list of bird species observed on the study area is presented in Appendix I.

A variety of granivorous birds were found to be present including the Sulphur-crested cockatoo (*Cacatua galerita*), Crested pigeon (*Ocyphaps lophotes lophotes*), Peaceful dove (*Geopelia striata placida*), southern squatter pigeon (*Geophaps scripta scripta*), Bar-shouldered dove (*Geopelia humeralis*), and Double-barred finch (*Taeniopygia bichenovii*).

The study area was found to support a number of honeyeaters including the White-throated honeyeater (*Melithreptus albogularis*), Brown honeyeater (*Lichmera indistincta ocularis*), Blue-faced honeyeater (*Entomyzon cyanotis*) and Noisy friarbird (*Philemon corniculatus*).

The suite of insectivorous birds recorded on site included the Grey fantail (*Rhipidura albiscapa*), Magpie-lark (*Grallina cyanoleuca*), Black-faced cuckoo-shrike (*Coracina novaehollandiae*), Grey-crowned babbler (*Pomatostomus temporalis*) and Striated pardalote (*Pardalotus striatus*).

A large diversity of omnivorous and carnivorous species was detected on the study area, including the Apostlebird (*Struthidea cinerea*), Pheasant coucal (*Centropus phasianinus*), Grey butcherbird (*Cracticus torquatus*), Australian magpie (*Cracticus tibicen*), Australian raven (*Corvus coronoides*), Laughing kookaburra (*Dacelo novaeguineae*) and Emu (*Dromaius novaehollandiae*).

Several nocturnal bird species including the Tawny Frogmouth (*Podargus strigoides*), Barn owl (*Tyto alba*) and Southern boobook (*Ninox boobook*) were observed during field surveys. Five raptor species, including Whistling kite (*Haliastur sphenurus*) and Brown falcon (*Falco berigora*) (Photo Plate 16) were also recorded on the study area.



Photo Plate 16 Brown falcon (*Falco berigora*) observed on the study area

Aquatic bird species such as the Brolga (*Grus rubicunda*) were also recorded during field surveys.

Birds of Conservation Significance

Threatened Species

The southern subspecies of the Squatter pigeon (*Geophaps scripta scripta*) was recorded in several locations (Figure 14) on the study area at the time of the surveys (Photo Plate 17).

The southern Squatter pigeon occurs along the inland slopes of the Great Dividing Range with a distribution from the Burdekin-Lynd divide in central Queensland, west to Charleville and Longreach, east to the coastline between Proserpine and Gladstone, and south to scattered sites throughout south-eastern Queensland (Cooper *et al.* 2004).

Suitable habitat for the southern Squatter Pigeon exists in open grassy woodland throughout the study area. Within this suitable habitat, fifteen birds were observed during the ecological survey period, the majority of them observed during the spring survey in September 2017. The species is regionally abundant, having been observed outside of the study area on multiple occasions, with AARC ecologists observing the species multiple times on local roads and elsewhere while traversing the local area. No breeding activity was observed within the study area.

It is unlikely that the proposed Project will have a significant impact on the local population of the southern Squatter Pigeon; either the local population or the population in its entirety due to:

- the abundance of more suitable habitat outside of the study area in connected woodland; and
- the local abundance of the southern Squatter pigeon.

A *Significant Residual Impact Assessment* (DEHP 2014a) for the southern Squatter pigeon can be found in Section 9.1.2 of this report.



Photo Plate 17 Squatter Pigeon (*Geophaps scripta scripta*) observed at the study area

Marine and Migratory Species

The EPBC Act lists bird species that are classified as migratory and/or marine. Two migratory and/or marine birds were identified on the study area (Figure 14), comprising of the Rufous fantail (*Rhipidura rufifrons*) which is a migratory and marine species and the Rainbow bee-eater (*Merops ornatus*) which is a marine species.

The Rufous fantail (also listed as Special Least Concern under the NC Act) is found in northern and eastern coastal Australia, being more common in the north. It is also found in New Guinea, the Solomon Islands, Sulawesi and Guam. The Rufous fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. The Rufous fantail is a common and secure species (Blakers *et al.* 1984).

The Rainbow bee-eater inhabits all of mainland Queensland, as well as Indonesia, New Guinea and the Solomon Islands. This species is widespread and breeds throughout most of its range, with the exception of southern birds, which move north to breed.

None of the marine species which utilise the study area are at the extent of their known range and the local populations do not constitute an 'ecologically significant proportion' of the total population of the species. While these marine species do inhabit the site, the surrounding region provides suitable habitat that can be utilised and impacts from the study area are unlikely to significantly impact the habitat or distribution of this species in the region. Due to the ephemeral nature of the waterways identified onsite it is unlikely that the Project provides year-round habitat for these species.

6.1.4 Mammals

Habitat Values

Mammal morphology varies widely from small rodents to larger kangaroos to bats. The ecology of each of these groups is equally variable and they are assessed separately in the following sections.

Small Mammals

Habitats suitable for small mammals include areas that provide a plentiful food source and suitable shelter sites. The highest density of small mammal species is usually associated with reliable rainfall which is reflected in a reliable source of food and dense ground vegetation, particularly shrubs and grasses.

The diversity of small mammals is often limited by the lack of a predictable food supply and open ground vegetation. Consequently, small mammal populations can fluctuate dramatically in response to rainfall which increases seed production and insect abundance. During less favourable periods, small mammal populations can be very low.

The study area provides a variety of habitat types suitable for small ground-dwelling mammals, including vegetated woodlands, open forests and watercourses, found in vegetation communities VC 1, VC 2 and VC 3. The majority of the study area is comprised of non-remnant vegetation which is mostly utilized as grazing pasture. This community reduces the availability of shelter.

Medium and Large Mammals

Factors affecting the occurrence of medium and large sized mammals are varied. Important factors can include land-clearing, feral animal predation and grazing pressures. Regardless of the clearing that has occurred on the Project, larger macropods have been much less affected than some other mammals. Larger macropods are considered generalists, likely to thrive and flourish in response to areas of grasslands and open vegetation, as they are less vulnerable to small predators such as foxes and cats. They are also highly opportunistic breeders, especially in the presence of permanent water sources such as the dams found onsite.

Most of the study area habitats include pastoral land and large areas of low open woodlands. These habitats are likely to support most medium mammals occurring in the region. In particular, the riparian habitats along waterways and watercourses are likely to provide important corridor values for this mammal group.

Larger mammals such as kangaroos have been much less affected by predation than other mammals and by land clearing activities. In fact, many species have flourished in response to increased areas of grassland and open vegetation caused by land clearing activities.

Arboreal Mammals

The majority of arboreal mammals that occur in Australia utilise tree hollows for nesting and shelter (Menkhorst and Knight 2011). A shortage of nest hollows is likely to limit arboreal mammal populations where the density of hollow bearing trees is less than two to eight trees per ha (Smith and Lindenmayer 1988).

Hollow-bearing trees on the study area generally occur along creek-lines or in adjoining vegetation communities. Away from the waterway corridors, hollow-bearing trees are few and are separated by vast open areas that would be difficult for arboreal mammals to cross without venturing onto the ground. Due to the previously cleared and disturbed nature of the study area, arboreal mammal habitat is largely restricted to the waterway corridors of the study area.

Bats

The density and diversity of Australian bat species is determined primarily by the availability of suitable nesting and roosting sites. Roosting sites can include locations such as thick foliage, loose exfoliating bark, rock caves or cavities, tree hollows or even fabricated structures such as old buildings and culverts (Churchill 2008).

Consequently, areas with a large number of hollow-bearing trees that occur within remnant vegetation are of high value to many bat species. As bats have a small body size, these hollows can be much smaller in size than required by some arboreal mammals. Possible roosting sites observed on the study area included tree hollows and exfoliating bark, particularly in VC 1, VC 2 and VC 3.

Potential roosting habitat including rocky areas and drainage areas on the study area were surveyed with an ANABAT echolocation call recorder. Riparian zones with large hollow bearing trees located adjacent to the study area were also surveyed.

Observed Species

In total, 33 mammal species were recorded in the study area, comprising 28 native species and five introduced species, all listed in Appendix I. All introduced species recorded are discussed in Section 6.2.

The suite of native mammal species recorded as having a presence on the study area included the Red-necked wallaby (*Macropus rufogriseus*), Short-beaked echidna (*Tachyglossus aculeatus*), Common brushtail possum (*Trichosurus vulpecula*), Water rat (*Hydromys chrysogaster*), Swamp wallaby (*Wallabia bicolor*), Greater glider (*Petauroides volans volans*), Rufous bettong (*Aepyprymnus rufescens*) (Photo Plate 18), Wallaroo (*Macropus robustus*), Eastern grey kangaroo (*Macropus giganteus*), Black-striped wallaby (*Notamacropus dorsalis*) and Delicate mouse (*Pseudomys delicatulus*).



Photo Plate 18 Rufous bettong (*Aepyprymnus rufescens*) observed in the study area

A total of 17 bat species were positively identified on the study area, none of which are listed under the EPBC Act. Those bat species positively identified on the study area included the Gould's wattled bat (*Chalinolobus gouldii*), Little pied bat (*Chalinolobus picatus*), Hoary wattled bat (*Chalinolobus nigrogriseus*), Northern free-tailed bat (*Chaerephon jobensis*), Eastern bentwing bat (*Miniopterus schreibersii oceanensis*), Inland forest bat (*Vespadelus baverstocki*), Rides free-tailed bat (*Ozimops ridei*), Inland free-tailed bat (*Ozimops petersi*), Northern free-tailed bat (*Ozimops lumsdenae*), Western broad-nosed bat (*Scotorepens balstoni*), Little broad-nosed bat (*Scotorepens greyii*), White-striped Free-tailed bat (*Austronomus australis*), Troughton's Sheath-tailed bat (*Taphozous troughtoni*), Lesser long-eared bat (*Nyctophilus geoffroyi*) and Yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*).

A Long-eared bat (*Nyctophilus* sp.) was also detected through the use of ANABAT recorders on the study area; but could not be identified to species level. The *Nyctophilus* genus has several species in Australia and cannot be identified further than the genus level through ANABATs and a positive identification requires active trapping. The region is known to form part of the distribution of the Vulnerable *Nyctophilus corbeni* (EPBC Act, NC Act). In response to this, ecologists conducted a targeted micro-bat survey in line with the *Survey Guidelines for Australia's Threatened Bats* (DoEE 2010a). The targeted micro-bat survey utilised Harp Traps and Mist Nets. The targeted micro-bat survey did not identify the Vulnerable species *Nyctophilus corbeni* within the study area but trapped the Lesser long-eared bat (*Nyctophilus geoffroyi*). It is highly likely that the *Nyctophilus* sp. call registered in the ANABAT belonged to the Least Concern *Nyctophilus geoffroyi*.

Several other species of bats not listed as threatened, could not be reliably identified from call analysis due to either poor data quality and/or similarities in call characteristics between species known to occur in the region. Unconfirmed species records include species that could not be distinguished between a group of two to three species. The bat call analysis results are detailed in Appendix G.

Mammals of Conservation Significance

The Short-beaked echidna (*Tachyglossus aculeatus*) (Photo Plate 19) was recorded in the study area across several sites (Figure 14). This species is not an EVNT species but is listed under the NC Act as Special Least Concern and is not listed under the EPBC Act.

The Short-beaked echidna is found in a variety of habitat types including open forests, grasslands and heavily vegetated woodlands. Its distribution spans across Australia, including Tasmania and is considered a habitat generalist. This species presence relies on the abundance of ants which are its only food source (Van Dyck *et al.* 2013). Due to the generality and wide distribution of this species, it is not expected that mining activity will have an impact of this species.

A *Significant Residual Impact Assessment* (DEHP 2014a) for the Short-beaked echidna can be found in Section 9.1.2 of this report.



Photo Plate 19 Short-beaked Echidna (*Tachyglossus aculeatus*) observed at the study area

The Greater glider (*Petauroides volans*) (Photo Plate 20), was detected during the field survey of the study area (Figure 14). The Greater glider is listed under the EPBC Act 1999 as a “Vulnerable” species (DoEE, 2018).

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 above sea level. The broad extent of occurrence is unlikely to have changed appreciably since European settlement, however the area of occupancy has decreased substantially, mostly due to land clearing (TSSC 2016a).

The Greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. Preferred habitat consists of taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. It also favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species (TSSC 2016a).

Critical microhabitat is an abundance of large hollows of large, old trees for daily denning shelters and breeding purposes. The species is absent from cleared areas and has little ability to disperse between fragments across cleared areas, with habitat connectivity critical to species survival (TSSC 2016a).

Major threats include habitat loss from clearing, high intensity fires, and logging and woodland thinning practices (TSSC 2016a).

Some of the study area has been subject to vegetation clearing to allow cattle grazing. Consequently, only small areas of suitable habitat remain on the site. Generally, habitat of the Great glider is confined to the Eucalypt riparian woodlands such as along the Charlevue Creek. This woodland suits the Greater glider's preferred habitat of tall open woodland with a sparse shrub layer. Vegetation community mapping identified this suitable habitat as VC 3.

Habitat values of the study area are limited by the large areas of non-remnant vegetation and the impacts of grazing. Considering the extent and connection to surrounding good quality habitat and the minimal disturbance caused by the Project to Charlevue Creek, impacts on a local population of Greater glider is unlikely to be significant.

A *Significant Residual Impact Assessment* (DEHP 2014a) for the Greater glider can be found in Section 9.1.2 of this report.



Photo Plate 20 Greater glider (*Petauroides volans*) observed at the study area

6.2 PEST SPECIES

Field surveys positively identified six introduced and/or pest fauna species as having a presence within the study area. Introduced species were recorded through detection of scats, tracks or other traces (e.g. skulls), sensor camera detection and/or direct observation. The suite of introduced species includes the Cane toad (*Rhinella marina*), Wild dog/Dingo (*Canis familiaris/Canis lupus dingo*), Feral cat (*Felis catus*), Rabbit (*Oryctolagus cuniculus*), House mouse (*Mus musculus*) and Feral pig (*Sus scrofa*).

All the non-native fauna species reported from the study area, with the exception of the Cane toad and the House mouse are listed as restricted species under the Biosecurity Act 2014 (DAF 2019) as shown in Table 17.

Table 17 Introduced species identified on the study area

Scientific name	Common name	Biosecurity Act 2014			
		Category 3	Category 4	Category 5	Category 6
<i>Canis familiaris</i> or <i>Canis lupus dingo</i>	Wild dog/Dingo	x	x	x	x
<i>Oryctolagus cuniculus</i>	Rabbit	x	x	x	x
<i>Felis catus</i>	Feral cat	x	x	-	x
<i>Sus scrofa</i>	Feral pig	x	x	-	x

Category 3: the invasive animal must not be distributed either by sale or gift or released into the environment.

Category 4: the invasive animal must not be moved.

Category 5: the invasive animal must not be kept.

Category 6: the invasive animal must not be fed.



Photo Plate 21 Feral cat (*Felis catus*) recorded on the camera trap at DF05

The Cane toad and the House mouse are not a prohibited or restricted invasive animal under the Biosecurity Act 2014; however, everyone has a general biosecurity obligation (GBO) to take reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control (DAF 2016b). Cane Toads are recognised as an invasive species, as they 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 cause the death of native predators that consume their toxins.

6.3 FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

6.3.1 Fauna Species of Conservation Significance Identified on the Study Area

Field surveys across the study area detected the presence of five fauna species of conservation significance:

- The southern Squatter pigeon (*Geophaps scripta scripta*) and Greater glider (*Petauroides volans*), both species are listed as Vulnerable under the EPBC Act and the NC Act;

- The short beaked Short-beaked echidna (*Tachyglossus aculeatus*) This species is not an EVNT species but is listed under the NC Act as Special Least Concern; and
- The Rufous fantail (*Rhipidura rufifrons*) listed as migratory and marine species, was identified on the study area.

A description of the four species is included in Sections 6.1.3 and 6.1.4, respectively.

6.3.2 Fauna Species of Conservation Significance Not Identified on the Study Area

Table 18 discusses EVNT and Migratory species that are known from the broader region and have been identified from desktop searches already identified as likely or potential to occur within the study area but 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 study area, previous surveys conducted on or near the study area and scientific literature. This assessment indicated that only 11 of the 19 species were considered as possible to occur on the Project.

The distribution of the marine and migratory species identified from desktop searches is widespread in eastern Australia (Simpson and Day, 2010). The study area is not at the limit of these species' range, nor are these species considered to be declining within the region. Therefore, it is unlikely that the study area will have a significant impact on the regional populations of these species.

Table 18 Fauna Species of Conservation Significance not identified on the study area

Species Name Common Name	EVNT Listing		Likelihood of Occurrence Post Survey
	EPBC Act	NC Act	
Amphibians			
<i>Adelotus brevis</i> Tusked frog	NL	V	<u>Potential</u> The study area occurs within the vicinity of the known range of the Tusked frog and suitable habitat is available year-round due to the presence of dams. Despite not being found during targeted field surveys (Aquatic survey, AARC 2019), it is a potential that the study area can support a population of Tusked frogs.
Reptiles			
<i>Delma torquata</i> Adorned delma	V	V	<u>Potential</u> Suboptimal habitat is present within the study area. However, field surveys revealed no evidence of this species occurring within the study area site.
<i>Strophurus taenicauda</i> Golden-tailed gecko	NL	NT	<u>Potential</u> Suitable habitat is present within the study area. However, field surveys revealed no evidence of this species occurring within the study area site.
Birds			
<i>Calidris acuminata</i> Sharp-tailed Sandpiper	Ma, Mi	SL	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary.

Species Name Common Name	EVNT Listing		Likelihood of Occurrence Post Survey
	EPBC Act	NC Act	
<i>Calyptorhynchus lathami erebus</i> Glossy black-cockatoo (northern)	-	V	<u>Potential</u> Suitable habitat occurs in the broader region and within the study area. This species is highly reliant on fodder species (<i>Allocasuarina</i> and <i>Casuarina</i> species). Within the study areas the species <i>Allocasuarina luehmannii</i> (Bull oak) was identified as present dominant in small patches. As such it is potential that the study area provides suitable habitat or food sources for this species.
<i>Erythrotriorchis radiatus</i> Red goshawk	V	E	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary. Additional suitable habitat is found throughout the surrounding region.
<i>Hirundapus caudacutus</i> White-throated needletail	Ma, Mi	SL	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary.
<i>Grantiella picta</i> Painted honeyeater	E	V	<u>Unlikely</u> This species is highly reliant on the presence of mistletoes in the canopy strata, no mistletoes were recorded during the terrestrial or aquatic field surveys. The study area is unlikely to provide suitable habitat for this species.
<i>Lathamus discolor</i> Swift Parrot	CE	E	<u>Unlikely</u> Limited suitable habitat occurs for this species was recorded along the watercourses within the study area. The study area occurs at the most upper limit of this species distribution.

Species Name Common Name	EVNT Listing		Likelihood of Occurrence Post Survey
	EPBC Act	NC Act	
<i>Monarcha melanopsis</i> Black-faced Monarch	Ma, Mi	SL	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary.
<i>Motacilla flava</i> Yellow wagtail	Ma, Mi	SL	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary.
<i>Myiagra cyanoleuca</i> Satin flycatcher	Ma, Mi	SL	<u>Potential</u> There is the potential for this species to utilise the study area due to the presence of suitable habitat within the study area's boundary.
<i>Ninox strenua</i> Powerful owl	-	V	<u>Unlikely</u> While there are hollow bearing trees along the watercourses within the study area, these hollows are generally small in nature and are unlikely to be of value to Powerful owls for nesting/shelter. Limited remnant vegetation has been mapped within the study area due to extensive clearing.
<i>Pedionomus torquatus</i> Plains wanderer	CE	V	<u>Unlikely</u> No native grasslands occur within the study areas boundary. This species is often absent from areas that are too dense or sparse. All open areas are heavily grazed and dominated by introduced pasture species.

Species Name Common Name	EVNT Listing		Likelihood of Occurrence Post Survey
	EPBC Act	NC Act	
<i>Poephila cincta cincta</i> Black-throated finch (white-rumped subspecies)	E	E	<u>Unlikely</u> No suitable habitat for this species occurs within the study area. Additionally, this species is not known from the area and was not detected during ecological surveys on site.
<i>Turmix melanogaster</i> Black-breasted button-quail	V	V	<u>Unlikely</u> No suitable habitat for this species was recorded within the study areas boundary.
Mammals			
<i>Chalinolobus dwyeri</i> Large-eared pied bat	V	V	<u>Unlikely</u> No sandstone gorges were recorded within the study area, the study area has also undergone extensive clearing limiting the extent of suitable habitat.
<i>Onychogalea fraenata</i> Bridle nailtail wallaby	E	E	<u>Potential</u> No preferred habitat such as Brigalow woodland and only small disconnected patches of Poplar box woodland have been identified in the study area. However, the only native population of this species is located directly north of the study area. This species could potentially utilise the habitat in the study area for foraging.
<i>Phascolarctos cinereus</i> Koala	V	V	<u>Unlikely</u> Suitable habitat is present within the study area. However, the amount of suitable habitat is limited on the study area and displays limited connectivity to the other known habitat preferences for the species. Field surveys revealed no evidence of this species occurring within the study area.

EPBC – Environment Protection and Biodiversity Conservation Act 1999
 NC Act – Nature Conservation Act 1992
 CE – Critically Endangered

V – Vulnerable
 E – Endangered
 C – Least Concern

SL – Special Least Concern
 Mi – Migratory

7.0 POTENTIAL IMPACTS

Potential impacts of the Project (Figure 15) on terrestrial ecology values are described below. Mitigation measures and management strategies for the potential impacts are described in Section 8.0.

7.1 TERRESTRIAL FLORA

7.1.1 Vegetation Communities

The Project will include vegetation clearance and land disturbance during the construction and operation of the mine. The extent of land disturbance would be approximately 1961 ha, of which, approximately 720 ha of remnant vegetation clearing is required over the life of the Project.

Other potential impacts to vegetation communities include:

- Removal of habitat for terrestrial flora and fauna.
- Further habitat fragmentation and loss of connectivity. It is noted that existing vegetation clearing due to agricultural land use has already limited connectivity within this community;
- Potential for reduced condition of neighbouring vegetation communities due to the introduction of weeds or the release of contaminants associated with mine operations.

7.1.2 Flora Species of Conservation Significance and Habitat

Cerbera dumicola has been identified during the vegetation surveys in two very localised rocky areas associated with vegetation community VC 2 and VC 1 (Figure 14). This species was not identified elsewhere in the study area, within similar habitat types, during targeted searches.

The proposed mining activity proposes no impacts to populations of *Cerbera dumicola*. The nearest land disturbance is located 1.3 km to the east.

7.1.3 Weed Species

Project development has the potential to create or enhance conditions for invasive weed species, that may spread and out-compete native and pasture species. Weed species may be introduced via the spread of seed on persons, vehicles and equipment. Weed species may quickly colonise disturbed areas if left untreated.

The introduction of weed species can reduce native species abundance and diversity through competition. Ultimately this can lead to the reduced condition of vegetation and native fauna habitat.

7.1.4 Wetlands

The Project has potential to impact on wetlands via

- Direct clearing;
- Changes in hydrology;
- Erosion and sedimentation; and
- Contaminant release.

7.1.5 Groundwater Dependant Ecosystems

Where wetlands exhibit a degree of dependence on groundwater for survival, drawdown from the mine can result in a reduced ecosystem condition, changes to vegetation composition or die back.

A groundwater assessment was undertaken by JBT Consulting (2019) in the study. Data obtained in this study, such as water quality, groundwater level and groundwater drawdown estimation were used in the assessment of the GDEs and the associated impact of drawdown.

Potential Impacts to GDEs within the study area

The potential GDEs within the study area are riverine type wetlands including riparian vegetation on watercourses and floodplains. The dominant species of this vegetation is Blue gum (*Eucalyptus tereticornis*), with *Bauhinia* spp., River oak (*Casuarina cunninghamiana*), Paperbark tea-tree (*Melaleuca* spp.) and Poplar box (*Eucalyptus populnea*) as associated species. Published research has identified the rooting depth of the Blue gum as 10 m (Boland *et al* 2006).

Groundwater modelling estimated that the Project has the potential to cause a maximum drawdown of 5 m (steady-state post-mining drawdown) at some locations below the Charlevue and Springton Creeks (JBT 2019). The groundwater adjacent to Charlevue Creek has been recorded at a depth of 8.8 mbgl with an Electrical Conductivity (EC) range from 15,200 $\mu\text{S}/\text{cm}$ to 16,600 $\mu\text{S}/\text{cm}$, whilst Springton Creek registered a depth of 11.2 mbgl with a recorded EC of 5,948 $\mu\text{S}/\text{cm}$ (from a single bore) (JBT 2019).

Considering Blue gum and River oak have moderate salinity tolerance of 4,000 to 8,000 $\mu\text{S}/\text{cm}$ (DA 2002), it is concluded that the groundwater within the Charlevue Creek alluvium is too saline to be useable by the vegetation along the Charlevue Creek.

The salinity recorded adjacent to Springton Creek alluvium is within the tolerance level of the dominant species (DA 2002). However, it is also noted that the depth to groundwater in that area (11.19 mbgl) is potentially beyond the depth that is accessible by vegetation.

Charlevue and Springton Creeks are highly ephemeral watercourses subject to occasional flow events that replenish the alluvial aquifers. As a result, fluctuations in the groundwater level throughout the year are likely within these riverine ecosystems. Based on the existing condition of the riverine vegetation communities within the study area, it is highly likely that this vegetation has a very low reliance on groundwater aquifers for survival, if any at all. Rather the riverine communities represent facultative GDEs, capable of surviving on soil moisture present in unsaturated shallow soil layers.

It is therefore concluded that there is a very low risk that groundwater drawdown would result in a significant impact to these riverine communities.

Potential impacts to the HES wetland outside the study area

The groundwater assessment (Appendix E) included an assessment of the potential GDE / wetland located to the south east of study area. The groundwater study predicted a 2m drawdown within the community, post mining.

The potential GDE is located on an elevated ridgeline; the feature is located within a shallow depression on the ridgeline that is surrounded to the south, west and east by elevation contours at 170 m Australian height datum (AHD), with the central of the depression falling below 165 mAHD. The feature is well above the natural ground surface within the MLA, which ranges from 125 to 135 mAHD, with the elevation of the Springton Creek floodplain dropping below 120 mAHD.

The potential GDE is therefore located within a shallow depression on the ridgeline that is likely to be internally draining under average rainfall conditions and that only discharges to the northeast under high rainfall conditions. It is interpreted that, under average rainfall conditions and at the tail end of high rainfall conditions, surface runoff within the relatively small catchment that reports to this area will pond in the area of the shallow depression and provide localised recharge to an underlying groundwater lens that is likely to be disconnected from the regional groundwater system.

Registered bores indicate the depth to water for bores constructed within Tertiary sediments and Permian coal measures ranges from 26.25 to 32.37 mbgl in this area. This equates to a groundwater elevation of 108-110 mAHD for bores in topographically elevated areas. The water level in the site monitoring bores, which were assessed to be representative of the regional groundwater level, are therefore considerably lower than the elevation of the base of the potential GDE, which is at an elevation approximately 165 mAHD.

Based on the observations discussed above, it is concluded that:

- The potential GDE is located on an elevated ridgeline, but within a shallow depression that is likely to drain internally under average rainfall conditions but drains to the northeast under high rainfall conditions;
- The drainage of surface runoff to the shallow depression is likely to result in localised recharge to a perched lens of groundwater that is disconnected from the regional groundwater system;
- It is probable that this perched groundwater lens provides water to vegetation within the depression during the dry season, but that the groundwater lens is an extremely localised system that relies on replenishment by seasonal rainfall rather than being maintained by the regional groundwater system.

It is noted the EC of site groundwater monitoring bores, which are interpreted to be within the regional groundwater system, is high (15,000 $\mu\text{S}/\text{cm}$ to 29,000 $\mu\text{S}/\text{cm}$ – refer Section 4.3). However, it is also noted that the EC of the registered bores to the north of the potential GDE is very low, with bore 111570 recording an EC of 240 $\mu\text{S}/\text{cm}$ and bore 161093 recording an EC of 710 $\mu\text{S}/\text{cm}$. This provide further evidence that the groundwater system in this area is perched above the regional groundwater system, with the flowline from the area of the potential GDE (where recharge is interpreted to occur) to the area where these bores are located being very short.

It is concluded that the potential GDE is maintained by localised runoff and shallow recharge and that a reduction in the regional groundwater level of approximately 2 m, at a vertical distance of approximately 50 to 60 m below the base of the potential GDE, has a very low risk of impacting groundwater levels beneath the potential GDE.

7.2 TERRESTRIAL FAUNA

7.2.1 Fauna Species of Conservation Significance and Habitat

Field surveys across the study area detected the presence of three fauna species of conservation significance; the southern Squatter pigeon (*Geophaps scripta scripta*), the Greater glider (*Petauroides volans*) and the Short-beaked echidna (*Tachyglossus aculeatus*).

Potential impacts of the Project to threatened fauna species include:

- Direct clearing of habitat within the Project defined impact areas;

- Further habitat fragmentation and loss of connectivity, particularly along Charlevue Creek which provides partial connectivity to larger downstream riparian communities. It is noted that existing vegetation clearing due to agricultural land use has already limited connectivity within this community;
- Potential for fauna mortality through interactions with vehicles on roads and/or heavy machinery used for land clearing;
- Potential for habitat degradation through increased risk of release of contaminants or sediments into receiving environments within and downstream of the Project; and
- Potential for increased invasive flora and fauna.

Southern Squatter Pigeon (*Geophaps scripta scripta*)

Suitable habitat for the southern Squatter Pigeon exists in open grassy woodland throughout the study area. Within this suitable habitat, fifteen birds were observed during the ecological survey period, the majority were observed during the spring survey in September 2017. The species is regionally abundant, having been observed outside of the study area on multiple occasions, with ecologists observing the species multiple times on local roads and elsewhere while traversing the local area. No breeding activity was observed within the study area.

It is unlikely that the proposed Project will have a significant impact on the southern Squatter Pigeon; either the local population or the population in its entirety due to:

- The species being highly mobile;
- The abundance of equivalent and more suitable habitat outside of the study area in adjacent areas;
- The observed high local abundance of the southern Squatter pigeon within and surrounding the study area; and
- The likely suitable habitat to be provided by rehabilitated land, post mining.

Greater glider (*Petauroides volans*)

The Greater glider preferred habitat consists of taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. It also favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species (TSSC 2016a). Critical microhabitat is an abundance of large hollows of large, old trees for daily denning shelters and breeding purposes. The species is absent from cleared areas and has little ability to disperse between fragments across cleared areas, with habitat connectivity critical to species survival (TSSC 2016a).

Habitat of the Greater glider within the study area is confined to the Eucalypt riparian woodlands such as along the Charlevue Creek. This woodland suits the Greater glider's preferred habitat of tall open woodland containing hollows with a sparse shrub layer.

It is unlikely that the proposed Project will have a significant impact on the Greater glider; either the local population or the population in its entirety due to:

- No significant impact proposed to habitat within the study area, specifically Charlevue Creek. Proposed disturbance within this habitat is limited to the development of a small culvert crossing;

- The observed abundance of Greater Gliders within the study area and within the broader Central Queensland region; and
- The abundance of equivalent and more suitable habitat outside of the study area in adjacent areas.

Short-beaked echidna (*Tachyglossus aculeatus*)

The Short-beaked echidna is found in a variety of habitat types including open forests, grasslands and heavily vegetated woodlands. Suitable habitat for the species exists across the study area.

It is unlikely that the proposed Project will have a significant impact on the Short-beaked echidna (*Tachyglossus aculeatus*); either the local population or the population in its entirety due to:

- The known abundance and wide-ranging distribution of the species;
- The presence of ample equivalent or better suited habitat surrounding the Project;
- The relatively small extent of impact proposed by the Project; and
- The likely suitable habitat to be provided by rehabilitated land, post mining.

7.2.2 Migratory Fauna Species

The Rufous fantail (*Rhipidura rufifrons*), a listed migratory bird species under the EPBC Act, was identified within the study area. The Rufous fantail is generally found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats, such as those within the study area.

It is unlikely that the proposed Project will have a significant impact on the Rufous fantail (*Rhipidura rufifrons*); either the local population or the population in its entirety due to:

- The Rufous fantail is a common and secure species (Blakers *et al.* 1984);
- The study area does not contain the preferred habitat type for the species;
- The species is highly mobile and likely only passing through the Project site on its migratory path;
- No known breeding sites or nesting habitat was identified on the study area; and
- Ample equivalent or higher quality habitat exists surrounding the study area.

7.2.3 Pest Species

Pest species compete with and prey on native fauna. Construction and operation of the Project increases the risk of pest species on the study area through:

- Generation of food and other waste that may attract pests; and
- Creation of artificial ponding areas providing habitat for pest species such as cane toads.

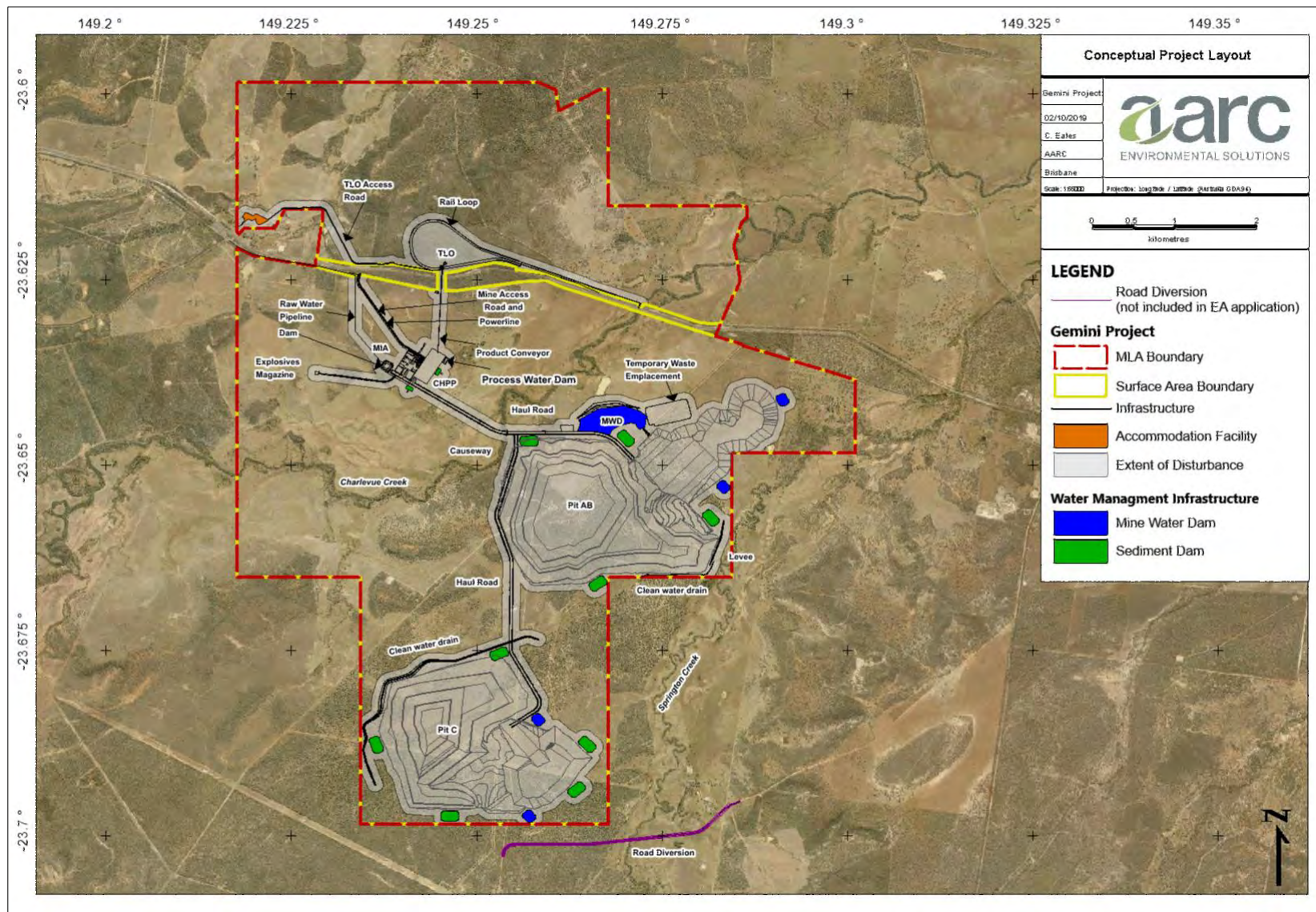


Figure 15 Conceptual Project Layout

8.0 MITIGATION AND MANAGEMENT STRATEGIES

8.1.1 Terrestrial Flora

8.1.1.1 Vegetation Communities

To minimise and mitigate impacts to vegetation communities on the Project area the following management strategies will be implemented:

- Clearing of land and vegetation will be limited to areas defined in the Project approval and required for safe operation.
 - An internal Permit to Disturb system will be implemented to minimise the chances of unauthorised clearing;
 - Areas to be cleared will be clearly defined and demarked to equipment operators;
- Inductions and training materials provided to employees will identify the environmental values of the site as well as the company procedures for managing impacts within its authority;
- Rehabilitation will be undertaken progressively and will aim to return the land to the pre-mining land use where possible;
- Where impact to Matters of State Environmental Significance cannot be avoided and are authorised by the Project approval, environmental offsets will be provided.

8.1.1.2 Flora Species of Conservation Significance

Suitable habitat for the *Cerbera dumicola* exists to the west of the Project, within the MLA. The proposed mine construction and development will not impact on the populations.

- An internal Permit to Disturb system will be implemented to minimise the chances of unauthorised clearing and impacts to the populations within the MLA;
- Inductions and training materials provided to employees will identify the environmental values of the site as well as the company procedures for managing impacts within its authority; and
- Existing populations will be monitored for abundance, distribution and health over the mine life.

8.1.1.3 Weed Species

To control the abundance and spread of weed species the following management strategies will be implemented:

- A pest and weed management plan will be prepared and implemented prior to construction;
- As required, weeds within the MLA will be controlled using herbicides and other recommended methods;
- Inductions and training materials provided to employees will assist the identification of common weeds and will include procedures for reporting; and
- Access to vehicle wash down facilities will be provided for vehicles at risk of spreading weeds.

8.1.1.4 Wetlands / GDEs

Wetlands / GDEs include Riverine vegetation on the MLA, particularly riparian vegetation associated with Charlevue and Springton Creeks. In addition, a HES wetland is located to the south east of the Project. To manage potential impacts on wetlands, the following will be undertaken:

- Sediment and erosion control structures will be installed and maintained near all at risk areas to prevent sediment release to wetlands;
- A Receiving Environment Monitoring Program (REMP) will be implemented and will include monitoring of water, sediments, riparian / riverine vegetation health and biological indicators in aquatic environments;
- The release of Mine Affected Water, will be in accordance with the quality controls provided by the model mining conditions; and
- Groundwater bores adjacent to Charlevue Creek (DW7076W) and Springton Creek (DW7292W1), will be fitted with dataloggers. This data will allow the assessment of the range of water levels within the alluvium and the response of groundwater levels within the alluvium to rainfall recharge, stream flow events and mining activities.

8.1.2 Terrestrial Fauna

8.1.2.1 Fauna Species of Conservation Significance

Fauna species of conservation significance associated with the Project site include; the southern Squatter pigeon (*Geophaps scripta scripta*), the Greater glider (*Petauroides volans*), the Short-beaked echidna (*Tachyglossus aculeatus*) and the Rufous fantail (*Rhipidura rufifrons*) (Migratory). To ensure no significant impact to these species, the following strategies will be implemented:

- An internal Permit to Disturb system will be implemented to minimise the chances of unauthorised clearing and impacts to the threatened fauna within the MLA;
- Inductions and training materials provided to employees will identify the environmental values of the site as well as the company procedures for managing impacts within its authority;
- Vehicles speeds will be limited within the MLA, to minimise the risk of collision;
- Vegetation clearing will be done in a staged manner, allowing time for fauna to escape the area; and
- Pre-clearing inspections will be undertaken by qualified staff to minimise the risk of fauna mortality.

8.1.2.2 Pest Species

To prevent the introduction of pest species and to control their spread, the following management strategies will be implemented for the Project:

- A pest and weed management plan will be prepared and implemented prior to construction;
- Rubbish and food scraps will be managed so as not to encourage pest species;

- Inductions and training materials provided to employees will assist the identification of common pests and will include procedures for reporting; and
- Control of feral cats and other animals will be undertaken within the MLA.

9.0 PROJECT ENVIRONMENTAL OFFSETS

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 *QEOP Significant Residual Impact Guideline* (DES 2014b) is used to determine whether residual impacts are considered to be significant.

Prescribed environmental matters (MSES) are listed in Schedule 2 of the Environmental Offsets Regulation. The following prescribed matters were mapped or identified within the Project area by the terrestrial ecology surveys:

- Regulated vegetation including:
 - Regional Ecosystems (REs) that are listed as Endangered or Of Concern (under the *Vegetation Management Act 1999* (VM Act));
 - REs located within the defined distance from the defining banks of a relevant watercourse or relevant drainage feature identified on the Regulated Vegetation Management Watercourse and Drainage Feature Map (as certified under the VM Act);
 - REs mapped as essential habitat on the Essential Habitat Map (as certified under the VM Act) for flora and fauna listed as Endangered and Vulnerable (under the *Nature Conservation Act 1992* (NC Act)); or
 - With specific application to the prescribed activity of 'native vegetation clearing' a RE mapped as essential habitat on the Essential Habitat Map (as certified under the VM Act) for flora and fauna listed as Near Threatened (under the NC Act);
- Remnant REs that contain an area of land required for ecosystem functioning (a connectivity area);
- Protected wildlife habitat, which includes;
 - Habitat for Endangered, Vulnerable and Special Least Concern animals (under the NC Act);

9.1 ASSESSMENT OF PRESCRIBED MATTERS IDENTIFIED IN THE STUDY AREA

9.1.1 Regulated Vegetation

The ground verified vegetation map identified the following regulated vegetation categories, under the VM Act:

- REs that are listed as Of Concern (under the VM Act);
- REs that are located within the prescribed distance from the defining banks of a relevant VM Act watercourse; and

The *QEOP Significant Residual Impact Guideline* (DES 2014a) covers vegetation clearing in excess of thresholds of between 0.5 ha and 5 ha, depending on the structural category of the vegetation. All regulated vegetation proposed to be cleared for the Project is in excess of the larger 5 ha threshold, and no further breakdown is defined (Table 19).

Figure 16 illustrates the distribution of vegetation in relation to proposed disturbance areas, whilst Figure 17 summarises the regulated vegetation present within the proposed disturbance.

Table 19 Summary of regulated vegetation within the proposed disturbance

RE	VM Act Status	Proposed Disturbance (ha)	Significant Residual Impact
RE 11.3.2	OC	7.53	Yes
REs located within the defined distance from the defining banks of a VM Act watercourse	-	59.79	Yes

Notes: * within complete study area

The Project is likely to result in a significant residual impact to MSES, through the clearing of regulated vegetation above the significant residual impact thresholds.

9.1.2 Conservation Significant Species, Protected Wildlife Habitat and Essential Habitat

The *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP 2014a) outlines the criteria for identifying when an impact on prescribed environmental matters (MSES) may be significant. The significant impact criteria provide a trigger for consideration of offsets (DEHP 2014a).

As stated in the *Environmental Offsets Regulation 2014* an area of habitat (e.g. foraging, roosting, nesting or breeding habitat) for an animal that is endangered, vulnerable or a special least concern is considered Protected Wildlife Habitat under the *Environmental Offsets Regulation 2014* (DEHP 2014a).

As previously discussed, three listed EVNT species under the NC Act were present within the study area, Greater glider, southern Squatter pigeon and the plant species *Cerbera dumicola*. Essential habitat for all three species has been mapped by the DES in accordance to the VM Act (Figure 18).

An assessment following the Significant residual impact criteria for vulnerable wildlife habitat (including essential habitat) has been conducted for the Greater glider and the southern Squatter pigeon. Similarly, an assessment for the special least concern animal wildlife habitat has been conducted for the Short-beaked echidna, also identified within the study area.

The *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP 2014a) does not include specific criteria for assessing impacts to Near Threatened wildlife. An assessment of the significant residual impact for *Cerbera dumicola* has been carried out in accordance with the criteria for Vulnerable wildlife, as described in Section 5.1 of the guideline.

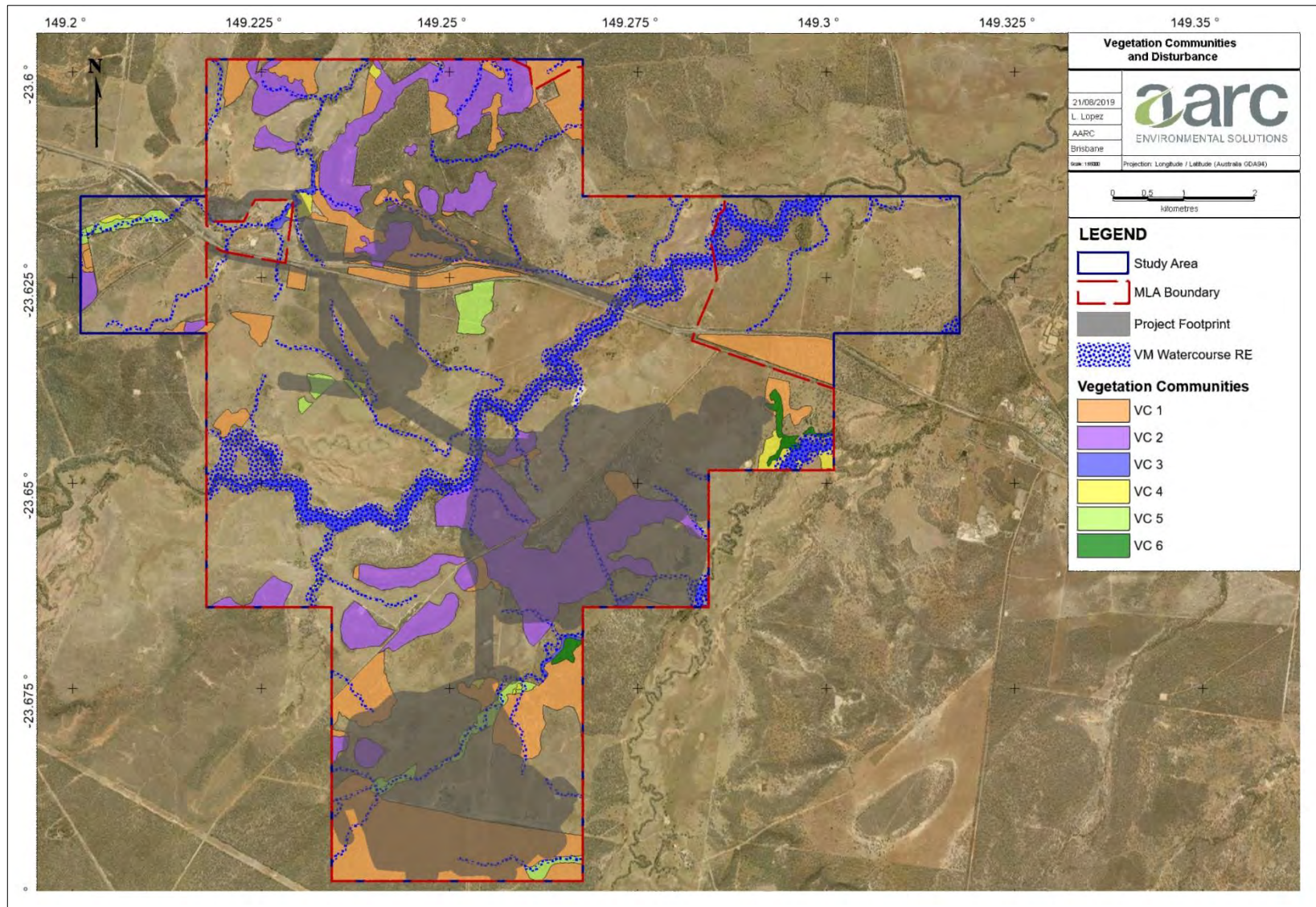


Figure 16 Vegetation Communities and Disturbance

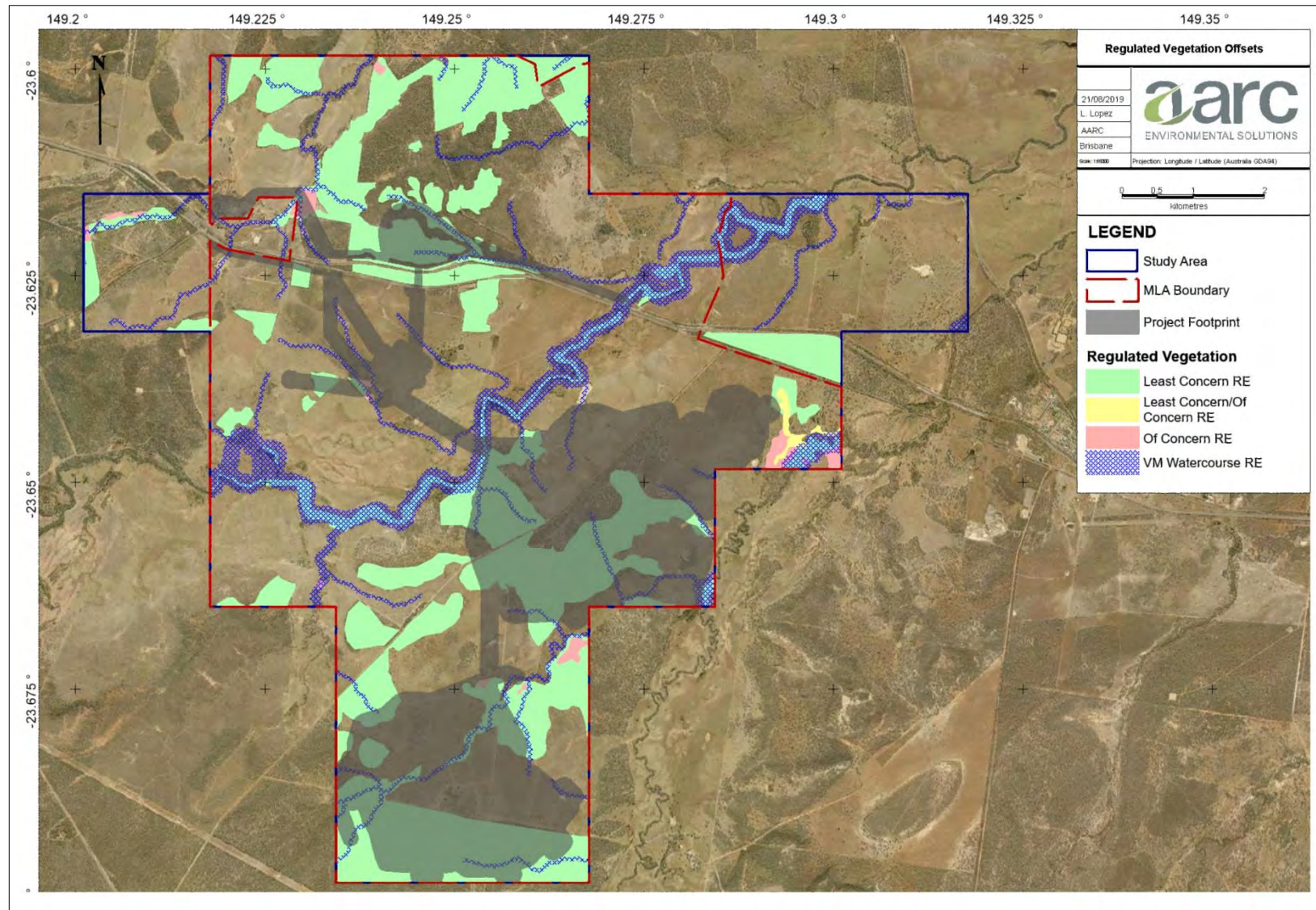


Figure 17 Regulated Vegetation Offsets Requirements

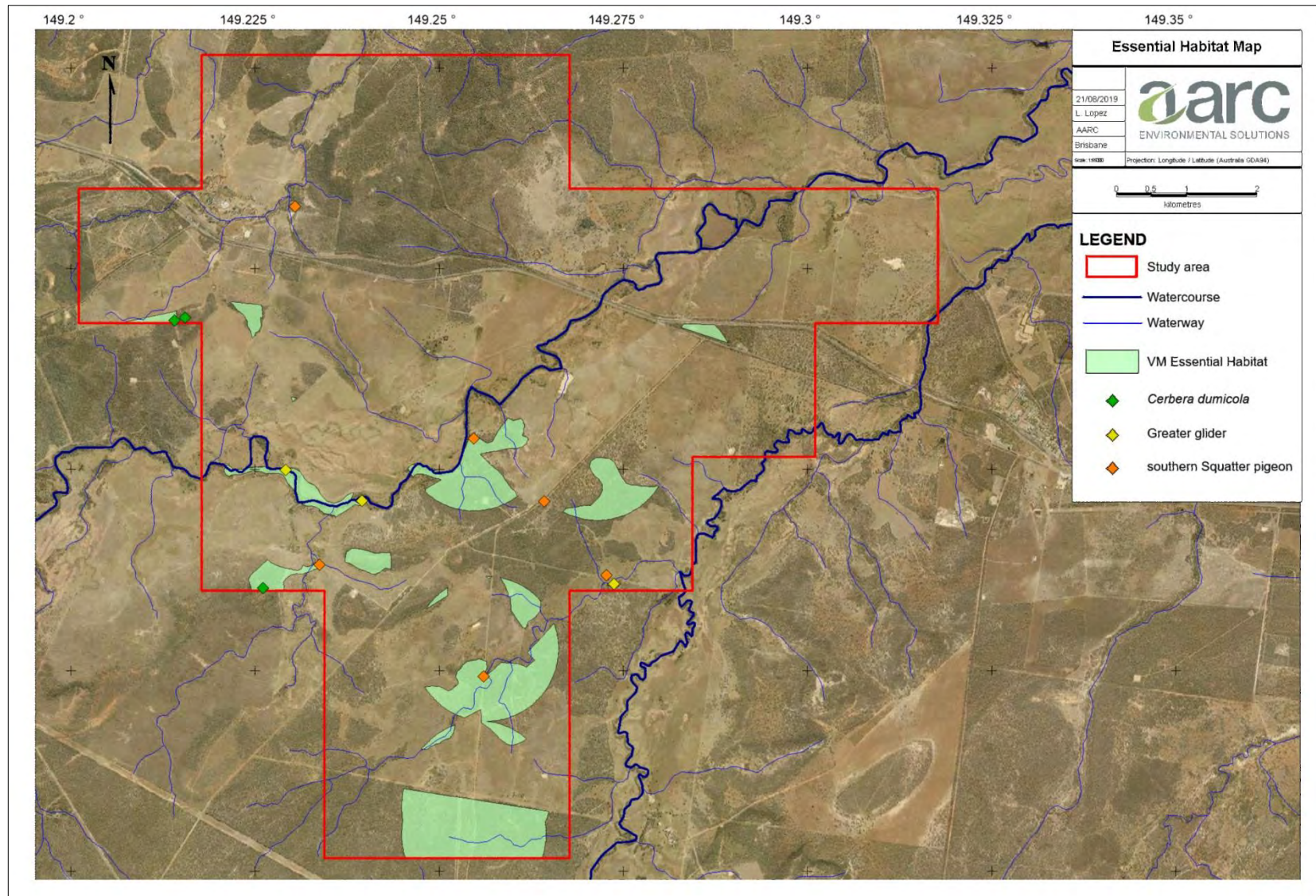


Figure 18 Essential Habitat (VM Act)

Significant Residual Impact Assessment on Vulnerable Species Under the NC Act

When assessed against the significant residual impact criteria, the Project is considered unlikely to result in any significant impact on the southern Squatter pigeon. An assessment of the potential impact of the Project on the southern Squatter pigeon using significant residual impact criteria is presented in Table 20.

When assessed against the significant impact guidelines (Table 21), the Project is considered unlikely to result in a significant impact on the Greater glider. The Project will not fragment available habitat to the extent of fragmenting the Greater glider population. There is considerable alternative habitat available in the surrounding region, and dispersal opportunities will not be impacted as habitat corridors will be retained.

Table 20 MSES Impact Assessment of the Project on the southern Squatter pigeon

Significant Impact Criteria	Impact Assessment
Will the action lead to a long-term decrease in the size of a local population of a species?	No, the Project would not fragment potential habitat for this species to the extent that it would decrease the size of local population of the species.
Will the action reduce the extent of occurrence of the species?	No, the species is highly mobile and individuals in the same area would have access to more suitable habitat through connecting open grasslands. The Project would not fragment potential habitat for this species to the extent that it would reduce the extent of occurrence of the species.
Will the action fragment an existing population?	No, this species is highly mobile and individuals in the same area would have access to more suitable habitat through connecting open grasslands. The Project includes measures to prevent significant impacts on this species. This Project will not result in the fragmentation of an existing population into two or more populations.
Will the action result in genetically distinct populations forming as a result of habitat isolation adversely?	No, the Project would not result in habitat isolation for the southern Squatter pigeon to the extent that this species will form genetically distinct populations.
Will the action disrupt ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	No, this species is mobile, and the surrounding habitat provides suitable sites for breeding, feeding, nesting, migration or resting activities. Given the minimal disturbance to suitable habitat for this species and the interconnectedness of habitats, the Project would not disrupt ecologically significant locations for this species.
Will the action result in invasive species that are harmful to the species becoming established in the species habitat?	No, while the southern Squatter pigeon is vulnerable to predation from introduced pest species; pest management strategies will be implemented to minimise the risk of introduced pest species preying on this species.
Will the action introduce disease that may cause the population to decline, or interfere with the recovery of the species?	No diseases are known for the species that could be caused by mining activities and cause the species' population to decline, nor would actions associated with mining activities interfere substantially with the recovery of the species.

Table 21 MSES Impact Assessment of the Project on the Greater glider

Significant Impact Criteria	Impact Assessment
Will the action lead to a long-term decrease in the size of a local population of a species?	No, the Project would not fragment potential habitat for this species to the extent that it would decrease the size of local population of the species.
Will the action reduce the extent of occurrence of the species?	No, the Project would not fragment potential habitat for this species to the extent that it would reduce the extent of occurrence of the species.
Will the action fragment an existing population?	No, the clearance of suitable habitat will impact individuals of a local population. This Project will not result in the fragmentation of an existing population into two or more populations.
Will the action result in genetically distinct populations forming as a result of habitat isolation adversely?	No, the Project would not result in habitat isolation for the Greater glider to the extent that this species will form genetically distinct populations.
Will the action disrupt ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	No, this species is mobile, and the surrounding habitat provides suitable sites for breeding, feeding, nesting, migration or resting activities. <i>E. tereticornis</i> (Blue gum) provides hollows and offers optimal habitat for Greater gliders. Given the minimal disturbance to suitable habitat for this species and the interconnectedness of habitats, the Project would not disrupt ecologically significant locations for this species.
Will the action result in invasive species that are harmful to the species becoming established in the species habitat?	No, while the Greater glider is vulnerable to predation from introduced pest species; pest management strategies will be implemented to minimise the risk of introduced pest species preying on this species.
Will the action introduce disease that may cause the population to decline, or interfere with the recovery of the species?	No diseases are known for the species that could be caused by mining activities and cause the species' population to decline, nor would actions associated with mining activities interfere substantially with the recovery of the species.

Significant Residual Impact Assessment for Near Threatened Species Under the NC Act

When assessed against the significant residual impact criteria, the Project is considered unlikely to result in any significant impact on *Cerbera dumicola*. An assessment of the potential impact of the Project on *Cerbera dumicola* using significant residual impact criteria is presented in Table 22.

Table 22 MSES Impact Assessment of the Project on the *Cerbera dumicola*

Significant Impact Criteria	Impact Assessment
Will the action lead to a long-term decrease in the size of a local population of a species?	No, <i>Cerbera dumicola</i> was not recorded within the proposed disturbance area following targeted surveys, nor is this area regarded as most suitable habitat for this species.

Significant Impact Criteria	Impact Assessment
Will the action reduce the extent of occurrence of the species?	No, the species was not recorded within the proposed disturbance area following targeted surveys, nor is this area regarded as most suitable habitat for this species.
Will the action fragment an existing population?	No, the proposed disturbance area is already moderately disturbed due to grazing. Suitable habitat for the species exists within the surrounding woodland.
Will the action result in genetically distinct populations forming as a result of habitat isolation adversely?	No, the proposed disturbance area will cover land where no <i>Cerbera dumicola</i> was not recorded.
Will the action disrupt ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	No, <i>Cerbera dumicola</i> is capable of producing suckers (plant growth that develops from the rootstock of a plant).
Will the action result in invasive species that are harmful to the species becoming established in the species habitat?	No, invasive species management strategies will be implemented to minimise the risk that introduced species pose for the native wildlife.
Will the action introduce disease that may cause the population to decline, or interfere with the recovery of the species?	No diseases are known for the species that could be caused by mining activities and cause the species' population to decline, nor would actions associated with mining activities interfere substantially with the recovery of the species.

Significant Residual Impact Assessment for Special Least Concern (non-migratory) Species Under the NC Act

When assessed against the significant residual impact criteria, the Project is considered unlikely to result in any significant impact on the Short-beaked echidna. An assessment of the potential impact of the Project on the Short-beaked echidna using significant residual impact criteria is presented in Table 23.

Table 23 MSES Impact Assessment of the Project on the Short-beaked echidna

Significant Impact Criteria	Impact Assessment
Will the action lead to a long-term decrease in the size of a local population of a species?	No, the Project would not fragment potential habitat for this species to the extent that it would decrease the size of local population of the species.
Will the action reduce the extent of occurrence of the species?	No, the species can be found in a variety of habitat types including open forests, grasslands and heavily vegetated woodlands. It's distribution spans across Australia, including Tasmania and is classified as a habitat generalist (Van Dyck <i>et al.</i> 2013). Suitable alternative habitat occurs throughout the broader region and immediately surrounding the study area.
Will the action fragment an existing population?	No, this Project will not result in the fragmentation of an existing population into two or more populations.
Will the action result in genetically distinct populations forming as a result of habitat isolation adversely?	No, the Project would not result in habitat isolation for the species to the extent that this species will form genetically distinct populations.

Significant Impact Criteria	Impact Assessment
Will the action disrupt ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	No, the surveys did not identify any unique habitat or significant breeding populations on the study area. This species presence relies on the abundance of ants which are its only food source.

9.1.3 HES Wetland

One HES wetland was identified to occur approximately 4 km east of the study area (Section 5.4). The *Queensland Environmental Offsets Policy: Significant Residual Impact Guideline* (DEHP 2014) is designed to assist in determining whether or not the impacts of a project will or is likely to have a significant residual impact on a MSES.

When assessed against the MSES significant residual impact guidelines, the Project is considered unlikely to result in a significant residual impact on the HES wetland to the east of the study area.

Table 24 MSES Wetland Significant Residual Impact Assessment

Significant Residual Impact Criteria	Ecological Assessment
Will the action result in areas of the wetland being destroyed or artificially modified?	No, the Project will not result in the wetland being destroyed or artificially modified. The HES wetland is located approximately 3.6 km east of the Project.
Will the action result in a measurable change in water quality of the wetland, for example a change in the level of the physical and/or chemical characteristics to a level that exceeds the water quality guidelines for the waters?	No, the Project will not result in a measurable change in water quality of the wetland. The wetland is not connected to the surface waters of the Project and does not have the potential to be affected by controlled water releases from the Project.
Will the action impact on the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected?	No, the Project will not impact the habitat or lifecycle of native species dependent upon the wetland given there would not be any impacts to the wetland habitat as a result of the Project.
Will the action result in a substantial and measurable change in the hydrological regime or recharge zones of the wetland? For example a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland?	No, the Project will not result in a substantial and measurable change in the hydrological regime of this wetland. Potential groundwater drawdown is not likely to affect this site since the wetland groundwater system is very localised and it perched above the regional groundwater system (JBT 2019).
Will the action result in an invasive species that is harmful to the environmental values of the wetland being established (or an existing invasive species being spread) in the wetland?	No, while the wetland is vulnerable to impacts from invasive species; pest and weed management strategies will be implemented to minimise the risk of introduced pest species (such as feral pigs, <i>Sus scrofa</i>) and invasive weed species (such as parthenium (<i>Parthenium hysterophorus</i>) impacting upon the HES wetland.

9.2 OFFSETS REQUIREMENTS

The prescribed matters identified within the Project area and potentially impacted by the proposed disturbance are summarised in Table 25 to determine the Project's MSES offset requirements.

Table 25 Summary of Assessment of Prescribed Matters

MSES	Total Impact Area (ha)	Impact Assessment	Offset Requirement
Of Concern RE11.3.2	7.53	Clearing is non-linear and exceeds the clearing threshold.	Offsetting Required
REs located within the defined distance from the defining banks of a VM Act watercourse	59.79	Clearing of watercourse vegetation is required. The clearing widths and areas exceed significant impact guidelines. REs supporting watercourse vegetation includes RE 11.3.25, 11.5.2, 11.3.2 and 11.7.2	Offsetting Required
Essential habitat	197.23	Greater glider: Significant impact assessment for the greater glider was completed under <i>MSES: Queensland Environmental Offsets Policy Significant Residual Impact Guideline</i> (DEHP 2014a). It was found there would be no significant impact to the species and its habitat (Section 9.1.2).	Not Required
	303.88	southern Squatter pigeon: Significant impact assessment for the southern Squatter pigeon was completed under <i>MSES: Queensland Environmental Offsets Policy Significant Residual Impact Guideline</i> (DEHP 2014a). It was found there would be no significant impact to the species and its habitat (Section 9.1.2).	Not Required
	106.65	Clearing of the regional ecosystem 11.7.2 mapped in the essential habitat map for the <i>Cerbera dumicola</i> is required.	Not Required
Connectivity area*	720.74	The Landscape Fragmentation and Connectivity Tool* was applied to the proposed extent of disturbance area. The results found that significant impact would occur to connectivity at both local scale and to core remnant areas.	Offsetting Required
Wildlife Habitat for Vulnerable species	13.35	Greater glider: 13.35 ha of suitable habitat is proposed to be cleared, which is 7.9% of the suitable habitat available within the study area. The Project will not fragment the habitat or local population, there is considerable habitat available in the surrounding region, and dispersal opportunity will not be impacted; by retaining corridors. Significant impact assessment for the greater glider was completed under <i>MSES: Queensland Environmental Offsets Policy Significant Residual Impact Guideline</i> (DEHP 2014a). It was found there would be no significant impact to the species and its habitat (Section 9.1.2).	Not Required

MSES	Total Impact Area (ha)	Impact Assessment	Offset Requirement
	720.74	southern Squatter pigeon: Significant impact assessment for the southern Squatter pigeon was completed under <i>MSES: Queensland Environmental Offsets Policy Significant Residual Impact Guideline</i> (DEHP 2014a). It was found there would be no significant impact to the species and its habitat (Section 9.1.2).	Not Required
Wildlife Habitat for Special Least Concern species.	720.74	Short-beaked echidna: Significant impact assessment for the Short-beaked echidna was completed under <i>MSES: Queensland Environmental Offsets Policy Significant Residual Impact Guideline</i> (DEHP 2014a). It was found there would be no significant impact to the species and its habitat (Section 9.1.2).	Not Required

* Landscape Fragmentation and Connectivity Tool is based on current government mapping.

A summary of MSES environmental offset requirements to be delivered under the QEOP is provided in Table 26, including the total extent of impact area to be offset.

Table 26 MSES Offset Requirements

MSES	Area to be Impacted (ha)	Habitat Description
RE 11.3.2 <i>Eucalyptus populnea</i> (Poplar box) woodland on alluvial plains	7.53	This vegetation community was characterised by <i>Eucalyptus populnea</i> (Poplar box) woodland on alluvial plains. It was represented in several small to moderate patches within the study area and is subject to pressures from grazing, exotic species invasion.
REs located within the defined distance from the defining banks of a VM Act watercourse.	59.79	A number of VM Act watercourses traverse the Project area. Impacts will occur to watercourse vegetation that is associated with RE 11.3.25, 11.5.2, 11.3.2 and 11.7.2
RE mapped as essential habitat on the Essential Habitat Map (as certified under the VM Act) for flora and fauna listed as Near Threatened (under the NC Act)	106.65	Clearing of RE 11.7.2 within the mapped essential habitat map for the <i>Cerbera dumicola</i> will require an offset.
Connectivity area*	720.74	The Landscape Fragmentation and Connectivity Tool determined that there is significant impact to the connectivity of the remnant vegetation within the Project.

* Landscape Fragmentation and Connectivity Tool is based on current government mapping.

Distribution of MSES requiring offsets in association with the footprint of Gemini Project is illustrated in Figure 17.

It is recommended that Magnetic South deliver the offset requirements agreed in the EA prior to disturbance of the area. 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.

10.0 REFERENCES

- AARC Environmental Solutions Pty Ltd (AARC) (2019) 'Gemini Project: Aquatic Ecology Assessment', prepared for Magnetic South Pty Ltd.
- Atlas of Living Australia (ALA) (2018). *Atlas of Living Australia website*. Available from: <http://www.ala.org.au>
- AVH (2019). The Australasian Virtual Herbarium, Council of Heads of Australasian Herbaria, <<http://avh.chah.org.au>>
- Barker, M. (1995). *Phaius australis*, in Species Management Manual. Department of Natural Resources, Brisbane.
- Blakers, M., S.J.J.F. Davies & P.N. Reilly (1984). *The Atlas of Australian Birds*. Melbourne, Victoria: Melbourne University Press.
- Boland D.J., Brooker M.I.H., Chippendale G.M., Hall N., Hyland B.P.M., Johnson R.D., Kleinig D.A., McDonald M.W., Turner J.D. (2006) *Forest Trees of Australia*. CSIRO Publishing, Collingwood.
- Brophy J.J., Craven L.A. and Doran J.C. 2013. *Melaleucas: their botany, essential oils and uses*. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research: Canberra. 415 pp.
- Brooks J.D. & Smith J.W. (1969). *The diagenesis of plant lipids during the formation of coal, petroleum and natural gas—II. Coalification and the formation of oil and gas in the Gippsland Basin*. *Geochimica et Cosmochimica Acta*, 33(10), 1183-1194.
- Bureau of Meteorology (BOM) (2018). *Queensland River Basins*. Available from: <http://www.bom.gov.au/qld/flood/brochures/qld/map.pdf>
- Bureau of Meteorology (BoM) (2019) *Groundwater Dependant Ecosystem Atlas*, Commonwealth of Australia, Canberra, available from <<http://www.bom.gov.au/water/groundwater/gde/map.shtml>>, accessed May 2019.
- Churchill, S. (2008). *Australian Bats*, Reed New Holland, Sydney.
- Cooper RM, McAllan IAW and Curtis BR (2014). *The Atlas of the Birds of NSW and the ACT*. Mini-Publishing, Gordon, New South Wales.
- Cropper, S (1993), *Management of endangered plants*, CSIRO Publications, Melbourne.
- Department of Agriculture - Western Australia (DA) (2002), *Salinity tolerance of plants for agriculture and revegetation*, Department of Agriculture, Western Australia.
- Department of Agriculture and Fisheries (DAF) (2016), *Mimosa bush, Vachellia farnesiana*, Department of Agriculture and Fisheries, Queensland Government.
- Department of Agriculture and Fisheries (DAF) (2016b), *Cane toad, Buffo marinus*, Department of Agriculture and Fisheries, Queensland Government.
- Department of Agriculture and Fisheries (DAF) (2018), *Restricted invasive plants of Queensland*, Department of Agriculture and Fisheries, Queensland Government.

Department of Agriculture and Fisheries (DAF) (2019) Invasive plant and animal fact sheets Available from: <https://www.daf.qld.gov.au/business-priorities/biosecurity/invasive-plants-animals/fact-sheets#pest_animals>

Department of Environment and Heritage Protection (DEHP) (2014a). *Queensland Environmental Offsets Policy, Significant Residual Impact Guideline*, Department of Environment and Science, Brisbane. Available from: <<https://environment.des.qld.gov.au/assets/documents/pollution/management/offsets/significant-residual-impact-guide.pdf>>

Department of Environment and Heritage Protection (DEHP) (2014b). *Species Profile Search*. Department of Environment and Science, Brisbane. Available from: <<https://environment.ehp.qld.gov.au/species-search/>>

Department of Environment and Science (DES) (2018a). *Queensland Environmental Offsets Policy (Version 1.6)*, Biodiversity Integration and Offsets, Ecosystem Outcomes, Department of Environment and Science, State of Queensland. <https://ehp.qld.gov.au/assets/documents/pollution/management/offsets/offsets-policyv1-6>

Department of Environment and Science (DES) (2018b). *Plants, animals, soils, water and more, WetlandInfo*, Department of Environment and Science, State of Queensland., Available from: <<https://wetlandinfo.des.qld.gov.au/wetlands/ecology/components/>>

Department of Environment and Science (DES) (2018c). *A Biodiversity Planning Assessment for the Brigalow Belt Bioregion. Version 2.1, Summary Report*. Department of Environment and Science, State of Queensland. Available from: <https://www.qld.gov.au/data/assets/pdf_file/0029/68186/bb-bpa-summary-report.pdf>

Department of Environment and Science (DES) (2019a), *Protected plants flora survey trigger map*, Department of Environment and Science, State of Queensland. Available from: <<https://apps.des.qld.gov.au/map-request/flora-survey-trigger/>>

Department of Environment and Science (DES) (2019b), *Wetland maps under the Environmental Protection Act 1994*, Department of Environment and Science, State of Queensland. Available from: <<https://environment.des.qld.gov.au/ecosystems/wetlands/referable-wetlands-maps.html>>

Department of Environment and Science (DES), Queensland Herbarium (2019c), *Regional Ecosystem Description Database (REDD) (V 11.1)*, Department of Environment and Science, Queensland Government, Brisbane.

Department of Environment and Science (DES) (2019d), *Flora Survey Guidelines - Protected Plants; Nature Conservation Act 1992*, Department of Environment and Science, Queensland Government, Brisbane.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009), *Weeping Myall Woodlands - EPBC Act policy statement 3.17 - Nationally threatened species and ecological communities*. Department of the Environment, Water, Heritage and the Arts, Commonwealth of Australia, Canberra.

Department of Science, Information Technology and Innovation (DSITI) (2015), *Queensland Groundwater Dependant Ecosystem Mapping Method, Version 1.1*, Department of Science, Information Technology and Innovation, Queensland Government, Brisbane.

Department of Natural Resources, Mines and Energy (DNRME) (2018), *General guide to the vegetation clearing codes Accepted development vegetation clearing codes*, Queensland Government. Available from: <https://www.dnrme.qld.gov.au/_data/assets/pdf_file/0008/1396988/landholders-guide-to-veg-clearing-codes.pdf>

Department of Environment (DoE) (2013), *Significant impact guidelines 1.1: Matters of National Environmental Significance*, Department of Environment and Energy, Commonwealth of Australia, Canberra.

Department of the Environment and Energy (DoEE) (2010a), *Survey guidelines for Australia's threatened bats; Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Department of the Environment and Energy (DoEE) (2010b), *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Department of the Environment and Energy (DoEE) (2011a), *Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Department of the Environment and Energy (DoEE) (2011b), *Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Department of the Environment and Energy (DoEE) (2015). *Environment Protection and Biodiversity Conservation Act 1999: Protected Matters Search Tool*. Department of the Environment, Canberra. Available from: <<http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/protected>>

Department of the Environment and Energy (DoEE) (2018), *Species Profile and Threats Database*, Department of the Environment, Canberra. Available from: <<http://www.environment.gov.au/sprat>>

Eyre T.J., Ferguson D.J., Hourigan C.L., Smith G.C., Mathieson M.T., Kelly A.L., Venz M.F., Hogan L.D. & Rowland J. (2018). *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland Version 3.0*. Department of Science, Information Technology, Innovation and the Arts, Queensland Government, Brisbane.

Ford, G. (2017-2018) *Microbat Call Identification Report* – prepared for AARC Environmental Solutions, Balance Environmental, Toowoomba.

Geoscience Australia (2018) *Province and Sedimentary Basin Geology - Bowen Basin*. Available from: <http://www.ga.gov.au/scientific-topics/energy/province-sedimentary-basin-geology/petroleum/onshore-australia/bowen-basin>

Glossy Black Conservancy (2010). *Glossy black-cockatoo Conservation Guidelines for South-Eastern Queensland and far North-Eastern New South Wales*. Glossy Black Conservancy.

Goff FG, Dawson GA & Rochow JJ (1982), *Site examination for threatened and endangered plant species*, *Environmental Management*, vol. 6: 307-316.

Hutton A.C. (2009). *Geological Setting of Australasian Coal Deposits*. Australasian Coal Mining Practice, pp. 40-84.

Independent Expert Scientific Committee (IESC) (2019) *Assessing Groundwater-Dependent Ecosystems: IESC Information Guidelines Explanatory Note*, Department of Environment and Energy, Commonwealth of Australia, Canberra.

JBT Consulting Pty Ltd, (2019) 'Groundwater Impact Assessment Gemini Coal Project', prepared for Magnetic South Pty Ltd.

JSTOR, Global Plants (2018), Herbarium collections, <http://plants.jstor.org/>

Lundie-Jenkins, G and Lowry, J 2005. Recovery plan for the bridled nailtail wallaby (*Onychogalea fraenata*) 2005-2009. Report to the Department of Environment and Heritage (DEH), Canberra.

Mutton A.J. (2003). Queensland Coals - Physical and Chemical Properties, Colliery and Company Information. Department of Natural Resources and Mines, Queensland Government, Brisbane. Available from: <<https://www.dnrm.qld.gov.au/?a=267497>>

Morcombe, M. 2002. Field Guide to Australian Birds. Steve Parish Publishing, Archerfield, Queensland.

Menkhorst P. & Knight F. (2011). *A field guide to the mammals of Australia*, Third Edition. Oxford University Press. South Melbourne, Victoria.

Nature Conservation Act 1992, Department of Environment and Science (DES), Queensland Government

Nature Conservation (Wildlife) Regulation 2006. Department of Environment and Science (DES), Queensland Government.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2019) Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 5.0. Updated April 2019. Queensland Herbarium, Queensland Department of Science, Information Technology and Innovation, Brisbane. 124 pp.

Pizzey, G. and Knight, F (2007). *The Field Guide to the Birds of Australia*, HarperCollins Publishers, Pty, Ltd., Pymble, New South Wales.

Rowland, J. 2013. Tusked frog, *Adelotus brevis*. Targeted species survey guidelines. Queensland Herbarium, Department of Environment and Science, Brisbane. Available from: <https://www.qld.gov.au/data/assets/pdf_file/0014/67100/tusked-frog.pdf>

Smith A.P. Lindenmayer D (1988) Tree Hollow Requirements of Leadbeater's Possum and Other Possums and Gliders in Timber Production Ash Forests of the Victorian Central Highlands. *Wildlife Research* 15, 347-362.

Threatened Species Scientific Committee (TSSC) (2008), *Commonwealth Conservation Advice Delma torquata. (Collared Delma)*. Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Threatened Species Scientific Committee (TSSC) (2016a), *Commonwealth Conservation Advice Petauroides volans*. Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Threatened Species Scientific Committee (TSSC) (2016b), *Commonwealth Conservation Advice Macroderna gigas*. Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Threatened Species Scientific Committee (TSSC) (2018), *Commonwealth Conservation Advice Antechinus argentus silver-headed antechinus*. Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Threatened Species Scientific Committee (TSSC) (no date), *Draft Conservation Advice (incorporating listing advice) for the Poplar Box Grassy Woodlands on Alluvial Plains*, Department of the Environment and Energy, Commonwealth of Australia, Canberra.

Van Dyck, S., Gynther, I. and Baker, A. (eds.) (2013). *Field Companion to The Mammals of Australia*. New Holland; Sydney.

Vegetation Management Act 1999, Department of Environment and Science (DES), Queensland Government

Wang, J. (1995). *Homoranthus decumbens* Species Management Profile, Flora and Fauna Information System. 2. Queensland Department of Natural Resources, Brisbane.

Wilson, S. (2005). *A Field Guide to the Reptiles of Queensland*. Reed New Holland, Sydney.

Appendix A Database Searches



Queensland Government

Department of Environment and Heritage Protection

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

Area of Interest: epc: 881

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@ehp.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Area of interest details

Area of Interest	EPC881
Size (ha)	7219.6
Local Government(s)	CENTRAL HIGHLANDS REGIONAL
Bioregion(s)	Brigalow Belt
Subregion(s)	Woorabinda
Catchment(s)	Fitzroy

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v1.3
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchment v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchment v1.3

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	6.4	0.1%
Of Concern	237.3	3.3%
No concern at present	1842.0	25.5%

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Heritage Protection's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0%
State	759.7	10.5%
Regional	167.0	2.3%
Local or Other Values	1232.6	17.1%

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	4
Number of Lacustrine wetlands	2
Total number of non-riverine wetlands	6

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

Name	Permanency
CHARLEVUE CREEK	Non-perennial
SPRINGTON CREEK	Non-perennial
STANLEY CREEK	Non-perennial

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Heritage Protection's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0%
High	0.0	0.0%
Medium	7219.6	100.0%
Low	0.0	0.0%
Very Low	0.0	0.0%

Table 8: Summary table, aquatic conservation significance (non-riverine)

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0%
High	0.0	0.0%
Medium	10.9	0.2%
Low	0.0	0.0%
Very Low	0.0	0.0%

Biodiversity Planning Assessments

Introduction

The department of Environment and Heritage Protection (EHP) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology (BAMM)* and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the EHP.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<http://qspatial.information.qld.gov.au/geoportal/>

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0%
State	759.7	10.5%
Regional	167.0	2.3%
Local or Other Values	1232.6	17.1%

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the *Environment Protection and Biodiversity Conservation Act 1999*. It excludes highly mobile fauna taxa which are instead

considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands and intertidal zones; and areas of national importance such as World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
Regional	Remnant contains at least one Of Concern RE (B1)	274.7	3.8
Local or Other Values	Refer to diagnostic data for additional information	1884.7	26.1

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa					427.6	5.9	1731.7	24.0
B1: Ecosystem Value (Bioregion)			274.6	3.8	1884.7	26.1		
B2: Ecosystem Value (Subregion)					2159.3	29.9		
C: Tract Size			1868.8	25.9	194.1	2.7	96.4	1.3
D1: Relative RE Size (Bioregion)							2159.3	29.9
D2: Relative RE Size (Subregion)							2159.3	29.9
F: Ecosystem Diversity	32.2	0.4	795.7	11.0	1206.0	16.7	125.4	1.7
G: Context and Connection	225.3	3.1	576.7	8.0	1294.0	17.9	63.3	0.9

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	239.1	3.3
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) Remnant forms part of a bioregional corridor (J)	369.1	5.1
State	Remnant forms part of a bioregional corridor (J)	151.3	2.1
Regional	Remnant forms part of a bioregional corridor (J)	1.0	0.0

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

This criterion can be used to identify essential and general habitat for EVNT and other priority taxa additional to that derived under Diagnostic Criterion A. Information sources include expert and local knowledge, technical reports and papers, and modelled maps of essential and general habitat.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al.* 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to assess overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa	520.5	7.2						

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ia: Centres of Endemism								
Ib: Wildlife Refugia	608.4	8.4						
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

- Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;
- Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;
- Maintaining large scale seasonal/migratory species processes and movement of fauna;
- Maximising connectivity between large tracts/patches of remnant vegetation;
- Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

- Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);
- Follow major watershed/catchment and/or coastal boundaries;
- Incorporate major altitudinal/geological/climatic gradients;
- Include and maximise connectivity between large tracts/patches of remnant vegetation;
- Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

- Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	520.5	7.2%
Regional	1.0	0.0%
Local or Other Values	0.0	0.0%

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_I_17	Terrestrial corridors	State Regional	J (Terrestrial Corridor): STATE J (Terrestrial Corridor): REGIONAL
brbn_I_62	Taunton Scientific Reserve and remnants around it, especially riparian vegetation	State	J (wildlife corridor): STATE H (core habitat for priority taxa): VERY HIGH

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_I_69	Core areas in fragmented subregions: Dawson River Downs Callide Creek Downs Isaac - Comet Downs Upper Belyando Floodout	State	Ib (wildlife refugia): VERY HIGH
brbs_I_17	Terrestrial Bioregional Corridors	State or Regional	J (Terrestrial Corridor): STATE or J (Terrestrial Corridor): REGIONAL

Expert panel decision descriptions:

brbn_I_17

The corridors along the Great Dividing Range Corridor and the eastern ranges, which span large distances, are mapped by including remnant vegetation within a 5 kilometre buffer either side of a centre line. Some of the other more significant corridors that cross bioregions are also mapped in this way. Where corridors are shorter and more numerous the corridors are mapped by including remnant vegetation within a 2.5 kilometre buffer either side of a centre line.

More information for this decision exists in the BRB BPA North Landscape Report.

brbn_I_62

Taunton National Park (Scientific) is essential habitat for the conservation of the endangered Bridled nail-tail wallaby. The surrounding landscape is extensively cleared, however, Bridled nail-tail wallabies have been recorded in remnant vegetation surrounding the park. Dispersal of wallabies to suitable habitat relies on retaining connectivity from the park, particularly along the following creeks: Five Mile, Duckworth, Walton, Iguana, Stanley, Charlevue, Spectacle, Lagoon and Wild Horse.

Regrowth and remnant vegetation along creek lines in the vicinity of Taunton should be considered essential habitat.

brbn_I_69

Tracts are patches of continuous remnant vegetation. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. The northern Brigalow Belt has some very large tracts of vegetation. Based on the Tract Size analysis (Criterion C), the following core areas are identified for the northern Brigalow Belt. They are the fragmented subregions:

More information for this decision exists in the BRB BPA North Landscape Report.

brbs_I_17

Maintaining connectivity across a landscape, either through corridors or "stepping-stones" of remnant vegetation, is important for the long-term conservation of biodiversity.

The corridors along the Great Dividing Range and the eastern ranges, which span large distances, are mapped by including remnant vegetation within a 5 kilometre buffer either side of a centre line. Some of the other more significant corridors that cross bioregions are also mapped in this way. Remnant ecosystem polygons which had 30% or more of its total area within the 5km buffered zone were included within the corridor and assigned a J Rating. The significance of this J Rating was based on the significance given to that corridor by the Expert Panel. Where corridors are shorter and more numerous (i.e. between the ranges and the coastline) the corridors are mapped by including remnant vegetation within a 2.5 kilometre buffer either side of a centre line.

More information for this decision exists in the BRB BPA South Landscape Report.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in Queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning processes

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at *WetlandInfo*:

<http://wetlandinfo.ehp.qld.gov.au/wetlands/assessment/assessment-methods/aca>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<http://qspatial.information.qld.gov.au/geoportal/>

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0%
High	0.0	0.0%

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Medium	7219.6	100.0%
Low	0.0	0.0%
Very Low	0.0	0.0%

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic					1273.2	17.6	5946.3	82.4
2. Naturalness catchment	2.5		7217.0	100.0				
3. Diversity and richness	1273.2	17.6	2074.2	28.7	3872.1	53.6		
4. Threatened species and ecosystems			7219.5	100.0				
5. Priority species and ecosystems	7217.0	100.0						
6. Special features								
7. Connectivity			5946.3	82.4	1273.2	17.6		

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

(No Records)

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0%
High	0.0	0.0%
Medium	10.9	0.2%
Low	0.0	0.0%
Very Low	0.0	0.0%

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	4.7	0.1			6.2	0.1		
2. Naturalness catchment					10.9	0.2		
3. Diversity and richness			6.9	0.1	3.7	0.1	0.3	
4. Threatened species and ecosystems	2.5		4.4	0.1				
5. Priority species and ecosystems			10.9	0.2				
6. Special features								
7. Connectivity								
8. Representativeness					6.9	0.1		

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
ma_nr_fl_02	Regional ecosystems 8.3.4 11.3.27	Mackenzie	5.2.1	3

4 is the highest rating/value

Expert panel decision descriptions:

ma_nr_fl_02

These regional ecosystems contain significant habitat values that are under threat from threatening processes such as physical alteration/ destruction and invasion by **hymenachne**.

Note: This priority ecosystem decision applies to the following catchments: Calliope, Comet, Dawson, Fitzroy, Isaac, Mackenzie, Misc Other Islands, Nogoia, O'Connell, Pioneer, Plane, Proserpine, Shoalwater, Styx and Waterpark.

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, HerbreCs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	Medium			FA
Dichanthium setosum		C	V	Low			FL
Onychogalea fraenata	bridled naitail wallaby	E	E	Critical			FA
Solanum elachophyllum		E		Medium			FL

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DEHP internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

*JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species.

**Y - wetland indicator species.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

(no results)

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

Species	Common name	Back on Track rank	Identified flora/fauna
Eucalyptus tereticornis			FL
Lomandra longifolia			FL
Eucalyptus camaldulensis			FL

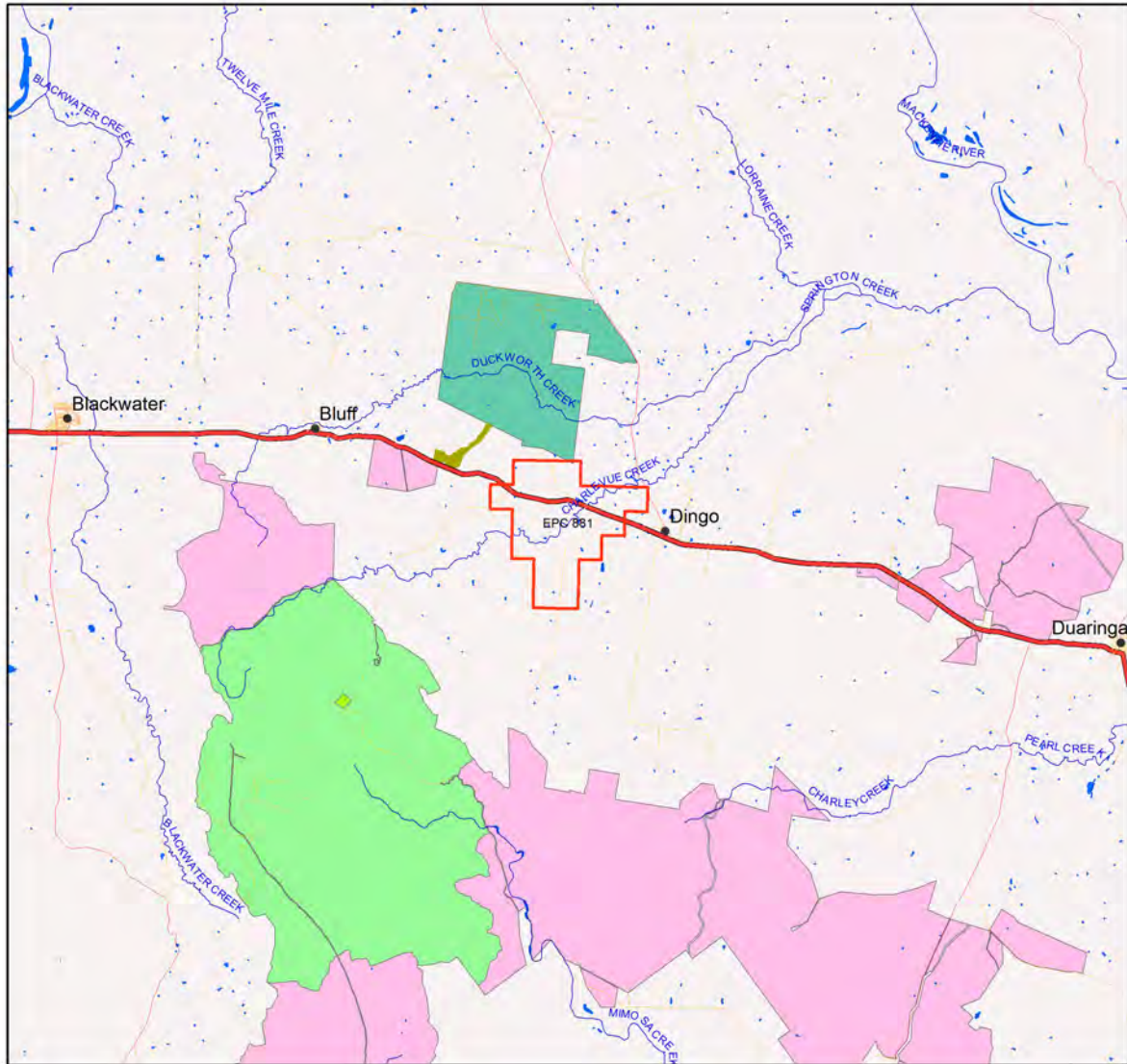
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

Species	Common name	Back on Track rank	Identified flora/fauna
Eucalyptus tereticornis			FL

NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

Map 1 - Locality Map



Locality Map

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Highway
- Connector
- Street/Local Road
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Lakes and Reservoirs
- Major rivers/creeks
- Queensland



0 2.5 5 7.5 10 12.5 Kilometers



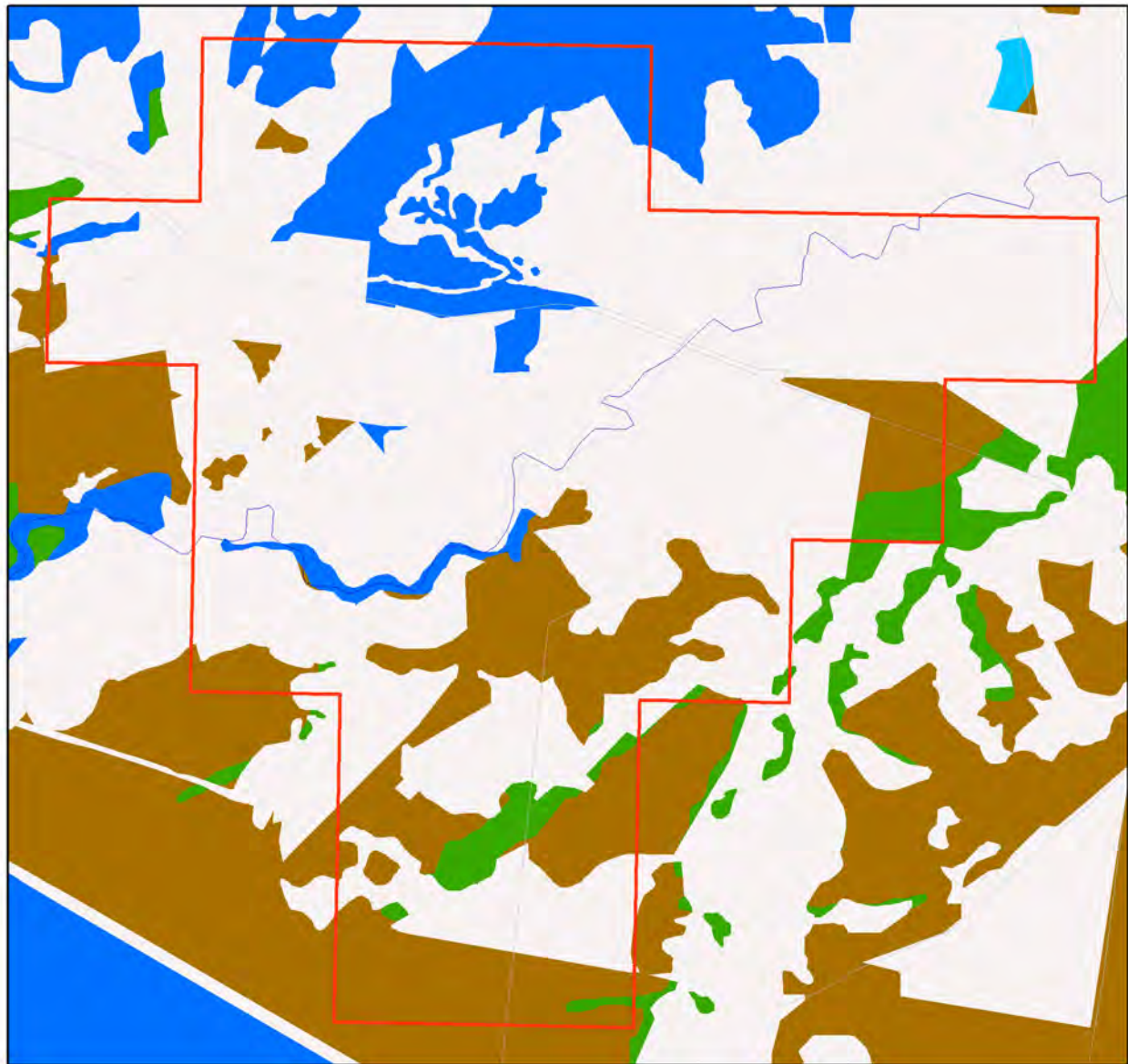
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Map 2 - Biodiversity Planning Assessment (BPA)



Biodiversity Planning Assessments

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Roads
- Major rivers/creeks
- Queensland
- Biodiversity Planning Assessment**
- State Habitat for EVNT taxa
- State
- Regional
- Local or Other Values
- Non Bioregion Ecosystem



0 0.45 0.9 1.35 1.8 2.25 Kilometers

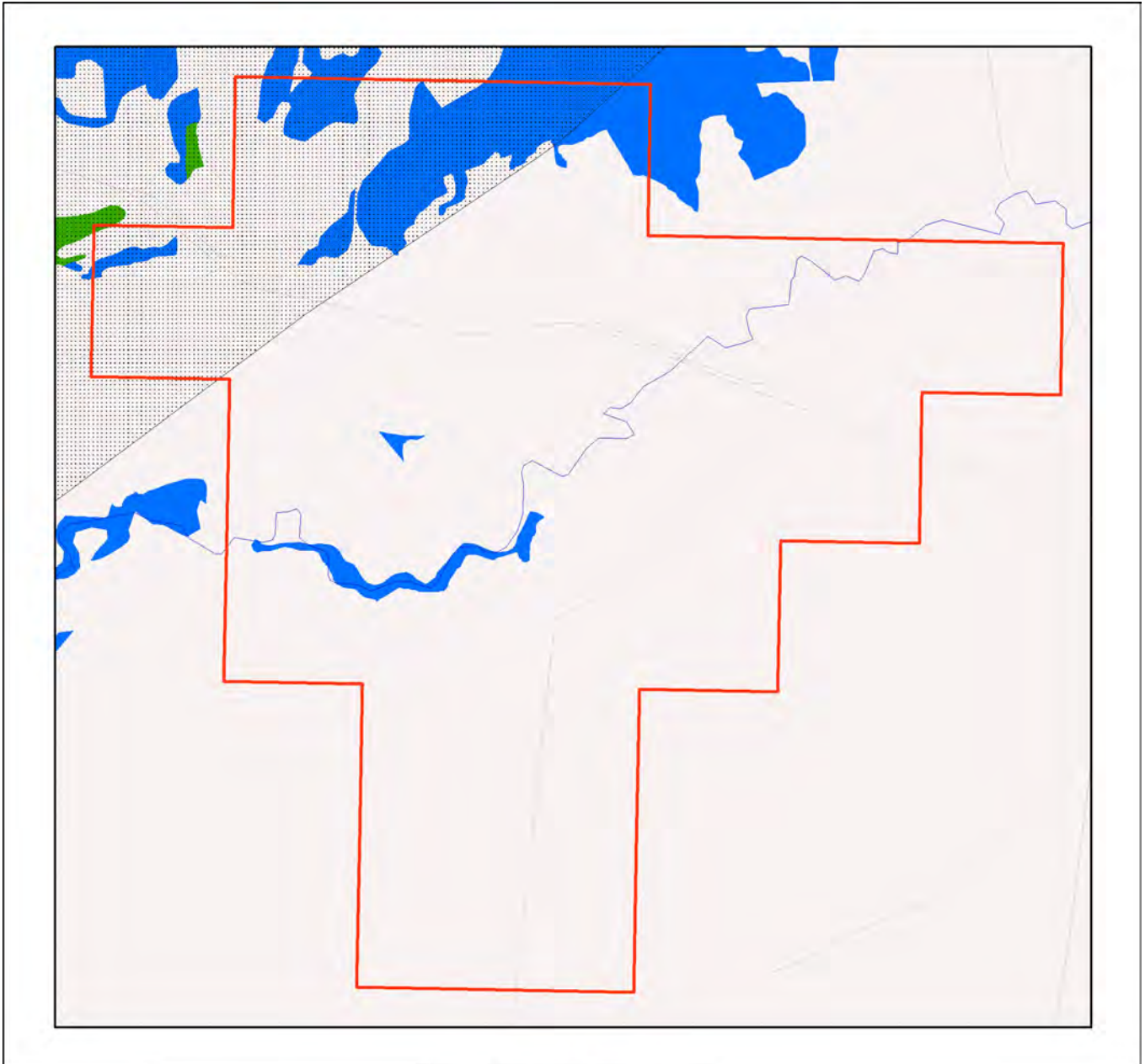
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Map 3 - Corridors



Corridors

Legend

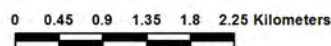
- Selected Exploration Permit Coal (EPC)
- Towns
- Roads
- Major rivers/creeks
- ☐ Queensland

Corridors

- ☐ State
- ☐ Regional

Corridor Triggered Vegetation

- ☐ State
- ☐ Regional
- ☐ Local



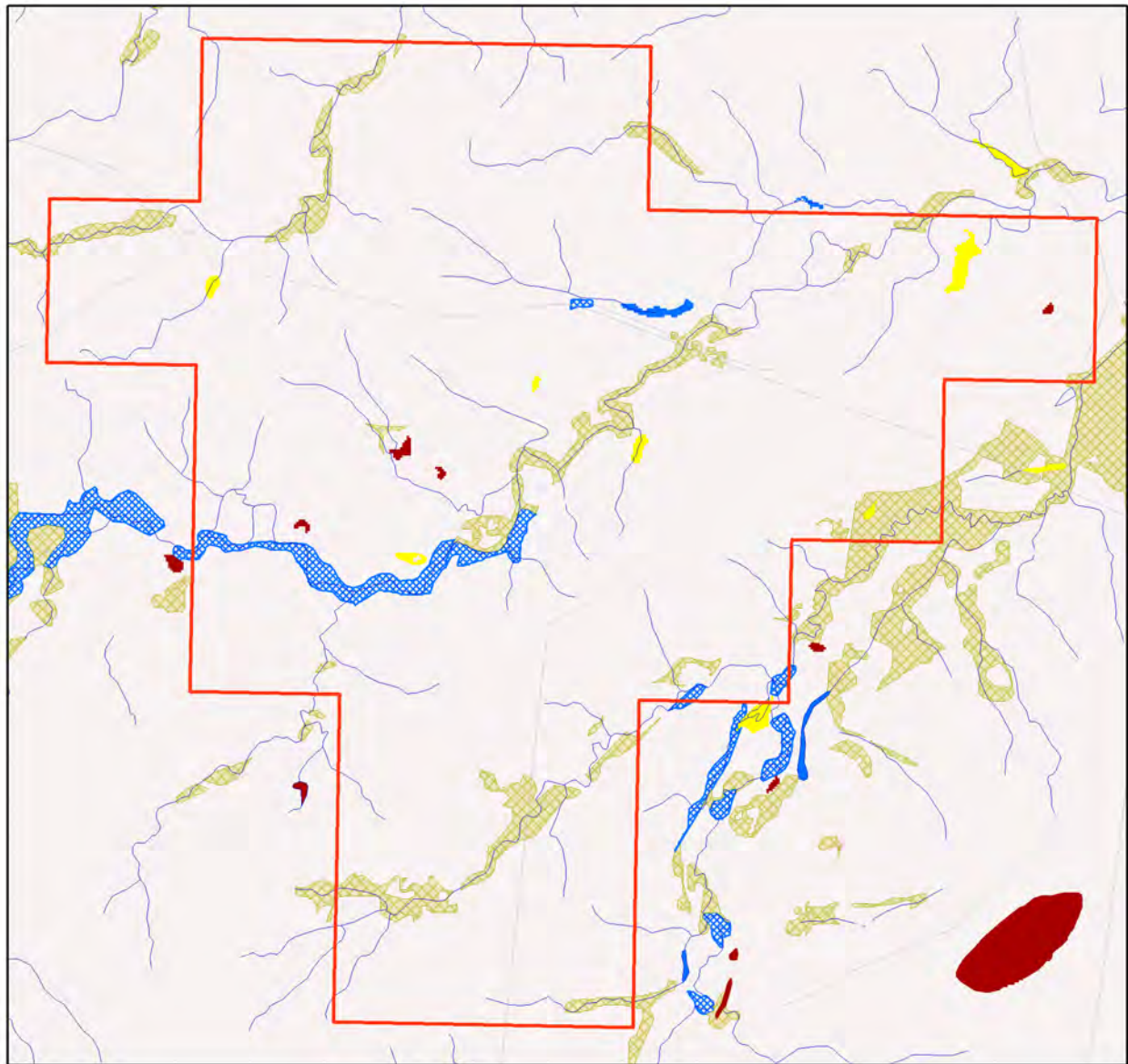
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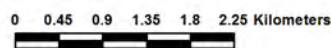
Map 4 - Wetlands and waterways



Wetlands and Waterways

Legend

- Selected Exploration Permit Coal (EPC)
 - Towns
 - Roads
 - Springs
 - Rivers/Creeks
 - Directory of Important Wetlands
 - Ramsar Sites - QLD
 - Queensland
- Wetland Type**
- Marine Waterbodies
 - Estuarine Waterbodies
 - Riverine Waterbodies
 - Lacustrine Waterbodies
 - Palustrine Waterbodies
 - Marine RE
 - Estuarine RE
 - Riverine RE
 - Lacustrine RE
 - Palustrine RE
 - RE 51-80% wetland (mosaic units)
 - RE 1-50% wetland (mosaic units)

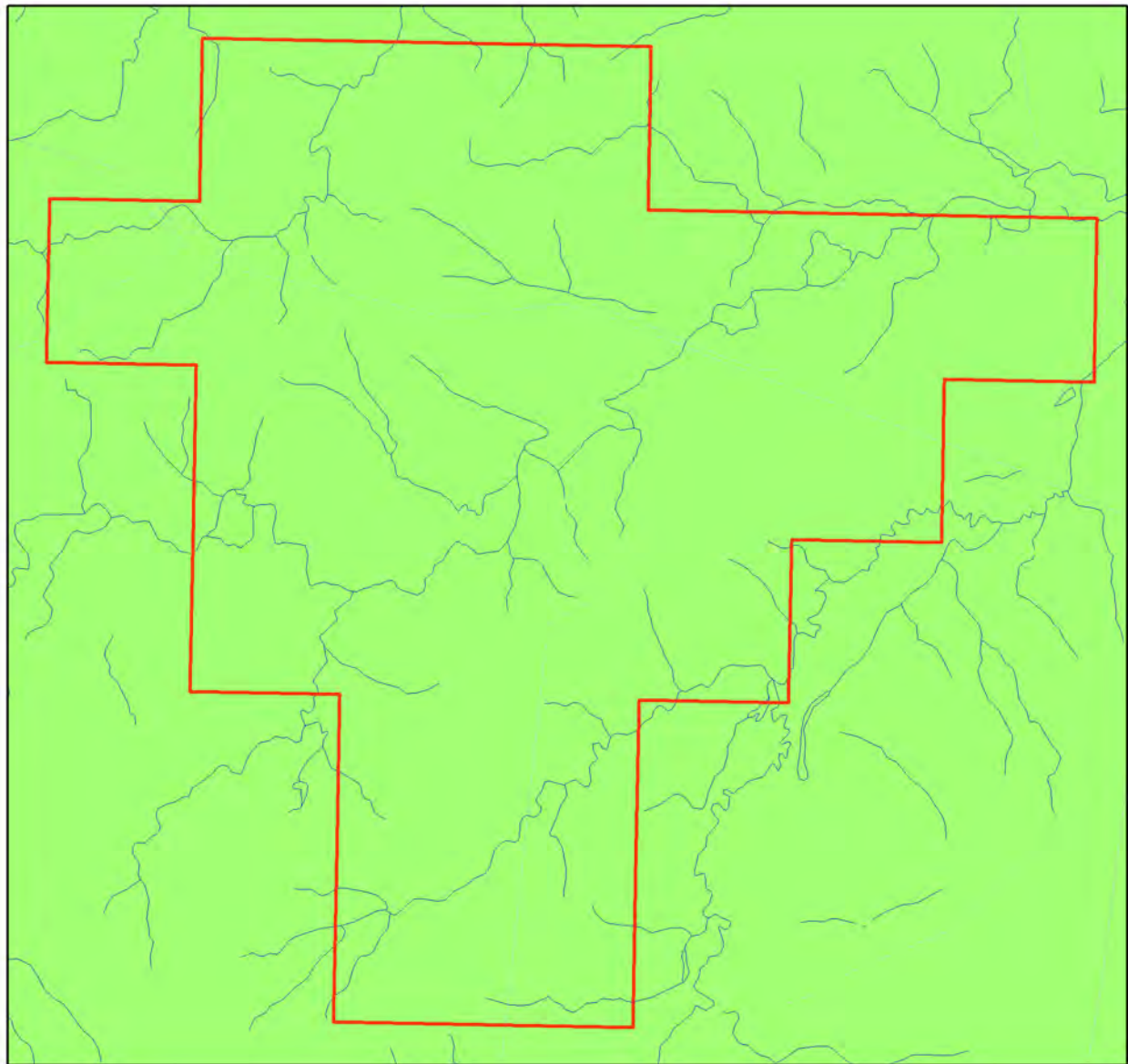


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Map 5 - Aquatic Conservation Assessment (ACA) - riverine



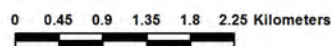
Aquatic Conservation Assessment (ACA) - riverine

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Riverine - Subcatchment Significance

- Very High
- High
- Medium
- Low
- Very Low



This product is projected into:
GDA 1994 Queensland Albers

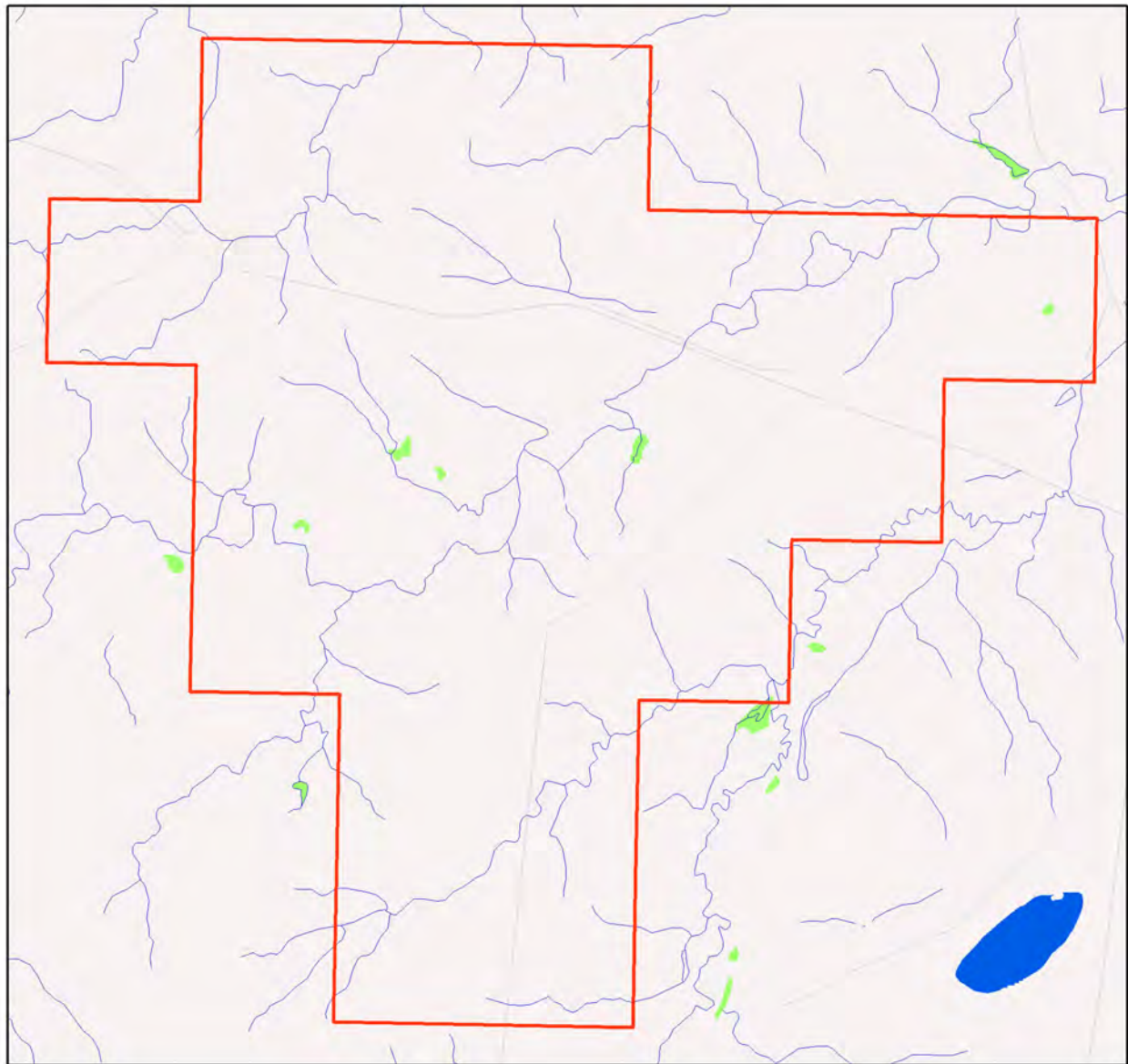
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Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



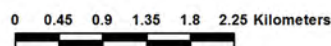
Aquatic Conservation Assessment (ACA) - nonriverine

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Roads
- Rivers/Creeks
- Queensland

ACA Non-riverine

- Very High
- High
- Medium
- Low
- Very Low



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References

Clayton, P.D., Fielder, D.F., Howell, S. and Hill, C.J. (2006) *Aquatic biodiversity assessment and mapping method (AquaBAMM): a conservation values assessment tool for wetlands with trial application in the Burnett River catchment*. Published by the Environmental Protection Agency, Brisbane. ISBN 1-90928-07-3. Available at

<http://wetlandinfo.ehp.qld.gov.au/wetlands/assessment/assessment-methods/aca/>

Environmental Protection Agency (2002) *Biodiversity Assessment and Mapping Methodology. Version 2.1, July 2002*. (Environmental Protection Agency, Brisbane).

Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series, Paper No. 4*, Biodiversity Unit, Environment Australia.

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1: Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Great Barrier Reef Catchment Non-riverine v1.3 QMDB Non-riverine ACA version 1.4 WBB Non-riverine ACA version 1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Great Barrier Reef Catchment Riverine v1.1 QMDB Riverine ACA version 1.4 WBB Riverine ACA version 1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v1.3 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Southeast Queensland v3.5
Statewide BPA Corridors*	Statewide corridors v1.1
Threatened Species	An internal DEHP database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DEHP database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DEHP database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.

*These datasets are available at:

<http://dds.information.qld.gov.au/DDS>

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
EHP	- Department of Environment and Heritage Protection
EPBC	- <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement



Queensland Government

Department of Environment and Heritage Protection

Environmental Reports

Matters of State Environmental Significance

Area of Interest: epc: 881

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@ehp.qld.gov.au

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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, AOI details

Area of Interest	EPC881
Size (ha)	7219.6
Local Government(s)	CENTRAL HIGHLANDS REGIONAL
Bioregion(s)	Brigalow Belt
Subregion(s)	Woorabinda
Catchment(s)	Fitzroy

Refer to **Map 1** for locality information.

Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992*;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004*;
- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
 - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
 - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
 - Category R areas on the regulated vegetation management map;
 - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
 - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014*;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Referable Wetlands under the Environmental Protection Regulation 2008;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

Refer to **Appendix 1** for a description of MSES categories.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

MSES Criteria 1 - STATE CONSERVATION AREAS	3.7 ha	0.1%
1.1 Protected Areas	3.7 ha	0.1%
1.2 Marine Parks	0.0 ha	0.0%
1.3 Fish Habitat Areas	0.0 ha	0.0%
MSES Criteria 2 - WETLANDS AND WATERWAYS - area features	0.0 ha	0.0%
MSES Criteria 2 - WETLANDS AND WATERWAYS - linear features	0.0 km	Not applicable
2.1 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0%
2.2 High Ecological Value (HEV) wetlands	0.0 ha	0.0%
2.2 High Ecological Value (HEV) waterways **	0.0 km	Not applicable
2.3 Strategic Environmental Areas (SEA)	0.0 ha	0.0%
MSES Criteria 3 - SPECIES	0.0 ha	0.0%
3.1 Threatened species and Iconic species	0.0 ha	0.0%
MSES Criteria 4 - REGULATED VEGETATION - area features	252.2 ha	3.5%
MSES Criteria 4 - REGULATED VEGETATION - linear features	81.4 km	Not applicable
4.1 Vegetation Management Regional Ecosystems and Remnant Map *	252.2 ha	3.5%
4.2 Vegetation Management Wetland Map *	0.0 ha	0.0%
4.3 Vegetation Management Watercourse Map **	81.4 km	Not applicable
MSES Criteria 5 - OFFSET AREAS	0.0 ha	0.0%
5.1 Legally secured offset areas	0.0 ha	0.0%
Total MSES (criteria 1.1, 1.2, 1.3, 2.1, part of 2.2, 2.3, 3.1, 4.1, 4.2 and 5.1) calculated for area features only	255.9 ha	3.5%

Please note that the area and percent area figures in the table above will not necessarily add up to the "Total MSES" figures due to overlapping values.

*The total extent area of regulated vegetation (Criteria 4.1) may be overestimated due to the presence of dominant and/or subdominant non-regulated regional ecosystems in mixed patches of vegetation, i.e. the total area of mixed vegetated patches is included irrespective of whether the patch consists only partly of endangered, of concern or wetland regional ecosystems.

**The total linear extent of watercourses may be overestimated in some instances, as both banks (rather than the centreline) of waterbodies and larger watercourses where present are mapped by the State, increasing the extent of linear features.

Additional Information with Respect to MSES Values Present

Criteria 1 - State Conservation Areas

1.1 Protected Areas

Protected Area Names
Taunton National Park

1.2 Marine Parks

(no results)

1.3 Fish Habitat Areas

(no results)

Refer to **Map 2 - MSES Criteria 1 - State Conservation Areas** for an overview of the relevant MSES.

Criteria 2 - Wetlands and Waterways

2.1 High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

2.2 High Ecological Value (HEV) wetlands

(no results)

2.2 High Ecological Value (HEV) waterways

(no results)

2.3 Strategic Environmental Areas

(no results)

Refer to **Map 3 - MSES Criteria 2 - Wetlands and Waterways** for an overview of the relevant MSES.

Criteria 3 - Species

3.1 Threatened species and Iconic species

Threatened and/or iconic species habitat within the AOI (derived from records/essential habitat mapping)

(no results)

**NCA E or V - Endangered or Vulnerable status under the NCA; VMA ehab - VMA essential habitat; Iconic - Iconic species.*

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Koala bushland habitat

(no results)

Dugong areas

(no results)

Refer to **Map 4 - MSES Criteria 3 - Species** for an overview of the relevant MSES.

Criteria 4 - Regulated Vegetation

4.1 Endangered and Of Concern regional ecosystems and Category R Regulated Vegetation

Regulated Vegetation Description	Regional Ecosystem Patch	VMA status
rem_oc	11.3.2/11.3.25	O-dom
hvr_end	11.3.1/11.3.2/11.3.25	E-dom
rem_end	11.3.2/11.3.25/11.3.1	E-subdom
rem_oc	11.3.2	O-dom
rem_end	11.3.25/11.3.1	E-subdom

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

4.2 Vegetation Management Wetlands

(no results)

Wetlands datasource

Not applicable

4.3 Watercourses shown on the Vegetation Management Watercourse and Drainage Feature Map

A vegetation management watercourse is mapped as present

Watercourses datasource

Vegetation Management Watercourse Map

Refer to **Map 5 - MSES Criteria 4 - Regulated Vegetation** for an overview of the relevant MSES.

Criteria 5 - Offset Areas

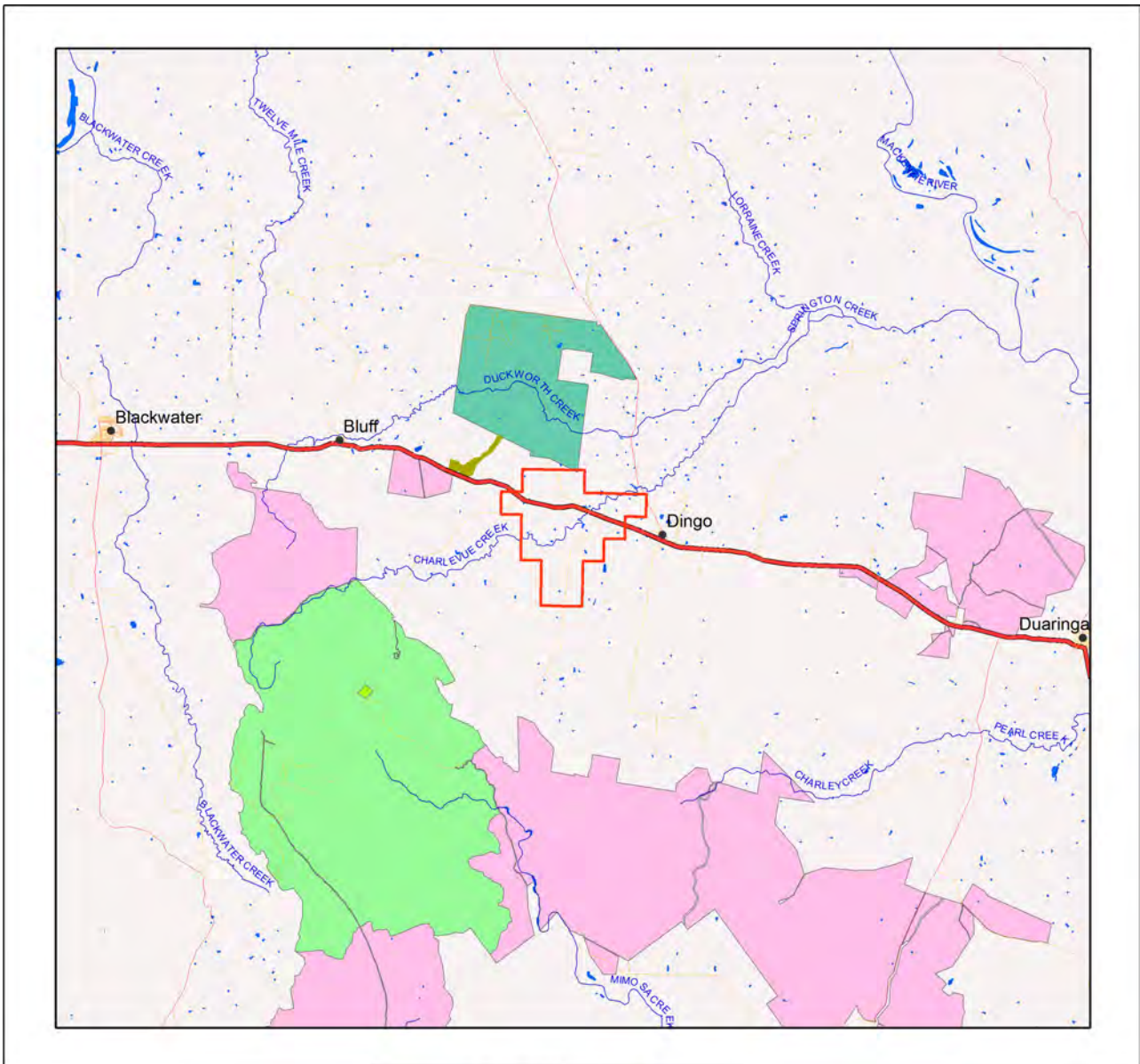
5.1 Legally secured offset areas

(no results)

Refer to **Map 6 - MSES Criteria 5 - Offset Areas** for an overview of the relevant MSES.

Maps

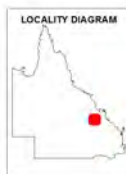
Map 1 - Location



Locality Map

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Highway
- Connector
- Street/Local Road
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Lakes and Reservoirs
- Major rivers/creeks
- Queensland



N

0 2.5 5 7.5 10 12.5 Kilometers



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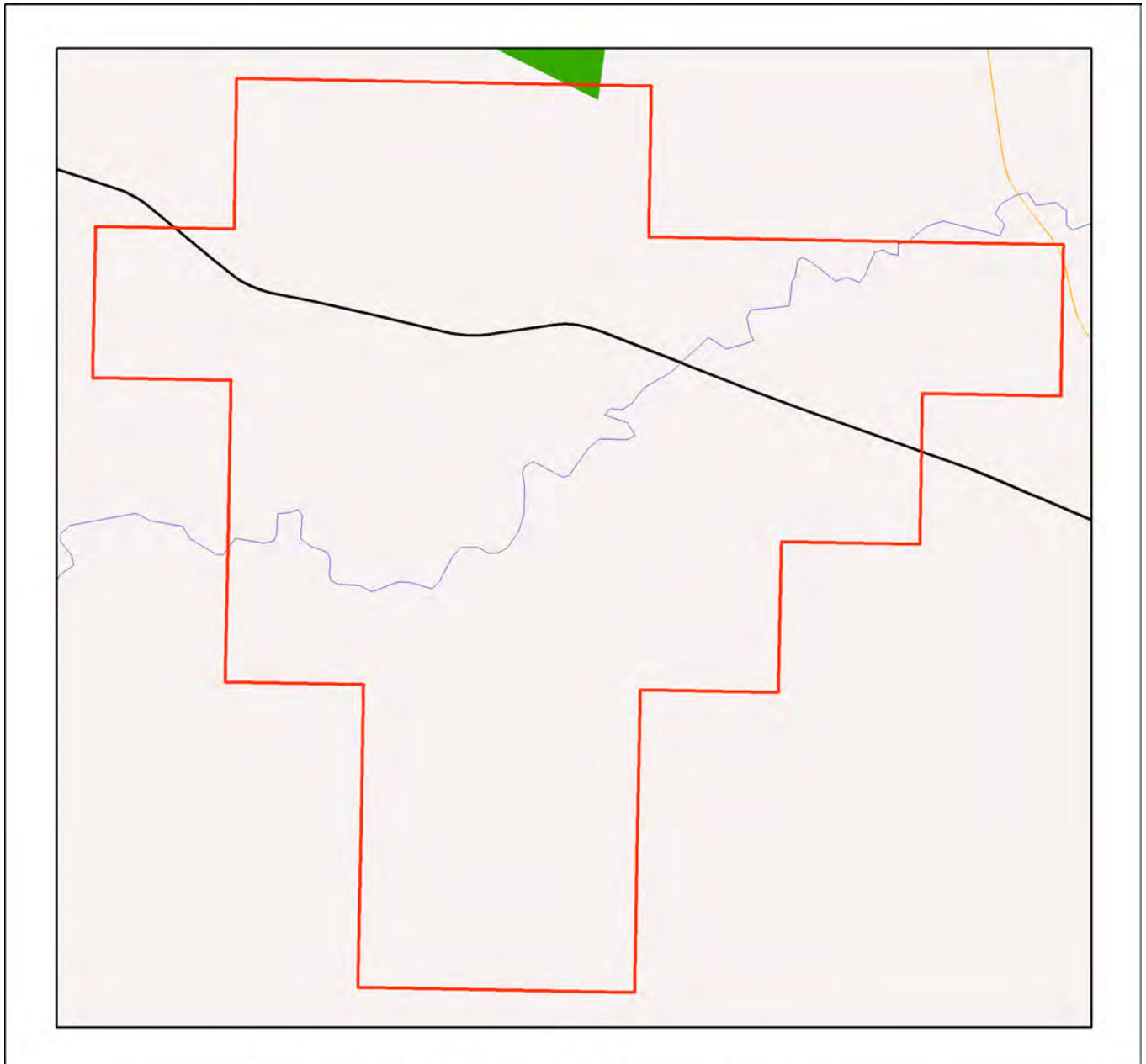
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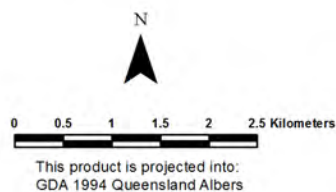
Map 2 - MSES Criteria 1 - State Conservation Areas



MSES Criteria 1- State Conservation Areas

Area of Interest

- Selected Exploration Permit Coal (EPC)
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- MSES Protected area
- MSES Declared fish habitat area
- MSES Marine park

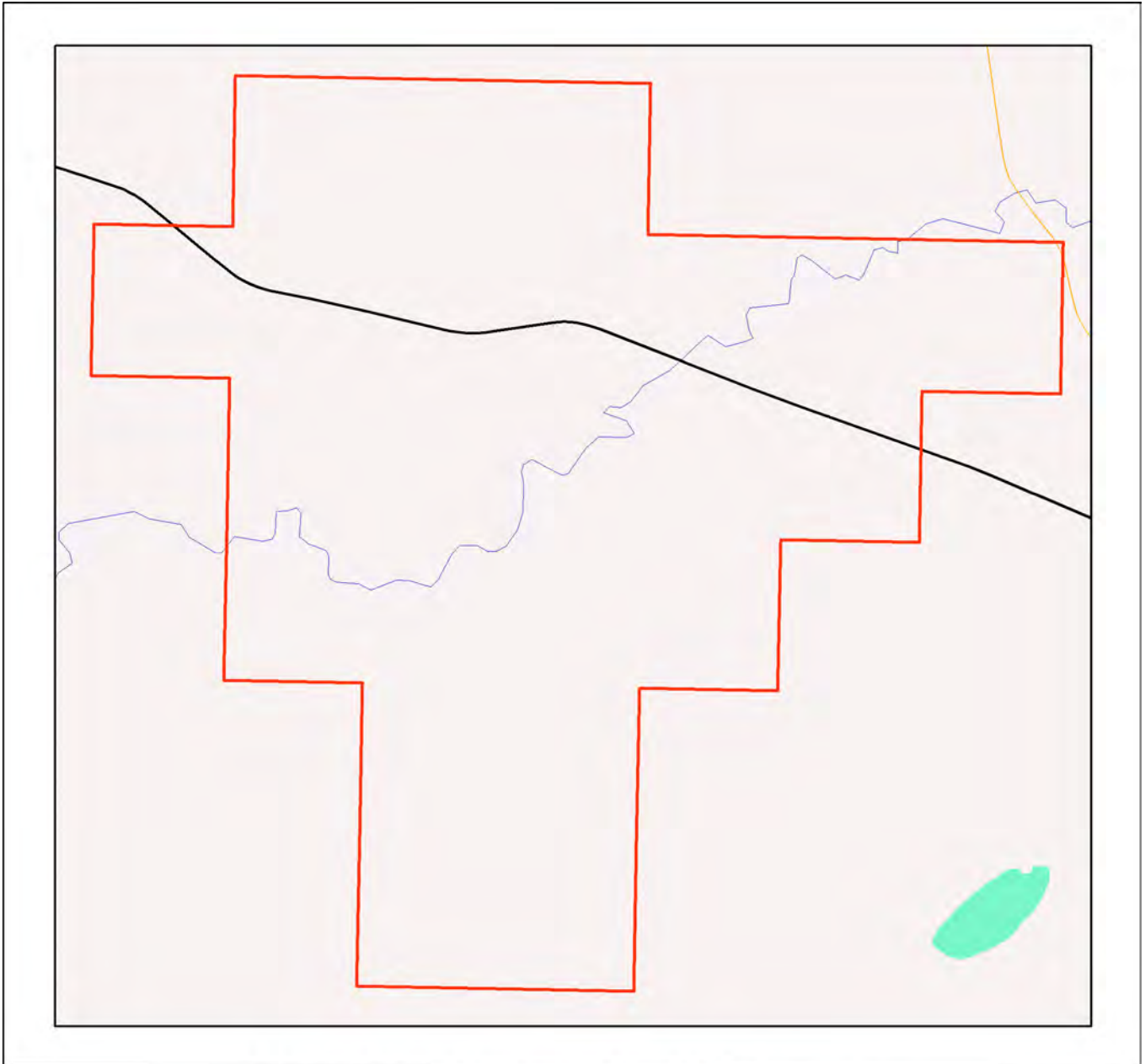


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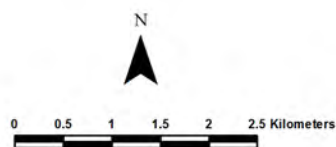
Map 3 - MSES Criteria 2 - Wetlands and Waterways



MSES Criteria 2 - Wetlands and Waterways

Area of Interest

- Selected Exploration Permit Coal (EPC)
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- MSES - High ecological value waters (watercourses)
- MSES - Strategic environmental area (designated precinct)
- MSES - High ecological value waters (wetland)
- MSES - High ecological significance wetlands



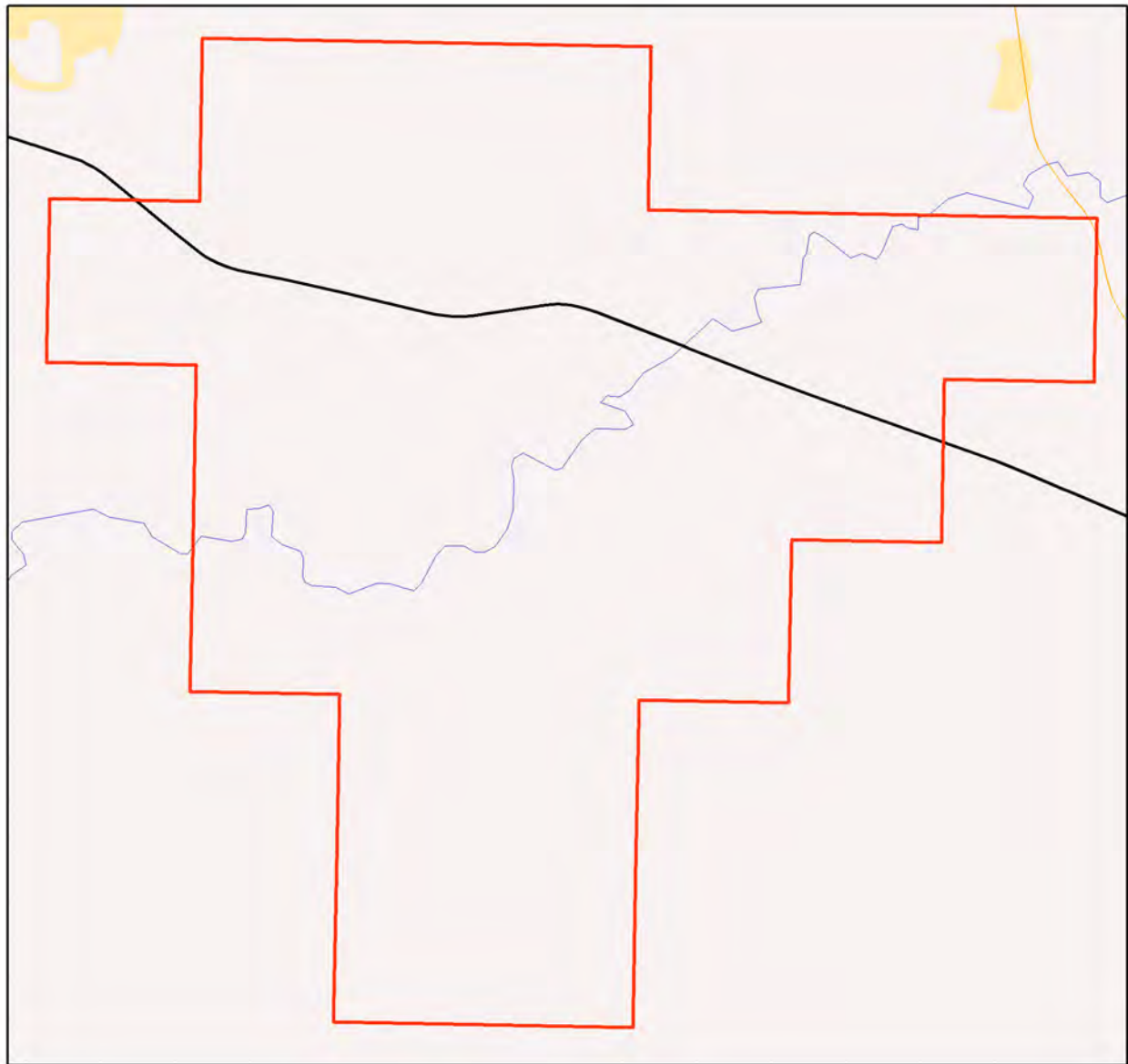
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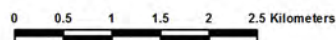
Map 4 - MSES Criteria 3 - Species



MSES Criteria 3 - Species

Area of Interest

- Selected Exploration Permit Coal (EPC)
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- MSES - Wildlife habitat



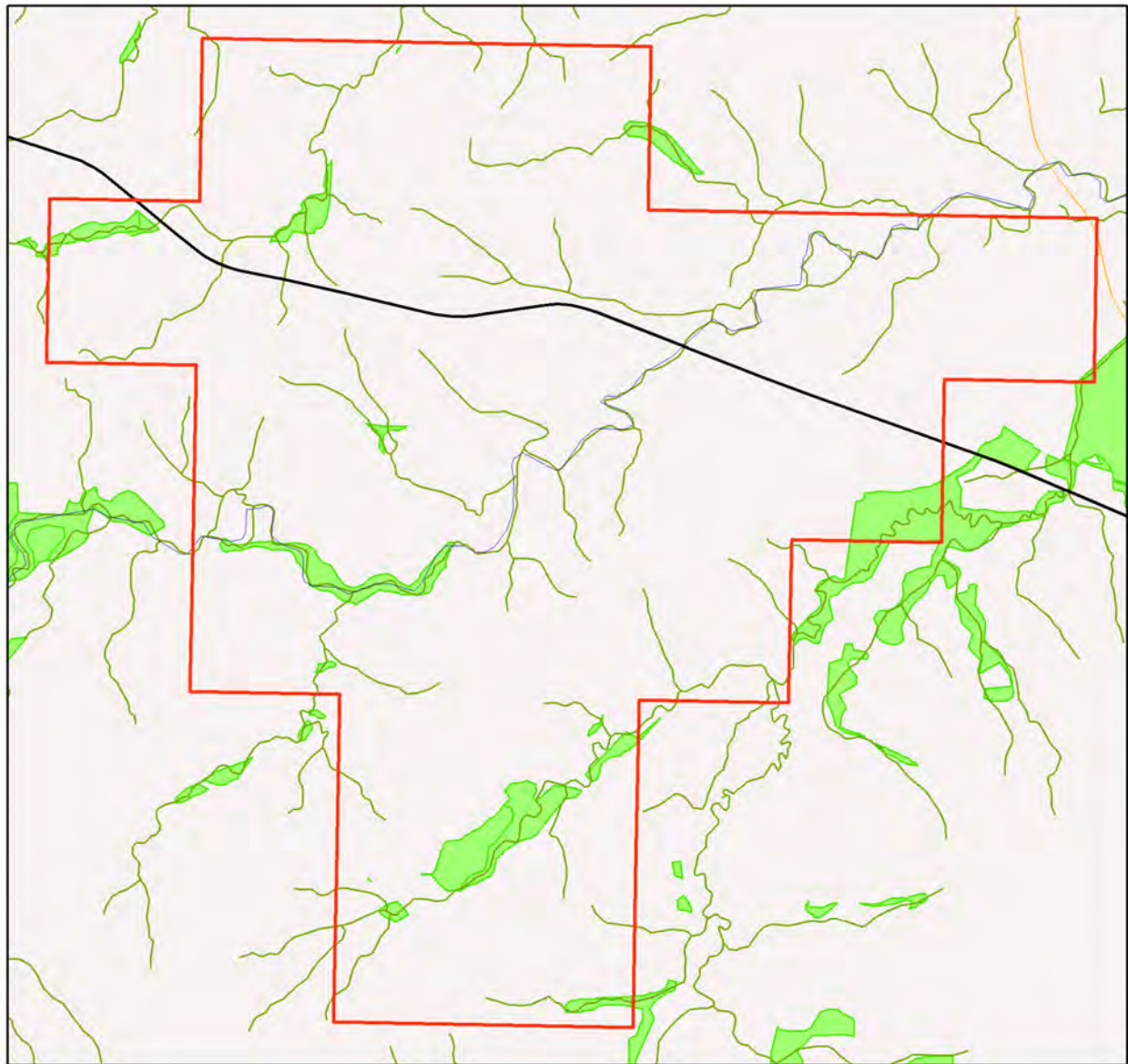
This product is projected into:
GDA 1994 Queensland Albers

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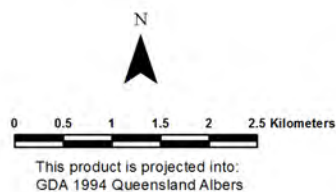
Map 5 - MSES Criteria 4 - Regulated Vegetation



MSES Criteria 4 - Regulated Vegetation

Area of Interest

- Selected Exploration Permit Coal (EPC)
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- MSES - Regulated vegetation (intersecting a watercourse)
- MSES - Regulated vegetation

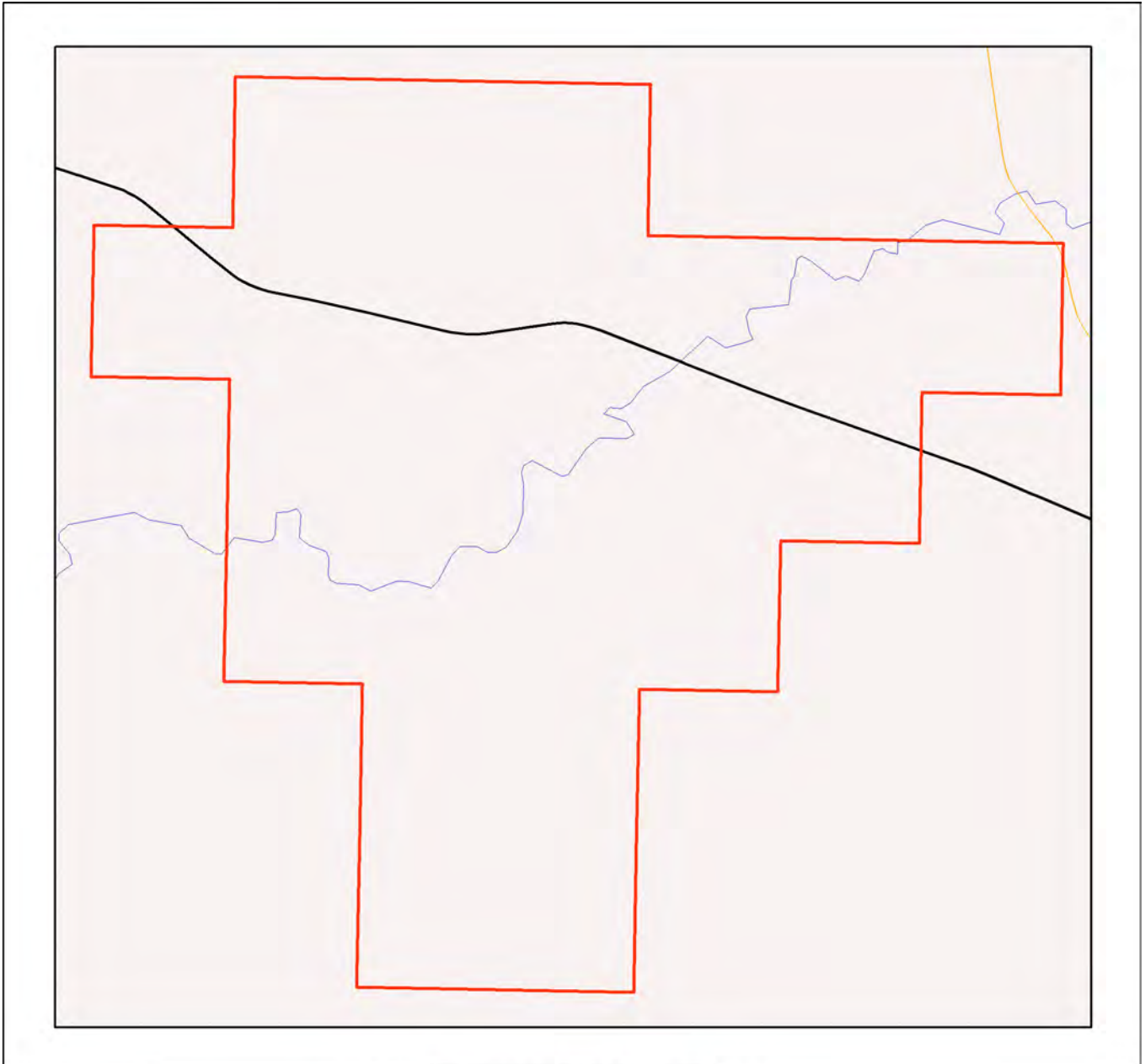


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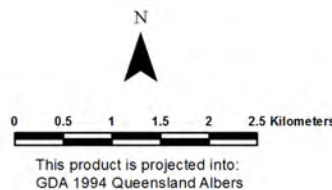
Map 6 - MSES Criteria 5 - Offset Areas



MSES Criteria 5 - Offset Areas

Area of Interest

-  Selected Exploration Permit Coal (EPC)
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  MSES - Legally secured offset area

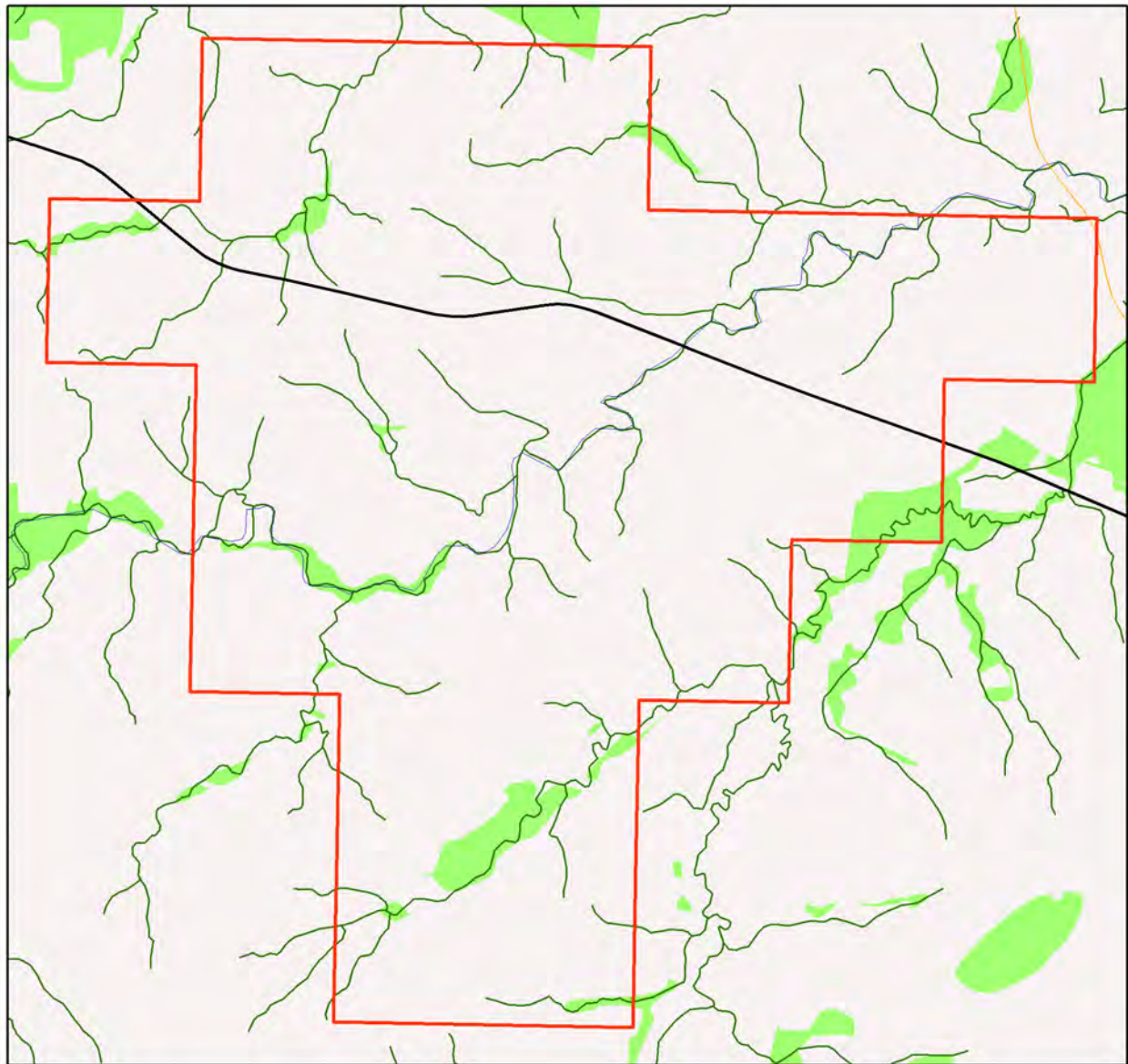


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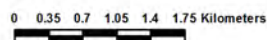
Map 7 - Matters of State Environmental Significance



Matters of State Environmental Significance

Area of Interest

- Selected Exploration Permit Coal (EPC)
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Matters of State Environmental Significance (watercourses)
- Matters of State Environmental Significance (areas)



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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) Criteria

Feature Name	Description
1.1 Protected Areas (NCA)	Protected areas under the <i>Nature Conservation Act 1992</i> , except coordinated conservation areas.
1.2 Marine Parks (MPA)	The following State marine parks zones under the <i>Marine Parks Act 2004</i> : <ul style="list-style-type: none"> - Marine National Park zone; - Marine Conservation Park zone; - Scientific Research zone; - Preservation zone; - Buffer zone.
1.3 Fish Habitat Areas (FA)	The following areas under the <i>Fisheries Act 1994</i> including: All fish habitat areas.
2.1 'High Ecological Significance' wetlands on the Map of Referable Wetlands	All natural wetlands that are 'High Ecological Significance' (HES) on the Map of Referable Wetlands. Exclude: any amendments to the Map of Referable Wetlands.
2.2 High Ecological Value (HEV) wetlands and waterways (EP Act)	Natural wetlands and waterways that occur in HEV (maintain) freshwater and estuarine areas under the Environmental Protection (Water) Policy.
2.3 Strategic Environmental Areas (RPI Act)	Designated precinct areas under the <i>Regional Planning Interests Act 2014</i> .
3.1 Threatened species and Iconic species (NCA)	Habitat for: Threatened wildlife under <i>Nature Conservation Act 1992</i> including: 'Endangered' and 'Vulnerable' species. Special least concern animals under the <i>Nature Conservation Act 1992</i> including: Koala (outside SEQ); Echidna and Platypus.
4.1 Vegetation Management Regional Ecosystem and Remnant Map (VMA)	Include VMA 'Endangered' and 'Of Concern' remnant (Category A and B) and high value regrowth (Category C) REs and Category R (GBR regrowth watercourse) areas from the Regulated Vegetation Management Map.
4.2 Vegetation Management Wetland Map (VMA)	Wetlands that are lakes and swamps shown on the Vegetation Management Wetlands Map.
4.3 Vegetation Management Watercourse and Drainage Feature Map (VMA)	Watercourses shown on the Vegetation Management Watercourse and Drainage Feature Map.
5.1 Legally secured offset areas (VMA, EP Act, SPA, TIA, EA)	Offset areas legally secured under a covenant, conservation agreement or development approval condition.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html>.

Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance
- Matters of State environmental significance drainage lines
- Boundaries of the Great Barrier Reef Marine Park

Note: MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Underlying data sources used to develop individual releases of compiled MSES mapping include, but are not limited to:

[- Regulated vegetation including:](#)

- Regulated Regional Ecosystems and Regrowth
- Regulated Essential habitat
- Regulated Wetlands
- Regulated Watercourses and Drainage
- Former Regrowth

[- Queensland Wetland Mapping \(v3\)](#)

[- Essential Habitat Mapping](#)

[- Protected Areas](#)

[- Marine Parks](#)

[- Fish Habitat Areas](#)

[- Strategic Environmental Areas](#)

[- The Map of Referable Wetlands:](#)

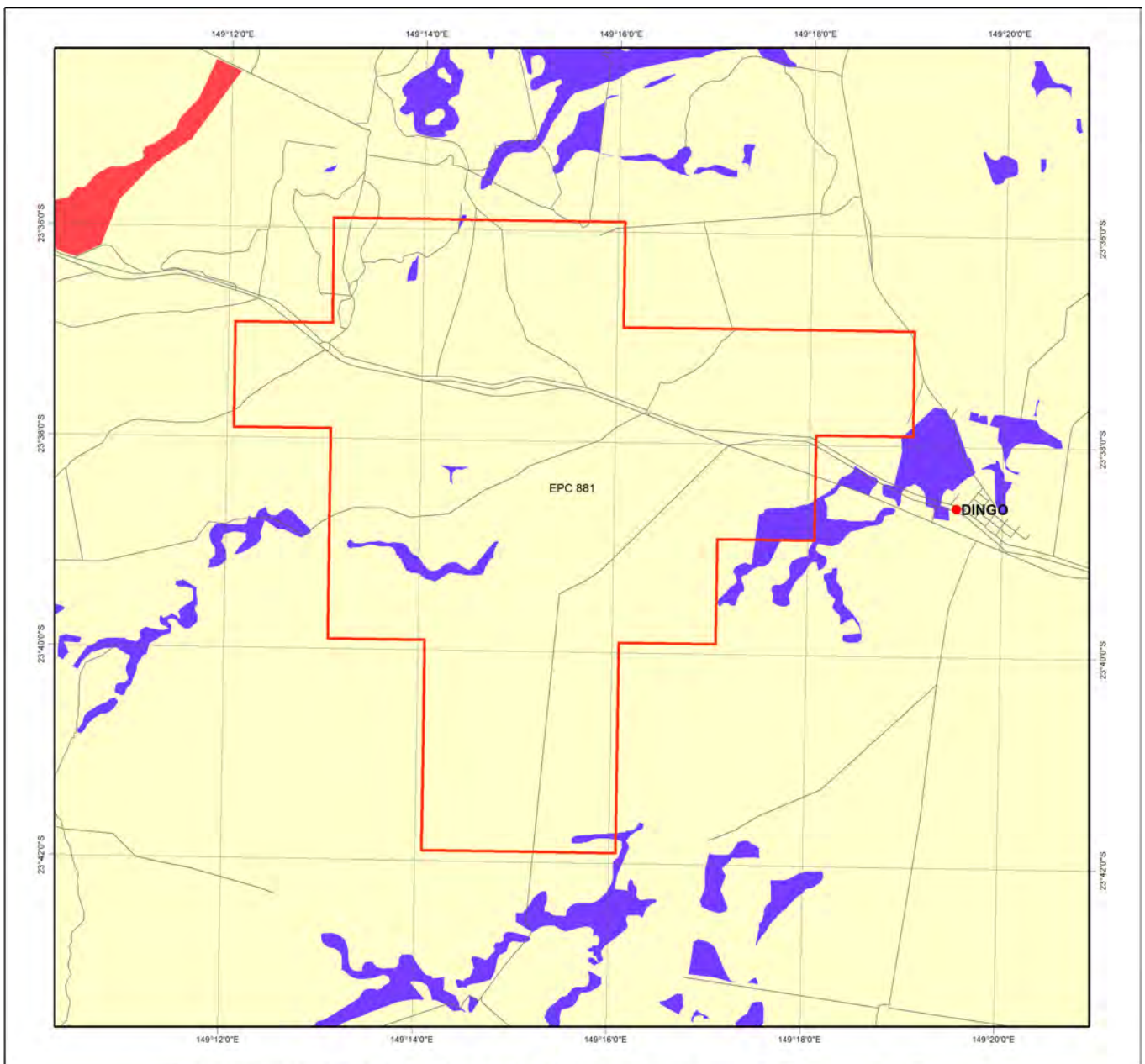
- [Wetland Protection Areas \(HES wetlands in the GBR\)](#)
- [Wetland Management Areas \(contains other HES wetlands\)](#)

Datasets reflective of the above matters can be downloaded via the Queensland Spatial Catalogue:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

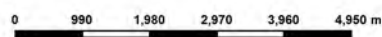
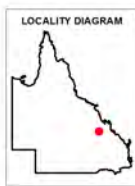
Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
EHP	- Department of Environment and Heritage Protection
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- | | |
|--|---|
| Selected Exploration Permit Coal (EPC) | CATEGORY C |
| CATEGORY A | Nature Refuges |
| National Parks | Resources Reserve |
| Conservation Parks | State Forests |
| Forest Reserves | Timber Reserves |
| Wet Tropics World Heritage Area | Declared Catchment Areas |
| Great Barrier Reef Marine Park Area | Declared Irrigation Areas |
| Marine Parks other than General Use Zones | Drainage Areas |
| CATEGORY B | River Improvement Areas |
| World Heritage Areas | Stanbrooke DLA |
| Queensland Heritage Register Places | Coastal Management District |
| Ramsar Sites | Dams and Weirs |
| Cultural Heritage Registered Areas and DLA's other than Stanbrooke | OTHERS |
| Special Forestry Areas | Towns |
| Fish Habitat Areas | Roads |
| Koala Plan | Repealed Wild River Nominated Waterways |
| Coordinated Conservation Areas | Repealed Wild River Preservation Areas |
| Endangered Regional Ecosystems (Biodiversity Status) | Repealed Wild River High Preservation Areas |
| Marine Parks other than General Use Zones | Mahogany Glider Habitat |
| Marine Plants | Directory of Important Wetlands |
| | Queensland |



This product is projected into GDA 1994 MGA Zone 55

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External contributors (non-government parties) of the data for this product are: Great Barrier Reef Marine Park Authority

Regional ecosystem mapping (remnant biodiversity status) may incorporate amendments, resulting from property level assessments, to the release version of the mapping available on QSpatial.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.

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Queensland Government

Department of Environment and Heritage Protection

Environmental Reports

Regional Ecosystems

Biodiversity Status

Area of Interest: epc: 881

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the Queensland Herbarium's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the status used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources and Mines website

<https://www.dnrm.qld.gov.au/>

Please direct queries about these reports to: Queensland.Herbarium@dsitia.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

Table 1: Area of interest details

Area of Interest	EPC881
Size (ha)	7219.6
Local Government(s)	CENTRAL HIGHLANDS REGIONAL
Bioregion(s)	Brigalow Belt
Subregion(s)	Woorabinda
Catchment(s)	Fitzroy

The table below summarizes the extent of remnant vegetation classified as "Endangered", "Of concern" and "No concern at present" classified by Biodiversity Status within the area of interest (AOI).

Table 2: Summary table, biodiversity status of regional ecosystems within the AOI

Biodiversity Status	Area (Ha)	% of AOI
Endangered	6.4	0.1
Of concern	237.5	3.3
No concern at present	1842.1	25.5
Total remnant vegetation	2086.0	28.9

Refer to **Map 2** for further information.

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem is regularly reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c).

The Queensland Herbarium has developed a methodology for mapping regional ecosystems across Queensland. As new information is obtained, the descriptions and status of regional ecosystems is updated. Regional ecosystems and broad vegetation groups descriptions in the format of Sattler and Williams (1999) are maintained in the Regional Ecosystem Description Database (REDD). Vegetation communities and regional ecosystems are amalgamated into the higher level classification of broad vegetation groups (BVGs).

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of matters relevant to the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium's Regional Ecosystem Mapping, and not mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Natural Resources and Mines website.

<https://www.dnrm.qld.gov.au/>

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 per cent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (1000 ha); or patch size (100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.

2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI, the associated short description, Biodiversity Status using the Queensland Herbarium's framework and the extent area present within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

Table 3: Remnant regional ecosystems, description and status within the AOI

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.3.1	Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains	Endangered	6.4	0.1
11.3.2	Eucalyptus populnea woodland on alluvial plains	Of concern	125.3	1.7
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	112.1	1.6
11.5.2	Eucalyptus crebra, Corymbia spp., with E. moluccana woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces	No concern at present	1004.5	13.9
11.5.9b	Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces	No concern at present	142.9	2.0
11.7.2	Acacia spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	No concern at present	694.7	9.6
non-rem	None	None	5133.6	71.1

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before European settlement.

Table 4 provides further information in regards to the remnant regional ecosystems present within the site with respect to the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

Table 4: Remnant regional ecosystems within the AOI, additional information

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.3.1	In 2013, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained	25a	None	Low
11.3.2	In 2013, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained	17a	Contains palustrine wetland (e.g. in swales).	Low

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.3.25	In 2013, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained	16a	Riverine wetland or fringing riverine wetland.	Low
11.5.2	In 2013, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained	18b	None	Low
11.5.9b	In 2013, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained	18b	None	Low
11.7.2	In 2013, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained	24a	None	Low
non-rem	None	None	None	None

Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.

Map 6 displays the distribution of mapped wetland systems within the area of interest.

The following table lists known special values associated with a regional ecosystem type.

Table 5: Remnant regional ecosystems within the AOI, special values

Regional Ecosystem	Special Values
11.3.1	Habitat for threatened fauna species including painted honeyeater, <i>Grantiella picta</i> particularly in subregion 35 (Oliver et al. 2003).
11.3.2	Habitat for threatened flora species <i>Homopholis belsonii</i> .
11.3.25	Habitat for threatened flora species including <i>Eucalyptus raveretiana</i> . Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species.
11.5.2	None
11.5.9b	None
11.7.2	Habitat for threatened flora species including <i>Acacia wardellii</i> .
non-rem	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional).

A comprehensive description of BVGs is available at:

<https://publications.qld.gov.au/dataset/vegetation-qlld/resource/921fa786-e6d5-4a8a-9b0c-e532d2ce3f32>

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

Table 6: Broad vegetation groups (1 million) within the AOI

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	5133.6	71.1
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	112.1	1.6
17a	Woodlands dominated by <i>Eucalyptus populnea</i> (poplar box) (or <i>E. brownii</i> (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	125.3	1.7
18b	Woodlands dominated <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark) frequently with <i>Corymbia</i> spp. or <i>Callitris</i> spp. on flat to undulating plains. (land zones 5, 3) (BRB, DEU, EIU, GUP, CYP)	1147.4	15.9
24a	Low woodlands to tall shrublands dominated by <i>Acacia</i> spp. on residuals. Species include <i>A. shirleyi</i> (lancewood), <i>A. catenulata</i> (bendee), <i>A. microsperma</i> (bowyakkka), <i>A. clivicola</i> , <i>A. sibirica</i> , <i>A. rhodoxylon</i> (rosewood) and <i>A. leptostachya</i> (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	694.7	9.6
25a	Open forests to woodlands dominated by <i>Acacia harpophylla</i> (brigalow) sometimes with <i>Casuarina cristata</i> (belah) on heavy clay soils. Includes areas co-dominated with <i>A. cambagei</i> (gidgee) and/or emergent eucalypts (land zones 4, 9, 3, 11, 7, 12, [5, 8]) (BRB, MUL, MGD, DEU, [SEQ])	6.4	0.1

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant area (hectares) of each vegetation community derived from the regional ecosystem mapping (spatial) data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Quantitative site data from relatively undisturbed sites are extracted from CORVEG and summarized to provide information specific to each vegetation community.

Technical descriptions include the attributes: tree canopy height and cover and native plant species composition of the predominant layer, which are used to assess the remnant status of vegetation under the *Vegetation Management Act 1999*.

However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used where possible (Neldner et al. 2012 (PDF)* section 3.3.1 of:

<http://www.qld.gov.au/environment/assets/documents/plants-animals/herbarium/herbarium-mapping-methodology.pdf>

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

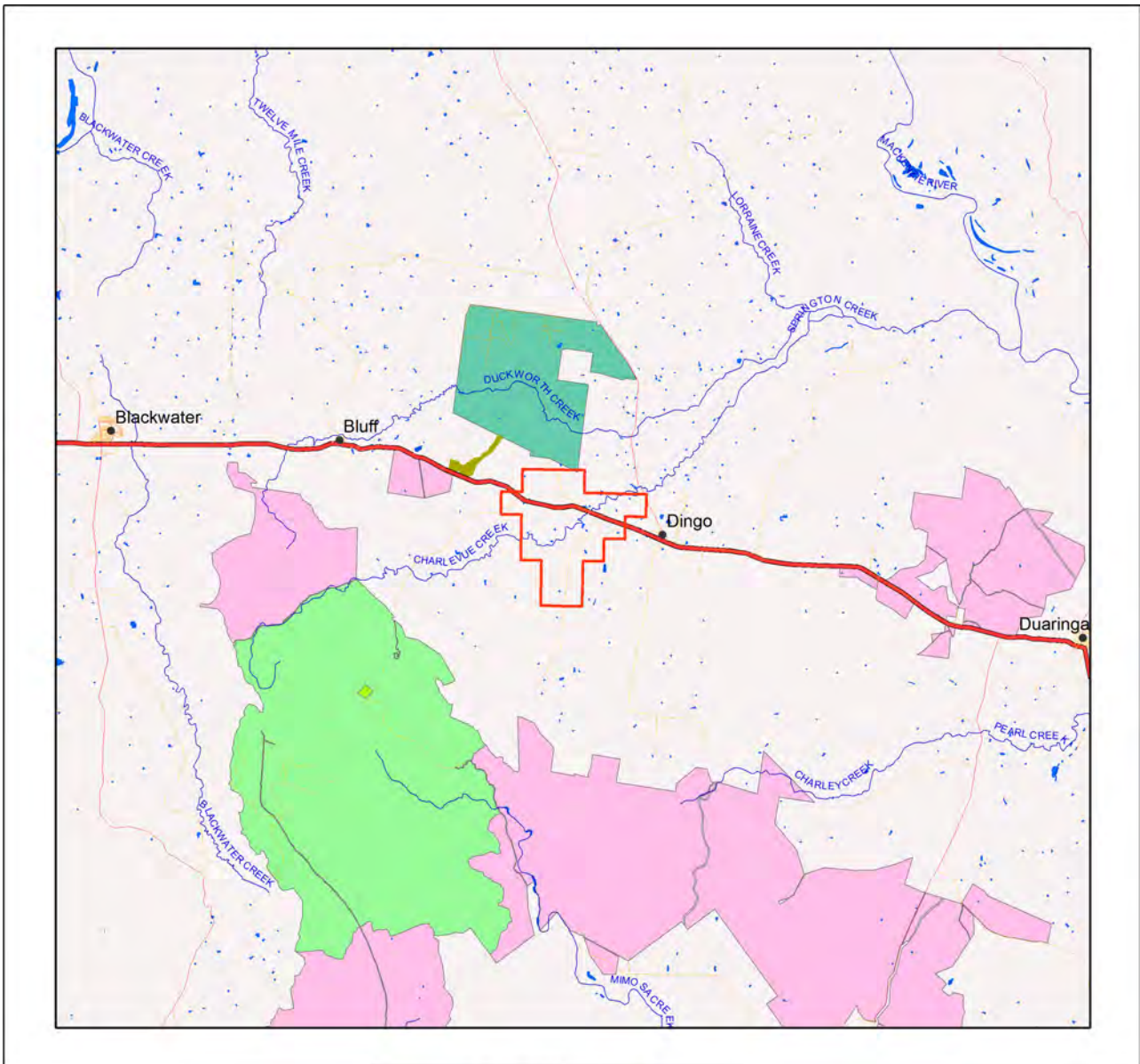
Benchmarks are subject to review based on additional data and expert opinion. Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.3.1	Not currently available	Available
11.3.2	Not currently available	Available
11.3.25	Not currently available	Available
11.5.2	Not currently available	Not currently available
11.5.9b	Not currently available	Not currently available
11.7.2	Not currently available	Not currently available
non-rem	Not currently available	Not currently available

Maps

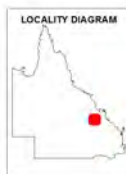
Map 1 - Location



Locality Map

Legend

- Selected Exploration Permit Coal (EPC)
- Towns
- Highway
- Connector
- Street/Local Road
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Lakes and Reservoirs
- Major rivers/creeks
- Queensland



N

0 2.5 5 7.5 10 12.5 Kilometers



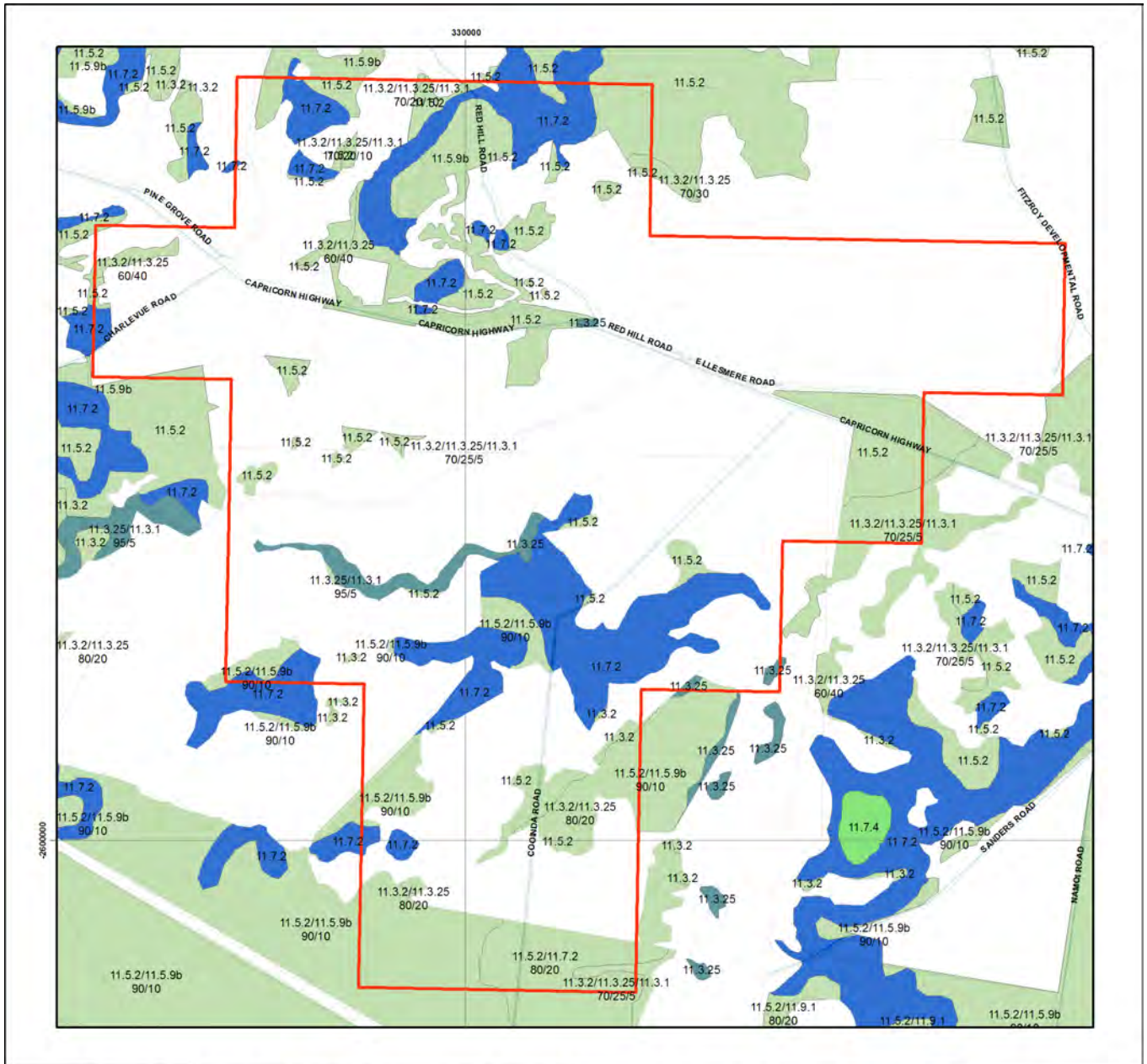
This product is projected into:
GDA 1994 Queensland Albers

DISCLAIMER:
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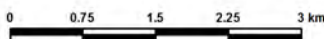
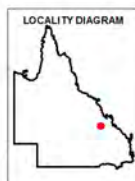
Map 4 - Remnant regional ecosystems by BVG (5M)



Remnant 2015 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- Selected Exploration Permit Coal (EPC)
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forlands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

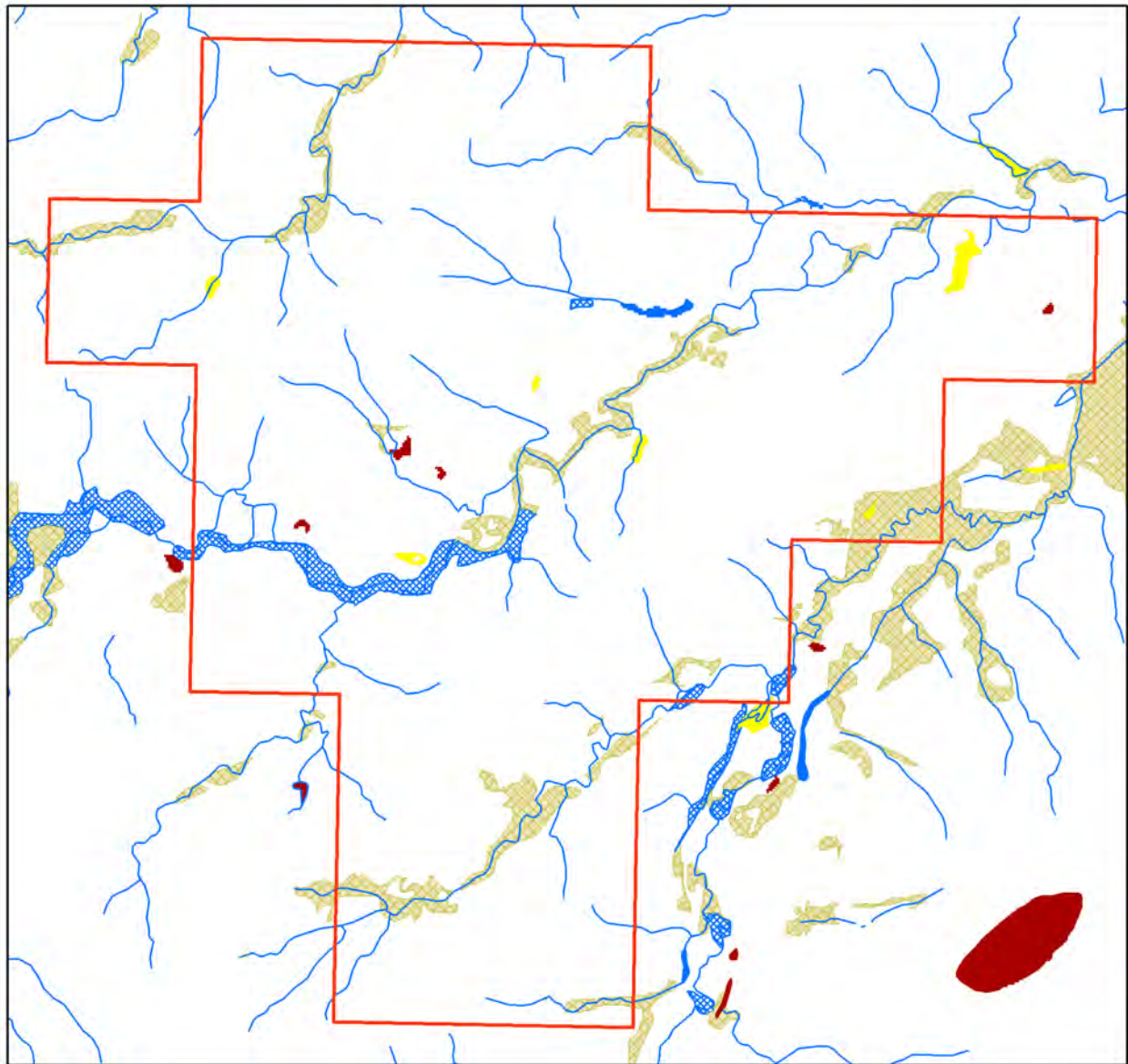
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The label consists of 3 components: bioregion, land zone, and vegetation community - the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.

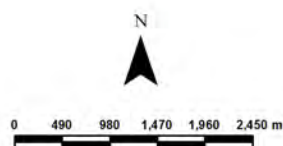
Map 6 - Wetlands and waterways



Queensland Wetland Data

Legend

- Selected Exploration Permit Coal (EPC)
- ▲ Towns (gazateer)
- Queensland Wetland Data**
- Riverine Drainage Lines
- ▲ Springs
- Wetland System - Water Bodies**
- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Wetland System - Regional Ecosystems**
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)



This product is projected into:
GDA 1994 Queensland Albers

Accuracy information: The positional accuracy of wetland data mapped at a scale of 1:100,000 is +/-100m with a minimum polygon size of 5ha or 75m wide for linear features, except for areas along the east coast which are mapped at the 1:50,000 scale with a positional accuracy of +/-50m, with a minimum polygon size of 1ha or 35m wide for linear features. Wetlands smaller than 1ha are not delineated on the wetland data. Consideration of the effects of mapped scale is necessary when interpreting data at a larger scale, e.g. 1:25,000. For property assessment, digital linework should be used as a guide only. The extent of wetlands depicted on this map is based on rectified 2013 Landsat ETM+ imagery supplied by Statewide Landcover and Trees Study (SLATS), Department of Science, Information Technology and Innovation (DSITI). The extent of water bodies is based on the maximum extent of inundation derived from available Landsat imagery up to and including the 2013 imagery.

Links and Other Information Sources

The Department of Environment and Heritage's Website -

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

<https://publications.qld.gov.au/dataset/vegetation-qld/resource/921fa786-e6d5-4a8a-9b0c-e532d2ce3f32>

The methodology for mapping regional ecosystems can be downloaded from:

<http://www.qld.gov.au/environment/assets/documents/plants-animals/herbarium/herbarium-mapping-methodology.pdf>

Technical descriptions for regional ecosystems can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

Benchmarks can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

For further information associated with the remnant regional ecosystem dataset used by this report, such as the year at which the extent of remnant is reflective of, refer to the metadata associated with the relevant Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) and which is available through the Queensland Government Information System portal,

<http://dds.information.qld.gov.au/dds/>

The Queensland Globe is a mapping and data application implemented inside the Google Earth TM application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

References

Neldner, V.J., Wilson, B.A., Thompson, E.J., and Dillewaard, H.A. (2012). *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

<http://www.qld.gov.au/environment/assets/documents/plants-animals/herbarium/herbarium-mapping-methodology.pdf>

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F. and Ford, A.J. (2014). *The Vegetation of Queensland. Descriptions of Broad Vegetation Groups*. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

<https://publications.qld.gov.au/dataset/vegetation-qld/resource/921fa786-e6d5-4a8a-9b0c-e532d2ce3f32>

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1: Source Data

The dataset listed below is available for download from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/>

- Regional Ecosystem Description Database

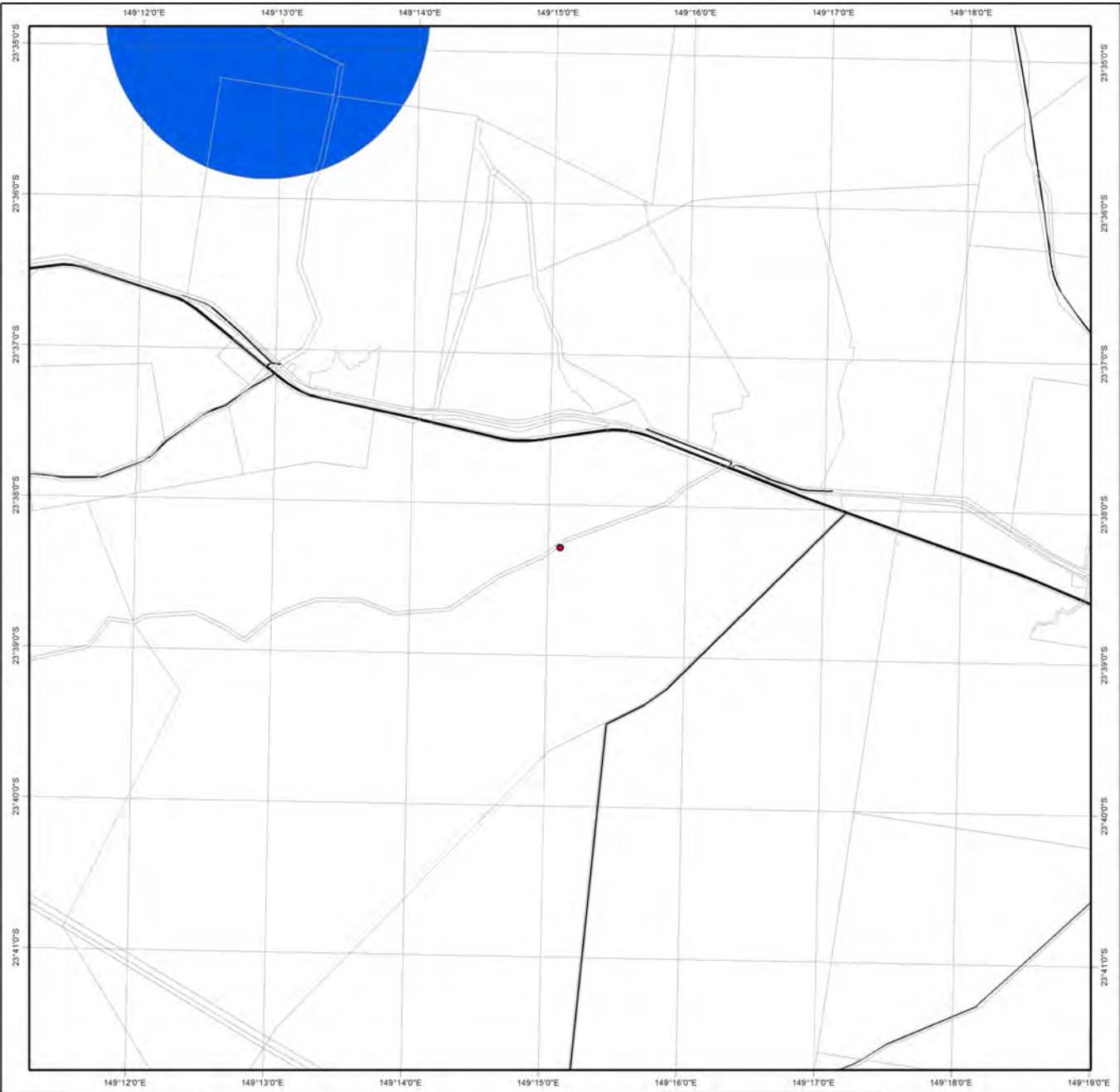
The datasets listed below are available for download from:

<http://dds.information.qld.gov.au/dds/>

- Remnant Regional Ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

Appendix 2 - Acronyms and Abbreviations

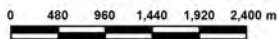
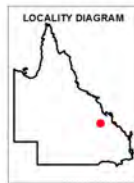
AOI	- Area of Interest
DNRM	- Department of Natural Resources and Mines
EHP	- Department of Environment and Heritage Protection
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



Protected Plants Flora Survey Trigger Map

Legend

- Coordinates
- High risk area
- Cadastral line
Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Heritage Protection at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.



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: 03/06/19 10:44:27

[Summary](#)

[Details](#)

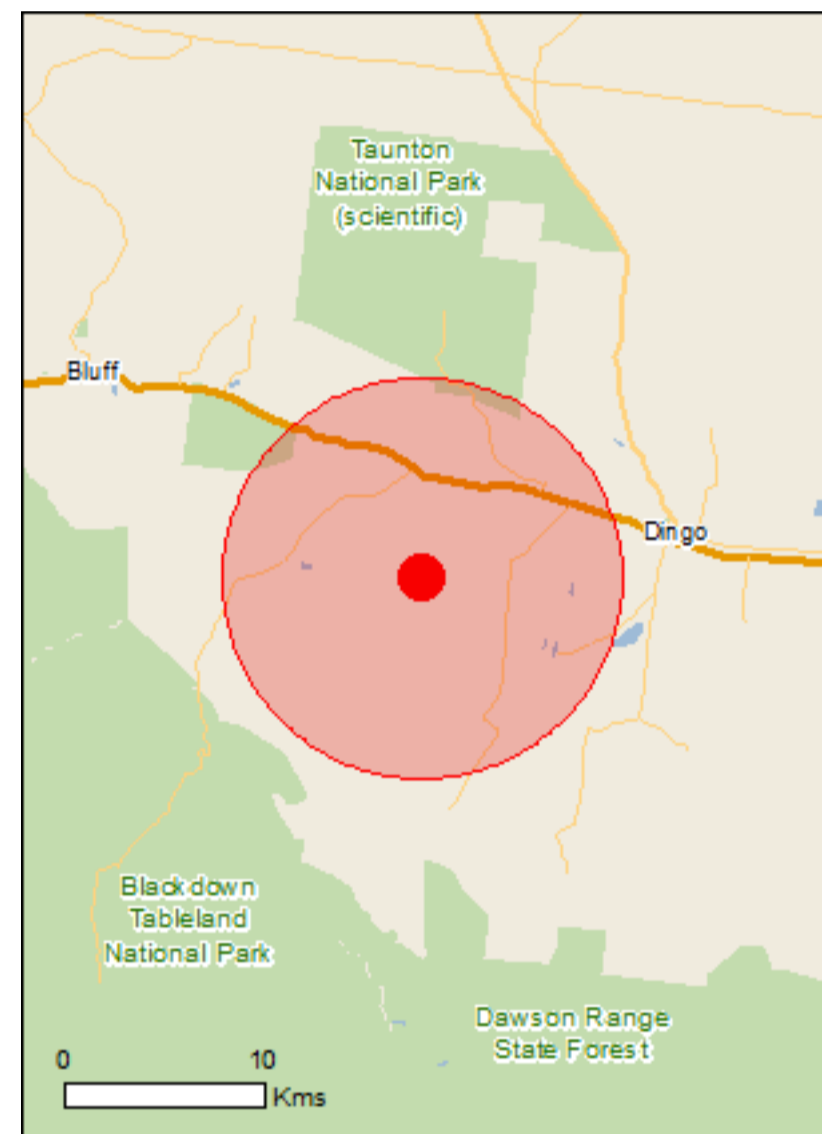
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

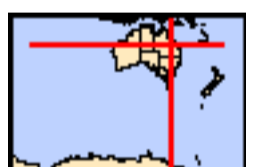
[Acknowledgements](#)



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

[Coordinates](#)

[Buffer: 10.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	25
Listed Migratory Species:	12

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:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	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:	2
Regional Forest Agreements:	None
Invasive Species:	21
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Weeping Myall Woodlands	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 may occur within area
Erythrorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Mammals		

Name	Status	Type of Presence
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Onychogalea fraenata Bridled Nail-tail Wallaby, Bridled Naitail Wallaby [239]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Logania diffusa [24159]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat likely to occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmali Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	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		

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to 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

Name	Threatened	Type of Presence within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely 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 may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely 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 habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Taunton	QLD
Wallaby Lane	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 Resources Audit, 2001.

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

Birds

Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Frogs

Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
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Mammals

Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus 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

Name	Status	Type of Presence
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
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
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Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
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Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

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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.

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- 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

-23.66512 149.21782

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- [-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.



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: 03/06/19 09:45:56

[Summary](#)

[Details](#)

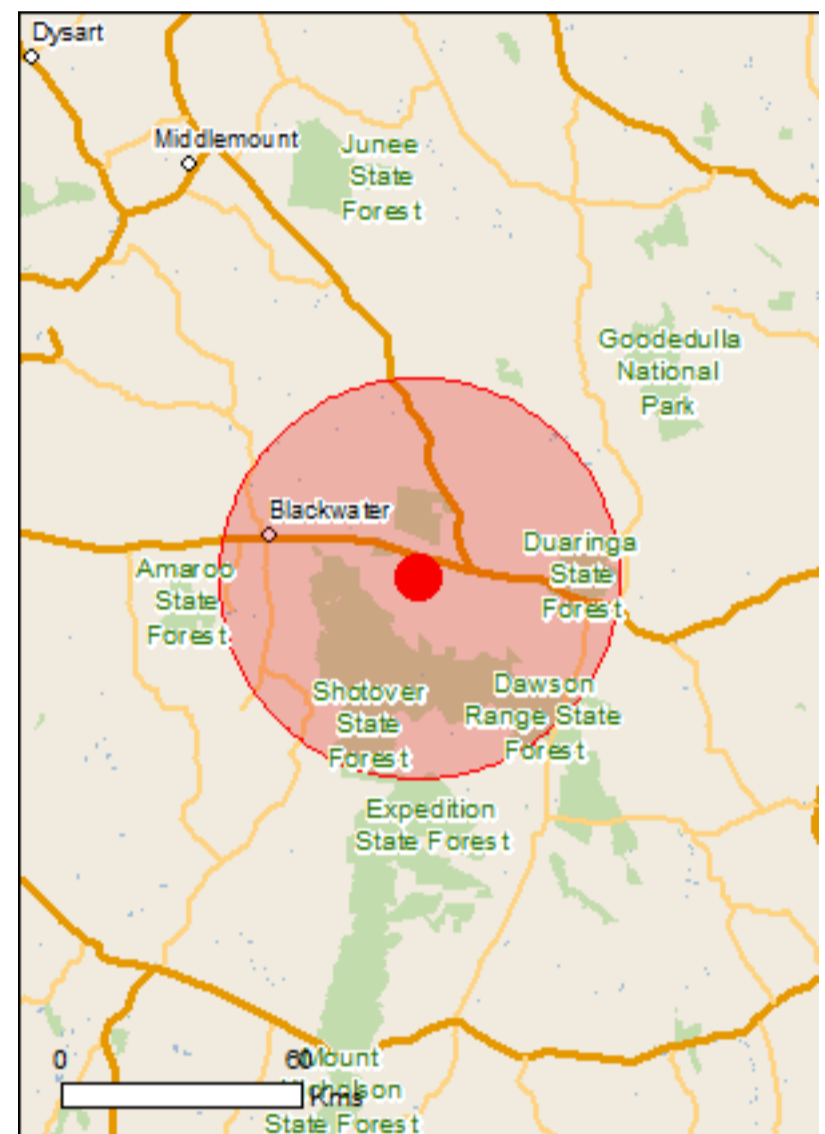
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

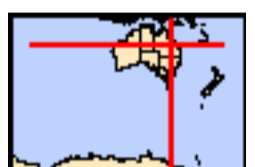
[Acknowledgements](#)



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

[Coordinates](#)

Buffer: 50.0Km



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:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	39
Listed Migratory Species:	16

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	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:	5
Regional Forest Agreements:	None
Invasive Species:	27
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	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 may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may 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 may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species

Name	Status	Type of Presence
habitat likely to occur within area		
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Onychogalea fraenata Bridled Nail-tail Wallaby, Bridled Naitail Wallaby [239]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) 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 poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Acacia grandifolia [3566]	Vulnerable	Species or species habitat known to occur within area
Aristida annua [17906]	Vulnerable	Species or species habitat likely to occur within area
Bertya opposens [13792]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Cycas ophiolitica [55797]	Endangered	Species or species habitat likely to occur within area
Daviesia discolor [3567]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat may occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Eucalyptus raveretiana Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Homoranthus decumbens a shrub [55186]	Endangered	Species or species habitat known to occur within area
Logania diffusa [24159]	Vulnerable	Species or species habitat likely to occur within area
Macrozamia platyrhachis cycad [3412]	Endangered	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Solanum dissectum [75720]	Endangered	Species or species habitat known to occur within area
Solanum johnsonianum [84820]	Endangered	Species or species habitat may occur within area

Reptiles

Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat known to occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area
Furina dunmali Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	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 Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[\[Resource Information \]](#)

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

Name
Defence - BLACKWATER TRAINING DEPOT

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		

Name	Threatened	Type of Presence
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 likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely 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 habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
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Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		habitat likely to occur within area Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Reptiles

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

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Blackdown Tableland	QLD
Blackwater	QLD
Ghungalu	QLD
Taunton	QLD
Wallaby Lane	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 Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area

Frogs

<i>Rhinella marina</i> Cane Toad [83218]		Species or species habitat known to occur within area
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Mammals

<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Lepus capensis</i> Brown Hare [127]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Sus scrofa</i> Pig [6]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Acacia nilotica</i> subsp. <i>indica</i> Prickly Acacia [6196]		Species or species habitat may occur within area
<i>Cryptostegia grandiflora</i> Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
<i>Hymenachne amplexicaulis</i> Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
<i>Jatropha gossypifolia</i> 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
<i>Lantana camara</i> 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
<i>Opuntia</i> spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
<i>Parkinsonia aculeata</i> Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
<i>Parthenium hysterophorus</i> Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
<i>Prosopis</i> spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
<i>Salvinia molesta</i> Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
<i>Tamarix aphylla</i> Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering		Species or species habitat likely to occur

Name	Status	Type of Presence
Cypress, Salt Cedar [16018] Vachellia nilotica		within area
Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

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- [-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.



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: -23.6381

Longitude: 149.2514

Distance: 10

Email: llopez@aacrc.net.au

Date submitted: Thursday 13 Jun 2019 10:03:40

Date extracted: Thursday 13 Jun 2019 10:10:12

The number of records retrieved = 7

Disclaimer

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

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

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

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	17
animals	mammals	Macropodidae	<i>Onychogalea fraenata</i>	bridled nailtail wallaby		E	E	15
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	2
plants	Equisetopsida	Apocynaceae	<i>Cerbera dumicola</i>			NT		2/2
plants	Equisetopsida	Solanaceae	<i>Solanum elachophyllum</i>			E		1
plants	Equisetopsida	Solanaceae	<i>Solanum adenophorum</i>			E		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.



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Status: All

Records: All

Date: All

Latitude: -23.6381

Longitude: 149.1514

Distance: 10

Email: llopez@aacrc.net.au

Date submitted: Thursday 13 Jun 2019 10:54:38

Date extracted: Thursday 13 Jun 2019 11:00:02

The number of records retrieved = 397

Disclaimer

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

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			4
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		1
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		1
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		5
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		1
animals	birds	Acanthizidae	<i>Smicromnis brevirostris</i>	weebill		C		3
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		7
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		3
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		6
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		2
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		1
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		1
animals	birds	Anatidae	<i>Anas rhynchotis</i>	Australasian shoveler		C		1
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		2
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		3
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		1
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		1
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		1
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		1
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		1
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		2
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		10
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		6
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		1
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		8
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		3
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		3
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		2
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		1
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		6
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		1
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		2
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		4
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	8

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		4
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		2
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		5
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		1
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		3
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		5
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		2
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		3
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		9
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		1
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		3
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		1
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		1
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		1
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		9
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		1
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		2
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		4
animals	birds	Gruidae	<i>Grus rubicunda</i>	brolga		C		3
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		7
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		2
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		2
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		1
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		2
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		1
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		7
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		2
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		1
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		3
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		3
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		3
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		7
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		1
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		5
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		7
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		11
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		2
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		7
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		11

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		11
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		3
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		3
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		2
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		2
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		1
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		7
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		2
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		5
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		5
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		1
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		6
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		11/1
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		1
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		1
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		4
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	piebald cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		1
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		1
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		3
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		1
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		4
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		2
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		8
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		2
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		7
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		5
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		1
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		1
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		1
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		10
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		6
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		1
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		4
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		1
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		1
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		1
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		3
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			1
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			1
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				6
animals	mammals	Equidae	<i>Equus caballus</i>	horse	Y			1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			3
animals	mammals	Hipposideridae	<i>Hipposideros ater aruensis</i>	eastern dusky leaf-nosed bat		C		1
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			2
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			2
animals	mammals	Macropodidae	<i>Macropus dorsalis</i>	black-striped wallaby		C		5
animals	mammals	Macropodidae	<i>Onychogalea fraenata</i>	bridled nailtail wallaby		E	E	13
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		2
animals	mammals	Macropodidae	<i>Macropus robustus</i>	common wallaroo		C		1
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		1
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			5
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		1
animals	mammals	Peramelidae	<i>Perameles nasuta</i>	long-nosed bandicoot		C		1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		4
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		2
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	2
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			1
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		4
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		2
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		2/1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		1/1
animals	reptiles	Boidae	<i>Aspidites melanocephalus</i>	black-headed python		C		1
animals	reptiles	Carphodactylidae	<i>Nephurus asper</i>	spiny knob-tailed gecko		C		2/1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		1
animals	reptiles	Diplodactylidae	<i>Oedura monilis</i>	ocellated velvet gecko		C		1/1
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko		NT		3
animals	reptiles	Elapidae	<i>Demansia vestigiata</i>	lesser black whipsnake		C		2
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		1
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake		C		1/1
animals	reptiles	Gekkonidae	<i>Gehyra catenata</i>	chain-backed dtella		C		1/1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		32
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		6
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		2/1
animals	reptiles	Scincidae	<i>Cryptoblepharus australis</i>	inland snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard		C		1
animals	reptiles	Scincidae	<i>Morethia taenioleura</i>	fire-tailed skink		C		2
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		1
animals	reptiles	Scincidae	<i>Concinnia brachysoma</i>	northern bar-sided skink		C		1/1
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		2
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		6
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		1
plants	Equisetopsida	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		1
plants	Equisetopsida	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			1/1
plants	Equisetopsida	Amaranthaceae	<i>Ptilotus polystachyus</i>			C		1/1
plants	Equisetopsida	Amoryllidaceae	<i>Crinum flaccidum</i>	Murray lily		C		1
plants	Equisetopsida	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		20
plants	Equisetopsida	Apocynaceae	<i>Cerbera dumicola</i>			NT		2/2
plants	Equisetopsida	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		10/1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia straminea</i>	monkey rope		C		6
plants	Equisetopsida	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia eucalyptophylla</i>	gargaloo		C		1
plants	Equisetopsida	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1
plants	Equisetopsida	Asteraceae	<i>Cyanthillium cinereum</i>			C		5
plants	Equisetopsida	Asteraceae	<i>Coronidium glutinosum</i>			C		2/2
plants	Equisetopsida	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		2
plants	Equisetopsida	Cactaceae	<i>Harrisia martinii</i>		Y			1
plants	Equisetopsida	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			2
plants	Equisetopsida	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Lysiphyllum carronii</i>	ebony tree		C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Cassia brewsteri</i>			C		21/1
plants	Equisetopsida	Capparaceae	<i>Capparis</i>			C		1
plants	Equisetopsida	Capparaceae	<i>Capparis mitchellii</i>			C		1
plants	Equisetopsida	Capparaceae	<i>Capparis loranthifolia</i>			C		1
plants	Equisetopsida	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		5/1
plants	Equisetopsida	Capparaceae	<i>Capparis canescens</i>			C		5
plants	Equisetopsida	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak		C		1
plants	Equisetopsida	Casuarinaceae	<i>Casuarina cunninghamiana subsp. cunninghamiana</i>			C		1/1
plants	Equisetopsida	Celastraceae	<i>Elaeodendron australe var. integrifolium</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Maireana</i>			C		2
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena</i>			C		1/1
plants	Equisetopsida	Chenopodiaceae	<i>Salsola australis</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Maireana microphylla</i>			C		2/2
plants	Equisetopsida	Clusiaceae	<i>Hypericum gramineum</i>			C		1
plants	Equisetopsida	Colchicaceae	<i>Iphigenia indica</i>			C		2/2
plants	Equisetopsida	Combretaceae	<i>Terminalia oblongata</i>			C		7
plants	Equisetopsida	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		1
plants	Equisetopsida	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		2
plants	Equisetopsida	Convolvulaceae	<i>Evolvulus alsinoides var. decumbens</i>			C		2
plants	Equisetopsida	Crassulaceae	<i>Bryophyllum x houghtonii</i>		Y			1/1
plants	Equisetopsida	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			9
plants	Equisetopsida	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine		C		1
plants	Equisetopsida	Cyperaceae	<i>Cyperaceae</i>			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Cyperaceae	<i>Cyperus fulvus</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Fimbristylis aestivalis</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus conicus</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus alterniflorus</i>			C		2/1
plants	Equisetopsida	Dipterocarpaceae	<i>Shorea</i>			C		1/1
plants	Equisetopsida	Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree		C		18/2
plants	Equisetopsida	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		1/1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia tannensis subsp. eremophila</i>			C		2
plants	Equisetopsida	Fabaceae	<i>Daviesia filipes</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Jacksonia scoparia</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Medicago polymorpha</i>	burr medic	Y			1/1
plants	Equisetopsida	Fabaceae	<i>Stylosanthes scabra</i>		Y			4
plants	Equisetopsida	Fabaceae	<i>Hovea linearis x Hovea planifolia</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Desmodium macrocarpum</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Jacksonia rhadinoclona</i>	Miles dogwood		C		1
plants	Equisetopsida	Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y			1
plants	Equisetopsida	Fabaceae	<i>Daviesia filipes subsp. filipes</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Crotalaria verrucosa</i>			C		1/1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia rotundifolia</i>			C		2
plants	Equisetopsida	Goodeniaceae	<i>Scaevola spinescens</i>	prickly fan flower		C		1/1
plants	Equisetopsida	Lamiaceae	<i>Plectranthus parviflorus</i>			C		1/1
plants	Equisetopsida	Loganiaceae	<i>Mitrasacme oasena</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Hibiscus divaricatus</i>			C		1
plants	Equisetopsida	Malvaceae	<i>Sida sp. (Aramac E.J.Thompson+ JER192)</i>			C		5/4
plants	Equisetopsida	Malvaceae	<i>Abutilon</i>			C		1
plants	Equisetopsida	Malvaceae	<i>Sida cordifolia</i>		Y			5/1
plants	Equisetopsida	Malvaceae	<i>Sida atherophora</i>			C		3
plants	Equisetopsida	Malvaceae	<i>Sida hackettiana</i>			C		3
plants	Equisetopsida	Malvaceae	<i>Hibiscus splendens</i>	pink hibiscus		C		1/1
plants	Equisetopsida	Malvaceae	<i>Malvastrum americanum</i>		Y			2
plants	Equisetopsida	Malvaceae	<i>Sida aprica var. aprica</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Hibiscus sturtii var. sturtii</i>			C		1
plants	Equisetopsida	Malvaceae	<i>Sida rohlenae subsp. rohlenae</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Malvastrum americanum var. americanum</i>		Y			1
plants	Equisetopsida	Meliaceae	<i>Owenia acidula</i>	emu apple		C		2/1
plants	Equisetopsida	Meliaceae	<i>Melia azedarach</i>	white cedar		C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia leiocalyx subsp. leiocalyx</i>			C		2/2
plants	Equisetopsida	Mimosaceae	<i>Leucaena leucocephala subsp. leucocephala</i>		Y			1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia blakei subsp. blakei</i>			C		2/1
plants	Equisetopsida	Mimosaceae	<i>Vachellia farnesiana</i>		Y			1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia bancroftiorum</i>			C		3/3
plants	Equisetopsida	Mimosaceae	<i>Acacia harpophylla</i>	brigalow		C		10
plants	Equisetopsida	Mimosaceae	<i>Acacia rhodoxylon</i>	ringy rosewood		C		26
plants	Equisetopsida	Mimosaceae	<i>Albizia lebbek</i>	Indian siris		C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia shirleyi</i>	lancewood		C		10/4
plants	Equisetopsida	Mimosaceae	<i>Acacia salicina</i>	doolan		C		10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Mimosaceae	<i>Acacia caroleae</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia excelsa</i>			C		4
plants	Equisetopsida	Mimosaceae	<i>Acacia cretata</i>			C		8/6
plants	Equisetopsida	Moraceae	<i>Ficus opposita</i>			C		2/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus thozetiana</i>			C		2/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		5
plants	Equisetopsida	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>citriodora</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>acuta</i>			C		2
plants	Equisetopsida	Myrtaceae	<i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i> x <i>Eucalyptus thozetiana</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia clarksoniana</i>			C		8/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		7/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia dallachiana</i>			C		3
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		30
plants	Equisetopsida	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		1
plants	Equisetopsida	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum		C		1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca groveana</i>			NT		2/2
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		3
plants	Equisetopsida	Myrtaceae	<i>Melaleuca nervosa</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		21/2
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus cambageana</i>	Dawson gum		C		14
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus suffulgens</i>			C		1/1
plants	Equisetopsida	Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>			C		2
plants	Equisetopsida	Orchidaceae	<i>Dendrobium speciosum</i>			C		1/1
plants	Equisetopsida	Oxalidaceae	<i>Oxalis corniculata</i>		Y			1
plants	Equisetopsida	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus</i>			C		1/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus virgatus</i>			C		6
plants	Equisetopsida	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		6
plants	Equisetopsida	Pittosporaceae	<i>Pittosporum angustifolium</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida</i>			C		9
plants	Equisetopsida	Poaceae	<i>Cymbopogon</i>			C		1
plants	Equisetopsida	Poaceae	<i>Enneapogon</i>			C		1
plants	Equisetopsida	Poaceae	<i>Eragrostis</i>			C		2
plants	Equisetopsida	Poaceae	<i>Oplismenus</i>					1
plants	Equisetopsida	Poaceae	<i>Paspalidium</i>			C		3
plants	Equisetopsida	Poaceae	<i>Perotis rara</i>	comet grass		C		1
plants	Equisetopsida	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		1
plants	Equisetopsida	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			2/2
plants	Equisetopsida	Poaceae	<i>Melinis repens</i>	red natal grass	Y			1
plants	Equisetopsida	Poaceae	<i>Aristida ingrata</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Dinebra ligulata</i>			C		2
plants	Equisetopsida	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Poaceae	<i>Aristida calycina</i>			C		2
plants	Equisetopsida	Poaceae	<i>Cenchrus ciliaris</i>		Y			5
plants	Equisetopsida	Poaceae	<i>Chloris pectinata</i>	comb chloris		C		1/1
plants	Equisetopsida	Poaceae	<i>Entolasia stricta</i>	wiry panic		C		2
plants	Equisetopsida	Poaceae	<i>Eragrostis pilosa</i>	soft lovegrass	Y			1/1
plants	Equisetopsida	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		5
plants	Equisetopsida	Poaceae	<i>Aristida latifolia</i>	feathertop wiregrass		C		1
plants	Equisetopsida	Poaceae	<i>Chrysopogon fallax</i>			C		3/1
plants	Equisetopsida	Poaceae	<i>Digitaria diminuta</i>			C		2
plants	Equisetopsida	Poaceae	<i>Eragrostis sororia</i>			C		3/2
plants	Equisetopsida	Poaceae	<i>Eriachne mucronata</i>			C		2
plants	Equisetopsida	Poaceae	<i>Paspalum dilatatum</i>	paspalum	Y			1/1
plants	Equisetopsida	Poaceae	<i>Eragrostis elongata</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Megathyrsus maximus</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Bothriochloa pertusa</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		7/1
plants	Equisetopsida	Poaceae	<i>Tripogon loliiformis</i>	five minute grass		C		1/1
plants	Equisetopsida	Poaceae	<i>Alloteropsis cimicina</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i>			C		2
plants	Equisetopsida	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		4
plants	Equisetopsida	Poaceae	<i>Aristida caput-medusae</i>			C		6/1
plants	Equisetopsida	Poaceae	<i>Bothriochloa decipiens</i>			C		2
plants	Equisetopsida	Poaceae	<i>Enneapogon lindleyanus</i>			C		2
plants	Equisetopsida	Poaceae	<i>Paspalidium spartellum</i>			C		1
plants	Equisetopsida	Poaceae	<i>Thyridolepis xerophila</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			6
plants	Equisetopsida	Poaceae	<i>Eragrostis leptostachya</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		3
plants	Equisetopsida	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass		C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida calycina</i> var. <i>calycina</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Chloris divaricata</i> var. <i>divaricata</i>	slender chloris		C		1/1
plants	Equisetopsida	Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Calyptochloa gracillima</i> subsp. <i>gracillima</i>			C		7/1
plants	Equisetopsida	Poaceae	<i>Cleistochloa</i> sp. (<i>Duaringa</i> K.B.Addison 42)			C		3/1
plants	Equisetopsida	Poaceae	<i>Digitaria divaricatissima</i> var. <i>divaricatissima</i>			C		1
plants	Equisetopsida	Poaceae	<i>Eriachne mucronata</i> forma (<i>Alpha</i> C.E.Hubbard 7882)			C		1/1
plants	Equisetopsida	Portulacaceae	<i>Portulaca filifolia</i>			C		1
plants	Equisetopsida	Potamogetonaceae	<i>Potamogeton octandrus</i>			C		1/1
plants	Equisetopsida	Proteaceae	<i>Persoonia falcata</i>			C		1
plants	Equisetopsida	Proteaceae	<i>Grevillea longistyla</i>			C		1
plants	Equisetopsida	Proteaceae	<i>Grevillea striata</i>	beefwood		C		4
plants	Equisetopsida	Proteaceae	<i>Hakea lorea</i>			C		2
plants	Equisetopsida	Proteaceae	<i>Grevillea parallela</i>			C		1/1
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes</i>			C		1
plants	Equisetopsida	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		15
plants	Equisetopsida	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack		C		4
plants	Equisetopsida	Rubiaceae	<i>Oldenlandia galioides</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Oldenlandia mitrasacmoides subsp. trachymenoides</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Everistia vacciniifolia</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Psydrax oleifolia</i>			C		2
plants	Equisetopsida	Rubiaceae	<i>Spermacoce brachystema</i>			C		2
plants	Equisetopsida	Rutaceae	<i>Geijera parviiflora</i>	wilga		C		8
plants	Equisetopsida	Rutaceae	<i>Citrus x limon</i>		Y			1/1
plants	Equisetopsida	Rutaceae	<i>Philotheca difformis subsp. difformis</i>			C		1/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea viscosa subsp. spatulata</i>			C		1/1
plants	Equisetopsida	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		3
plants	Equisetopsida	Sapindaceae	<i>Alectryon oleifolius</i>			C		2
plants	Equisetopsida	Sapindaceae	<i>Atalaya hemiglauca</i>			C		3/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea</i>			C		3
plants	Equisetopsida	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		9
plants	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i>			C		1
plants	Equisetopsida	Solanaceae	<i>Solanum adenophorum</i>			E		1/1
plants	Equisetopsida	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		1
plants	Equisetopsida	Solanaceae	<i>Solanum ferocissimum</i>			C		2
plants	Equisetopsida	Solanaceae	<i>Solanum elachophyllum</i>			E		1
plants	Equisetopsida	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		4
plants	Equisetopsida	Sparrmanniaceae	<i>Grewia retusifolia</i>			C		3/1
plants	Equisetopsida	Stylidiaceae	<i>Stylidium eriorhizum</i>			C		2/1
plants	Equisetopsida	Verbenaceae	<i>Phyla canescens</i>		Y			1/1
plants	Equisetopsida	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			1
plants	Equisetopsida	Violaceae	<i>Afrohybanthus stellarioides</i>			C		2

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: -23.6380

Longitude: 149.2514

Distance: 50

Email: llopez@aacrc.net.au

Date submitted: Thursday 13 Jun 2019 10:03:05

Date extracted: Thursday 13 Jun 2019 10:10:15

The number of records retrieved = 50

Disclaimer

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog		V		10
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk	E		V	15
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami</i>	glossy black-cockatoo		V		4
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami erebus</i>	glossy black-cockatoo (northern)		V		19/2
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	47
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)	E		E	4/1
animals	birds	Meliphagidae	<i>Grantiella picta</i>	painted honeyeater		V	V	3
animals	birds	Pedionomidae	<i>Pedionomus torquatus</i>	plains-wanderer		V	CE	1
animals	birds	Psittacidae	<i>Psephotus pulcherrimus</i>	paradise parrot	PE		EX	9/2
animals	birds	Psittacidae	<i>Lathamus discolor</i>	swift parrot	E		CE	1
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		3
animals	birds	Turnicidae	<i>Turnix melanogaster</i>	black-breasted button-quail		V	V	7
animals	insects	Lycaenidae	<i>Jalmenus eubulus</i>	pale imperial hairstreak		V		5
animals	mammals	Dasyuridae	<i>Antechinus argentus</i>	silver-headed antechinus		V	E	23
animals	mammals	Macropodidae	<i>Onychogalea fraenata</i>	bridled nailtail wallaby	E		E	41
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	13
animals	mammals	Potoroidae	<i>Bettongia gaimardi gaimardi</i>	eastern bettong	PE		EX	4
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	69
animals	mammals	Pseudocheiridae	<i>Petauroides volans</i>	greater glider		V	V	3
animals	mammals	Vespertilionidae	<i>Chalinolobus dwyeri</i>	large-eared pied bat		V	V	2
animals	reptiles	Chelidae	<i>Elseya albagula</i>	southern snapping turtle	E		CE	3
animals	reptiles	Chelidae	<i>Rheodytes leukops</i>	Fitzroy River turtle		V	V	1
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko		NT		10/1
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	2
animals	reptiles	Pygopodidae	<i>Delma torquata</i>	collared delma		V	V	1
plants	Equisetopsida	Apocynaceae	<i>Cerbera dumicola</i>			NT		6/6
plants	Equisetopsida	Arecaceae	<i>Livistona fulva</i>			V		16/12
plants	Equisetopsida	Asteraceae	<i>Rutidosia glandulosa</i>			NT		7/7
plants	Equisetopsida	Byttneriaceae	<i>Commersonia pearnii</i>			E		2/2
plants	Equisetopsida	Combretaceae	<i>Macropteranthes leiocaulis</i>			NT		1/1
plants	Equisetopsida	Euphorbiaceae	<i>Bertya pedicellata</i>			NT		3
plants	Equisetopsida	Fabaceae	<i>Daviesia discolor</i>			V	V	8/6
plants	Equisetopsida	Fabaceae	<i>Daviesia quoquoversus</i>			V		7/2
plants	Equisetopsida	Lamiaceae	<i>Plectranthus blakei</i>			NT		10/10
plants	Equisetopsida	Loganiaceae	<i>Logania diffusa</i>			V	V	4/2
plants	Equisetopsida	Mimosaceae	<i>Acacia storyi</i>			NT		21/17
plants	Equisetopsida	Myrtaceae	<i>Sannantha brachypoda</i>			V		1/1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca pearsonii</i>			NT		13/12
plants	Equisetopsida	Myrtaceae	<i>Baeckea trapeza</i>			V		7/7
plants	Equisetopsida	Myrtaceae	<i>Melaleuca groveana</i>			NT		6/4
plants	Equisetopsida	Orchidaceae	<i>Phaius australis</i>			E	E	5/3
plants	Equisetopsida	Orchidaceae	<i>Corunastylis valida</i>			V		1/1
plants	Equisetopsida	Orchidaceae	<i>Gastrodia crebriflora</i>			V		1/1
plants	Equisetopsida	Orchidaceae	<i>Corunastylis pedersonii</i>			V		1/1
plants	Equisetopsida	Picrodendraceae	<i>Pseudanthus pauciflorus subsp. arenicola</i>			NT		2/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Solanaceae	<i>Solanum dissectum</i>			E	E	3/3
plants	Equisetopsida	Solanaceae	<i>Solanum adenophorum</i>			E		12/10
plants	Equisetopsida	Solanaceae	<i>Solanum elachophyllum</i>			E		17/14
plants	Equisetopsida	Surianaceae	<i>Cadellia pentastylis</i>	ooline		V	V	4/4
plants	Equisetopsida	Zamiaceae	<i>Macrozamia platyrhachis</i>			E	E	55/30

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: All

Records: All

Date: All

Latitude: -23.6381

Longitude: 149.1514

Distance: 50

Email: llopez@aacrc.net.au

Date submitted: Thursday 13 Jun 2019 10:01:50

Date extracted: Thursday 13 Jun 2019 10:10:02

The number of records retrieved = 2173

Disclaimer

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			75/1
animals	amphibians	Hylidae	<i>Cyclorana cultripes</i>	grassland collared frog		C		3/3
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		16/1
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		12/1
animals	amphibians	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog		C		3/2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		48/1
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		5/2
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		15/1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		41/1
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		20/1
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		5/1
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		22/1
animals	amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog		C		6
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		17/1
animals	amphibians	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog		V		10
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		11
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		28/2
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		14/1
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		35/1
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		13
animals	amphibians	Myobatrachidae	<i>Crinia signifera</i>	clicking froglet		C		5
animals	amphibians	Myobatrachidae	<i>Pseudophryne sp.</i>					1
animals	amphibians	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan		C		2/1
animals	amphibians	Myobatrachidae	<i>Pseudophryne major</i>	great brown broodfrog		C		20/1
animals	amphibians	Myobatrachidae	<i>Uperoleia laevisgata</i>	eastern gungan		C		10
animals	amphibians	Myobatrachidae	<i>Uperoleia sp.</i>					3
animals	amphibians	Myobatrachidae	<i>Crinia parinsignifera</i>	beeping froglet		C		17
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		27
animals	birds	Acanthizidae	<i>Gerygone fusca</i>	western gerygone		C		3
animals	birds	Acanthizidae	<i>Acanthiza lineata</i>	striated thornbill		C		28/9
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		6
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		90
animals	birds	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill		C		8
animals	birds	Acanthizidae	<i>Sericornis citreogularis</i>	yellow-throated scrubwren		C		1
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		25
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		10
animals	birds	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill		C		1
animals	birds	Acanthizidae	<i>Chthonicola sagittata</i>	speckled warbler		C		8
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		129
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		80/8
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		10
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		14
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		52
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		3
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		3
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk		E	V	13
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		46
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		14
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		5
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		1
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		1
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		2
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		8
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		61
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		11
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		17
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		60
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		31
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		6
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		7
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		5
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		3
animals	birds	Anatidae	<i>Anas rhynchos</i>	Australasian shoveler		C		3
animals	birds	Anatidae	<i>Tadorna radjah</i>	radjah shelduck		C		1
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		14
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		27
animals	birds	Anatidae	<i>Anas castanea</i>	chestnut teal		C		1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		27
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		4
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		SL		6
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		17
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		2
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		13
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		33
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		26
animals	birds	Ardeidae	<i>Egretta picata</i>	piebald heron		C		1
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		13
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		4
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		3
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		141/3
animals	birds	Artamidae	<i>Artamus cyanopterus</i>	dusky woodswallow		C		4
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		174
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		15
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		16
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		206
animals	birds	Artamidae	<i>Artamus cinereus dealbatus</i>	black-faced woodswallow (east-central Queensland)		C		4
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		15
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		12
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird		C		128
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		10
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		108
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		2
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii banksii</i>	red-tailed black-cockatoo (Cape York & Eastern Aust)		C		1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami erebus</i>	glossy black-cockatoo (northern)		V		19/2
animals	birds	Cacatuidae	<i>Calyptorhynchus funereus</i>	yellow-tailed black-cockatoo		C		3
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami</i>	glossy black-cockatoo		V		4
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		6
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		8
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		29
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		34
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		1
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		27
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cidcabird		C		42
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		93
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		5
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		10
animals	birds	Charadriidae	<i>Elseyornis melanops</i>	black-fronted dotterel		C		15
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		23
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		1
animals	birds	Charadriidae	<i>Erythronyx cinctus</i>	red-kneed dotterel		C		1
animals	birds	Charadriidae	<i>Vanellus tricolor</i>	banded lapwing		C		2
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		7
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		1
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		12
animals	birds	Climacteridae	<i>Climacteris picumnus</i>	brown treecreeper		C		7
animals	birds	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)		C		84/8
animals	birds	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper		C		19
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	44
animals	birds	Columbidae	<i>Leucosarcia melanoleuca</i>	wonga pigeon		C		1
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		25
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		9
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		67
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		43
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		13
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		47
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		82
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		31
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		31
animals	birds	Corvidae	<i>Corvus sp.</i>					7
animals	birds	Corvidae	<i>Corvus bennetti</i>	little crow		C		1
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		209

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		12
animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		2
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		25
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		12
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		2
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		53
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		35
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		33
animals	birds	Cuculidae	<i>Chalcites minutillus barnardi</i>	Eastern little bronze-cuckoo		C		5
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		16
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)		C		4
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		18
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		8
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		17
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		11
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		73
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		5
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		3
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		11
animals	birds	Falconidae	<i>Falco sp.</i>					1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		36
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		6
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		12
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		28
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		4
animals	birds	Gruidae	<i>Grus rubicunda</i>	brolga		C		19
animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher		C		1
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		189
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		28
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		35
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		25
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		8
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		18
animals	birds	Hirundinidae	<i>Cheramoeca leucosterna</i>	white-backed swallow		C		1
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		27
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		25
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		11
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		4
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		34
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		118/1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		199
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		2
animals	birds	Megaluridae	<i>Cincloramphus cruralis</i>	brown songlark		C		5
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		24

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animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		2
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		42
animals	birds	Meliphagidae	<i>Melithreptus gularis gularis</i>	black-chinned honeyeater (eastern)		C		2
animals	birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	eastern spinebill		C		14/1
animals	birds	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater		C		4
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		41/1
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		113
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		6
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		70
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		12
animals	birds	Meliphagidae	<i>Grantiella picta</i>	painted honeyeater		V	V	3
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		7
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		79/4
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		123
animals	birds	Meliphagidae	<i>Phylidonyris niger</i>	white-cheeked honeyeater		C		18
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		43
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		90
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		1
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		48/4
animals	birds	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		C		50
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		223/4
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		4
animals	birds	Meliphagidae	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater		C		17
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		225
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		23
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		65
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		3
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		101
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		62
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		22
animals	birds	Monarchidae	<i>Myiagra alecto</i>	shining flycatcher		C		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		17
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		74
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		25/1
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		45/1
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		8
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		22/1
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		170
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		124
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		9/1
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		2
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		271/1
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		56/2
animals	birds	Pardalotidae	<i>Pardalotus rubricatus</i>	red-browed pardalote		C		2

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animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			7
animals	birds	Pedionomidae	<i>Pedionomus torquatus</i>	plains-wanderer		V	CE	1
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		15
animals	birds	Petroicidae	<i>Petroica rosea</i>	rose robin		C		3
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		3
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		32/2
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		44/4
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		15
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		33
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		9
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		3
animals	birds	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail		C		1
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		15
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		40
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		32
animals	birds	Podicipedidae	<i>Poliocephalus poliocephalus</i>	hoary-headed grebe		C		1
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		4
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis temporalis</i>	grey-crowned babbler (eastern)		C		10
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		78
animals	birds	Psittacidae	<i>Lathamus discolor</i>	swift parrot		E	CE	1
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		49
animals	birds	Psittacidae	<i>Platycercus elegans</i>	crimson rosella		C		2
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		17
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		143/1
animals	birds	Psittacidae	<i>Psephotus pulcherrimus</i>	paradise parrot		PE	EX	6/1
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		9
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		270/4
animals	birds	Psittacidae	<i>Platycercus adscitus adscitus</i>	pale-headed rosella (northern form)		C		1
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		61
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		86
animals	birds	Psittacidae	<i>Platycercus adscitus palliceps</i>	pale-headed rosella (southern form)		C		10
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird		C		6
animals	birds	Psophodidae	<i>Cinclosoma punctatum</i>	spotted quail-thrush		C		15
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		149
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		17
animals	birds	Rallidae	<i>Tribonyx ventralis</i>	black-tailed native-hen		C		4
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		9
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		8
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		12
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys leucophrys</i>	willie wagtail (southern)		C		12
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		95
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		6
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		166/1
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		1
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper		SL		2
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		SL		1

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animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		51
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		3
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		5
animals	birds	Sulidae	<i>Morus serrator</i>	Australasian gannet		C		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		12
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		14
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		12
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		24
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		24
animals	birds	Timaliidae	<i>Zosterops lateralis cornwalli</i>	silveryeye (eastern)		C		1
animals	birds	Turnicidae	<i>Turnix velox</i>	little button-quail		C		4
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		5
animals	birds	Turnicidae	<i>Turnix melanogaster</i>	black-breasted button-quail		V	V	7
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		13
animals	birds	Tytonidae	<i>Tyto novaehollandiae</i>	masked owl		C		2
animals	insects	Hesperiidae	<i>Ocybadistes hypomeloma hypomeloma</i>	white-margined grass-dart (eastern subspecies)				1
animals	insects	Hesperiidae	<i>Cephrenes augiades sperthias</i>	orange palm-dart				1
animals	insects	Hesperiidae	<i>Ocybadistes walkeri sothis</i>	green grass-dart				1
animals	insects	Hesperiidae	<i>Hesperilla ornata ornata</i>	spotted sedge-skipper (southern subspecies)				1
animals	insects	Hesperiidae	<i>Badamia exclamationis</i>	narrow-winged awl				1
animals	insects	Hesperiidae	<i>Hesperilla malindeva</i>	two-spotted sedge-skipper				1
animals	insects	Hesperiidae	<i>Trapezites phigalia</i>	heath ochre				1
animals	insects	Hesperiidae	<i>Toxidia peron</i>	dingy grass-skipper				1
animals	insects	Hesperiidae	<i>Hesperilla furva</i>	grey sedge-skipper				2
animals	insects	Hesperiidae	<i>Mesodina halyzia</i>	eastern iris-skipper				1
animals	insects	Hesperiidae	<i>Trapezites taori</i>	sandstone ochre				1
animals	insects	Hesperiidae	<i>Trapezites eliena</i>	orange ochre				1
animals	insects	Hesperiidae	<i>Trapezites maheta</i>	northern silver ochre				1
animals	insects	Hesperiidae	<i>Parnara bada</i>	grey swift				1
animals	insects	Lycaenidae	<i>Nacaduba biocellata biocellata</i>	two-spotted line-blue				1
animals	insects	Lycaenidae	<i>Candalides cyprotus pallescens</i>	copper pencilled-blue				1
animals	insects	Lycaenidae	<i>Theclinesstes miskini miskini</i>	wattle blue (Australian subspecies)				1
animals	insects	Lycaenidae	<i>Neolucia agricola agricola</i>	fringed heath-blue				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				2
animals	insects	Lycaenidae	<i>Nesolycaena albosericea</i>	satin opal				39
animals	insects	Lycaenidae	<i>Euchrysops cnejus cnidus</i>	spotted pea-blue				1
animals	insects	Lycaenidae	<i>Zizeeria karsandra</i>	spotted grass-blue				1
animals	insects	Lycaenidae	<i>Candalides geminus</i>	twin dusky-blue				1
animals	insects	Lycaenidae	<i>Lampides boeticus</i>	long-tailed pea-blue				1
animals	insects	Lycaenidae	<i>Jalmenus eubulus</i>	pale imperial hairstreak			V	1
animals	insects	Nymphalidae	<i>Hypocysta metirius</i>	brown ringlet				1
animals	insects	Nymphalidae	<i>Hypocysta sp.</i>					1

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animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				4
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				3
animals	insects	Nymphalidae	<i>Junonia villida villida</i>	meadow argus				4
animals	insects	Nymphalidae	<i>Ypthima arctous arctous</i>	dusky knight				1
animals	insects	Nymphalidae	<i>Hypolimnias bolina nerina</i>	varied eggfly				3
animals	insects	Nymphalidae	<i>Hypocysta adiante adiante</i>	orange ringlet				2
animals	insects	Nymphalidae	<i>Junonia orithya albicincta</i>	blue argus				5
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				2
animals	insects	Nymphalidae	<i>Charaxes sempronius sempronius</i>	tailed emperor				2
animals	insects	Nymphalidae	<i>Hypocysta pseudirius</i>	grey ringlet				1
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				3
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				5
animals	insects	Nymphalidae	<i>Hypocysta irius</i>	orange-streaked ringlet				1
animals	insects	Nymphalidae	<i>Vanessa kershawi</i>	Australian painted lady				1
animals	insects	Papilionidae	<i>Graphium eurypylus lycaon</i>	pale triangle				1
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				2
animals	insects	Papilionidae	<i>Papilio aegaeus aegaeus</i>	orchard swallowtail (Australian subspecies)				4
animals	insects	Pieridae	<i>Appias paulina ega</i>	yellow albatross				1
animals	insects	Pieridae	<i>Elodina angulipennis</i>	southern pearl-white				1
animals	insects	Pieridae	<i>Belenois java teutonia</i>	caper white				3
animals	insects	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel				1
animals	insects	Pieridae	<i>Catopsilia gorgophone gorgophone</i>	yellow migrant				2
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				1
animals	insects	Pieridae	<i>Eurema herla</i>	pink grass-yellow				1
animals	insects	Pieridae	<i>Catopsilia pomona</i>	lemon migrant				3
animals	insects	Pieridae	<i>Elodina parthia</i>	striated pearl-white				1
animals	insects	Pieridae	<i>Eurema smilax</i>	small grass-yellow				2
animals	insects	Pieridae	<i>Cepora perimale scyllara</i>	caper gull (Australian subspecies)				3
animals	mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider			C	11
animals	mammals	Bovidae	<i>Bos sp.</i>	cattle	Y			4
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			18
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			1
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				22
animals	mammals	Canidae	<i>Canis lupus familiaris</i>	dog		Y		11
animals	mammals	Dasyuridae	<i>Dasyurus sp.</i>					1
animals	mammals	Dasyuridae	<i>Antechinus flavipes flavipes</i>	yellow-footed antechinus (south-east Queensland)			C	8
animals	mammals	Dasyuridae	<i>Sminthopsis macroura</i>	stripe-faced dunnart			C	2
animals	mammals	Dasyuridae	<i>Antechinus argentus</i>	silver-headed antechinus			V E	23
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart			C	3
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale			C	4
animals	mammals	Dasyuridae	<i>Planigale ingrami</i>	long-tailed planigale			C	1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat			C	16
animals	mammals	Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail bat			C	5
animals	mammals	Equidae	<i>Equus caballus</i>	horse	Y			2

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animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			26
animals	mammals	Hipposideridae	<i>Hipposideros ater aruensis</i>	eastern dusky leaf-nosed bat		C		3
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			20
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			9
animals	mammals	Macropodidae	<i>Onychogalea fraenata</i>	bridled nailtail wallaby		E	E	42
animals	mammals	Macropodidae	<i>Lagorchestes conspicillatus</i>	spectacled hare-wallaby		C		2
animals	mammals	Macropodidae	<i>Macropus parryi</i>	whiptail wallaby		C		3
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		9
animals	mammals	Macropodidae	<i>Macropus dorsalis</i>	black-striped wallaby		C		19
animals	mammals	Macropodidae	<i>Macropus robustus</i>	common wallaroo		C		9/1
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		30
animals	mammals	Macropodidae	<i>Petrogale herberti</i>	Herbert's rock-wallaby		C		6/3
animals	mammals	Macropodidae	<i>Petrogale inornata</i>	unadorned rock-wallaby		C		3
animals	mammals	Macropodidae	<i>Macropus rufogriseus</i>	red-necked wallaby		C		2
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		2
animals	mammals	Molossidae	<i>Mormopterus petersi</i>	inland free-tailed bat		C		1
animals	mammals	Molossidae	<i>Tadarida australis</i>	white-striped freetail bat		C		4
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		2
animals	mammals	Molossidae	<i>Mormopterus sp.</i>					7
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			69
animals	mammals	Muridae	<i>Rattus sp.</i>					1
animals	mammals	Muridae	<i>Rattus tunneyi</i>	pale field-rat		C		16/1
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		1/1
animals	mammals	Muridae	<i>Rattus fuscipes</i>	bush rat		C		2
animals	mammals	Muridae	<i>Rattus sordidus</i>	canefield rat		C		2
animals	mammals	Muridae	<i>Zyzomys argurus</i>	common rock-rat		C		1
animals	mammals	Muridae	<i>Rattus lutreolus</i>	swamp rat		C		1
animals	mammals	Muridae	<i>Pseudomys patrius</i>	eastern pebble-mound mouse		C		2
animals	mammals	Muridae	<i>Leggadina forresti</i>	Forrest's mouse		C		2
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		27
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		5
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		11
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		7
animals	mammals	Muridae	<i>Melomys sp.</i>					3
animals	mammals	Muridae	<i>Pseudomys sp.</i>					1/1
animals	mammals	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	platypus		SL		2
animals	mammals	Peramelidae	<i>Isodon macrourus</i>	northern brown bandicoot		C		7
animals	mammals	Peramelidae	<i>Perameles nasuta</i>	long-nosed bandicoot		C		3
animals	mammals	Petauridae	<i>Petaurus breviceps</i>	sugar glider		C		22
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		12
animals	mammals	Petauridae	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)		C		42
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		23
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	12
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		15
animals	mammals	Potoroidae	<i>Bettongia gaimardi gaimardi</i>	eastern bettong		PE	EX	4

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animals	mammals	Pseudocheiridae	<i>Petauroides volans</i>	greater glider		V	V	3
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	69
animals	mammals	Pteropodidae	<i>Pteropus sp.</i>					1
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		4
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		5
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			9
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		24
animals	mammals	Vespertilionidae	<i>Scotorepens sp.</i>					8
animals	mammals	Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat		C		9
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		16
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		4
animals	mammals	Vespertilionidae	<i>Chalinolobus dwyeri</i>	large-eared pied bat		V	V	2
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		17
animals	mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat		C		7
animals	mammals	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat		C		4
animals	mammals	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat		C		5
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		5
animals	mammals	Vespertilionidae	<i>Vespadelus baverstocki</i>	inland forest bat		C		2
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		7
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>					1
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		2
animals	mammals	Vespertilionidae	<i>Vespadelus sp.</i>					2
animals	mammals	Vespertilionidae	<i>Vespadelus pumilus</i>	eastern forest bat		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				3
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				4
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				5
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				135
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				6
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				18
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				136
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon				3
animals	ray-finned fishes	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				4
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				3
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				8
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				1
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				3
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				5
animals	ray-finned fishes	Osteoglossidae	<i>Scleropages leichardti</i>	southern saratoga				22
animals	ray-finned fishes	Percichthyidae	<i>Macquaria ambigua</i>	golden perch				10
animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				5
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtil's catfish				6
animals	ray-finned fishes	Pseudomugilidae	<i>Pseudomugil signifer</i>	Pacific blue eye				1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				5
animals	ray-finned fishes	Terapontidae	<i>Scortum hillii</i>	leathery grunter				9
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				17

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animals	reptiles	Agamidae	<i>Amphibolurus muricatus</i>	jacky lizard		C		1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		7/1
animals	reptiles	Agamidae	<i>Diporiphora sp.</i>					1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		6/1
animals	reptiles	Agamidae	<i>Chlamydosaurus kingii</i>	frilled lizard		C		1
animals	reptiles	Agamidae	<i>Lophognathus gilberti sensu lato</i>	Gilbert's dragon		C		1
animals	reptiles	Agamidae	<i>Diporiphora lalliae</i>	Lally's two-line dragon		C		1
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi		C		19
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon		C		9
animals	reptiles	Boidae	<i>Aspidites melanocephalus</i>	black-headed python		C		6
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		6
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		8/1
animals	reptiles	Carphodactylidae	<i>Underwoodisaurus milii</i>	thick-tailed gecko		C		4
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		17/2
animals	reptiles	Carphodactylidae	<i>Saltuarius salebrosus</i>	rough-throated leaf-tailed gecko		C		17
animals	reptiles	Chelidae	<i>Chelodina expansa</i>	broad-shelled river turtle		C		1
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle		C		3
animals	reptiles	Chelidae	<i>Chelodina longicollis</i>	eastern snake-necked turtle		C		1
animals	reptiles	Chelidae	<i>Elseya albagula</i>	southern snapping turtle		E	CE	2
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		8
animals	reptiles	Chelidae	<i>Rheodytes leukops</i>	Fitzroy River turtle		V	V	1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		6
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		7
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		7
animals	reptiles	Diplodactylidae	<i>Oedura sp.</i>					1
animals	reptiles	Diplodactylidae	<i>Oedura tryoni</i>	southern spotted velvet gecko		C		27/1
animals	reptiles	Diplodactylidae	<i>Oedura monillis</i>	ocellated velvet gecko		C		16/3
animals	reptiles	Diplodactylidae	<i>Amalosa rhombifer</i>	zig-zag gecko		C		3/1
animals	reptiles	Diplodactylidae	<i>Diplodactylus platyurus</i>	eastern fat-tailed gecko		C		6/1
animals	reptiles	Diplodactylidae	<i>Strophurus williamsi</i>	soft-spined gecko		C		3
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko		NT		10/1
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		14
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		7/1
animals	reptiles	Diplodactylidae	<i>Nebulifera robusta</i>	robust velvet gecko		C		15
animals	reptiles	Elapidae	<i>Suta suta</i>	myall snake		C		8/1
animals	reptiles	Elapidae	<i>Furina ornata</i>	orange-naped snake		C		1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		4/1
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	1
animals	reptiles	Elapidae	<i>Cryptophis boschmai</i>	Carpentaria whip snake		C		1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		5
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake		C		5/2
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		4
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		5
animals	reptiles	Elapidae	<i>Pseudechis australis</i>	king brown snake		C		1
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		7
animals	reptiles	Elapidae	<i>Brachyuropis australis</i>	coral snake		C		1

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animals	reptiles	Elapidae	<i>Demansia vestigiata</i>	lesser black whipsnake		C		2
animals	reptiles	Gekkonidae	<i>Gehyra sp.</i>					1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		115/1
animals	reptiles	Gekkonidae	<i>Hemidactylus frenatus</i>	house gecko	Y			2
animals	reptiles	Gekkonidae	<i>Gehyra versicolor</i>			C		2
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		113/2
animals	reptiles	Gekkonidae	<i>Gehyra catenata</i>	chain-backed dtella		C		25/1
animals	reptiles	Pygopodidae	<i>Delma torquata</i>	collared delma		V	V	1
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot		C		9
animals	reptiles	Pygopodidae	<i>Pygopus lepidopodus</i>	common scaly-foot		C		1
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		6
animals	reptiles	Scincidae	<i>Ctenotus strauchii</i>	eastern barred wedgesnout ctenotus		C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		6
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>					2
animals	reptiles	Scincidae	<i>Ctenotus leonhardii</i>	Leonhardi's ctenotus		C		1/1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		25/1
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		17
animals	reptiles	Scincidae	<i>Concinnia brachysoma</i>	northern bar-sided skink		C		4/1
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		59/3
animals	reptiles	Scincidae	<i>Lampropholis amicula</i>	friendly sunskink		C		9
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		22/1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		29/3
animals	reptiles	Scincidae	<i>Anomalopus brevicollis</i>	short-necked worm-skink		C		2
animals	reptiles	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider		C		3
animals	reptiles	Scincidae	<i>Cryptoblepharus pannosus</i>	ragged snake-eyed skink		C		15
animals	reptiles	Scincidae	<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus australis</i>	inland snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		5
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		64/2
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		17
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		45
animals	reptiles	Scincidae	<i>Carlia sp.</i>					5
animals	reptiles	Scincidae	<i>Lerista sp.</i>					1
animals	reptiles	Scincidae	<i>Menetia sp.</i>					1
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		4
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Ctenotus sp.</i>					4
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		8
animals	reptiles	Scincidae	<i>Eulamprus sp.</i>					3/1
animals	reptiles	Scincidae	<i>Egernia rugosa</i>	yakka skink		V	V	1/1
animals	reptiles	Scincidae	<i>Menetia greyii</i>	common dwarf skink		C		4
animals	reptiles	Scincidae	<i>Concinnia tenuis</i>	bar-sided skink		C		6/2
animals	reptiles	Scincidae	<i>Ctenotus ingrami</i>	unspotted yellow-sided ctenotus		C		2
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		11
animals	reptiles	Scincidae	<i>Lampropholis sp.</i>			C		5

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animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		30
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink		C		11
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		18/2
animals	reptiles	Scincidae	<i>Concinnia martini</i>	dark bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Egernia striolata</i>	tree skink		C		1
animals	reptiles	Scincidae	<i>Concinnia sokosoma</i>	stout bar-sided skink		C		3/1
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		1/1
animals	reptiles	Typhlopidae	<i>Anilius sp.</i>					1
animals	reptiles	Typhlopidae	<i>Anilius affinis</i>	small-headed blind snake		C		1
animals	reptiles	Typhlopidae	<i>Anilius bituberculatus</i>	prong-snouted blind snake		C		1
animals	reptiles	Typhlopidae	<i>Anilius nigrescens</i>	blackish blind snake		C		1/1
animals	reptiles	Typhlopidae	<i>Anilius proximus</i>	proximus blind snake		C		1/1
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		10/1
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		7
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending		C		15
bacteria	blue-green algae	Aphanothecaceae	<i>Aphanothece stagnina</i>			C		1/1
bacteria	blue-green algae	Scytonemataceae	<i>Scytonema hofman-bangii</i>			C		2/2
bacteria	blue-green algae	Stigonemataceae	<i>Stigonema hormoides</i>			C		1/1
bacteria	blue-green algae	Stigonemataceae	<i>Stigonema multipartitum</i>			C		1/1
fungi	Agaricomycetes	Polyporaceae	<i>Polyporus</i>			C		1/1
fungi	Agaricomycetes	Stereaceae	<i>Stereum</i>			C		1/1
fungi	lecanoromycetes	Cladoniaceae	<i>Cladonia rigida var. rigida</i>			C		1/1
fungi	lecanoromycetes	Cladoniaceae	<i>Cladonia</i>			C		2/2
fungi	lecanoromycetes	Cladoniaceae	<i>Cladonia ochrochlora</i>			C		1/1
fungi	lecanoromycetes	Collemaataceae	<i>Collema</i>			C		1/1
fungi	lecanoromycetes	Graphidaceae	<i>Diploschistes euganeus</i>			C		1/1
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora elatinoides</i>			C		1/1
fungi	lecanoromycetes	Leprocaulaceae	<i>Leprocaulon microscopicum</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema tinctorum</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea scabrida subsp. elegans</i>			C		5/5
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia antleriformis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia stuartioides</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia neoquintaria</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea baileyi</i>			C		6/6
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea rubicunda</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Relicina limbata</i>			C		3/3
fungi	lecanoromycetes	Parmeliaceae	<i>Parmelia erumpens</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Parmelia signifera</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema cooperi</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Punctelia subflava</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea trichodeoides</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema eurysacum</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Relicina sydneyensis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Flavoparmelia rutidota</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Pannoparmelia wilsonii</i>			C		1/1

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fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema lobulascens</i>			C		4/4
fungi	lecanoromycetes	Parmeliaceae	<i>Hypotrachyna immaculata</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema subcaperatum</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia amplexula</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia tasmanica</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia isidiigera</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Austroparmelina conlabrosa</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Punctelia pseudocoralloidea</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia australasica</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Rinodina williamsii</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Heterodermia obscurata</i>			C		1/1
fungi	lecanoromycetes	Psoraceae	<i>Protoblastenia</i>			C		2/2
fungi	lecanoromycetes	Stereocaulaceae	<i>Lepraria jackii</i>			C		1/1
plants	Conjugatophyceae	Zygnemataceae	<i>Zygogonium ericetorum</i>			C		1/1
plants	Equisetopsida	Acanthaceae	<i>Pseuderanthemum</i>			C		1
plants	Equisetopsida	Acanthaceae	<i>Ruellia simplex</i>		Y			1/1
plants	Equisetopsida	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		8
plants	Equisetopsida	Acanthaceae	<i>Pseuderanthemum tenellum</i>			C		1
plants	Equisetopsida	Acanthaceae	<i>Rostellularia adscendens</i>			C		12/2
plants	Equisetopsida	Acanthaceae	<i>Acanthaceae</i>			C		1/1
plants	Equisetopsida	Acanthaceae	<i>Dipteracanthus australasicus</i>			C		1
plants	Equisetopsida	Acanthaceae	<i>Asystasia gangetica</i> subsp. <i>gangetica</i>		Y			1/1
plants	Equisetopsida	Acanthaceae	<i>Rostellularia adscendens</i> var. <i>adscendens</i>			C		2
plants	Equisetopsida	Acanthaceae	<i>Dipteracanthus australasicus</i> subsp. <i>corynothecus</i>			C		4/2
plants	Equisetopsida	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		9/2
plants	Equisetopsida	Agavaceae	<i>Agave vivipara</i> var. <i>vivipara</i>		Y			1/1
plants	Equisetopsida	Aizoaceae	<i>Trianthema triquetra</i>	red spinach		C		13/1
plants	Equisetopsida	Aizoaceae	<i>Zaleya galericulata</i> subsp. <i>galericulata</i>			C		3/2
plants	Equisetopsida	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			8
plants	Equisetopsida	Alismataceae	<i>Caldesia oligococca</i>			C		1
plants	Equisetopsida	Alismataceae	<i>Damasonium minus</i>	starfruit		C		1/1
plants	Equisetopsida	Amaranthaceae	<i>Ptilotus nobilis</i>			C		1
plants	Equisetopsida	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed		C		7
plants	Equisetopsida	Amaranthaceae	<i>Achyranthes aspera</i>			C		8/2
plants	Equisetopsida	Amaranthaceae	<i>Nyssanthes erecta</i>			C		4/2
plants	Equisetopsida	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		6
plants	Equisetopsida	Amaranthaceae	<i>Amaranthus viridis</i>	green amaranth	Y			1
plants	Equisetopsida	Amaranthaceae	<i>Nyssanthes diffusa</i>	barbed-wire weed		C		1
plants	Equisetopsida	Amaranthaceae	<i>Ptilotus semilanatus</i>			C		1/1
plants	Equisetopsida	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			1/1
plants	Equisetopsida	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			4
plants	Equisetopsida	Amaranthaceae	<i>Ptilotus polystachyus</i>			C		1/1
plants	Equisetopsida	Amaranthaceae	<i>Amaranthus macrocarpus</i>	dwarf amaranth		C		1
plants	Equisetopsida	Amaranthaceae	<i>Ptilotus macrocephalus</i>	green pussytails		C		2/1
plants	Equisetopsida	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		4/1

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plants	Equisetopsida	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		2/1
plants	Equisetopsida	Amaryllidaceae	<i>Crinum flaccidum</i>	Murray lily		C		4
plants	Equisetopsida	Anacardiaceae	<i>Euroschinus falcatus</i>			C		1
plants	Equisetopsida	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1
plants	Equisetopsida	Anacardiaceae	<i>Schinus terebinthifolius</i>		Y			1/1
plants	Equisetopsida	Annonaceae	<i>Melodorum leichhardtii</i>			C		1
plants	Equisetopsida	Apiaceae	<i>Platysace ericoides</i>	heath platysace		C		6/3
plants	Equisetopsida	Apiaceae	<i>Actinotus helianthi</i>	flannel flower		C		1
plants	Equisetopsida	Apiaceae	<i>Actinotus gibbonsii</i>	dwarf flannel flower		C		1
plants	Equisetopsida	Apiaceae	<i>Centella asiatica</i>			C		2/1
plants	Equisetopsida	Apocynaceae	<i>Alyxia magnifolia</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Alyxia ruscifolia</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Cascabela thevetia</i>	yellow oleander	Y			1/1
plants	Equisetopsida	Apocynaceae	<i>Cynanchum viminale</i>			C		3
plants	Equisetopsida	Apocynaceae	<i>Parsonsia lilacina</i>	crisped silkpod		C		1
plants	Equisetopsida	Apocynaceae	<i>Secamone elliptica</i>			C		2
plants	Equisetopsida	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		30/1
plants	Equisetopsida	Apocynaceae	<i>Marsdenia australis</i>	doubah		C		1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia straminea</i>	monkey rope		C		9/1
plants	Equisetopsida	Apocynaceae	<i>Vincetoxicum ovatum</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Marsdenia micradenia</i>	gymnema		C		1
plants	Equisetopsida	Apocynaceae	<i>Marsdenia microlepis</i>			C		3/1
plants	Equisetopsida	Apocynaceae	<i>Marsdenia pleiadenia</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		12/2
plants	Equisetopsida	Apocynaceae	<i>Asclepias curassavica</i>	red-head cottonbush	Y			1/1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia plaesiophylla</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			8/2
plants	Equisetopsida	Apocynaceae	<i>Gomphocarpus physocarpus</i>	balloon cottonbush	Y			1
plants	Equisetopsida	Apocynaceae	<i>Parsonsia eucalyptophylla</i>	gargaloo		C		3
plants	Equisetopsida	Apocynaceae	<i>Hoya australis subsp. australis</i>			C		5/5
plants	Equisetopsida	Apocynaceae	<i>Cynanchum viminale subsp. australe</i>			C		2
plants	Equisetopsida	Apocynaceae	<i>Cynanchum viminale subsp. brunonianum</i>			C		7/2
plants	Equisetopsida	Apocynaceae	<i>Marsdenia viridiflora subsp. viridiflora</i>			C		7/3
plants	Equisetopsida	Apocynaceae	<i>Cerbera dumicola</i>			NT		6/6
plants	Equisetopsida	Apocynaceae	<i>Hoya australis</i>			C		1
plants	Equisetopsida	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		87
plants	Equisetopsida	Apocynaceae	<i>Marsdenia</i>			C		3
plants	Equisetopsida	Apocynaceae	<i>Parsonsia</i>			C		8
plants	Equisetopsida	Araliaceae	<i>Polyscias elegans</i>	celery wood		C		2/1
plants	Equisetopsida	Araliaceae	<i>Astrotricha cordata</i>			C		7/1
plants	Equisetopsida	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		1
plants	Equisetopsida	Araliaceae	<i>Trachymene procumbens</i>	creeping wild parsnip		C		2/1
plants	Equisetopsida	Araliaceae	<i>Astrotricha intermedia</i>			C		1
plants	Equisetopsida	Araliaceae	<i>Astrotricha longifolia</i>	star hair bush		C		1
plants	Equisetopsida	Arecaceae	<i>Livistona</i>			C		6
plants	Equisetopsida	Arecaceae	<i>Livistona fulva</i>			V		16/12

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plants	Equisetopsida	Arecaceae	<i>Livistona australis</i>	cabbage tree palm		C		2
plants	Equisetopsida	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Ageratum conyzoides</i> subsp. <i>conyzoides</i>		Y			1/1
plants	Equisetopsida	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		4/4
plants	Equisetopsida	Asteraceae	<i>Verbesina encelioides</i> var. <i>encelioides</i>		Y			3/3
plants	Equisetopsida	Asteraceae	<i>Crassocephalum crepidioides</i>	thickhead	Y			1
plants	Equisetopsida	Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed		C		1
plants	Equisetopsida	Asteraceae	<i>Vittadinia dissecta</i> var. <i>hirta</i>			C		5/3
plants	Equisetopsida	Asteraceae	<i>Lactuca serriola</i> forma <i>serriola</i>		Y			1/1
plants	Equisetopsida	Asteraceae	<i>Peripleura hispidula</i> var. <i>setosa</i>			C		3/3
plants	Equisetopsida	Asteraceae	<i>Gynura drymophila</i> var. <i>drymophila</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Conyza</i>					1
plants	Equisetopsida	Asteraceae	<i>Calotis</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Olearia</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Senecio</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Vittadinia</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Brachyscome</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Bidens pilosa</i>		Y			2/1
plants	Equisetopsida	Asteraceae	<i>Blumea lacera</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Centipeda minima</i> subsp. <i>minima</i>			C		2/2
plants	Equisetopsida	Asteraceae	<i>Peripleura hispidula</i> var. <i>hispidula</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Sonchus asper</i>	rough sowthistle	Y			1
plants	Equisetopsida	Asteraceae	<i>Calotis dentex</i>	white burr daisy		C		8/7
plants	Equisetopsida	Asteraceae	<i>Tagetes minuta</i>	stinking roger	Y			1/1
plants	Equisetopsida	Asteraceae	<i>Calotis cuneata</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Cassinia laevis</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Bidens bipinnata</i>	bipinnate beggar's ticks	Y			2/1
plants	Equisetopsida	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Centipeda minima</i>			C		2
plants	Equisetopsida	Asteraceae	<i>Olearia nernstii</i>	Ipswich daisy		C		1
plants	Equisetopsida	Asteraceae	<i>Pluchea dunlopia</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Pluchea xanthina</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Camptacra barbata</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			3/2
plants	Equisetopsida	Asteraceae	<i>Gynura drymophila</i>			C		2
plants	Equisetopsida	Asteraceae	<i>Olearia canescens</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Olearia xerophila</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	Y			4/2
plants	Equisetopsida	Asteraceae	<i>Tridax procumbens</i>	tridax daisy	Y			1/1
plants	Equisetopsida	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy		C		1
plants	Equisetopsida	Asteraceae	<i>Coronidium cymosum</i>			C		5/5
plants	Equisetopsida	Asteraceae	<i>Emilia sonchifolia</i>		Y			1
plants	Equisetopsida	Asteraceae	<i>Flaveria trinervia</i>		Y			1/1
plants	Equisetopsida	Asteraceae	<i>Vittadinia sulcata</i>	native daisy		C		3/2
plants	Equisetopsida	Asteraceae	<i>Coronidium rupicola</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Euchiton sphaericus</i>			C		3/2

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plants	Equisetopsida	Asteraceae	<i>Glossocardia bidens</i>	native cobbler's pegs		C		2/1
plants	Equisetopsida	Asteraceae	<i>Minuria integerrima</i>	smooth minuria		C		5/3
plants	Equisetopsida	Asteraceae	<i>Olearia microphylla</i>			C		2/1
plants	Equisetopsida	Asteraceae	<i>Rutidosia leucantha</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1
plants	Equisetopsida	Asteraceae	<i>Erigeron bonariensis</i>		Y			2/1
plants	Equisetopsida	Asteraceae	<i>Lagenophora gracilis</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Peripleura hispidula</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Pterocaulon redolens</i>			C		2
plants	Equisetopsida	Asteraceae	<i>Rhodanthe polyphylla</i>			C		3/2
plants	Equisetopsida	Asteraceae	<i>Rutidosia glandulosa</i>			NT		7/7
plants	Equisetopsida	Asteraceae	<i>Senecio depressicola</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Vittadinia pustulata</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Xanthium occidentale</i>		Y			7/2
plants	Equisetopsida	Asteraceae	<i>Coronidium glutinosum</i>			C		7/5
plants	Equisetopsida	Asteraceae	<i>Cyanthillium cinereum</i>			C		16/4
plants	Equisetopsida	Asteraceae	<i>Lagenophora stipitata</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Podolepis longipedata</i>	tall copper-wire daisy		C		2/1
plants	Equisetopsida	Asteraceae	<i>Rutidosia murchisonii</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Senecio bathurstianus</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Senecio brigalowensis</i>			C		4/4
plants	Equisetopsida	Asteraceae	<i>Senecio prenanthoides</i>			C		1/1
plants	Equisetopsida	Asteraceae	<i>Verbesina encelioides</i>	crownbeard	Y			1
plants	Equisetopsida	Asteraceae	<i>Brachyscome dalbyensis</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Pterocaulon serrulatum</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Senecio quadridentatus</i>	cotton fireweed		C		1
plants	Equisetopsida	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed		C		1
plants	Equisetopsida	Asteraceae	<i>Gamochoaeta pensylvanica</i>		Y			1
plants	Equisetopsida	Asteraceae	<i>Isoetopsis graminifolia</i>	grass cushion		C		1
plants	Equisetopsida	Asteraceae	<i>Ozothamnus cassinioides</i>			C		2/1
plants	Equisetopsida	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1/1
plants	Equisetopsida	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			14/6
plants	Equisetopsida	Asteraceae	<i>Symphyotrichum subulatum</i>		Y			1/1
plants	Equisetopsida	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		7/2
plants	Equisetopsida	Asteraceae	<i>Sphaeromorphaea australis</i>			C		4/1
plants	Equisetopsida	Asteraceae	<i>Sphaeromorphaea subintegra</i>			C		1
plants	Equisetopsida	Asteraceae	<i>Synedrellopsis grisebachii</i>		Y			1/1
plants	Equisetopsida	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		4/1
plants	Equisetopsida	Blechnaceae	<i>Blechnum indicum</i>	swamp water fern		C		2
plants	Equisetopsida	Blechnaceae	<i>Doodia media</i>			C		1
plants	Equisetopsida	Blechnaceae	<i>Blechnum nudum</i>	fishbone water fern		C		5
plants	Equisetopsida	Blechnaceae	<i>Blechnum cartilagineum</i>	gristle fern		C		2/1
plants	Equisetopsida	Blechnaceae	<i>Blechnum ambiguum</i>			C		4/3
plants	Equisetopsida	Blechnaceae	<i>Doodia caudata</i>			C		2
plants	Equisetopsida	Boraginaceae	<i>Heliotropium moorei</i>			C		1/1
plants	Equisetopsida	Boraginaceae	<i>Heliotropium indicum</i>		Y			2/1

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plants	Equisetopsida	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		9
plants	Equisetopsida	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		1/1
plants	Equisetopsida	Burmanniaceae	<i>Burmannia disticha</i>			C		3/1
plants	Equisetopsida	Byttneriaceae	<i>Commersonia pearnii</i>			E		2/2
plants	Equisetopsida	Byttneriaceae	<i>Seringia corollata</i>			C		7/2
plants	Equisetopsida	Byttneriaceae	<i>Waltheria indica</i>			C		3/2
plants	Equisetopsida	Byttneriaceae	<i>Seringia collina</i>			C		1/1
plants	Equisetopsida	Byttneriaceae	<i>Melochia pyramidata</i>		Y			1
plants	Equisetopsida	Byttneriaceae	<i>Commersonia dasyphylla</i>			C		1
plants	Equisetopsida	Byttneriaceae	<i>Hannafordia shanesii</i>			C		1/1
plants	Equisetopsida	Byttneriaceae	<i>Seringia lanceolata</i>			C		4/2
plants	Equisetopsida	Byttneriaceae	<i>Seringia hookeriana</i>			C		4/4
plants	Equisetopsida	Byttneriaceae	<i>Commersonia leichhardtii</i>			C		2
plants	Equisetopsida	Cactaceae	<i>Harrisia</i>			C		1
plants	Equisetopsida	Cactaceae	<i>Opuntia stricta</i>		Y			14
plants	Equisetopsida	Cactaceae	<i>Harrisia martinii</i>		Y			18/2
plants	Equisetopsida	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			23/1
plants	Equisetopsida	Cactaceae	<i>Opuntia</i>			C		8
plants	Equisetopsida	Cactaceae	<i>Harrisia pomanensis</i>		Y			2/2
plants	Equisetopsida	Cactaceae	<i>Opuntia leucotricha</i>		Y			1/1
plants	Equisetopsida	Cactaceae	<i>Opuntia streptacantha</i>	cardona pear	Y			12
plants	Equisetopsida	Cactaceae	<i>Acanthocereus tetragonus</i>	sword pear	Y			1
plants	Equisetopsida	Cactaceae	<i>Opuntia aurantiaca</i>	tiger pear	Y			1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna aciphylla</i>	Australian senna		C		2/2
plants	Equisetopsida	Caesalpiniaceae	<i>Cassia brewsteri</i>			C		54/8
plants	Equisetopsida	Caesalpiniaceae	<i>Senna barclayana</i>			C		2/1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna circinnata</i>			C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Cassia tomentella</i>			C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Labichea rupestris</i>			C		2/2
plants	Equisetopsida	Caesalpiniaceae	<i>Senna coronilloides</i>			C		3
plants	Equisetopsida	Caesalpiniaceae	<i>Lysiphyllum carronii</i>	ebony tree		C		31/1
plants	Equisetopsida	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			14/9
plants	Equisetopsida	Caesalpiniaceae	<i>Petalostylis labicheoides</i>			C		4/3
plants	Equisetopsida	Caesalpiniaceae	<i>Chamaecrista nomame</i> var. <i>nomame</i>			C		1/1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna artemisioides</i> subsp. <i>coriacea</i>			C		2
plants	Equisetopsida	Caesalpiniaceae	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>		Y			1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna</i>			C		4
plants	Equisetopsida	Caesalpiniaceae	<i>Cassia</i>			C		2
plants	Equisetopsida	Caesalpiniaceae	<i>Lysiphyllum</i>			C		2
plants	Equisetopsida	Caesalpiniaceae	<i>Petalostylis</i>			C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Delonix regia</i>	poinciana	Y			1/1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna gaudichaudii</i>			C		1
plants	Equisetopsida	Caesalpiniaceae	<i>Senna occidentalis</i>	coffee senna	Y			4/2
plants	Equisetopsida	Caesalpiniaceae	<i>Chamaecrista nomame</i>			C		1/1
plants	Equisetopsida	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		19/3
plants	Equisetopsida	Campanulaceae	<i>Lobelia quadrangularis</i>			C		1

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plants	Equisetopsida	Campanulaceae	<i>Lobelia trigonocaulis</i>	forest lobelia		C		2/1
plants	Equisetopsida	Campanulaceae	<i>Wahlenbergia gracilis</i>	sprawling bluebell		C		1
plants	Equisetopsida	Campanulaceae	<i>Lobelia purpurascens</i>	white root		C		1
plants	Equisetopsida	Campanulaceae	<i>Isotoma gulliveri</i>			C		1
plants	Equisetopsida	Campanulaceae	<i>Isotoma axillaris</i>	australian harebell		C		1
plants	Equisetopsida	Campanulaceae	<i>Lobelia concolor</i>			C		1
plants	Equisetopsida	Campanulaceae	<i>Lobelia gibbosa</i>	native lobelia		C		1
plants	Equisetopsida	Campanulaceae	<i>Wahlenbergia</i>			C		3
plants	Equisetopsida	Capparaceae	<i>Capparis mitchellii</i>			C		7
plants	Equisetopsida	Capparaceae	<i>Capparis loranthifolia</i>			C		12
plants	Equisetopsida	Capparaceae	<i>Capparis loranthifolia var. bancroftii</i>			C		2/2
plants	Equisetopsida	Capparaceae	<i>Capparis loranthifolia var. loranthifolia</i>			C		3/3
plants	Equisetopsida	Capparaceae	<i>Apophyllum anomalum</i>	broom bush		C		24
plants	Equisetopsida	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		22/3
plants	Equisetopsida	Capparaceae	<i>Capparis canescens</i>			C		14/1
plants	Equisetopsida	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		1
plants	Equisetopsida	Capparaceae	<i>Capparis ornans</i>			C		1
plants	Equisetopsida	Capparaceae	<i>Capparis</i>			C		10
plants	Equisetopsida	Carpodetaceae	<i>Cuttsia viburnea</i>	silver-leaf cuttsia		C		3/2
plants	Equisetopsida	Caryophyllaceae	<i>Polycarpaea spirostylis subsp. compacta</i>			C		2
plants	Equisetopsida	Caryophyllaceae	<i>Cerastium glomeratum</i>	mouse ear chickweed	Y			1
plants	Equisetopsida	Caryophyllaceae	<i>Polycarpaea corymbosa var. minor</i>			C		2/2
plants	Equisetopsida	Casuarinaceae	<i>Casuarina cristata</i>	belah		C		4/2
plants	Equisetopsida	Casuarinaceae	<i>Allocasuarina torulosa</i>			C		151/1
plants	Equisetopsida	Casuarinaceae	<i>Allocasuarina inophloia</i>			C		1
plants	Equisetopsida	Casuarinaceae	<i>Allocasuarina littoralis</i>			C		6
plants	Equisetopsida	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak		C		22/2
plants	Equisetopsida	Casuarinaceae	<i>Casuarina cunninghamiana</i>			C		2
plants	Equisetopsida	Casuarinaceae	<i>Casuarina cunninghamiana subsp. cunninghamiana</i>			C		1/1
plants	Equisetopsida	Celastraceae	<i>Denhamia disperma</i>			C		3
plants	Equisetopsida	Celastraceae	<i>Denhamia oleaster</i>			C		11/1
plants	Equisetopsida	Celastraceae	<i>Denhamia bilocularis</i>			C		1
plants	Equisetopsida	Celastraceae	<i>Elaeodendron australe var. integrifolium</i>			C		2/1
plants	Equisetopsida	Celastraceae	<i>Denhamia cunninghamii</i>			C		6/1
plants	Equisetopsida	Celastraceae	<i>Elaeodendron australe</i>			C		5
plants	Equisetopsida	Celastraceae	<i>Siphonodon australis</i>	ivorywood		C		2
plants	Equisetopsida	Chenopodiaceae	<i>Maireana</i>			C		4
plants	Equisetopsida	Chenopodiaceae	<i>Salsola australis</i>			C		39/1
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena</i>			C		1/1
plants	Equisetopsida	Chenopodiaceae	<i>Einadia nutans</i>			C		7
plants	Equisetopsida	Chenopodiaceae	<i>Einadia hastata</i>			C		5/1
plants	Equisetopsida	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		8
plants	Equisetopsida	Chenopodiaceae	<i>Dysphania carinata</i>			C		4/2
plants	Equisetopsida	Chenopodiaceae	<i>Rhagodia spinescens</i>	thorny saltbush		C		2
plants	Equisetopsida	Chenopodiaceae	<i>Atriplex semibaccata</i>	creeping saltbush		C		3/1
plants	Equisetopsida	Chenopodiaceae	<i>Einadia polygonoides</i>	knotweed goosefoot		C		4

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plants	Equisetopsida	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		30
plants	Equisetopsida	Chenopodiaceae	<i>Maireana microphylla</i>			C		5/3
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena muricata</i>			C		4
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena ramulosa</i>			C		2/1
plants	Equisetopsida	Chenopodiaceae	<i>Atriplex elachophylla</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena calcarata</i>	red burr		C		3
plants	Equisetopsida	Chenopodiaceae	<i>Dysphania ambrosioides</i>		Y			1
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena tetracuspis</i>	brigalow burr		C		4/1
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena anisacanthoides</i>	yellow burr		C		4
plants	Equisetopsida	Chenopodiaceae	<i>Einadia nutans subsp. nutans</i>			C		1/1
plants	Equisetopsida	Chenopodiaceae	<i>Einadia nutans subsp. linifolia</i>			C		2/2
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena bicornis var. horrida</i>			C		2
plants	Equisetopsida	Chenopodiaceae	<i>Enchylaena tomentosa var. tomentosa</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Sclerolaena muricata var. semiglabra</i>			C		1/1
plants	Equisetopsida	Chenopodiaceae	<i>Dysphania melanocarpa forma melanocarpa</i>			C		1/1
plants	Equisetopsida	Chenopodiaceae	<i>Dysphania glomulifera subsp. glomulifera</i>			C		3/3
plants	Equisetopsida	Chenopodiaceae	<i>Chenopodium desertorum subsp. anidiophyllum</i>			C		1
plants	Equisetopsida	Chenopodiaceae	<i>Chenopodium</i>			C		1
plants	Equisetopsida	Cleomaceae	<i>Cleome viscosa</i>	tick-weed		C		3/1
plants	Equisetopsida	Clusiaceae	<i>Hypericum gramineum</i>			C		8/4
plants	Equisetopsida	Colchicaceae	<i>Iphigenia indica</i>			C		2/2
plants	Equisetopsida	Combretaceae	<i>Terminalia oblongata</i>			C		62
plants	Equisetopsida	Combretaceae	<i>Terminalia porphyrocarpa</i>			C		1
plants	Equisetopsida	Combretaceae	<i>Macropteranthes fitzalanii</i>			C		1
plants	Equisetopsida	Combretaceae	<i>Terminalia oblongata subsp. oblongata</i>			C		10
plants	Equisetopsida	Commelinaceae	<i>Commelina</i>			C		1
plants	Equisetopsida	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		9
plants	Equisetopsida	Commelinaceae	<i>Murdannia graminea</i>	murdannia		C		3/1
plants	Equisetopsida	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		2
plants	Equisetopsida	Convolvulaceae	<i>Evolvulus alsinoides var. decumbens</i>			C		3/1
plants	Equisetopsida	Convolvulaceae	<i>Ipomoea polpha subsp. weirana</i>			C		1
plants	Equisetopsida	Convolvulaceae	<i>Convolvulus graminetinus</i>			C		1/1
plants	Equisetopsida	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		1
plants	Equisetopsida	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		12
plants	Equisetopsida	Convolvulaceae	<i>Convolvulus arvensis</i>		Y			2
plants	Equisetopsida	Convolvulaceae	<i>Polymeria calycina</i>	pink bindweed		C		2/1
plants	Equisetopsida	Convolvulaceae	<i>Ipomoea polymorpha</i>			C		3/2
plants	Equisetopsida	Convolvulaceae	<i>Polymeria pusilla</i>			C		2
plants	Equisetopsida	Convolvulaceae	<i>Ipomoea calobra</i>			C		1/1
plants	Equisetopsida	Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine		C		5
plants	Equisetopsida	Crassulaceae	<i>Crassula colorata</i>			C		1
plants	Equisetopsida	Crassulaceae	<i>Bryophyllum x houghtonii</i>		Y			2/2
plants	Equisetopsida	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			28/5
plants	Equisetopsida	Crassulaceae	<i>Crassula sieberiana</i>			C		1
plants	Equisetopsida	Cucurbitaceae	<i>Cucumis melo</i>			C		1
plants	Equisetopsida	Cucurbitaceae	<i>Diplocyclos palmatus</i>			C		1

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plants	Equisetopsida	Cucurbitaceae	<i>Zehneria cunninghamii</i>	slender cucumber		C		1
plants	Equisetopsida	Cucurbitaceae	<i>Neoalsomitra capricornica</i>			C		1
plants	Equisetopsida	Cucurbitaceae	<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian gherkin	Y			3/2
plants	Equisetopsida	Cucurbitaceae	<i>Cucumis myriocarpus</i> subsp. <i>myriocarpus</i>	prickly pademelon	Y			1
plants	Equisetopsida	Cucurbitaceae	<i>Diplocyclos palmatus</i> subsp. <i>palmatus</i>			C		1/1
plants	Equisetopsida	Cupressaceae	<i>Callitris endlicheri</i>	black cypress pine		C		6/2
plants	Equisetopsida	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine		C		1
plants	Equisetopsida	Cyatheaceae	<i>Cyathea australis</i>			C		2/1
plants	Equisetopsida	Cyatheaceae	<i>Cyathea cooperi</i>			C		2
plants	Equisetopsida	Cyperaceae	<i>Schoenus apogon</i> var. <i>apogon</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus betchei</i> subsp. <i>betchei</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Lepidosperma laterale</i> var. <i>laterale</i>			C		2
plants	Equisetopsida	Cyperaceae	<i>Cyperus gunnii</i> subsp. <i>novae-hollandiae</i>			C		4/1
plants	Equisetopsida	Cyperaceae	<i>Caustis</i> sp. (Robinson Gorge P.I.Forster+ PIF11256)			C		6/3
plants	Equisetopsida	Cyperaceae	<i>Gahnia</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Caustis</i>			C		4
plants	Equisetopsida	Cyperaceae	<i>Cyperus</i>			C		3
plants	Equisetopsida	Cyperaceae	<i>Scleria</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Schoenus</i>			C		4/3
plants	Equisetopsida	Cyperaceae	<i>Cyperaceae</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Cyperus iria</i>			C		5/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus bifax</i>	western nutgrass		C		1/1
plants	Equisetopsida	Cyperaceae	<i>Gahnia aspera</i>			C		3/1
plants	Equisetopsida	Cyperaceae	<i>Scleria levis</i>			C		2/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus fulvus</i>			C		6/4
plants	Equisetopsida	Cyperaceae	<i>Cyperus haspan</i>			C		7/2
plants	Equisetopsida	Cyperaceae	<i>Cyperus laevis</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Cyperus betchei</i>			C		6
plants	Equisetopsida	Cyperaceae	<i>Cyperus conicus</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus lucidus</i>			C		3/2
plants	Equisetopsida	Cyperaceae	<i>Schoenus apogon</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Schoenus kennyi</i>			C		3/3
plants	Equisetopsida	Cyperaceae	<i>Caustis flexuosa</i>			C		3/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus gracilis</i>			C		9
plants	Equisetopsida	Cyperaceae	<i>Eleocharis plana</i>	ribbed spikerush		C		1
plants	Equisetopsida	Cyperaceae	<i>Fuirena ciliaris</i>			C		2
plants	Equisetopsida	Cyperaceae	<i>Baumea planifolia</i>			C		5/3
plants	Equisetopsida	Cyperaceae	<i>Baumea rubiginosa</i>	soft twigrush		C		6/3
plants	Equisetopsida	Cyperaceae	<i>Caustis pentandra</i>	thick twistrush		C		5/3
plants	Equisetopsida	Cyperaceae	<i>Caustis recurvata</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Cyperus concinnus</i>			C		3/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus difformis</i>	rice sedge		C		3
plants	Equisetopsida	Cyperaceae	<i>Cyperus exaltatus</i>	tall flatsedge		C		2
plants	Equisetopsida	Cyperaceae	<i>Cyperus javanicus</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Gahnia sieberiana</i>	sword grass		C		3/1
plants	Equisetopsida	Cyperaceae	<i>Isolepis inundata</i>	swamp club rush		C		1

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plants	Equisetopsida	Cyperaceae	<i>Schoenus sparteus</i>			C		3/2
plants	Equisetopsida	Cyperaceae	<i>Schoenus villosus</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Cyperus rigidellus</i>			C		3/1
plants	Equisetopsida	Cyperaceae	<i>Eleocharis atricha</i>	tuber spikerush		C		3/1
plants	Equisetopsida	Cyperaceae	<i>Scleria sphacelata</i>			C		6/2
plants	Equisetopsida	Cyperaceae	<i>Cyperus brevifolius</i>	Mullumbimby couch	Y			2/2
plants	Equisetopsida	Cyperaceae	<i>Cyperus curvistylis</i>			C		2/2
plants	Equisetopsida	Cyperaceae	<i>Cyperus gymnocaulos</i>	spiny flatsedge		C		1
plants	Equisetopsida	Cyperaceae	<i>Tetragia capillaris</i>			C		2/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus involucreatus</i>		Y			1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus polystachyos</i>			C		5
plants	Equisetopsida	Cyperaceae	<i>Rhynchospora brownii</i>	beak rush		C		2/2
plants	Equisetopsida	Cyperaceae	<i>Scleria mackaviensis</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus alterniflorus</i>			C		2/1
plants	Equisetopsida	Cyperaceae	<i>Eleocharis sphacelata</i>	tall spikerush		C		3/1
plants	Equisetopsida	Cyperaceae	<i>Isolepis subtilissima</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Lepidosperma laterale</i>			C		4/1
plants	Equisetopsida	Cyperaceae	<i>Cyperus sanguinolentus</i>			C		2/1
plants	Equisetopsida	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		11/3
plants	Equisetopsida	Cyperaceae	<i>Schoenus melanostachys</i>			C		4/2
plants	Equisetopsida	Cyperaceae	<i>Fimbristylis aestivalis</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Lipocarpa microcephala</i>			C		1
plants	Equisetopsida	Cyperaceae	<i>Schoenoplectiella erecta</i>		Y			2/1
plants	Equisetopsida	Cyperaceae	<i>Schoenoplectiella laevis</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Eleocharis cylindrostachys</i>			C		1/1
plants	Equisetopsida	Cyperaceae	<i>Schoenoplectiella mucronata</i>			C		4/2
plants	Equisetopsida	Davalliaceae	<i>Davallia pyxidata</i>			C		2
plants	Equisetopsida	Dennstaedtiaceae	<i>Histiopteris incisa</i>	bats-wing fern		C		4/1
plants	Equisetopsida	Dennstaedtiaceae	<i>Pteridium esculentum</i>	common bracken		C		10
plants	Equisetopsida	Dicksoniaceae	<i>Calochlaena dubia</i>			C		7
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia</i>			C		4/2
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia linearis var. obtusifolia</i>			C		7/2
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia stricta var. stricta</i>			C		1/1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia hendersonii</i>			C		4/4
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia oligodonta</i>			C		11/5
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia acicularis</i>			C		1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia cistoidea</i>			C		3/1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia linearis</i>			C		3/1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia stricta</i>			C		5
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia sp. (Isla Gorge P.Sharpe 598)</i>			C		1/1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia ferox</i>			C		1/1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia aspera</i>			C		4
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia diffusa</i>			C		1
plants	Equisetopsida	Dilleniaceae	<i>Hibbertia riparia</i>			C		4
plants	Equisetopsida	Dioscoreaceae	<i>Dioscorea transversa</i>	native yam		C		2
plants	Equisetopsida	Dipterocarpaceae	<i>Shorea</i>			C		1/1

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plants	Equisetopsida	Droseraceae	<i>Drosera burmanni</i>			C		2/2
plants	Equisetopsida	Droseraceae	<i>Drosera binata</i>	forked sundew		C		4/2
plants	Equisetopsida	Droseraceae	<i>Drosera</i>			C		3
plants	Equisetopsida	Droseraceae	<i>Drosera spatulata</i>			C		2
plants	Equisetopsida	Droseraceae	<i>Drosera spatulata var. spatulata</i>			C		3/3
plants	Equisetopsida	Droseraceae	<i>Drosera lunata</i>			C		1/1
plants	Equisetopsida	Dryopteridaceae	<i>Arachniodes aristata</i>	prickly shield fern		C		1
plants	Equisetopsida	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		17/1
plants	Equisetopsida	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		3
plants	Equisetopsida	Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	ash quandong		C		3/2
plants	Equisetopsida	Elatinaceae	<i>Elatine gratiolooides</i>	waterwort		C		2
plants	Equisetopsida	Ericaceae	<i>Leucopogon</i>			C		1
plants	Equisetopsida	Ericaceae	<i>Melichrus</i>			C		4/3
plants	Equisetopsida	Ericaceae	<i>Monotoca scoparia</i>	prickly broom heath		C		5/2
plants	Equisetopsida	Ericaceae	<i>Leucopogon muticus</i>			C		5/4
plants	Equisetopsida	Ericaceae	<i>Acrotriche aggregata</i>	red cluster heath		C		6/4
plants	Equisetopsida	Ericaceae	<i>Leucopogon biflorus</i>			C		10/8
plants	Equisetopsida	Ericaceae	<i>Epacris obtusifolia</i>	common heath		C		2/1
plants	Equisetopsida	Ericaceae	<i>Agortia pleiosperma</i>			C		1
plants	Equisetopsida	Ericaceae	<i>Melichrus procumbens</i>	jam tarts		C		1
plants	Equisetopsida	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse		C		3/2
plants	Equisetopsida	Ericaceae	<i>Melichrus sp. (Isla Gorge P.Sharpe+ 601)</i>			C		6/4
plants	Equisetopsida	Ericaceae	<i>Brachyloma daphnoides subsp. daphnoides</i>			C		1/1
plants	Equisetopsida	Ericaceae	<i>Leucopogon mitchellii</i>			C		3/1
plants	Equisetopsida	Ericaceae	<i>Leucopogon cuspidatus</i>			C		1/1
plants	Equisetopsida	Ericaceae	<i>Brachyloma daphnoides</i>			C		4
plants	Equisetopsida	Eriocaulaceae	<i>Eriocaulon nanum</i>			C		1/1
plants	Equisetopsida	Eriocaulaceae	<i>Eriocaulon scariosum</i>			C		5/2
plants	Equisetopsida	Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree		C		43/3
plants	Equisetopsida	Erythroxylaceae	<i>Erythroxylum</i>			C		1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			1/1
plants	Equisetopsida	Euphorbiaceae	<i>Croton insularis</i>	Queensland cascarilla		C		5/3
plants	Equisetopsida	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			2/2
plants	Equisetopsida	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		12/2
plants	Equisetopsida	Euphorbiaceae	<i>Bertya pedicellata</i>			NT		3
plants	Equisetopsida	Euphorbiaceae	<i>Acalypha capillipes</i>	small-leaved acalypha		C		6
plants	Equisetopsida	Euphorbiaceae	<i>Beyeria viscosa</i>			C		2/1
plants	Equisetopsida	Euphorbiaceae	<i>Bertya opposens</i>			C	V	4/3
plants	Equisetopsida	Euphorbiaceae	<i>Ricinocarpos</i>			C		2
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia</i>			C		6
plants	Equisetopsida	Euphorbiaceae	<i>Acalypha</i>			C		1
plants	Equisetopsida	Euphorbiaceae	<i>Ricinocarpos ledifolius</i>	scrub wedding bush		C		1
plants	Equisetopsida	Euphorbiaceae	<i>Ricinocarpos ruminatus</i>			C		4
plants	Equisetopsida	Euphorbiaceae	<i>Excoecaria dallachyana</i>	scrub poison tree		C		1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia hyssopifolia</i>		Y			1/1
plants	Equisetopsida	Euphorbiaceae	<i>Claoxylon tenerifolium</i>	Queensland brittlewood		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		3/1
plants	Equisetopsida	Euphorbiaceae	<i>Mallotus claoxyloides</i>	green kamala		C		1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia dallachyana</i>			C		2/1
plants	Equisetopsida	Euphorbiaceae	<i>Croton acronychioides</i>	thick-leaved croton		C		1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia drummondii</i>			C		2
plants	Equisetopsida	Euphorbiaceae	<i>Alchornea ilicifolia</i>	native holly		C		2
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia tannensis</i>			C		1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia tannensis subsp. eremophila</i>			C		4/1
plants	Equisetopsida	Euphorbiaceae	<i>Euphorbia tannensis subsp. tannensis</i>			C		2
plants	Equisetopsida	Euphorbiaceae	<i>Homalanthus stillingiifolius</i>			C		1/1
plants	Equisetopsida	Euphorbiaceae	<i>Ricinocarpus linearifolius</i>			C		14/10
plants	Equisetopsida	Euphorbiaceae	<i>Homalanthus populifolius</i>			C		1
plants	Equisetopsida	Euphorbiaceae	<i>Tragia novae-hollandiae</i>	stinging-vine		C		1
plants	Equisetopsida	Euphorbiaceae	<i>Croton pheballoides</i>	narrow-leaved croton		C		16/4
plants	Equisetopsida	Fabaceae	<i>Mirbelia rubiifolia</i>	heathy mirbelia		C		3/1
plants	Equisetopsida	Fabaceae	<i>Stylosanthes scabra</i>		Y			16/3
plants	Equisetopsida	Fabaceae	<i>Crotalaria verrucosa</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Indigofera australis</i>			C		5
plants	Equisetopsida	Fabaceae	<i>Indigofera brevidens</i>			C		4/3
plants	Equisetopsida	Fabaceae	<i>Indigofera linifolia</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Indigofera pratensis</i>			C		3/1
plants	Equisetopsida	Fabaceae	<i>Phyllota phyllicoides</i>	yellow peabush		C		5/3
plants	Equisetopsida	Fabaceae	<i>Pultenaea petiolaris</i>			C		14/9
plants	Equisetopsida	Fabaceae	<i>Tephrosia brachyodon</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Daviesia quoquoversus</i>			V		7/2
plants	Equisetopsida	Fabaceae	<i>Desmodium brachypodum</i>	large ticktrefoil		C		4/1
plants	Equisetopsida	Fabaceae	<i>Desmodium macrocarpum</i>			C		8/4
plants	Equisetopsida	Fabaceae	<i>Dillwynia phyllicoides</i>			C		5/4
plants	Equisetopsida	Fabaceae	<i>Erythrina vespertilio</i>			C		4
plants	Equisetopsida	Fabaceae	<i>Gompholobium pinnatum</i>	poor mans gold		C		3/1
plants	Equisetopsida	Fabaceae	<i>Hardenbergia violacea</i>			C		5/1
plants	Equisetopsida	Fabaceae	<i>Crotalaria medicaginea</i>	trefoil rattlepod		C		2
plants	Equisetopsida	Fabaceae	<i>Jacksonia rhadinoclona</i>	Miles dogwood		C		3/1
plants	Equisetopsida	Fabaceae	<i>Pultenaea cunninghamii</i>	prickly pea		C		7/7
plants	Equisetopsida	Fabaceae	<i>Hovea</i>			C		6/1
plants	Equisetopsida	Fabaceae	<i>Glycine</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Galactia</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Kennedia</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Mirbelia</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Pultenaea</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Swainsona</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Tephrosia</i>			C		3/1
plants	Equisetopsida	Fabaceae	<i>Indigofera</i>			C		2
plants	Equisetopsida	Fabaceae	<i>Cullen tenax</i>	emu-foot		C		4/1
plants	Equisetopsida	Fabaceae	<i>Stylosanthes</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Hovea linearis</i>	erect hovea		C		3/2

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plants	Equisetopsida	Fabaceae	<i>Hovea longipes</i>	brush hovea		C		4/1
plants	Equisetopsida	Fabaceae	<i>Aotus subglauca</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Cullen cinereum</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Glycine falcata</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Lotus australis</i>	Australian trefoil		C		1
plants	Equisetopsida	Fabaceae	<i>Medicago sativa</i>	lucerne	Y			1
plants	Equisetopsida	Fabaceae	<i>Pultenaea borea</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Vigna vexillata</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Zornia areolata</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Bossiaea brownii</i>			C		6
plants	Equisetopsida	Fabaceae	<i>Daviesia filipes</i>			C		4/1
plants	Equisetopsida	Fabaceae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	Equisetopsida	Fabaceae	<i>Hovea lanceolata</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Hovea planifolia</i>			C		11/3
plants	Equisetopsida	Fabaceae	<i>Mirbelia pungens</i>			C		2/1
plants	Equisetopsida	Fabaceae	<i>Tephrosia rufula</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Vigna lanceolata</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Bossiaea concolor</i>			C		5/2
plants	Equisetopsida	Fabaceae	<i>Canavalia papuana</i>	wild jack bean		C		1/1
plants	Equisetopsida	Fabaceae	<i>Clitoria ternatea</i>	butterfly pea	Y			1
plants	Equisetopsida	Fabaceae	<i>Crotalaria brevis</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Daviesia discolor</i>			V	V	8/6
plants	Equisetopsida	Fabaceae	<i>Desmodium varians</i>	slender tick trefoil		C		6
plants	Equisetopsida	Fabaceae	<i>Hovea tholiformis</i>			C		5/3
plants	Equisetopsida	Fabaceae	<i>Mirbelia aotoides</i>			C		2/2
plants	Equisetopsida	Fabaceae	<i>Aeschynomene brevifolia</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Pultenaea spinosa</i>			C		15/1
plants	Equisetopsida	Fabaceae	<i>Rhynchosia minima</i>			C		3
plants	Equisetopsida	Fabaceae	<i>Austrostenisia blackii</i>	bloodvine		C		1
plants	Equisetopsida	Fabaceae	<i>Desmodium campylocaulon</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Gompholobium foliolosum</i>	fern-leaved burtonia		C		2
plants	Equisetopsida	Fabaceae	<i>Desmodium rhytidophyllum</i>			C		5/2
plants	Equisetopsida	Fabaceae	<i>Macroptilium lathyroides</i>		Y			4/4
plants	Equisetopsida	Fabaceae	<i>Hardenbergia perbrevidens</i>			C		4/4
plants	Equisetopsida	Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y			4/2
plants	Equisetopsida	Fabaceae	<i>Rhynchosia minima</i> var. <i>minima</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Aotus subglauca</i> var. <i>filiformis</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Crotalaria incana</i> subsp. <i>incana</i>		Y			1/1
plants	Equisetopsida	Fabaceae	<i>Daviesia filipes</i> subsp. <i>filipes</i>			C		4/4
plants	Equisetopsida	Fabaceae	<i>Glycine clandestina</i> var. <i>sericea</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Pultenaea millarii</i> var. <i>millarii</i>			C		9/7
plants	Equisetopsida	Fabaceae	<i>Tephrosia filipes</i> subsp. <i>filipes</i>			C		3/1
plants	Equisetopsida	Fabaceae	<i>Hovea linearis</i> x <i>Hovea planifolia</i>			C		3/3
plants	Equisetopsida	Fabaceae	<i>Sesbania cannabina</i> var. <i>cannabina</i>			C		3
plants	Equisetopsida	Fabaceae	<i>Mirbelia speciosa</i> subsp. <i>ringrosei</i>			C		2/1
plants	Equisetopsida	Fabaceae	<i>Zornia muriculata</i> subsp. <i>angustata</i>			C		3/3

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plants	Equisetopsida	Fabaceae	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Glycine clandestina</i> var. <i>clandestina</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Hovea planifolia</i> x <i>Hovea tholiformis</i>			C		1/1
plants	Equisetopsida	Fabaceae	<i>Erythrina vespertilio</i> subsp. <i>vespertilio</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Macroptilium lathyroides</i> var. <i>semirectum</i>		Y			1
plants	Equisetopsida	Fabaceae	<i>Crotalaria dissitiflora</i> subsp. <i>dissitiflora</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Kennedia</i> sp. (Blackdown Tableland R.J.Henderson+ H747)			C		1/1
plants	Equisetopsida	Fabaceae	<i>Templetonia egena</i>	desert broombush		C		1/1
plants	Equisetopsida	Fabaceae	<i>Zornia muriculata</i>			C		2
plants	Equisetopsida	Fabaceae	<i>Bossiaea carinalis</i>			C		12/7
plants	Equisetopsida	Fabaceae	<i>Crotalaria montana</i>			C		3
plants	Equisetopsida	Fabaceae	<i>Daviesia villifera</i>	prickly daviesia		C		1
plants	Equisetopsida	Fabaceae	<i>Daviesia wyattiana</i>	long-leaved bitter pea		C		8/5
plants	Equisetopsida	Fabaceae	<i>Glycine tomentella</i>	woolly glycine		C		5/1
plants	Equisetopsida	Fabaceae	<i>Indigofera hirsuta</i>	hairy indigo		C		2/2
plants	Equisetopsida	Fabaceae	<i>Indigofera linnaei</i>	Birdsville indigo		C		1
plants	Equisetopsida	Fabaceae	<i>Jacksonia scoparia</i>			C		17/2
plants	Equisetopsida	Fabaceae	<i>Pultenaea millarii</i>			C		2/1
plants	Equisetopsida	Fabaceae	<i>Pultenaea paleacea</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Sesbania cannabina</i>			C		2
plants	Equisetopsida	Fabaceae	<i>Zornia dyctiocarpa</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		2
plants	Equisetopsida	Fabaceae	<i>Daviesia acicularis</i>			C		1
plants	Equisetopsida	Fabaceae	<i>Daviesia ulicifolia</i>	native gorse		C		3
plants	Equisetopsida	Fabaceae	<i>Glycine clandestina</i>			C		3
plants	Equisetopsida	Fabaceae	<i>Medicago polymorpha</i>	burr medic	Y			1/1
plants	Equisetopsida	Fissidentaceae	<i>Fissidens asplenioides</i>			C		1/1
plants	Equisetopsida	Fissidentaceae	<i>Fissidens</i>			C		1/1
plants	Equisetopsida	Gentianaceae	<i>Schenkia australis</i>			C		1/1
plants	Equisetopsida	Gentianaceae	<i>Centaurium erythraea</i>	common centaury	Y			1
plants	Equisetopsida	Gleicheniaceae	<i>Gleichenia dicarpa</i>	pouched coral fern		C		6/2
plants	Equisetopsida	Gleicheniaceae	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>			C		7/1
plants	Equisetopsida	Gleicheniaceae	<i>Dicranopteris linearis</i> var. <i>linearis</i>			C		1
plants	Equisetopsida	Gleicheniaceae	<i>Dicranopteris linearis</i>			C		3
plants	Equisetopsida	Gleicheniaceae	<i>Sticherus flabellatus</i>			C		1/1
plants	Equisetopsida	Gleicheniaceae	<i>Gleichenia rupestris</i>			C		2/1
plants	Equisetopsida	Goodeniaceae	<i>Scaevola spinescens</i>	prickly fan flower		C		3/2
plants	Equisetopsida	Goodeniaceae	<i>Goodenia grandiflora</i>			C		7/6
plants	Equisetopsida	Goodeniaceae	<i>Scaevola ramosissima</i>	purple fan flower		C		2/1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia fascicularis</i>			C		1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia rotundifolia</i>			C		9/3
plants	Equisetopsida	Goodeniaceae	<i>Goodenia racemosa</i> var. <i>racemosa</i>			C		1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia racemosa</i> var. <i>latifolia</i>			C		1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia bellidifolia</i> subsp. <i>argentea</i>			C		3/2
plants	Equisetopsida	Goodeniaceae	<i>Goodenia</i> sp. (Mt Castletower M.D.Crisp 2753)			C		1/1

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plants	Equisetopsida	Goodeniaceae	<i>Goodenia hederacea</i>			C		1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia</i>			C		3
plants	Equisetopsida	Goodeniaceae	<i>Goodenia rosulata</i>			C		1/1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia racemosa</i>			C		2
plants	Equisetopsida	Goodeniaceae	<i>Dampiera discolor</i>			C		6/2
plants	Equisetopsida	Goodeniaceae	<i>Dampiera adpressa</i>			C		4/3
plants	Equisetopsida	Goodeniaceae	<i>Dampiera stricta</i>			C		1
plants	Equisetopsida	Goodeniaceae	<i>Goodenia glabra</i>			C		3/2
plants	Equisetopsida	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion		C		3
plants	Equisetopsida	Goodeniaceae	<i>Dampiera</i>			C		1
plants	Equisetopsida	Gyrostemonaceae	<i>Codonocarpus attenuatus</i>			C		1
plants	Equisetopsida	Gyrostemonaceae	<i>Codonocarpus cotinifolius</i>			C		1
plants	Equisetopsida	Haemodoraceae	<i>Haemodorum austroqueenslandicum</i>			C		4/2
plants	Equisetopsida	Haloragaceae	<i>Gonocarpus</i>			C		2/1
plants	Equisetopsida	Haloragaceae	<i>Haloragis stricta</i>			C		1
plants	Equisetopsida	Haloragaceae	<i>Gonocarpus micranthus subsp. ramosissimus</i>			C		2/1
plants	Equisetopsida	Haloragaceae	<i>Myriophyllum simulans</i>			C		3/2
plants	Equisetopsida	Haloragaceae	<i>Haloragis heterophylla</i>	rough raspweed		C		1
plants	Equisetopsida	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil		C		1/1
plants	Equisetopsida	Haloragaceae	<i>Gonocarpus chinensis subsp. verrucosus</i>			C		2/1
plants	Equisetopsida	Haloragaceae	<i>Haloragis aspera</i>	raspweed		C		1/1
plants	Equisetopsida	Haloragaceae	<i>Gonocarpus humilis</i>			C		1/1
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella longifolia var. stenophylla</i>			C		1/1
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella caerulea var. petasmatodes</i>			C		1/1
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella caerulea var. protensa</i>			C		1/1
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella revoluta var. tenuis</i>			C		2/2
plants	Equisetopsida	Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	scrambling lily		C		2
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella longifolia</i>			C		3/1
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella revoluta</i>			C		8
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella caerulea</i>			C		3
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella</i>			C		4
plants	Equisetopsida	Hemerocallidaceae	<i>Dianella rara</i>			C		2/2
plants	Equisetopsida	Hernandiaceae	<i>Gyrocarpus americanus</i>			C		1
plants	Equisetopsida	Hydrocharitaceae	<i>Ottelia ovalifolia subsp. ovalifolia</i>			C		2/2
plants	Equisetopsida	Hydrocharitaceae	<i>Ottelia ovalifolia</i>	swamp lily		C		3
plants	Equisetopsida	Hydrocharitaceae	<i>Vallisneria nana</i>			C		1/1
plants	Equisetopsida	Hymenophyllaceae	<i>Abrodictyum caudatum</i>			C		1
plants	Equisetopsida	Hymenophyllaceae	<i>Abrodictyum brassii</i>			C		1
plants	Equisetopsida	Hypoxidaceae	<i>Hypoxis hygrometrica var. villosisepala</i>			C		1
plants	Equisetopsida	Iridaceae	<i>Patersonia sericea</i>			C		1
plants	Equisetopsida	Iridaceae	<i>Patersonia sericea var. sericea</i>			C		2/1
plants	Equisetopsida	Iridaceae	<i>Patersonia glabrata</i>			C		3/2
plants	Equisetopsida	Johnsoniaceae	<i>Tricoryne anceps</i>			C		1
plants	Equisetopsida	Johnsoniaceae	<i>Caesia parviflora var. parviflora</i>			C		3/1
plants	Equisetopsida	Johnsoniaceae	<i>Tricoryne muricata</i>			C		4/1
plants	Equisetopsida	Johnsoniaceae	<i>Tricoryne elatior</i>	yellow autumn lily		C		6

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plants	Equisetopsida	Johnsoniaceae	<i>Caesia parviflora</i>			C		1
plants	Equisetopsida	Johnsoniaceae	<i>Caesia chlorantha</i>			C		1
plants	Equisetopsida	Juncaceae	<i>Juncus prismatocarpus</i>	branching rush		C		3/1
plants	Equisetopsida	Juncaceae	<i>Juncus planifolius</i>			C		1
plants	Equisetopsida	Juncaceae	<i>Juncus continuus</i>			C		7/2
plants	Equisetopsida	Juncaceae	<i>Juncus aridicola</i>	tussock rush		C		2
plants	Equisetopsida	Juncaceae	<i>Juncus usitatus</i>			C		3
plants	Equisetopsida	Juncaceae	<i>Juncus</i>			C		1
plants	Equisetopsida	Juncaginaceae	<i>Cycnogeton procerus</i>			C		1
plants	Equisetopsida	Lamiaceae	<i>Plectranthus</i>			C		1
plants	Equisetopsida	Lamiaceae	<i>Prostanthera cryptandroides subsp. euphrasioides</i>			C		5/1
plants	Equisetopsida	Lamiaceae	<i>Prostanthera</i>			C		3/2
plants	Equisetopsida	Lamiaceae	<i>Ajuga australis</i>	Australian bugle		C		3/1
plants	Equisetopsida	Lamiaceae	<i>Teucrium argutum</i>			C		1
plants	Equisetopsida	Lamiaceae	<i>Teucrium junceum</i>			C		3/1
plants	Equisetopsida	Lamiaceae	<i>Mentha grandiflora</i>			C		1
plants	Equisetopsida	Lamiaceae	<i>Ocimum tenuiflorum</i>			C		4
plants	Equisetopsida	Lamiaceae	<i>Teucrium daucoides</i>			C		1/1
plants	Equisetopsida	Lamiaceae	<i>Teucrium puberulum</i>			C		1/1
plants	Equisetopsida	Lamiaceae	<i>Plectranthus blakei</i>			NT		10/10
plants	Equisetopsida	Lamiaceae	<i>Prostanthera collina</i>			C		2/2
plants	Equisetopsida	Lamiaceae	<i>Chloanthes parviflora</i>			C		6/2
plants	Equisetopsida	Lamiaceae	<i>Glossocarya hemiderma</i>			C		2
plants	Equisetopsida	Lamiaceae	<i>Ocimum caryophyllinum</i>			C		1/1
plants	Equisetopsida	Lamiaceae	<i>Pityrodia salviifolia</i>	pityrodia		C		3/1
plants	Equisetopsida	Lamiaceae	<i>Plectranthus diversus</i>			C		1/1
plants	Equisetopsida	Lamiaceae	<i>Prostanthera oleoides</i>			C		2/2
plants	Equisetopsida	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/1
plants	Equisetopsida	Lamiaceae	<i>Prostanthera parvifolia</i>			C		3/3
plants	Equisetopsida	Lamiaceae	<i>Clerodendrum floribundum</i>			C		6/2
plants	Equisetopsida	Lamiaceae	<i>Plectranthus parviflorus</i>			C		4/2
plants	Equisetopsida	Lamiaceae	<i>Prostanthera suborbicularis</i>			C		2/2
plants	Equisetopsida	Lamiaceae	<i>Ocimum</i>					1
plants	Equisetopsida	Lauraceae	<i>Cassytha filiformis</i>	dodder laurel		C		2
plants	Equisetopsida	Lauraceae	<i>Cassytha pubescens</i>	downy devil's twine		C		1
plants	Equisetopsida	Lauraceae	<i>Cassytha glabella forma glabella</i>			C		2/1
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra multiflora subsp. multiflora</i>			C		4
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra leucocephala</i>			C		2
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra confertifolia subsp. pallida</i>			C		7/3
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra confertifolia</i>			C		1
plants	Equisetopsida	Laxmanniaceae	<i>Thysanotus tuberosus subsp. tuberosus</i>			C		1/1
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra</i>			C		5
plants	Equisetopsida	Laxmanniaceae	<i>Laxmannia</i>			C		1/1
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra laxa</i>	broad-leaved matrush		C		1
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra obliqua</i>			C		9/4
plants	Equisetopsida	Laxmanniaceae	<i>Laxmannia compacta</i>			C		3/3

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plants	Equisetopsida	Laxmanniaceae	<i>Laxmannia gracilis</i>	slender wire lily		C		3
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra filiformis</i>			C		3
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra longifolia</i>			C		12
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra ramosissima</i>			C		1/1
plants	Equisetopsida	Laxmanniaceae	<i>Thysanotus tuberosus</i>			C		1
plants	Equisetopsida	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		9
plants	Equisetopsida	Laxmanniaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>			C		8/1
plants	Equisetopsida	Lentibulariaceae	<i>Utricularia lateriflora</i>	small bladderwort		C		1
plants	Equisetopsida	Lentibulariaceae	<i>Utricularia blackmanii</i>			C		1/1
plants	Equisetopsida	Lentibulariaceae	<i>Utricularia dichotoma</i>	fairy aprons		C		2/1
plants	Equisetopsida	Lentibulariaceae	<i>Utricularia aurea</i>	golden bladderwort		C		1/1
plants	Equisetopsida	Lentibulariaceae	<i>Utricularia bifida</i>			C		3
plants	Equisetopsida	Leucobryaceae	<i>Leucobryum aduncum</i>			C		2/2
plants	Equisetopsida	Leucobryaceae	<i>Leucobryum chlorophyllosum</i>			C		1/1
plants	Equisetopsida	Lindsaeaceae	<i>Lindsaea ensifolia</i>			C		1/1
plants	Equisetopsida	Lindsaeaceae	<i>Lindsaea microphylla</i>	lacy wedge fern		C		3/1
plants	Equisetopsida	Loganiaceae	<i>Logania</i>			C		1
plants	Equisetopsida	Loganiaceae	<i>Logania diffusa</i>			V	V	4/2
plants	Equisetopsida	Loganiaceae	<i>Logania albiflora</i>			C		8/5
plants	Equisetopsida	Loganiaceae	<i>Mitrasacme oasena</i>			C		1/1
plants	Equisetopsida	Loganiaceae	<i>Orianthera pusilla</i>			C		1
plants	Equisetopsida	Loganiaceae	<i>Mitrasacme paludosa</i>			C		6/5
plants	Equisetopsida	Loganiaceae	<i>Mitrasacme prolifera</i>			C		1
plants	Equisetopsida	Loganiaceae	<i>Mitrasacme alsinoides</i>			C		3/2
plants	Equisetopsida	Loganiaceae	<i>Strychnos psilosperma</i>	strychnine tree		C		1
plants	Equisetopsida	Loranthaceae	<i>Amyema cambagei</i>			C		1
plants	Equisetopsida	Loranthaceae	<i>Amyema quandang</i> var. <i>quandang</i>			C		2/1
plants	Equisetopsida	Loranthaceae	<i>Dendrophthoe glabrescens</i>			C		1/1
plants	Equisetopsida	Loranthaceae	<i>Dendrophthoe vitellina</i>	long-flowered mistletoe		C		2/1
plants	Equisetopsida	Loranthaceae	<i>Muellerina bidwillii</i>			C		1
plants	Equisetopsida	Loranthaceae	<i>Lysiana subfalcata</i>			C		6
plants	Equisetopsida	Loranthaceae	<i>Lysiana filifolia</i>			C		4/3
plants	Equisetopsida	Loranthaceae	<i>Amyema</i>			C		1
plants	Equisetopsida	Loranthaceae	<i>Amyema quandang</i> var. <i>bancroftii</i>	broad-leaved grey mistletoe		C		2
plants	Equisetopsida	Loranthaceae	<i>Amyema quandang</i>			C		1
plants	Equisetopsida	Lycopodiaceae	<i>Lycopodiella cernua</i>			C		2/1
plants	Equisetopsida	Lygodiaceae	<i>Lygodium microphyllum</i>	snake fern		C		7/4
plants	Equisetopsida	Lygodiaceae	<i>Lygodium flexuosum</i>			C		1
plants	Equisetopsida	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		2/2
plants	Equisetopsida	Lythraceae	<i>Lythrum paradoxum</i>			C		1
plants	Equisetopsida	Lythraceae	<i>Rotala mexicana</i>			C		1/1
plants	Equisetopsida	Lythraceae	<i>Rotala</i>			C		1
plants	Equisetopsida	Macarthuriaceae	<i>Macarthuria ephedroides</i>			C		11/8
plants	Equisetopsida	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1
plants	Equisetopsida	Malvaceae	<i>Sida rohlenae</i>			C		4
plants	Equisetopsida	Malvaceae	<i>Sida corrugata</i>			C		3/1

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plants	Equisetopsida	Malvaceae	<i>Abutilon nobile</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Sida cordifolia</i>		Y			10/3
plants	Equisetopsida	Malvaceae	<i>Sida fibulifera</i>			C		2
plants	Equisetopsida	Malvaceae	<i>Sida trichopoda</i>			C		9/2
plants	Equisetopsida	Malvaceae	<i>Abutilon auritum</i>	Chinese lantern		C		1
plants	Equisetopsida	Malvaceae	<i>Abutilon fraseri</i>	dwarf lantern flower		C		1
plants	Equisetopsida	Malvaceae	<i>Hibiscus sturtii</i>			C		4/2
plants	Equisetopsida	Malvaceae	<i>Hibiscus trionum</i>					3
plants	Equisetopsida	Malvaceae	<i>Sida atherophora</i>			C		7/2
plants	Equisetopsida	Malvaceae	<i>Sida hackettiana</i>			C		11/1
plants	Equisetopsida	Malvaceae	<i>Sida rhombifolia</i>		Y			8/3
plants	Equisetopsida	Malvaceae	<i>Sida cunninghamii</i>			C		2
plants	Equisetopsida	Malvaceae	<i>Abutilon guineense</i>		Y			3/3
plants	Equisetopsida	Malvaceae	<i>Abutilon otoparpum</i>			C		4/1
plants	Equisetopsida	Malvaceae	<i>Abutilon oxycarpum</i>			C		1
plants	Equisetopsida	Malvaceae	<i>Gossypium australe</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Gossypium hirsutum</i>		Y			2/2
plants	Equisetopsida	Malvaceae	<i>Hibiscus splendens</i>	pink hibiscus		C		2/1
plants	Equisetopsida	Malvaceae	<i>Abutilon malvifolium</i>	bastard marshmallow		C		2
plants	Equisetopsida	Malvaceae	<i>Hibiscus divaricatus</i>			C		5/4
plants	Equisetopsida	Malvaceae	<i>Hibiscus meraukensis</i>	Merauke hibiscus		C		2/1
plants	Equisetopsida	Malvaceae	<i>Abelmoschus ficulneus</i>	native rosella		C		1/1
plants	Equisetopsida	Malvaceae	<i>Abutilon leucopetalum</i>			C		2/1
plants	Equisetopsida	Malvaceae	<i>Malvastrum americanum</i>		Y			9
plants	Equisetopsida	Malvaceae	<i>Hibiscus heterophyllus</i>			C		2
plants	Equisetopsida	Malvaceae	<i>Hibiscus krichauffianus</i>			C		3/3
plants	Equisetopsida	Malvaceae	<i>Sida aprica</i> var. <i>aprica</i>			C		3/3
plants	Equisetopsida	Malvaceae	<i>Hibiscus brachysiphonius</i>			C		3
plants	Equisetopsida	Malvaceae	<i>Hibiscus sturtii</i> var. <i>sturtii</i>			C		5/2
plants	Equisetopsida	Malvaceae	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			C		5/3
plants	Equisetopsida	Malvaceae	<i>Abutilon fraseri</i> subsp. <i>fraseri</i>			C		2/1
plants	Equisetopsida	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>incanum</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Sida corrugata</i> var. <i>angustifolia</i>			C		1/1
plants	Equisetopsida	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>			C		1
plants	Equisetopsida	Malvaceae	<i>Malvastrum americanum</i> var. <i>stellatum</i>			C		2/2
plants	Equisetopsida	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>subsagittatum</i>			C		2
plants	Equisetopsida	Malvaceae	<i>Malvastrum americanum</i> var. <i>americanum</i>		Y			19/1
plants	Equisetopsida	Malvaceae	<i>Sida</i> sp. (Aramac E.J.Thompson+ JER192)			C		7/5
plants	Equisetopsida	Malvaceae	<i>Hibiscus</i> sp. (Emerald S.L.Everist 2124)			C		1/1
plants	Equisetopsida	Malvaceae	<i>Sida</i> sp. (Musselbrook M.B.Thomas+ MRS437)			C		5/3
plants	Equisetopsida	Malvaceae	<i>Sida</i>			C		21/1
plants	Equisetopsida	Malvaceae	<i>Abutilon</i>			C		18
plants	Equisetopsida	Malvaceae	<i>Malvaceae</i>			C		2/1
plants	Equisetopsida	Malvaceae	<i>Sida spinosa</i>	spiny sida	Y			2
plants	Equisetopsida	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo		C		2/1
plants	Equisetopsida	Marsileaceae	<i>Marsilea hirsuta</i>	hairy nardoo		C		2

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plants	Equisetopsida	Marsileaceae	<i>Marsilea drummondii</i>	common nardoo		C		1
plants	Equisetopsida	Marsileaceae	<i>Marsilea costulifera</i>	narrow-leaved nardoo		C		2
plants	Equisetopsida	Melastomataceae	<i>Melastoma malabathricum subsp. malabathricum</i>			C		8/2
plants	Equisetopsida	Meliaceae	<i>Owenia venosa</i>	crow's apple		C		2/1
plants	Equisetopsida	Meliaceae	<i>Owenia acidula</i>	emu apple		C		15/2
plants	Equisetopsida	Meliaceae	<i>Melia azedarach</i>	white cedar		C		4/1
plants	Equisetopsida	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		2
plants	Equisetopsida	Menispermaceae	<i>Tinospora smilacina</i>	snakevine		C		2/1
plants	Equisetopsida	Menyanthaceae	<i>Nymphoides crenata</i>	wavy marshwort		C		2/1
plants	Equisetopsida	Menyanthaceae	<i>Nymphoides geminata</i>			C		3/1
plants	Equisetopsida	Menyanthaceae	<i>Nymphoides indica</i>	water snowflake		C		5/4
plants	Equisetopsida	Mimosaceae	<i>Neptunia gracilis forma gracilis</i>			C		3/1
plants	Equisetopsida	Mimosaceae	<i>Acacia cretata - Acacia leiocalyx</i>			C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia cretata x Acacia fodinalis</i>			C		2/2
plants	Equisetopsida	Mimosaceae	<i>Acacia leiocalyx subsp. leiocalyx</i>			C		15/5
plants	Equisetopsida	Mimosaceae	<i>Acacia victoriae subsp. victoriae</i>			C		3/3
plants	Equisetopsida	Mimosaceae	<i>Acacia julifera subsp. curvinervia</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia disparrima subsp. disparrima</i>			C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia penninervis var. penninervis</i>			C		2/2
plants	Equisetopsida	Mimosaceae	<i>Leucaena leucocephala subsp. glabrata</i>		Y			1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia bancroftiorum x Acacia falciformis</i>			C		3/3
plants	Equisetopsida	Mimosaceae	<i>Leucaena leucocephala subsp. leucocephala</i>		Y			3/3
plants	Equisetopsida	Mimosaceae	<i>Acacia</i>			C		19
plants	Equisetopsida	Mimosaceae	<i>Acacia blakei</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia decora</i>	pretty wattle		C		2
plants	Equisetopsida	Mimosaceae	<i>Acacia storyi</i>			NT		21/17
plants	Equisetopsida	Mimosaceae	<i>Acacia cretata</i>			C		23/15
plants	Equisetopsida	Mimosaceae	<i>Acacia excelsa</i>			C		17
plants	Equisetopsida	Mimosaceae	<i>Acacia implexa</i>	lightwood		C		3/1
plants	Equisetopsida	Mimosaceae	<i>Acacia burrowii</i>			C		5/2
plants	Equisetopsida	Mimosaceae	<i>Acacia caroleae</i>			C		6
plants	Equisetopsida	Mimosaceae	<i>Acacia conferta</i>			C		2/1
plants	Equisetopsida	Mimosaceae	<i>Acacia coriacea</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia oswaldii</i>	miljee		C		8/2
plants	Equisetopsida	Mimosaceae	<i>Acacia salicina</i>	doolan		C		25
plants	Equisetopsida	Mimosaceae	<i>Acacia shirleyi</i>	lancewood		C		16/5
plants	Equisetopsida	Mimosaceae	<i>Acacia venulosa</i>	veined wattle		C		8/7
plants	Equisetopsida	Mimosaceae	<i>Albizia lebbbeck</i>	Indian siris		C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia amblygona</i>	fan-leaf wattle		C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia buxifolia</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia decurrens</i>		Y			1
plants	Equisetopsida	Mimosaceae	<i>Acacia everistii</i>			C		9/8
plants	Equisetopsida	Mimosaceae	<i>Acacia gittinsii</i>			C		27/22
plants	Equisetopsida	Mimosaceae	<i>Acacia leiocalyx</i>			C		7/1
plants	Equisetopsida	Mimosaceae	<i>Acacia polifolia</i>			C		5/4
plants	Equisetopsida	Mimosaceae	<i>Acacia pubicosta</i>			C		1

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plants	Equisetopsida	Mimosaceae	<i>Acacia catenulata</i>	bendee		C		13
plants	Equisetopsida	Mimosaceae	<i>Acacia complanata</i>	flatstem wattle		C		10/1
plants	Equisetopsida	Mimosaceae	<i>Acacia concurrens</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia flavescens</i>	toothed wattle		C		16
plants	Equisetopsida	Mimosaceae	<i>Acacia holotricha</i>			C		5/5
plants	Equisetopsida	Mimosaceae	<i>Acacia juncifolia</i>			C		9/6
plants	Equisetopsida	Mimosaceae	<i>Acacia leptocarpa</i>	north coast wattle		C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia macradenia</i>	zig-zag wattle		C		15/6
plants	Equisetopsida	Mimosaceae	<i>Acacia neriifolia</i>	pechey wattle		C		9/7
plants	Equisetopsida	Mimosaceae	<i>Acacia rhodoxylon</i>	ringy rosewood		C		43
plants	Equisetopsida	Mimosaceae	<i>Acacia semirigida</i>			C		3/2
plants	Equisetopsida	Mimosaceae	<i>Acacia ulicifolia</i>			C		3/2
plants	Equisetopsida	Mimosaceae	<i>Albizia canescens</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia aulacocarpa</i>			C		3
plants	Equisetopsida	Mimosaceae	<i>Acacia falciformis</i>	broad-leaved hickory		C		2/2
plants	Equisetopsida	Mimosaceae	<i>Acacia glaucocarpa</i>	hickory wattle		C		15
plants	Equisetopsida	Mimosaceae	<i>Acacia grandifolia</i>			C	V	1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia harpophylla</i>	brigalow		C		88
plants	Equisetopsida	Mimosaceae	<i>Acacia hendersonii</i>			C		5/5
plants	Equisetopsida	Mimosaceae	<i>Acacia holosericea</i>			C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia melanoxylon</i>	blackwood		C		2
plants	Equisetopsida	Mimosaceae	<i>Acacia penninervis</i>			C		3
plants	Equisetopsida	Mimosaceae	<i>Acacia dietrichiana</i>			C		5/3
plants	Equisetopsida	Mimosaceae	<i>Acacia leichhardtii</i>			C		8/5
plants	Equisetopsida	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		8/4
plants	Equisetopsida	Mimosaceae	<i>Acacia longispicata</i>			C		4/4
plants	Equisetopsida	Mimosaceae	<i>Vachellia bidwillii</i>			C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia bancroftiorum</i>			C		8/7
plants	Equisetopsida	Mimosaceae	<i>Acacia fasciculifera</i>	scaly bark		C		1
plants	Equisetopsida	Mimosaceae	<i>Acacia resinicostata</i>			C		4
plants	Equisetopsida	Mimosaceae	<i>Vachellia farnesiana</i>		Y			6/1
plants	Equisetopsida	Mimosaceae	<i>Acacia neobrachycarpa</i>			C		9/5
plants	Equisetopsida	Mimosaceae	<i>Acacia podalyriifolia</i>	Queensland silver wattle		C		7/4
plants	Equisetopsida	Mimosaceae	<i>Desmanthus pernambucanus</i>		Y			1/1
plants	Equisetopsida	Mimosaceae	<i>Archidendropsis basaltica</i>	red lancewood		C		7
plants	Equisetopsida	Mimosaceae	<i>Archidendropsis thozetiana</i>			C		2
plants	Equisetopsida	Mimosaceae	<i>Acacia blakei subsp. blakei</i>			C		7/6
plants	Equisetopsida	Mimosaceae	<i>Acacia crassa subsp. crassa</i>			C		3/2
plants	Equisetopsida	Mimosaceae	<i>Acacia excelsa subsp. angusta</i>			C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia excelsa subsp. excelsa</i>			C		1/1
plants	Equisetopsida	Mimosaceae	<i>Acacia crassa subsp. longicoma</i>			C		2/1
plants	Equisetopsida	Mimosaceae	<i>Acacia julifera subsp. julifera</i>			C		2/2
plants	Equisetopsida	Mimosaceae	<i>Acacia sp. (Comet L.Pedley 4091)</i>			C		7/7
plants	Equisetopsida	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed		C		3/3
plants	Equisetopsida	Moraceae	<i>Ficus obliqua</i>			C		2
plants	Equisetopsida	Moraceae	<i>Ficus opposita</i>			C		7/1

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plants	Equisetopsida	Moraceae	<i>Ficus rubiginosa forma rubiginosa</i>			C		1/1
plants	Equisetopsida	Moraceae	<i>Ficus virens</i>			C		1
plants	Equisetopsida	Moraceae	<i>Ficus coronata</i>	creek sandpaper fig		C		5/1
plants	Equisetopsida	Myrsinaceae	<i>Myrsine variabilis</i>			C		2
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah		C		11/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus mensalis</i>			C		22/15
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		61
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus tenuipes</i>	narrow-leaved white mahogany		C		6/6
plants	Equisetopsida	Myrtaceae	<i>Harmogia densifolia</i>			C		3/2
plants	Equisetopsida	Myrtaceae	<i>Melaleuca bracteata</i>			C		4
plants	Equisetopsida	Myrtaceae	<i>Melaleuca lazaridis</i>			C		6/6
plants	Equisetopsida	Myrtaceae	<i>Melaleuca pearsonii</i>			NT		13/12
plants	Equisetopsida	Myrtaceae	<i>Melaleuca viminalis</i>			C		3/2
plants	Equisetopsida	Myrtaceae	<i>Triplarina paludosa</i>			C		18/14
plants	Equisetopsida	Myrtaceae	<i>Angophora floribunda</i>	rough-barked apple		C		48/2
plants	Equisetopsida	Myrtaceae	<i>Corymbia dallachiana</i>			C		9/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia hendersonii</i>			C		31/9
plants	Equisetopsida	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		21/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus baileyana</i>	Bailey's stringybark		C		66/13
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus cloeziana</i>	Gympie messmate		C		46/7
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus mediocris</i>			C		8/8
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus moluccana</i>	gum-topped box		C		74/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus propinqua</i>	small-fruited grey gum		C		13/8
plants	Equisetopsida	Myrtaceae	<i>Melaleuca hemisticta</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Sannantha brachypoda</i>			V		1/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia clarksoniana</i>			C		32/8
plants	Equisetopsida	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		2
plants	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus acmenoides</i>			C		70/12
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus caliginosa</i>	broad-leaved stringybark		C		18
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus cabbageana</i>	Dawson gum		C		48/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus interstans</i>			C		11/11
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus suffulgens</i>			C		36/21
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus thozetiana</i>			C		14/4
plants	Equisetopsida	Myrtaceae	<i>Homoranthus decasetus</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Lophostemon confertus</i>	brush box		C		6/1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		6/1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca tamariscina</i>			C		3/3
plants	Equisetopsida	Myrtaceae	<i>Ochrosperma adpressum</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia erythrophloia</i>	variable-barked bloodwood		C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus decorticans</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus eugenioides</i>			C		3
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus melanoleuca</i>	Nanango ironbark		C		48/8
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		C	V	2/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus tholiformis</i>			C		1/1

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plants	Equisetopsida	Myrtaceae	<i>Leptospermum neglectum</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Leptospermum sericatum</i>			C		3/2
plants	Equisetopsida	Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C		40/3
plants	Equisetopsida	Myrtaceae	<i>Melaleuca linariifolia</i>	snow-in summer		C		4/2
plants	Equisetopsida	Myrtaceae	<i>Backhousia angustifolia</i>	narrow-leaved backhousia		C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		16
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus sphaerocarpa</i>	Blackdown stringybark		C		210/29
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		21
plants	Equisetopsida	Myrtaceae	<i>Homoranthus brevistylis</i>			C		2/2
plants	Equisetopsida	Myrtaceae	<i>Leptospermum lamellatum</i>			C		19/3
plants	Equisetopsida	Myrtaceae	<i>Melaleuca montis-zamiae</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca quinquenervia</i>	swamp paperbark		C		1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca trichostachya</i>			C		4/2
plants	Equisetopsida	Myrtaceae	<i>Micromyrtus capricornia</i>			C		9/9
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus camaldulensis</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus longirostrata</i>			C		46/6
plants	Equisetopsida	Myrtaceae	<i>Lophostemon grandiflorus</i>			C		2
plants	Equisetopsida	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo		C		34/4
plants	Equisetopsida	Myrtaceae	<i>Leptospermum brachyandrum</i>	weeping tea-tree		C		4/2
plants	Equisetopsida	Myrtaceae	<i>Leptospermum polygalifolium</i>	tantoon		C		11/4
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus saligna</i> subsp. <i>saligna</i>			C		4/4
plants	Equisetopsida	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>variegata</i>			C		40
plants	Equisetopsida	Myrtaceae	<i>Corymbia watsoniana</i> subsp. <i>capillata</i>			C		2/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>citriodora</i>			C		135/2
plants	Equisetopsida	Myrtaceae	<i>Corymbia watsoniana</i> subsp. <i>watsoniana</i>			C		3/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>acuta</i>			C		3
plants	Equisetopsida	Myrtaceae	<i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>			C		10/4
plants	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>carnarvonica</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>			C		17
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i> x <i>Eucalyptus thozetiana</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i> x <i>Eucalyptus melanophloia</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus melanophloia</i> subsp. <i>melanophloia</i>			C		1/1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>			C		49/1
plants	Equisetopsida	Myrtaceae	<i>Corymbia</i>			C		2
plants	Equisetopsida	Myrtaceae	<i>Melaleuca</i>			C		6/3
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus</i>			C		10/6
plants	Equisetopsida	Myrtaceae	<i>Leptospermum</i>			C		3/1
plants	Equisetopsida	Myrtaceae	<i>Baeckea trapeza</i>			V		7/7
plants	Equisetopsida	Myrtaceae	<i>Kunzea opposita</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Corymbia aureola</i>			C		2/2
plants	Equisetopsida	Myrtaceae	<i>Corymbia bunites</i>			C		95/22
plants	Equisetopsida	Myrtaceae	<i>Gossia bidwillii</i>			C		2
plants	Equisetopsida	Myrtaceae	<i>Melaleuca nodosa</i>			C		3/2
plants	Equisetopsida	Myrtaceae	<i>Angophora costata</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Backhousia kingii</i>			C		1

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plants	Equisetopsida	Myrtaceae	<i>Eucalyptus carnea</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		140/6
plants	Equisetopsida	Myrtaceae	<i>Melaleuca nervosa</i>			C		11/2
plants	Equisetopsida	Myrtaceae	<i>Syzygium australe</i>	scrub cherry		C		1
plants	Equisetopsida	Myrtaceae	<i>Corymbia bloxsomei</i>			C		1
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		11/3
plants	Equisetopsida	Myrtaceae	<i>Eucalyptus saligna</i>			C		2/1
plants	Equisetopsida	Myrtaceae	<i>Melaleuca groveana</i>			NT		6/4
plants	Equisetopsida	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum		C		59/3
plants	Equisetopsida	Myrtaceae	<i>Corymbia citriodora</i>	spotted gum		C		12
plants	Equisetopsida	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		67/6
plants	Equisetopsida	Myrtaceae	<i>Corymbia watsoniana</i>			C		1
plants	Equisetopsida	Nyctaginaceae	<i>Boerhavia</i>			C		1
plants	Equisetopsida	Nyctaginaceae	<i>Boerhavia sp. (St George A.Hill AQ399299)</i>			C		2/2
plants	Equisetopsida	Nyctaginaceae	<i>Boerhavia pubescens</i>			C		1
plants	Equisetopsida	Nyctaginaceae	<i>Boerhavia dominii</i>			C		10/2
plants	Equisetopsida	Olacaceae	<i>Ximenia americana</i>			C		1/1
plants	Equisetopsida	Olacaceae	<i>Olax stricta</i>			C		3/1
plants	Equisetopsida	Oleaceae	<i>Jasminum didymum</i>			C		9
plants	Equisetopsida	Oleaceae	<i>Jasminum didymum subsp. racemosum</i>			C		5
plants	Equisetopsida	Oleaceae	<i>Notelaea microcarpa</i>			C		4
plants	Equisetopsida	Oleaceae	<i>Jasminum simplicifolium</i>			C		1
plants	Equisetopsida	Oleaceae	<i>Jasminum didymum subsp. didymum</i>			C		2
plants	Equisetopsida	Oleaceae	<i>Jasminum didymum subsp. lineare</i>			C		12/1
plants	Equisetopsida	Oleaceae	<i>Jasminum simplicifolium subsp. australiense</i>			C		2/1
plants	Equisetopsida	Oleaceae	<i>Notelaea sp. (Barakula A.R.Bean 7553)</i>			C		2/2
plants	Equisetopsida	Oleaceae	<i>Notelaea punctata</i>			C		4
plants	Equisetopsida	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		6
plants	Equisetopsida	Onagraceae	<i>Ludwigia peploides subsp. montevidensis</i>			C		1
plants	Equisetopsida	Ophioglossaceae	<i>Ophioglossum pendulum</i>	ribbon fern		C		1
plants	Equisetopsida	Ophioglossaceae	<i>Ophioglossum reticulatum</i>			C		2/1
plants	Equisetopsida	Orchidaceae	<i>Erythrorchis cassythoides</i>	climbing orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Bulbophyllum schillerianum</i>	red rope orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Caladenia carnea var. carnea</i>			C		1/1
plants	Equisetopsida	Orchidaceae	<i>Thelymitra ixioides var. ixioides</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Cymbidium</i>			C		4
plants	Equisetopsida	Orchidaceae	<i>Calochilus</i>			C		2/1
plants	Equisetopsida	Orchidaceae	<i>Thelymitra</i>			C		1/1
plants	Equisetopsida	Orchidaceae	<i>Prasophyllum</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Caleana major</i>	flying duck orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Diuris luteola</i>	northern yellow donkeys tails		C		2/2
plants	Equisetopsida	Orchidaceae	<i>Caladenia carnea</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Corybas barbarae</i>	helmet orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Diuris sulphurea</i>	tiger orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Phaius australis</i>			E	E	5/3
plants	Equisetopsida	Orchidaceae	<i>Acianthus exsertus</i>			C		1

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plants	Equisetopsida	Orchidaceae	<i>Caladenia catenata</i>			C		3/1
plants	Equisetopsida	Orchidaceae	<i>Dipodium punctatum</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Pterostylis nutans</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Sarcochilus hillii</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Corunastylis valida</i>			V		1/1
plants	Equisetopsida	Orchidaceae	<i>Cryptostylis erecta</i>	bonnet orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Dockrillia bowmanii</i>	scrub pencil orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Microtis parviflora</i>	slender onion orchid		C		2
plants	Equisetopsida	Orchidaceae	<i>Acianthus fornicatus</i>	pixie caps		C		1
plants	Equisetopsida	Orchidaceae	<i>Chiloglottis reflexa</i>	autumn bird orchid				1
plants	Equisetopsida	Orchidaceae	<i>Corunastylis archeri</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Dendrobium speciosum</i>			C		3/2
plants	Equisetopsida	Orchidaceae	<i>Gastrodia sesamoides</i>	cinnamon bells		C		1
plants	Equisetopsida	Orchidaceae	<i>Sarcochilus ceciliae</i>	fairy bells		C		1
plants	Equisetopsida	Orchidaceae	<i>Spiranthes australis</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Calochilus campestris</i>	copper beard orchid		C		3/2
plants	Equisetopsida	Orchidaceae	<i>Chiloglottis trullata</i>			C		2/2
plants	Equisetopsida	Orchidaceae	<i>Corybas aconitiflorus</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Dendrobium tetragonum</i>	tree spider orchid		C		2/1
plants	Equisetopsida	Orchidaceae	<i>Dockrillia cucumerina</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Gastrodia crebriflora</i>			V		1/1
plants	Equisetopsida	Orchidaceae	<i>Calochilus robertsonii</i>	purplish beard orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Dipodium hamiltonianum</i>	yellow hyacinth orchid		C		1
plants	Equisetopsida	Orchidaceae	<i>Lyperanthus suaveolens</i>	brown beaks		C		2/1
plants	Equisetopsida	Orchidaceae	<i>Pterostylis longicurva</i>			C		1
plants	Equisetopsida	Orchidaceae	<i>Pterostylis parviflora</i>	tiny greenhood		C		1
plants	Equisetopsida	Orchidaceae	<i>Corunastylis pedersonii</i>			V		1/1
plants	Equisetopsida	Orchidaceae	<i>Cymbidium canaliculatum</i>			C		11/1
plants	Equisetopsida	Orchidaceae	<i>Pterostylis ophioglossa</i>			C		1/1
plants	Equisetopsida	Orchidaceae	<i>Thelymitra angustifolia</i>			C		2/2
plants	Equisetopsida	Orchidaceae	<i>Bulbophyllum minutissimum</i>	grain-of-wheat orchid		C		1
plants	Equisetopsida	Orobanchaceae	<i>Buchnera urticifolia</i>			C		1
plants	Equisetopsida	Orobanchaceae	<i>Striga parviflora</i>			C		2
plants	Equisetopsida	Orobanchaceae	<i>Buchnera linearis</i>			C		1
plants	Equisetopsida	Orobanchaceae	<i>Buchnera gracilis</i>			C		1
plants	Equisetopsida	Orthotrichaceae	<i>Macromitrium hemitrichodes</i>			C		1/1
plants	Equisetopsida	Osmundaceae	<i>Todea barbara</i>	king fern		C		3/1
plants	Equisetopsida	Oxalidaceae	<i>Oxalis corniculata</i>		Y			6
plants	Equisetopsida	Oxalidaceae	<i>Oxalis perennans</i>			C		1/1
plants	Equisetopsida	Oxalidaceae	<i>Oxalis</i>			C		3
plants	Equisetopsida	Papaveraceae	<i>Argemone ochroleuca subsp. ochroleuca</i>	Mexican poppy	Y			2/1
plants	Equisetopsida	Passifloraceae	<i>Passiflora aurantia</i>			C		1
plants	Equisetopsida	Passifloraceae	<i>Passiflora aurantia var. aurantia</i>			C		3/3
plants	Equisetopsida	Passifloraceae	<i>Passiflora foetida</i>		Y			2/2
plants	Equisetopsida	Pentapetaceae	<i>Melhania oblongifolia</i>			C		7/6
plants	Equisetopsida	Pentapetaceae	<i>Melhania ovata</i>			C		1

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plants	Equisetopsida	Philydraceae	<i>Philydrum lanuginosum</i>	frogsmouth		C		8/1
plants	Equisetopsida	Phrymaceae	<i>Mimulus gracilis</i>	slender monkey flower		C		1
plants	Equisetopsida	Phrymaceae	<i>Glossostigma diandrum</i>			C		2/1
plants	Equisetopsida	Phyllanthaceae	<i>Glochidion sumatranum</i>	umbrella cheese tree		C		1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus mitchellii</i>			C		18/10
plants	Equisetopsida	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera		C		3/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus fuernrohrii</i>			C		2
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus carpentariae</i>			C		1/1
plants	Equisetopsida	Phyllanthaceae	<i>Synostemon rhytidospermus</i>			C		1/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>			C		5/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus maderaspatensis var. maderaspatensis</i>			C		4/1
plants	Equisetopsida	Phyllanthaceae	<i>Flueggea</i>					1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus</i>				C	4/2
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus gunnii</i>				C	2
plants	Equisetopsida	Phyllanthaceae	<i>Poranthera obovata</i>				C	3/3
plants	Equisetopsida	Phyllanthaceae	<i>Sauropus hirtellus</i>				C	1
plants	Equisetopsida	Phyllanthaceae	<i>Flueggea leucopyrus</i>				C	3
plants	Equisetopsida	Phyllanthaceae	<i>Synostemon spinosus</i>				C	1/1
plants	Equisetopsida	Phyllanthaceae	<i>Breynia oblongifolia</i>				C	10
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus collinus</i>				C	1/1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus tenellus</i>		Y			1
plants	Equisetopsida	Phyllanthaceae	<i>Phyllanthus virgatus</i>			C		18/3
plants	Equisetopsida	Phyllanthaceae	<i>Bridelia leichhardtii</i>			C		1
plants	Equisetopsida	Phyllanthaceae	<i>Glochidion ferdinandi</i>			C		1
plants	Equisetopsida	Picrodendraceae	<i>Pseudanthus pauciflorus subsp. arenicola</i>				NT	2/1
plants	Equisetopsida	Picrodendraceae	<i>Petalostigma pachyphyllum</i>				C	15/5
plants	Equisetopsida	Picrodendraceae	<i>Pseudanthus orientalis</i>				C	2/1
plants	Equisetopsida	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree			C	29/4
plants	Equisetopsida	Piperaceae	<i>Peperomia blanda var. floribunda</i>				C	1
plants	Equisetopsida	Pittosporaceae	<i>Rhytidosporum diosmoides</i>				C	2/2
plants	Equisetopsida	Pittosporaceae	<i>Pittosporum angustifolium</i>				C	7/1
plants	Equisetopsida	Pittosporaceae	<i>Bursaria incana</i>				C	5
plants	Equisetopsida	Pittosporaceae	<i>Billardiera scandens</i>				C	2/1
plants	Equisetopsida	Pittosporaceae	<i>Auranticarpa rhombifolia</i>				C	1
plants	Equisetopsida	Pittosporaceae	<i>Pittosporum spinescens</i>				C	12/1
plants	Equisetopsida	Pittosporaceae	<i>Bursaria spinosa subsp. spinosa</i>				C	4
plants	Equisetopsida	Plantaginaceae	<i>Gratiola pedunculata</i>				C	2
plants	Equisetopsida	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			3/2
plants	Equisetopsida	Plantaginaceae	<i>Veronica plebeia</i>	trailing speedwell			C	3/1
plants	Equisetopsida	Plantaginaceae	<i>Stemodia pubescens</i>				C	1/1
plants	Equisetopsida	Plantaginaceae	<i>Plantago cunninghamii</i>	sago weed			C	1
plants	Equisetopsida	Plumbaginaceae	<i>Plumbago zeylanica</i>	native plumbago			C	4/1
plants	Equisetopsida	Poaceae	<i>Entolasia whiteana</i>				C	1
plants	Equisetopsida	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass			C	1
plants	Equisetopsida	Poaceae	<i>Eragrostis curvula</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Eragrostis sororia</i>				C	9/4

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plants	Equisetopsida	Poaceae	<i>Eriachne aristidea</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Eriachne mucronata</i>			C		3
plants	Equisetopsida	Poaceae	<i>Ischaemum australe</i>			C		4
plants	Equisetopsida	Poaceae	<i>Chloris</i>			C		10
plants	Equisetopsida	Poaceae	<i>Panicum</i>			C		4
plants	Equisetopsida	Poaceae	<i>Poaceae</i>			C		7
plants	Equisetopsida	Poaceae	<i>Aristida</i>			C		35
plants	Equisetopsida	Poaceae	<i>Cenchrus</i>			C		1
plants	Equisetopsida	Poaceae	<i>Eriachne</i>			C		2
plants	Equisetopsida	Poaceae	<i>Paspalum</i>			C		2
plants	Equisetopsida	Poaceae	<i>Digitaria</i>			C		6
plants	Equisetopsida	Poaceae	<i>Cymbopogon</i>			C		1
plants	Equisetopsida	Poaceae	<i>Enneapogon</i>			C		5
plants	Equisetopsida	Poaceae	<i>Eragrostis</i>			C		18
plants	Equisetopsida	Poaceae	<i>Oplismenus</i>					1
plants	Equisetopsida	Poaceae	<i>Sporobolus</i>			C		5
plants	Equisetopsida	Poaceae	<i>Dichanthium</i>			C		1
plants	Equisetopsida	Poaceae	<i>Echinochloa</i>			C		1
plants	Equisetopsida	Poaceae	<i>Paspalidium</i>			C		19
plants	Equisetopsida	Poaceae	<i>Perotis rara</i>	comet grass		C		3/1
plants	Equisetopsida	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		3/1
plants	Equisetopsida	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			3/2
plants	Equisetopsida	Poaceae	<i>Melinis repens</i>	red natal grass	Y			11/1
plants	Equisetopsida	Poaceae	<i>Panicum buncei</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Panicum simile</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Aristida ramosa</i>	purple wiregrass		C		4/2
plants	Equisetopsida	Poaceae	<i>Aristida vagans</i>			C		2
plants	Equisetopsida	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			12/2
plants	Equisetopsida	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			4
plants	Equisetopsida	Poaceae	<i>Eriachne obtusa</i>			C		8/7
plants	Equisetopsida	Poaceae	<i>Isachne globosa</i>	swamp millet		C		1
plants	Equisetopsida	Poaceae	<i>Panicum effusum</i>			C		6
plants	Equisetopsida	Poaceae	<i>Setaria surgens</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Sorghum x almum</i>		Y			1/1
plants	Equisetopsida	Poaceae	<i>Triodia pungens</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Aristida ingrata</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Aristida lignosa</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Cynodon dactylon</i>		Y			4
plants	Equisetopsida	Poaceae	<i>Dinebra ligulata</i>			C		3/1
plants	Equisetopsida	Poaceae	<i>Eragrostis minor</i>	smaller stinkgrass	Y			3/1
plants	Equisetopsida	Poaceae	<i>Eriochloa crebra</i>	spring grass		C		7
plants	Equisetopsida	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		4/1
plants	Equisetopsida	Poaceae	<i>Sporobolus laxus</i>			C		1
plants	Equisetopsida	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		21/2
plants	Equisetopsida	Poaceae	<i>Urochloa foliosa</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida calycina</i>			C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Poaceae	<i>Dichanthium sericeum</i>			C		4/1
plants	Equisetopsida	Poaceae	<i>Digitaria longiflora</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Digitaria parviflora</i>			C		1
plants	Equisetopsida	Poaceae	<i>Digitaria violascens</i>	bastard summergrass	Y			1/1
plants	Equisetopsida	Poaceae	<i>Dimorphochloa rigida</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Enneapogon nigricans</i>	niggerheads		C		2
plants	Equisetopsida	Poaceae	<i>Enneapogon truncatus</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		13/3
plants	Equisetopsida	Poaceae	<i>Eragrostis tenellula</i>	delicate lovegrass		C		1
plants	Equisetopsida	Poaceae	<i>Panicum decompositum</i>			C		6
plants	Equisetopsida	Poaceae	<i>Paspalum longifolium</i>			C		3/1
plants	Equisetopsida	Poaceae	<i>Sporobolus elongatus</i>			C		4
plants	Equisetopsida	Poaceae	<i>Sporobolus scabridus</i>			C		3/2
plants	Equisetopsida	Poaceae	<i>Tripogon loliiformis</i>	five minute grass		C		3/2
plants	Equisetopsida	Poaceae	<i>Alloteropsis cimicina</i>			C		8/6
plants	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i>			C		5
plants	Equisetopsida	Poaceae	<i>Chionachne cyathopoda</i>	river grass		C		1/1
plants	Equisetopsida	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		1
plants	Equisetopsida	Poaceae	<i>Dichanthium aristatum</i>	angleton grass	Y			1/1
plants	Equisetopsida	Poaceae	<i>Dichelachne micrantha</i>	shorthair plumegrass		C		3/2
plants	Equisetopsida	Poaceae	<i>Astrebla lappacea</i>	curly mitchell grass		C		1
plants	Equisetopsida	Poaceae	<i>Cenchrus ciliaris</i>		Y			49/2
plants	Equisetopsida	Poaceae	<i>Chloris pectinata</i>	comb chloris		C		2/1
plants	Equisetopsida	Poaceae	<i>Digitaria brownii</i>			C		4/2
plants	Equisetopsida	Poaceae	<i>Digitaria diffusa</i>			C		6/2
plants	Equisetopsida	Poaceae	<i>Entolasia stricta</i>	wiry panic		C		10/1
plants	Equisetopsida	Poaceae	<i>Eragrostis pilosa</i>	soft lovegrass	Y			2/2
plants	Equisetopsida	Poaceae	<i>Eriachne glabrata</i>			C		1
plants	Equisetopsida	Poaceae	<i>Holcolemma dispar</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Hyparrhenia hirta</i>	coolati grass	Y			1
plants	Equisetopsida	Poaceae	<i>Panicum coloratum</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Panicum paludosum</i>	swamp panic		C		1/1
plants	Equisetopsida	Poaceae	<i>Setaria apiculata</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		23
plants	Equisetopsida	Poaceae	<i>Sporobolus creber</i>			C		6/1
plants	Equisetopsida	Poaceae	<i>Urochloa piligera</i>			C		3/3
plants	Equisetopsida	Poaceae	<i>Urochloa pubigera</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Aristida benthamii</i>			C		1
plants	Equisetopsida	Poaceae	<i>Aristida holathera</i>			C		1
plants	Equisetopsida	Poaceae	<i>Aristida latifolia</i>	feathertop wiregrass		C		4/2
plants	Equisetopsida	Poaceae	<i>Aristida leptopoda</i>	white speargrass		C		1
plants	Equisetopsida	Poaceae	<i>Aristida personata</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Astrebla squarrosa</i>	bull mitchell grass		C		5
plants	Equisetopsida	Poaceae	<i>Cenchrus echinatus</i>	Mossman River grass	Y			1
plants	Equisetopsida	Poaceae	<i>Chloris divaricata</i>			C		1
plants	Equisetopsida	Poaceae	<i>Chloris ventricosa</i>	tall chloris		C		5/1

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plants	Equisetopsida	Poaceae	<i>Chrysopogon fallax</i>			C		10/2
plants	Equisetopsida	Poaceae	<i>Digitaria bicornis</i>			C		4/3
plants	Equisetopsida	Poaceae	<i>Digitaria ciliaris</i>	summer grass	Y			2/1
plants	Equisetopsida	Poaceae	<i>Digitaria diminuta</i>			C		8/4
plants	Equisetopsida	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass	Y			7/1
plants	Equisetopsida	Poaceae	<i>Echinopogon ovatus</i>			C		1
plants	Equisetopsida	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass		C		8/1
plants	Equisetopsida	Poaceae	<i>Aristida caput-medusae</i>			C		15/5
plants	Equisetopsida	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		8/2
plants	Equisetopsida	Poaceae	<i>Bothriochloa decipiens</i>			C		4
plants	Equisetopsida	Poaceae	<i>Bothriochloa ewartiana</i>	desert bluegrass		C		9/1
plants	Equisetopsida	Poaceae	<i>Bothriochloa insculpta</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		6/1
plants	Equisetopsida	Poaceae	<i>Chrysopogon oliganthus</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Cleistochloa subjuncea</i>			C		5/2
plants	Equisetopsida	Poaceae	<i>Enneapogon lindleyanus</i>			C		7/4
plants	Equisetopsida	Poaceae	<i>Enneapogon polyphyllus</i>	leafy nineawn		C		2/1
plants	Equisetopsida	Poaceae	<i>Enteropogon acicularis</i>	curly windmill grass		C		6
plants	Equisetopsida	Poaceae	<i>Enteropogon unispiceus</i>			C		10/2
plants	Equisetopsida	Poaceae	<i>Paspalidium criniforme</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Paspalidium globoideum</i>	sago grass		C		1/1
plants	Equisetopsida	Poaceae	<i>Paspalidium jubiflorum</i>	warrego grass		C		2/1
plants	Equisetopsida	Poaceae	<i>Paspalidium spartellum</i>			C		1
plants	Equisetopsida	Poaceae	<i>Paspalum scrobiculatum</i>	ditch millet		C		5
plants	Equisetopsida	Poaceae	<i>Setaria paspalidioides</i>			C		3/3
plants	Equisetopsida	Poaceae	<i>Thyridolepis xerophila</i>			C		3/3
plants	Equisetopsida	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			18
plants	Equisetopsida	Poaceae	<i>Urochloa subquadriflora</i>		Y			1/1
plants	Equisetopsida	Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass		C		7/5
plants	Equisetopsida	Poaceae	<i>Aristida leichhardtiana</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Dactyloctenium australe</i>	sweet smother grass	Y			1/1
plants	Equisetopsida	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		9/1
plants	Equisetopsida	Poaceae	<i>Dinebra divaricatissima</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Eragrostis leptostachya</i>			C		4/2
plants	Equisetopsida	Poaceae	<i>Eragrostis megalosperma</i>			C		4/2
plants	Equisetopsida	Poaceae	<i>Eragrostis spartinoides</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		18/4
plants	Equisetopsida	Poaceae	<i>Paspalidium constrictum</i>			C		3/1
plants	Equisetopsida	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		7
plants	Equisetopsida	Poaceae	<i>Austrostipa verticillata</i>	slender bamboo grass		C		1
plants	Equisetopsida	Poaceae	<i>Dactyloctenium aegyptium</i>	coast button grass	Y			1/1
plants	Equisetopsida	Poaceae	<i>Enteropogon paucispiceus</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Sporobolus australasicus</i>			C		2
plants	Equisetopsida	Poaceae	<i>Oplismenus aemulus</i>	creeping shade grass		C		1
plants	Equisetopsida	Poaceae	<i>Paspalidium gausum</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Paspalum dilatatum</i>	paspalum	Y			2/1

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plants	Equisetopsida	Poaceae	<i>Paspalum distichum</i>	water couch		C		2
plants	Equisetopsida	Poaceae	<i>Sacciolepis indica</i>	Indian cupscale grass		C		4/2
plants	Equisetopsida	Poaceae	<i>Triodia mitchellii</i>	buck spinifex		C		14/10
plants	Equisetopsida	Poaceae	<i>Aristida gracilipes</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida polyclados</i>			C		3
plants	Equisetopsida	Poaceae	<i>Chrysopogon filipes</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Dichelachne montana</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Digitaria ammophila</i>	silky umbrella grass		C		1
plants	Equisetopsida	Poaceae	<i>Digitaria ramularis</i>			C		1
plants	Equisetopsida	Poaceae	<i>Enneapogon gracilis</i>	slender nineawn		C		7/2
plants	Equisetopsida	Poaceae	<i>Enteropogon ramosus</i>			C		4/1
plants	Equisetopsida	Poaceae	<i>Entolasia marginata</i>	bordered panic		C		3/2
plants	Equisetopsida	Poaceae	<i>Eragrostis elongata</i>			C		8/4
plants	Equisetopsida	Poaceae	<i>Eragrostis speciosa</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Eriachne pallescens</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		8
plants	Equisetopsida	Poaceae	<i>Leptochloa digitata</i>			C		8
plants	Equisetopsida	Poaceae	<i>Megathyrsus maximus</i>		Y			4
plants	Equisetopsida	Poaceae	<i>Panicum larcomianum</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Paspalidium distans</i>	shotgrass		C		2
plants	Equisetopsida	Poaceae	<i>Paspalidium gracile</i>	slender panic		C		4/1
plants	Equisetopsida	Poaceae	<i>Tragus australianus</i>	small burr grass		C		8/1
plants	Equisetopsida	Poaceae	<i>Bothriochloa pertusa</i>		Y			5/1
plants	Equisetopsida	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		13/1
plants	Equisetopsida	Poaceae	<i>Walwhalleya subxerophila</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Cymbopogon queenslandicus</i>			C		1
plants	Equisetopsida	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass		C		2/2
plants	Equisetopsida	Poaceae	<i>Diplachne fusca var. fusca</i>			C		2/1
plants	Equisetopsida	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Eragrostis longipedicellata</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Hyparrhenia rufa subsp. rufa</i>		Y			2/2
plants	Equisetopsida	Poaceae	<i>Cynodon dactylon var. dactylon</i>		Y			2
plants	Equisetopsida	Poaceae	<i>Aristida calycina var. calycina</i>			C		4/3
plants	Equisetopsida	Poaceae	<i>Aristida calycina var. praealta</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Dinebra decipiens var. asthenes</i>			C		3/2
plants	Equisetopsida	Poaceae	<i>Dinebra decipiens var. decipiens</i>			C		4/1
plants	Equisetopsida	Poaceae	<i>Dinebra decipiens var. peacockii</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Ischaemum australe var. australe</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Megathyrsus maximus var. maximus</i>		Y			1
plants	Equisetopsida	Poaceae	<i>Aristida benthamii var. benthamii</i>			C		3/3
plants	Equisetopsida	Poaceae	<i>Aristida holathera var. holathera</i>			C		3/2
plants	Equisetopsida	Poaceae	<i>Panicum decompositum var. tenuius</i>			C		2
plants	Equisetopsida	Poaceae	<i>Chloris divaricata var. divaricata</i>	slender chloris		C		5/2
plants	Equisetopsida	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>			C		2
plants	Equisetopsida	Poaceae	<i>Eriachne pallescens var. pallescens</i>			C		3/2
plants	Equisetopsida	Poaceae	<i>Megathyrsus maximus var. pubiglumis</i>		Y			14/3

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plants	Equisetopsida	Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>			C		1
plants	Equisetopsida	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>humilius</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			C		4/3
plants	Equisetopsida	Poaceae	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>			C		6/2
plants	Equisetopsida	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>			C		7/4
plants	Equisetopsida	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>			C		5/1
plants	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			C		6/1
plants	Equisetopsida	Poaceae	<i>Aristida queenslandica</i> var. <i>queenslandica</i>			C		2/2
plants	Equisetopsida	Poaceae	<i>Calyptochloa gracillima</i> subsp. <i>gracillima</i>			C		13/4
plants	Equisetopsida	Poaceae	<i>Cleistochloa</i> sp. (<i>Duaringa</i> K.B.Addison 42)			C		11/9
plants	Equisetopsida	Poaceae	<i>Digitaria divaricatissima</i> var. <i>divaricatissima</i>			C		1
plants	Equisetopsida	Poaceae	<i>Eriachne mucronata</i> forma (<i>Alpha</i> C.E.Hubbard 7882)			C		3/3
plants	Equisetopsida	Poaceae	<i>Echinochloa esculenta</i>	Japanese millet	Y			1
plants	Equisetopsida	Poaceae	<i>Eragrostis microcarpa</i>			C		1
plants	Equisetopsida	Poaceae	<i>Eremochloa bimaculata</i>	poverty grass		C		7
plants	Equisetopsida	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		15
plants	Equisetopsida	Poaceae	<i>Iseilema vaginiflorum</i>	red flinders grass		C		2
plants	Equisetopsida	Poaceae	<i>Schizachyrium fragile</i>	firegrass		C		1/1
plants	Equisetopsida	Poaceae	<i>Sporobolus disjunctus</i>			C		4/4
plants	Equisetopsida	Podocarpaceae	<i>Podocarpus spinulosus</i>	dwarf plum-pine		C		2/1
plants	Equisetopsida	Polygalaceae	<i>Comesperma retusum</i>			C		1
plants	Equisetopsida	Polygalaceae	<i>Polygala triflora</i>			C		3/3
plants	Equisetopsida	Polygalaceae	<i>Comesperma</i>			C		1
plants	Equisetopsida	Polygalaceae	<i>Comesperma sphaerocarpum</i>			C		6/2
plants	Equisetopsida	Polygalaceae	<i>Comesperma patentifolium</i>			C		12/7
plants	Equisetopsida	Polygalaceae	<i>Comesperma ericinum</i>			C		1
plants	Equisetopsida	Polygonaceae	<i>Muehlenbeckia rhyticarya</i>			C		1
plants	Equisetopsida	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed		C		1/1
plants	Equisetopsida	Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C		3/1
plants	Equisetopsida	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		2/2
plants	Equisetopsida	Polygonaceae	<i>Duma florulenta</i>			C		2
plants	Equisetopsida	Polygonaceae	<i>Emex</i>			C		1
plants	Equisetopsida	Polygonaceae	<i>Persicaria attenuata</i>			C		2/1
plants	Equisetopsida	Polypodiaceae	<i>Drynaria rigidula</i>			C		2/1
plants	Equisetopsida	Polypodiaceae	<i>Platycterium veitchii</i>	silver elkhorn		C		4/2
plants	Equisetopsida	Polypodiaceae	<i>Pyrrosia rupestris</i>	rock felt fern		C		1
plants	Equisetopsida	Polypodiaceae	<i>Pyrrosia confluens</i>			C		1
plants	Equisetopsida	Pontederiaceae	<i>Monochoria cyanea</i>			C		3
plants	Equisetopsida	Portulacaceae	<i>Portulaca pilosa</i>		Y			3
plants	Equisetopsida	Portulacaceae	<i>Portulaca bicolor</i>			C		3/1
plants	Equisetopsida	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			12
plants	Equisetopsida	Portulacaceae	<i>Portulaca filifolia</i>			C		7
plants	Equisetopsida	Portulacaceae	<i>Calandrinia pleiopetala</i>			C		1
plants	Equisetopsida	Portulacaceae	<i>Portulaca</i>			C		1
plants	Equisetopsida	Portulacaceae	<i>Calandrinia pickeringii</i>			C		4/2

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plants	Equisetopsida	Potamogetonaceae	<i>Potamogeton octandrus</i>			C		1/1
plants	Equisetopsida	Potamogetonaceae	<i>Potamogeton</i>			C		1/1
plants	Equisetopsida	Potamogetonaceae	<i>Potamogeton tricarinatus</i>	floating pondweed		C		2
plants	Equisetopsida	Proteaceae	<i>Hakea</i>			C		2/2
plants	Equisetopsida	Proteaceae	<i>Banksia integrifolia subsp. integrifolia</i>			C		1
plants	Equisetopsida	Proteaceae	<i>Hakea lorea</i>			C		5
plants	Equisetopsida	Proteaceae	<i>Hakea benthamii</i>			C		4/1
plants	Equisetopsida	Proteaceae	<i>Banksia spinulosa</i>			C		5
plants	Equisetopsida	Proteaceae	<i>Grevillea striata</i>	beefwood		C		8
plants	Equisetopsida	Proteaceae	<i>Persoonia falcata</i>			C		19/2
plants	Equisetopsida	Proteaceae	<i>Grevillea helmsiae</i>			C		2
plants	Equisetopsida	Proteaceae	<i>Grevillea sessilis</i>			C		12/6
plants	Equisetopsida	Proteaceae	<i>Lomatia silaifolia</i>	crinkle bush		C		8/1
plants	Equisetopsida	Proteaceae	<i>Persoonia subtilis</i>			C		8/6
plants	Equisetopsida	Proteaceae	<i>Grevillea parallela</i>			C		2/1
plants	Equisetopsida	Proteaceae	<i>Xylomelum benthamii</i>			C		1
plants	Equisetopsida	Proteaceae	<i>Banksia oblongifolia</i>	dwarf banksia		C		5
plants	Equisetopsida	Proteaceae	<i>Grevillea floribunda</i>			C		2
plants	Equisetopsida	Proteaceae	<i>Grevillea longistyla</i>			C		14/8
plants	Equisetopsida	Proteaceae	<i>Petrophile canescens</i>			C		6/2
plants	Equisetopsida	Proteaceae	<i>Stenocarpus salignus</i>	scrub beefwood		C		5/4
plants	Equisetopsida	Proteaceae	<i>Conospermum taxifolium</i>	devil's rice		C		1
plants	Equisetopsida	Proteaceae	<i>Grevillea singuliflora</i>			C		2
plants	Equisetopsida	Proteaceae	<i>Hakea lorea subsp. lorea</i>			C		3/2
plants	Equisetopsida	Proteaceae	<i>Xylomelum cunninghamianum</i>			C		10/1
plants	Equisetopsida	Proteaceae	<i>Grevillea decora subsp. decora</i>			C		4/4
plants	Equisetopsida	Proteaceae	<i>Banksia spinulosa var. spinulosa</i>			C		3/3
plants	Equisetopsida	Proteaceae	<i>Grevillea floribunda subsp. floribunda</i>			C		1/1
plants	Equisetopsida	Proteaceae	<i>Xylomelum</i>			C		1
plants	Equisetopsida	Psilotaceae	<i>Psilotum nudum</i>	skeleton fork fern		C		3/2
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes</i>			C		3
plants	Equisetopsida	Pteridaceae	<i>Vittaria elongata</i>			C		1
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern		C		3/1
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi</i>			C		26
plants	Equisetopsida	Pteridaceae	<i>Pityrogramma calomelanos var. calomelanos</i>		Y			1/1
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes nudiuscula</i>			C		2
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes tenuifolia</i>	rock fern		C		1
plants	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>			C		9/1
plants	Equisetopsida	Pteridaceae	<i>Adiantum hispidulum var. hispidulum</i>			C		2/1
plants	Equisetopsida	Pteridaceae	<i>Adiantum aethiopicum</i>			C		1
plants	Equisetopsida	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		1
plants	Equisetopsida	Ranunculaceae	<i>Clematis glycinoides</i>			C		6/1
plants	Equisetopsida	Ranunculaceae	<i>Ranunculus sceleratus</i>		Y			1
plants	Equisetopsida	Restionaceae	<i>Baloskion pallens</i>			C		7/5
plants	Equisetopsida	Rhamnaceae	<i>Pomaderris</i>			C		1
plants	Equisetopsida	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		56

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plants	Equisetopsida	Rhamnaceae	<i>Pomaderris lanigera</i>			C		4/2
plants	Equisetopsida	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack		C		22/1
plants	Equisetopsida	Rhamnaceae	<i>Polianthion minutiflorum</i>			V	V	2/2
plants	Equisetopsida	Rhamnaceae	<i>Pomaderris queenslandica</i>			C		4/3
plants	Equisetopsida	Rosaceae	<i>Rubus probus</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Gynochthodes jasminoides</i>			C		3/2
plants	Equisetopsida	Rubiaceae	<i>Coelospermum reticulatum</i>			C		13/3
plants	Equisetopsida	Rubiaceae	<i>Everistia vacciniifolia</i>			C		6
plants	Equisetopsida	Rubiaceae	<i>Triflorensia ixoroides</i>			C		2/2
plants	Equisetopsida	Rubiaceae	<i>Spermacoce multicaulis</i>			C		2/1
plants	Equisetopsida	Rubiaceae	<i>Spermacoce brachystema</i>			C		6/3
plants	Equisetopsida	Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y			1
plants	Equisetopsida	Rubiaceae	<i>Psychotria daphnoides</i>			C		3
plants	Equisetopsida	Rubiaceae	<i>Pavetta australiensis</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Oldenlandia galioides</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Opercularia diphylla</i>			C		2/1
plants	Equisetopsida	Rubiaceae	<i>Larsenaikia ochreatea</i>			C		3/3
plants	Equisetopsida	Rubiaceae	<i>Antirhea putaminosa</i>			C		2/1
plants	Equisetopsida	Rubiaceae	<i>Psydrax oleifolia</i>			C		6
plants	Equisetopsida	Rubiaceae	<i>Psydrax johnsonii</i>			C		2/2
plants	Equisetopsida	Rubiaceae	<i>Psydrax attenuata</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Psydrax forsteri</i>			C		3/2
plants	Equisetopsida	Rubiaceae	<i>Psydrax odorata</i>			C		3
plants	Equisetopsida	Rubiaceae	<i>Pomax umbellata</i>			C		6
plants	Equisetopsida	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1
plants	Equisetopsida	Rubiaceae	<i>Psychotria</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Oldenlandia mitrasacmoides subsp. trachymenoides</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Everistia vacciniifolia forma vacciniifolia</i>			C		3/3
plants	Equisetopsida	Rubiaceae	<i>Psydrax odorata subsp. australiana</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Psydrax attenuata forma megalantha</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Psydrax odorata forma buxifolia</i>			C		3
plants	Equisetopsida	Rubiaceae	<i>Psydrax saligna forma saligna</i>			C		1/1
plants	Equisetopsida	Rubiaceae	<i>Cyclophyllum coprosmoides</i>			C		1
plants	Equisetopsida	Rubiaceae	<i>Oldenlandia coerulescens</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Phebalium glandulosum subsp. glandulosum</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Zieria minutiflora subsp. trichocarpa</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Philotheca difformis subsp. smithiana</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Philotheca difformis subsp. difformis</i>			C		7/7
plants	Equisetopsida	Rutaceae	<i>Zieria fraseri subsp. robusta</i>			C		5/5
plants	Equisetopsida	Rutaceae	<i>Murraya paniculata 'Exotica'</i>		Y			2
plants	Equisetopsida	Rutaceae	<i>Dinosperma erythrococcum</i>			C		2/1
plants	Equisetopsida	Rutaceae	<i>Flindersia dissosperma</i>			C		21/8
plants	Equisetopsida	Rutaceae	<i>Acronychia pauciflora</i>	soft acronychia		C		1
plants	Equisetopsida	Rutaceae	<i>Philotheca difformis</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Boronia occidentalis</i>			C		3/3
plants	Equisetopsida	Rutaceae	<i>Melicope micrococca</i>	white evodia		C		1/1

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plants	Equisetopsida	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		3
plants	Equisetopsida	Rutaceae	<i>Coatesia paniculata</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Zieria minutiflora</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Philotheca ciliata</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Geijera parviflora</i>	wilga		C		39/2
plants	Equisetopsida	Rutaceae	<i>Phebalium woombye</i>	wallum phebalium		C		1/1
plants	Equisetopsida	Rutaceae	<i>Boronia splendida</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Boronia duiganiae</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Boronia bipinnata</i>	rock boronia		C		6/2
plants	Equisetopsida	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		1
plants	Equisetopsida	Rutaceae	<i>Phebalium nottii</i>	pink phebalium		C		5/3
plants	Equisetopsida	Rutaceae	<i>Boronia odorata</i>			C		1/1
plants	Equisetopsida	Rutaceae	<i>Boronia obovata</i>			C		33/22
plants	Equisetopsida	Rutaceae	<i>Zieria smithii</i>			C		3/2
plants	Equisetopsida	Rutaceae	<i>Zieria fraseri</i>			C		1
plants	Equisetopsida	Rutaceae	<i>Citrus x limon</i>		Y			1/1
plants	Equisetopsida	Rutaceae	<i>Citrus glauca</i>			C		18
plants	Equisetopsida	Rutaceae	<i>Zieria aspalathoides subsp. aspalathoides</i>			C		5/4
plants	Equisetopsida	Rutaceae	<i>Boronia</i>			C		1
plants	Equisetopsida	Santalaceae	<i>Exocarpos cupressiformis</i>	native cherry		C		4
plants	Equisetopsida	Santalaceae	<i>Santalum lanceolatum</i>			C		13/2
plants	Equisetopsida	Santalaceae	<i>Exocarpos latifolius</i>			C		2
plants	Equisetopsida	Sapindaceae	<i>Dodonaea vestita</i>			C		9/4
plants	Equisetopsida	Sapindaceae	<i>Cardiospermum halicacabum var. halicacabum</i>		Y			1/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea lanceolata var. subsessilifolia</i>			C		1/1
plants	Equisetopsida	Sapindaceae	<i>Alectryon oleifolius subsp. elongatus</i>			C		5/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea viscosa subsp. burmanniana</i>			C		1/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea viscosa subsp. spatulata</i>			C		3/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea viscosa subsp. viscosa</i>			C		1
plants	Equisetopsida	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		2/1
plants	Equisetopsida	Sapindaceae	<i>Elattostachys xylocarpa</i>	white tamarind		C		1
plants	Equisetopsida	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		45/2
plants	Equisetopsida	Sapindaceae	<i>Dodonaea triangularis</i>			C		3/1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea peduncularis</i>			C		4/2
plants	Equisetopsida	Sapindaceae	<i>Alectryon subdentatus</i>			C		1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea stenophylla</i>			C		3
plants	Equisetopsida	Sapindaceae	<i>Dodonaea macrossanii</i>			C		1
plants	Equisetopsida	Sapindaceae	<i>Alectryon oleifolius</i>			C		5
plants	Equisetopsida	Sapindaceae	<i>Dodonaea lanceolata</i>			C		1
plants	Equisetopsida	Sapindaceae	<i>Dodonaea filifolia</i>			C		7/2
plants	Equisetopsida	Sapindaceae	<i>Dodonaea</i>			C		11/3
plants	Equisetopsida	Sapindaceae	<i>Dodonaea viscosa</i>			C		2
plants	Equisetopsida	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		4/1
plants	Equisetopsida	Sapindaceae	<i>Atalaya hemiglauca</i>			C		32/2
plants	Equisetopsida	Sapotaceae	<i>Planchonella cotinifolia</i>			C		1
plants	Equisetopsida	Sapotaceae	<i>Planchonella cotinifolia var. pubescens</i>			C		1

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plants	Equisetopsida	Schizaeaceae	<i>Schizaea bifida</i>	forked comb fern		C		1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila longifolia</i>	berrigan		C		3/1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila maculata</i>			C		4
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>glabra</i>			C		2/2
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>			C		3/3
plants	Equisetopsida	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		12
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		56/1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila latrobei</i>			C		2/1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila deserti</i>			C		18/1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple		C		3/2
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila</i>			C		1
plants	Equisetopsida	Scrophulariaceae	<i>Myoporum</i>			C		1
plants	Equisetopsida	Scrophulariaceae	<i>Eremophila maculata</i> subsp. <i>maculata</i>			C		3/3
plants	Equisetopsida	Selaginellaceae	<i>Selaginella</i>			C		1/1
plants	Equisetopsida	Simaroubaceae	<i>Ailanthus triphysa</i>	white siris		C		1
plants	Equisetopsida	Smilacaceae	<i>Smilax australis</i>	barbed-wire vine		C		4/1
plants	Equisetopsida	Solanaceae	<i>Solanum furfuraceum</i>			C		2/2
plants	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i>			C		2
plants	Equisetopsida	Solanaceae	<i>Solanum semiarmatum</i>	prickly nightshade		C		2
plants	Equisetopsida	Solanaceae	<i>Solanum stelligerum</i>	devil's needles		C		1
plants	Equisetopsida	Solanaceae	<i>Physalis lanceifolia</i>		Y			1
plants	Equisetopsida	Solanaceae	<i>Solanum ferocissimum</i>			C		9/3
plants	Equisetopsida	Solanaceae	<i>Solanum densevestitum</i>			C		1
plants	Equisetopsida	Solanaceae	<i>Solanum elachophyllum</i>			E		17/14
plants	Equisetopsida	Solanaceae	<i>Solanum mitchellianum</i>			C		2/2
plants	Equisetopsida	Solanaceae	<i>Nicotiana megalosiphon</i>			C		1
plants	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i> subsp. <i>parvifolium</i>			C		1/1
plants	Equisetopsida	Solanaceae	<i>Solanum</i>			C		27
plants	Equisetopsida	Solanaceae	<i>Physalis</i>		Y			1
plants	Equisetopsida	Solanaceae	<i>Solanum opacum</i>	green berry nightshade		C		1
plants	Equisetopsida	Solanaceae	<i>Solanum esuriale</i>	quena		C		5/2
plants	Equisetopsida	Solanaceae	<i>Solanum pusillum</i>			C		2/2
plants	Equisetopsida	Solanaceae	<i>Physalis angulata</i>		Y			2/2
plants	Equisetopsida	Solanaceae	<i>Solanum dissectum</i>			E	E	3/3
plants	Equisetopsida	Solanaceae	<i>Solanum gympiense</i>			C		1
plants	Equisetopsida	Solanaceae	<i>Solanum americanum</i>			C		3/3
plants	Equisetopsida	Solanaceae	<i>Solanum cocosoides</i>			C		5/5
plants	Equisetopsida	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		9/4
plants	Equisetopsida	Solanaceae	<i>Solanum nemophilum</i>			C		6/1
plants	Equisetopsida	Solanaceae	<i>Datura leichhardtii</i>	native thornapple	Y			1/1
plants	Equisetopsida	Solanaceae	<i>Solanum adenophorum</i>			E		12/10
plants	Equisetopsida	Sparrmanniaceae	<i>Corchorus tomentellus</i>			C		3/3
plants	Equisetopsida	Sparrmanniaceae	<i>Corchorus trilocularis</i>			C		3/1
plants	Equisetopsida	Sparrmanniaceae	<i>Grewia retusifolia</i>			C		4/1
plants	Equisetopsida	Sparrmanniaceae	<i>Grewia scabrella</i>			C		8/3
plants	Equisetopsida	Sparrmanniaceae	<i>Grewia</i>			C		1

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plants	Equisetopsida	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		19/2
plants	Equisetopsida	Sphagnaceae	<i>Sphagnum</i>			C		2/2
plants	Equisetopsida	Stackhousiaceae	<i>Stackhousia viminea</i>	slender stackhousia		C		2
plants	Equisetopsida	Stackhousiaceae	<i>Stackhousia monogyna</i>	creamy candles		C		1/1
plants	Equisetopsida	Sterculiaceae	<i>Brachychiton bidwillii</i>	little kurrajong		C		3/1
plants	Equisetopsida	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		C		2
plants	Equisetopsida	Sterculiaceae	<i>Sterculia quadrifida</i>	peanut tree		C		1
plants	Equisetopsida	Sterculiaceae	<i>Brachychiton rupestris</i>			C		15/1
plants	Equisetopsida	Sterculiaceae	<i>Brachychiton populneus subsp. trilobus</i>			C		1/1
plants	Equisetopsida	Stylidiaceae	<i>Stylidium graminifolium</i>	grassy-leaved trigger-flower		C		3/2
plants	Equisetopsida	Stylidiaceae	<i>Stylidium eglandulosum</i>			C		2/1
plants	Equisetopsida	Stylidiaceae	<i>Stylidium eriorhizum</i>			C		3/2
plants	Equisetopsida	Stylidiaceae	<i>Stylidium tenerum</i>			C		1
plants	Equisetopsida	Stylidiaceae	<i>Stylidium debile</i>	frail trigger plant		C		8/3
plants	Equisetopsida	Surianaceae	<i>Cadellia pentastylis</i>	ooline		V	V	3/2
plants	Equisetopsida	Tamaricaceae	<i>Tamarix aphylla</i>	athel pine	Y			1/1
plants	Equisetopsida	Thelypteridaceae	<i>Christella dentata</i>	creek fern		C		3
plants	Equisetopsida	Thelypteridaceae	<i>Cyclosorus interruptus</i>			C		2/2
plants	Equisetopsida	Thelypteridaceae	<i>Sphaerostephanos unitus</i>			C		1/1
plants	Equisetopsida	Thymelaeaceae	<i>Pimelea mollis</i>			C		1/1
plants	Equisetopsida	Thymelaeaceae	<i>Pimelea linifolia</i>			C		2
plants	Equisetopsida	Thymelaeaceae	<i>Pimelea haematostachya</i>			C		2/1
plants	Equisetopsida	Thymelaeaceae	<i>Pimelea linifolia subsp. linifolia</i>			C		4/4
plants	Equisetopsida	Typhaceae	<i>Typha orientalis</i>	broad-leaved cumbungi		C		1
plants	Equisetopsida	Ulmaceae	<i>Trema tomentosa var. aspera</i>			C		1/1
plants	Equisetopsida	Urticaceae	<i>Dendrocnide photiniphylla</i>	shiny-leaved stinging tree		C		1
plants	Equisetopsida	Urticaceae	<i>Pipturus argenteus</i>	white nettle		C		1
plants	Equisetopsida	Verbenaceae	<i>Lantana camara</i>	lantana	Y			1/1
plants	Equisetopsida	Verbenaceae	<i>Phyla canescens</i>		Y			1/1
plants	Equisetopsida	Verbenaceae	<i>Verbena bonariensis</i>	purpletop	Y			1
plants	Equisetopsida	Verbenaceae	<i>Lippia alba var. alba</i>		Y			5/5
plants	Equisetopsida	Verbenaceae	<i>Glandularia aristigera</i>		Y			1
plants	Equisetopsida	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			3/1
plants	Equisetopsida	Violaceae	<i>Viola betonicifolia subsp. betonicifolia</i>			C		1/1
plants	Equisetopsida	Violaceae	<i>Afrohybanthus stellarioides</i>			C		5
plants	Equisetopsida	Violaceae	<i>Afrohybanthus enneaspermus</i>			C		4/2
plants	Equisetopsida	Violaceae	<i>Hybanthus monopetalus</i>			C		2/1
plants	Equisetopsida	Violaceae	<i>Viola perreniformis</i>			C		1/1
plants	Equisetopsida	Violaceae	<i>Viola betonicifolia</i>			C		1
plants	Equisetopsida	Violaceae	<i>Viola</i>			C		1
plants	Equisetopsida	Violaceae	<i>Viola hederacea</i>			C		1
plants	Equisetopsida	Viscaceae	<i>Viscum articulatum</i>	flat mistletoe		C		2/1
plants	Equisetopsida	Viscaceae	<i>Notothixos cornifolius</i>	kurrajong mistletoe		C		1
plants	Equisetopsida	Vitaceae	<i>Cissus oblonga</i>			C		2/1
plants	Equisetopsida	Vitaceae	<i>Cayratia clematidea</i>	slender grape		C		2
plants	Equisetopsida	Vitaceae	<i>Clematicissus opaca</i>			C		28

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plants	Equisetopsida	Vitaceae	<i>Cissus hypoglauca</i>			C		2
plants	Equisetopsida	Vitaceae	<i>Cayratia acris</i>	hairy grape		C		1
plants	Equisetopsida	Vitaceae	<i>Cissus repens</i>			C		1
plants	Equisetopsida	Vitaceae	<i>Cissus reniformis</i>			C		1
plants	Equisetopsida	Xanthorrhoeaceae	<i>Xanthorrhoea</i>			C		2
plants	Equisetopsida	Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>			C		13/1
plants	Equisetopsida	Xyridaceae	<i>Xyris complanata</i>	yellow-eye		C		6/4
plants	Equisetopsida	Zamiaceae	<i>Macrozamia moorei</i>			C		1
plants	Equisetopsida	Zamiaceae	<i>Macrozamia platyrhachis</i>			E	E	55/30
plants	Equisetopsida	Zygophyllaceae	<i>Tribulus eichlerianus</i>	bull head		C		3
plants	Equisetopsida	Zygophyllaceae	<i>Tribulus micrococcus</i>	yellow vine		C		2/2
plants	Equisetopsida	Zygophyllaceae	<i>Zygophyllum apiculatum</i>	gall weed		C		1/1
plants	Equisetopsida	Zygophyllaceae	<i>Tribulus terrestris</i>	caltrop		C		2
plants	Florideophyceae	Cystocloniaceae	<i>Hypnea pannosa</i>			C		1/1
plants	Ulvophyceae	Trentepohliaceae	<i>Trentepohlia bosseae</i> var. <i>samoensis</i>			C		1/1
plants	Ulvophyceae	Ulotrichaceae	<i>Ulothrix cylindricum</i>			C		1/1
plants	green algae	Uronemataceae	<i>Uronema confervicola</i>			C		1/1
plants	uncertain	Incertae sedis Plantae	<i>Schizothrix friesii</i>			C		1/1
plants	uncertain	Incertae sedis Plantae	<i>Schizothrix calcicola</i>			C		1/1
plants	uncertain	Indet.	<i>Indet.</i>			C		5

CODES

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

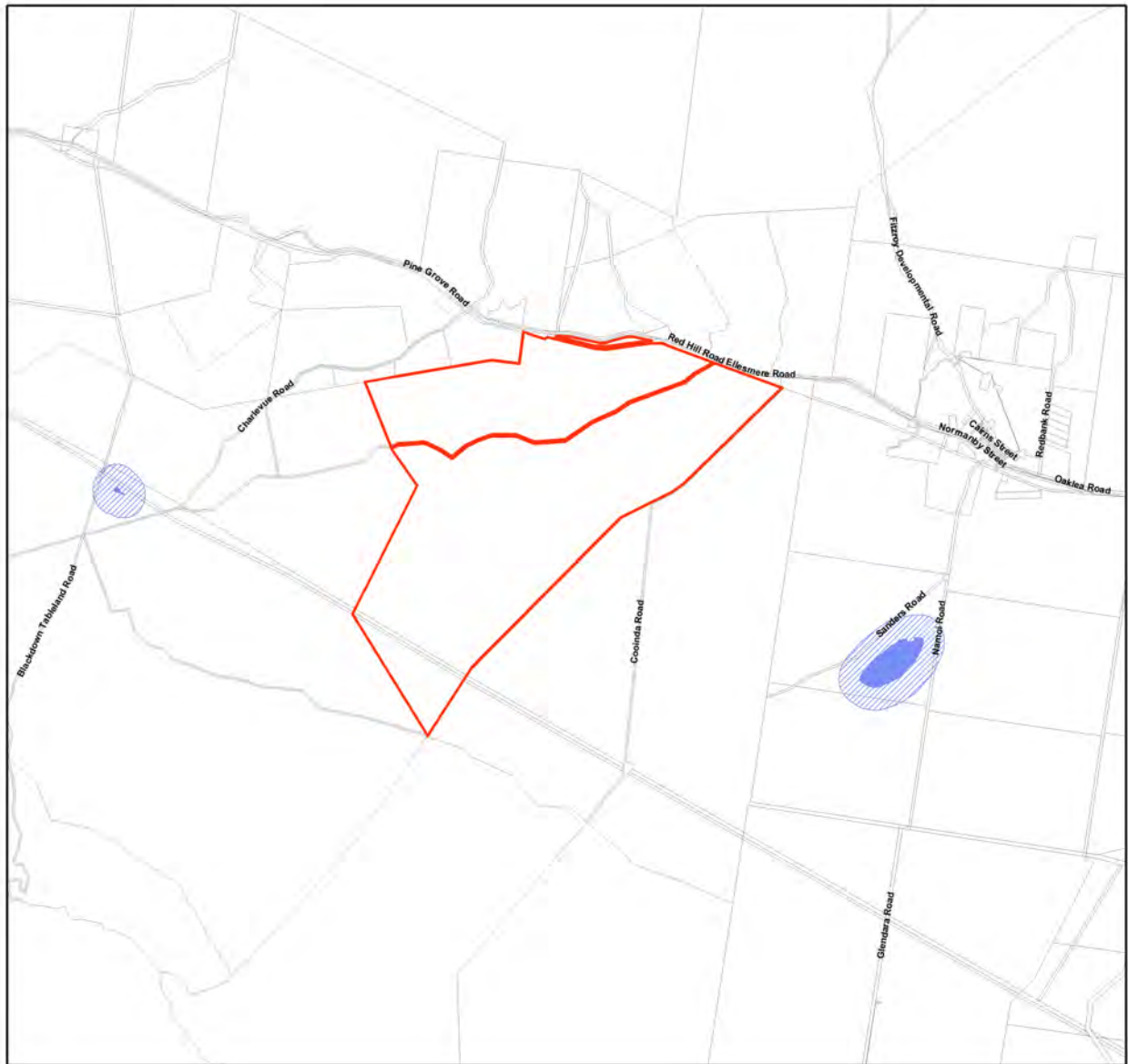
Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

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).

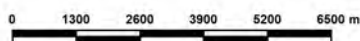
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

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



This product is projected into GDA 1994 MGA Zone 55

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.

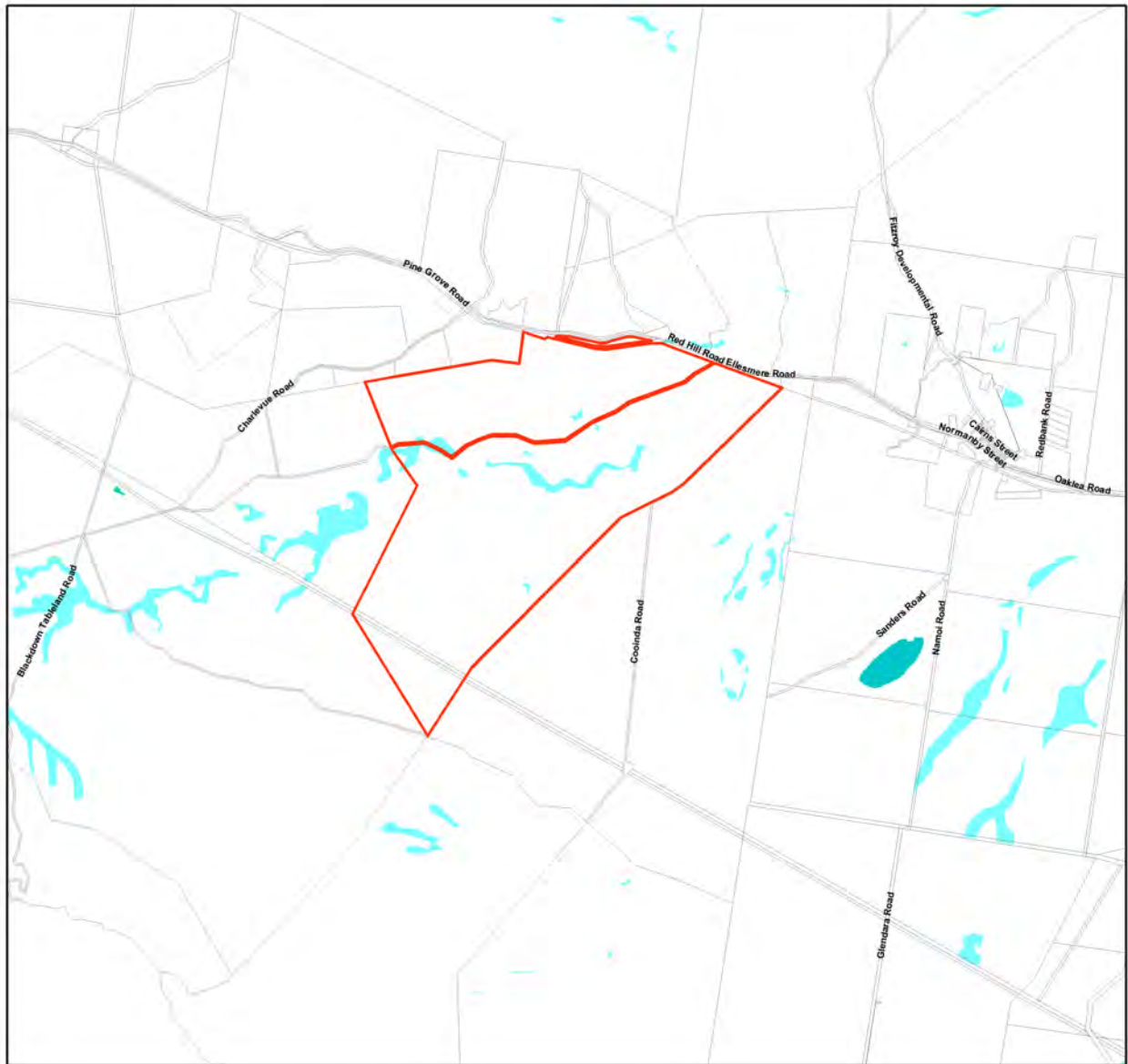
The Department of State Development, Manufacturing, Infrastructure and Planning is the State Assessment Referral Agency (SARA) under Schedule 7 of the Sustainable Planning Regulation 2009 for assessable development involving high impact earthworks within wetland protection areas. The Department of Environment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

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Map of Referable Wetlands for the Environmental Protection Act 1994

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



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 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.

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This product is projected into GDA 1994 MGA Zone 55

Appendix B Likelihood of Occurrence for Threatened Ecological
Communities (TEC)

Likelihood of Occurrence for Threatened Ecological Communities

Community Name	Database searches		Desktop likelihood determination
	PMST	Corresponding REs mapped within EPC	
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Known to occur (0-10 km)	11.3.1	<u>Likely</u> Brigalow TEC is common throughout central QLD in small patches. It is known to occur within a 10 km buffer of the study area. One RE that corresponds to the TEC has been mapped by DES as occurring on the study area. It is likely that this TEC will be identified within the study area during RE mapping validation.
Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin	May occur (0-10 km)	None	<u>Unlikely</u> This TEC may occur within a 10 km buffer of the study area according to the PMST. There are no REs corresponding to this TEC mapped by DES within the study area.
Coolabah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	May occur (0-10 km)	None	<u>Unlikely</u> Search with PMST has identified that this TEC may occur within a 10 km buffer of the study area. None of the REs identified within the study area correspond with this TEC and therefore it is unlikely that this TEC will be found within the study area.
Weeping Myall Woodlands	Likely to occur (0-10 km)	11.3.2	<u>Unlikely</u> Weeping Myall TEC is uncommon and is only known to form minor components of two possible REs. It is considered likely to occur within a 0 – 10 km buffer of the study area. One RE that has the potential to contain minor components corresponding to this TEC has been mapped by DES as occurring on the study area. No records of <i>Acacia pendula</i> (Weeping Myall) were returned in a 50 km search of the Project using Wildlife Online. It is considered unlikely that this TEC will occur on the study area.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Likely to occur (10-50 km)	None	<u>Unlikely</u> Vine thicket TEC is not known to occur within 10 km of the study area and is only considered likely to occur within a 10 – 50 km buffer of the Project. No REs that correspond to the TEC have been mapped by DES as occurring on the study area.

Community Name	Database searches		Desktop likelihood determination
	PMST	Corresponding REs mapped within EPC	
Poplar Box Grassy Woodlands on Alluvial Plains	Not identified at time of search	11.3.2	<p><u>Likely</u></p> <p>Poplar Box TEC was added to the list of TECs protected by the EPBC Act effective from 4 July 2019.</p> <p>One RE that corresponds to the TEC has been mapped by DES as occurring on the study area, <i>Eucalyptus populnea</i> woodland on alluvial plains (RE 11.3.2).</p>

Appendix C Likelihood of Occurrence for Flora Species of
Conservation Significance

Likelihood of Occurrence for Fauna Species of Conservation Significance

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Acacia grandiflora</i>	V	LC	Species or species habitat known to occur within area (10 – 50 km)	6 10 - 50 km	<i>Acacia grandifolia</i> grows in hilly terrain on hillslopes of varying aspects and slope. The species also occurs on hillcrests, gullies and plains. Soil is usually shallow and well drained and is described as sandy loam to clay loam in texture derived from sandstones and acidic volcanics. Altitudes are predominantly between 200 and 370 metres. The vegetation is tall woodland or open forest with a range of floristic associations. The most frequently recorded tree species are <i>Eucalyptus crebra</i> , <i>Corymbia citriodora</i> , <i>C. trachyphloia</i> , <i>E. maculata</i> and <i>E. exserta</i> (QCRA/FRA, 1998; Queensland Herbarium 2011, cited in DES 2018b).	<u>Unlikely</u> This species has been recorded 6 times within 50 km of the Project. Potential suitable habitat is not likely to occur within the Project due to the elevation requirements of the species. The Project is located outside of the species distribution range.
<i>Acacia storyi</i>	-	NT	-	17 10 - 50 km	<i>Acacia storyi</i> typically grows on sandy and shallow skeletal soils over sandstone and grows in open forests. This species is associated with <i>Eucalyptus teriticornis</i> and <i>Aristida</i> spp. The species was considered occasional in two populations from Blackdown Tableland National Park, west of Rockhampton in central Queensland (DES 2018b).	<u>Unlikely</u> This species has been recorded 17 times within 50 km of the Project and potential habitat is likely to occur within the Project. However, the species range is very restricted, and the majority of the known populations protected within the Blackdown Tablelands NP, to the southwest of the Project.
<i>Aristida annua</i>	V	V	Species or species habitat likely to occur within area (10 – 50 km)	No Records	This species is restricted to Eucalypt woodland on black clay and basalt soils (DoEE 2018).	<u>Unlikely</u> This species was returned in the 50 km PMST search as likely to occur, however has no records within 50 km of the Project on Wildlife Online or Atlas of Living Australia database (ALA). Potential habitat is unlikely to occur within the Project due to the absence of suitable soil types.

C

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Baeckea trapeza</i>	-	NT	-	7 10 - 50 km	<i>Baeckea trapeza</i> grows at altitudes around 700 – 800m and on sandy soil in open Eucalyptus forest. This species is confined to the Blackdown Tableland (DES 2018b).	<u>Unlikely</u> This species has been recorded 7 times within 50 km of the Project and potential habitat is likely to occur within the Project. However, the species range is very restricted, and the majority of the known populations area protected within the Blackdown Tablelands NP, to the southwest of the Project.
<i>Bertya opposens</i>	V	V	Species or species habitat likely to occur within area (10 – 50 km)	No Records	Recorded growing in a variety of community types including mixed shrubland, Lancewood woodland, Mallee woodland, Eucalyptus / Acacia open forest with shrubby understorey, Eucalyptus / Callitris open woodland and semi-evergreen vine-thicket. Soils are recorded as generally shallow sandy loams or red earths associated mostly with sandstone, but also with rhyolite, shale and metasediments (DoEE 2018).	<u>Potential</u> This species was returned in the 50 km PMST search as likely to occur, however has no records within 50 km of the Project on Wildlife Online, ALA or Australian Virtual Herbarium (AVH). Due to the presence of Lancewood woodland within the study area and the proximity to the edge of the species distribution, the species potentially could be found within the study area.
<i>Bertya pedicellata</i>	-	NT	-	3 10 - 50 km	<i>Bertya pedicellata</i> grows on rocky hillsides in range of community types including eucalypt forest or woodland, Acacia woodland or shrubland and open heathland or vine thicket communities. The soils on which this species grow on are mainly skeletal to shallow sandy, sandy clay or clay loams overlaying rhyolite, trachyte or sandstone substrates (DES 2018b).	<u>Potential</u> This species has been recorded 3 times within 50 km of the Project. Even though there are no records of the species in the vicinity of the Project, this is located within the species distribution range. Potential suitable habitat may occur within the Project.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Cadellia pentastylis</i> Ooline	V	V	Species or species habitat likely to occur within area (0-10 km)	4 10 - 50 km	Ooline occurs in a range of vegetation types including dry rainforest, semi-evergreen vine thickets and sclerophyll communities including, Brigalow-Belah, Poplar Box and Bendee communities (Pollock 1999; DEWHA 2008; cited in DES 2014b). Ooline often occurs on the edges of sandstone and basalt escarpments, 200 - 500m above sea level. Ooline grows on the moderately fertile soils preferred for agriculture and pasture development (Pollock 1999; DEWHA 2008; cited in DES 2014b).	<u>Unlikely</u> This species has been recorded four times within 50 km of the Project. Potential suitable habitat is not likely to occur within the Project due to the elevation requirements of the species. The Project is located outside of the species distribution range.
<i>Cerbera dumicola</i>	-	NT	-	2 0 - 10 km 6 10 - 50 km	<i>Cerbera dumicola</i> occurs across a range of habitats in central and southern Queensland. Associated vegetation and species include: sandstone hills in open <i>E. umbra subsp. carnea</i> ; on plateaus, in woodland of <i>Acacia shirleyi</i> with <i>Corymbia dolichocarpa</i> ; acidic soils in mine rehabilitation area; woodland of <i>A. catenulata</i> and <i>A. shirleyi</i> with <i>E. thozetiana</i> on a slope of sand/clay soil; semi-deciduous notophyll-microphyll vine forest of <i>Brachychiton australis</i> , <i>Gyrocarpus americanus</i> , <i>Flindersia australis</i> , <i>Pleiogynium timorense</i> , <i>Drypetes deplanchei</i> and <i>Sterculia quadrifida</i> on rhyolite hillslopes; open-woodland of <i>E. melanophloia</i> with occasional <i>Acacia shirleyi</i> , <i>E. populnea</i> and <i>E. brownii</i> ; semi-evergreen vine thicket with <i>Corymbia citriodora</i> and <i>Corymbia aureola</i> emergents; woodland of <i>A. rhodoxylon</i> on brown, sandy loam; and in <i>Corymbia tessellaris</i> - <i>Acacia aneura</i> open woodland (Queensland Herbarium, 2011; cited in DES 2018).	<u>Likely</u> This species has been recorded twice within 10 km of the Project, and six times within 50 km. Potential suitable habitat is likely to occur within the Project.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Commersonia pearnii</i>	-	E	-	2 10 - 50 km	<i>Commersonia pearnii</i> occurs in open forests and woodlands with a range of canopy species. This species grows on sandstone escarpments and tablelands with shallow, medium to coarse-grained soils. This species is restricted to Blackdown Tableland in central Queensland (DES 2014b).	<u>Unlikely</u> This species is restricted to the Blackdown Tablelands NP. Potential suitable habitat is not likely to occur within the Project.
<i>Corunastylis pedersonii</i>	-	V	-	1 0 - 50 km	This species has been recorded in Queensland from a single location in the Blackdown Tableland NP, on coarse decomposed sandstone. Seepage area on rock ledge with sedges, moss and <i>Drosera</i> sp. (AVH 2019). Specimens from New South Wales were recorded from Undulating country. Reddish/brown sandy clay loam soil over sandstone. Shrubby <i>Eucalyptus crebra</i> woodland with <i>Melaleuca uncinata</i> .	<u>Unlikely</u> This species has been recorded once within 50 km of the Project, in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the Project due to the absence of suitable soil types.
<i>Corunastylis valida</i>	-	V	-	1 10 - 50 km	This species has been recorded in Queensland from a single location in the Blackdown Tableland NP, on coarse decomposed sandstone. Sparse woodland dominated by <i>Banksia</i> sp. (AVH 2019).	<u>Unlikely</u> This species has been recorded once within 50 km of the Project, in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the Project due to the absence of suitable soil types.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Cycas ophiolitica</i> Marlborough blue	E	E	Species or species habitat likely to occur within area (10 – 50 km)	No Records	<i>Cycas ophiolitica</i> inhabits eucalypt open forest and woodland communities with a grassy understorey. They occur on hill tops or steep slopes, at altitudes of 80-620m above sea level. It grows on shallow, stony, red clay loams or sandy soils (DES 2018b).	<u>Unlikely</u> This species was returned in the 50 km PMST search as likely to occur, however has no records within 50 km of the Project on Wildlife Online or ALA. Potential suitable habitat is unlikely to occur within the Project.
<i>Daviesia discolor</i>	V	V	Species or species habitat likely to occur within area (10 – 50 km)	6 10 - 50 km	This species is distributed in three localities in Queensland; Blackdown Tableland NP, Mount Walsh area near Biggeden, and in Carnarvon National Park (north of Mount Playfair) (DoEE 2018; Queensland Herbarium 2012). <i>Daviesia discolor</i> typically occurs from coastal hills to mountain slopes and ridges and grows between 50 – 1100m in altitude, mostly on fine-textured soils, which may be derived from acid volcanic or metamorphic rocks. Specifically, on the Blackdown Tableland NP, this species occurs on sandy soil derived from sandstone and on lateritic clay at altitudes of 600 – 900m, in open eucalypt forest dominated by species such as <i>Eucalyptus sphaerocarpa</i> and <i>E. nigra</i> (Queensland Herbarium 2012, cited in DES 2018b).	<u>Unlikely</u> This species has been recorded within 50 km of the Project in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the Project due to the absence of suitable soil types and elevation.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Daviesia quoquoversus</i>	-	V	-	2 10 - 50 km	<i>Daviesia quoquoversus</i> occurs in open forests on sandy soil derived from sandstone. This species is restricted to south-east Queensland and only found in Blackdown Tableland NP (Queensland Herbarium 2012, cited in DES 2018b).	<u>Unlikely</u> This species has been described as restricted to the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the study area due to the absence of suitable soil types.
<i>Dichanthium queenslandicum</i> King bluegrass	E	V	Species or species habitat may occur within area (10 – 50 km)	No Records	This species occurs on black cracking clay in tussock grasslands mainly in association with other species of Bluegrasses. It is mostly confined to the natural Bluegrass grasslands of central and southern Queensland (DoEE 2018).	<u>Unlikely</u> The species has not been recorded within 50 km of the Project. The species is mostly confined to natural Bluegrass grasslands and not in grazed land. The study area lacks on suitable habitat.
<i>Dichanthium setosum</i> Bluegrass	V	-	Species or species habitat likely to occur within area (0 – 10 km) Species or species habitat likely to occur within area (10 – 50 km)	No Records	Occurs in grassy woodland and open forests in inland Australia. Associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture (DoEE 2018).	<u>Unlikely</u> The species has not been recorded within 50 km of the Project. The species is mostly confined to natural Bluegrass grasslands and not in grazed land. The study area lacks on suitable habitat.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Eucalyptus raveretiana</i> Black ironbox	V	LC	Species or species habitat likely to occur within area (10 – 50 km)	No Records	Occurs on alluvial soils, loams, light clays or cracking clays in open forests and woodlands along watercourses and occasionally on river flats (DES 2018b).	<u>Unlikely</u> Potential suitable habitat may occur within the study area. This species was returned in the 50 km PMST search as likely to occur, however has not been recorded within 50 km of the Project. The species is unlikely to occur within the study area as it is only known from coastal regions of eastern Queensland, with the nearest records north and east of Coppabella.
<i>Gastrodia crebrifolia</i>	-	V	-	1 10 - 50 km	<i>Gastrodia crebrifolia</i> is an orchid that grows in loose colonies on protected slopes in tall open forest, often close to fallen trees. This species occurs on soils that are sands derived from decomposed sandstone. Endemic to Queensland (Jones 1991 cited in DES 2018b).	<u>Unlikely</u> This species has been recorded once within 50 km of the study area, in the Blackdown Tableland NP. However, the study area is located outside the known distribution of the species.
<i>Homoranthus decumbens</i>	E	V	Species or species habitat known to occur within area (10 – 50 km)	No Records	<i>Homoranthus decumbens</i> occurs in tall shrubland or heath up to 800m above sea level. It occurs on the edge of sandstone cliffs or in shallow sandy soils containing lateritic (iron-rich) pebbles (Wang 1995).	<u>Unlikely</u> This species was returned in the 50 km PMST search as known to occur, however, it has not been recorded within 50 km of the Project on Wildlife Online or ALA. The closest record of the species is from near Taroom, over 200 km south of the Project. Potential suitable habitat is unlikely to occur within the study area.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Livistona fulva</i>	-	V	-	12 10 - 50 km	<i>Livistona fulva</i> occurs mainly along sandstone cliff-lines, on rocky foot-slopes below cliffs, in shallow rocky gullies of the Blackdown Tableland NP, and in deep sandstone gorges below major waterfalls around the edge of the plateau. Grows in moderately tall eucalypt forest, typically dominated by <i>Eucalyptus sphaerocarpa</i> . Most occurrences are recorded at altitudes 300 – 600m above sea level (DES 2018b). This species is found in the Blackdown Tablelands NP.	<u>Unlikely</u> This species has been described as occur mainly in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the study area due to the absence of suitable soil types and low elevation.
<i>Logania diffusa</i>	V	V	Species or species habitat likely to occur within area (0-10 km)	2 10 - 50 km	<i>Logania diffusa</i> occurs in heathland and eucalypt open forest. It grows in sandy or sandy clay soil with sandstone outcropping and loose surface stones on escarpments. This species grows at altitudes of 600 – 780m above sea level. This species is restricted to the Blackdown Tableland NP (DES 2014b).	<u>Unlikely</u> This species has been described as restricted to the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the Project due to the absence of suitable soil types and low elevation.
<i>Macrozamia platyrhachis</i>	E	E	Species or species habitat likely to occur within area (0-10 km)	30 10 - 50 km	<i>Macrozamia platyrhachis</i> is scattered locally and abundantly in eucalypt woodland or open forest at altitudes between 300 – 780m above sea level. Mid- and under-stories of the vegetation may be relatively dense but is variably dependent on fire history. This species grows on deep sandy soils, derived from sandstone and is mainly found on Blackdown Tableland NP and has occurrence recorded in areas slightly south of township of Dingo (DES 2018b).	<u>Unlikely</u> This species has been recorded mainly within 50 km of the Project, in the Blackdown Tableland NP. The study area with its highest elevation at 200m above sea level, lacks the suitable habitat for this species.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Melaleuca groveana</i>	-	NT	-	4 10 - 50 km	<i>Melaleuca groveana</i> grows on exposed rocky ridges, high mountain slopes and the summit of mountains at altitudes 340 – 600m above sea level. This species typically occurs on in heaths and eucalypt woodlands and forests with heath understoreys. It is also found in tall open forest with a grassy understorey and in microphyll vine forests. It has been previously recorded growing on red sandy loams, brown loams, skeletal rocky soils and sandy soils over sandstone rock. This species is found in fragments from Port Stephens (NSW) to the Blackdown Tableland NP (DES 2014b).	<u>Unlikely</u> This species has been recorded within 50 km of the Project, in the Blackdown Tableland NP. The study area with its highest elevation at 200m above sea level, lacks the suitable habitat for this species.
<i>Melaleuca pearsonii</i>	-	NT	-	12 10 - 50 km	<i>Melaleuca pearsonii</i> occurs in Blackdown Tableland NP. Grows near rivers, in rocky gullies and in wallum vegetation in creek beds (Brophy <i>et al.</i> 2013).	<u>Unlikely</u> This species has been described as occurring in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the study area.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Phaius australis</i>	E	E	Species or species habitat known to occur within area (0-10 km)	3 10 - 50 km	<i>Phaius australis</i> grows in areas where soils are almost always damp, but not flooded for lengthy periods. Sands are generally the underlying soil type. <i>P. australis</i> are usually found in coastal habitats between swamps and forests or in suitable areas further inland. This includes swampy sclerophyll forest dominated by melaleucas, swampy forest that often have sclerophyll emergents, or fringing open forest and melaleuca swamp forest associated with rainforest species. <i>P. australis</i> has also been recorded in wallum, sedgeland, rainforest and closed forest. They often grow in deep shade but can also occur in full sun. This species occurs at higher altitudes in northern Queensland (Barker 1995).	<u>Unlikely</u> Despite being described from coastal habitats, this species has been recorded 3 times within 50 km of the study area in the Blackdown Tableland NP. Potential suitable habitat is not likely to occur within the Project.
<i>Plectranthus blakei</i>	-	NT	-	10 10 - 50 km	<i>Plectranthus blakei</i> has been only recorded from sandstone rock outcrops and ledges in association with <i>Hoya australis</i> and <i>Clandrina</i> in the Blackdown Tableland NP (JSTOR 2018).	<u>Unlikely</u> This species has only been recorded in the Blackdown Tableland NP. However, the study area is located outside the known distribution of the species.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Pseudanthus pauciflorus subsp. arenicola</i>	-	NT	-	1 10 - 50 km	This species occurs in crevices on vertical or near vertical rock faces and sandstone cliffs within dry sclerophyll woodland (DSITI 2015) and is endemic to the Blackdown Tableland NP (DES 2018b).	<u>Unlikely</u> This species has been described as being endemic to the Blackdown Tableland NP. Potential suitable habitat does not occur within the study area.
<i>Rutidosia glandulosa</i>	-	NT	-	7 10 - 50 km	<i>Rutidosia glandulosa</i> is known from approximately 15 populations across six distinct localities, which includes Blackdown Tableland NP. This species mainly occurs on sandy or gravelly well drained soil in grassy open eucalypt woodland. Around Blackdown Tableland NP, this species appears to be growing in open forest dominated by <i>Eucalyptus interstans</i> , <i>E. sphaerocarpa</i> and <i>Angophora leiocarpa</i> . (DES 2018b).	<u>Unlikely</u> The study area is located outside of the species distribution, which extends from Stanthorpe to the Blackdown Tableland NP, to the west of the study area. Potential suitable habitat is not likely to occur within the Project.
<i>Sannantha brachypoda</i>	-	V	-	1 10 - 50 km	<i>Sannantha brachypoda</i> has been described from loamy, sandy or rocky soils and from gorges and creek lines (AVH 2019).	<u>Unlikely</u> This species has been recorded once within 50 km of the study area, in the Blackdown Tableland NP. Potential suitable habitat does not occur within the study area.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Solanum adenophorum</i>	-	NT	-	10 10 - 50 km	<i>Solanum adenophorum</i> occurs mostly in brigalow woodland and on very gently inclined slopes. It also occurs in gidgee (<i>Acacia cambagei</i>) scrub on deep cracking clay soils (DES 2018e). Occurrence records show that this species is from south and south-west of Marlborough to Rockhampton and also found in small populations north and north-east of Wagga Wagga, NSW (ALA 2018).	<u>Potential</u> The Project is located south of the distribution range of the species. All records near the Project are located within Taunton NP. Potential suitable habitat may occur within the study area in small patches.
<i>Solanum dissectum</i>	E	E	Species or species habitat known to occur within area (0-10 km)	3 10 - 50 km	<i>Solanum dissectum</i> occurs in open forest and woodland of brigalow (<i>Acacia harpophylla</i>) or <i>Eucalyptus thozetiana</i> on solodic clay soils (Queensland Herbarium 2012, cited in DES 2018b).	<u>Potential</u> This species was returned in the 50 km PMST search as known to occur, however, the closest record of the species is from west of Blackdown Tableland NP. Potential suitable habitat may occur within the study area in small patches.
<i>Solanum elachophyllum</i>	-	E	-	1 0 - 10 km 14 10 - 50 km	<i>Solanum elachophyllum</i> grows on fertile cracking-clay soils in open forest of <i>Eucalyptus thozetiana</i> , <i>Acacia harpophylla</i> , with understorey of <i>Geijera parviflora</i> , <i>Casuarina cristata</i> , <i>Macropteranthes leichhardtii</i> , <i>Eucalyptus cambageana</i> , or woodland of <i>E. creba</i> and <i>E. tenuipes</i> (DES 2018b). Occurrence of this species has been recorded in areas from south-west of Mackay to south-west of Gladstone.	<u>Likely</u> The Project is located within the species distribution. Potential suitable habitat may occur within the study area in small patches.

Species Name Common Name	EVNT Listing		Database Searches		Preferred Habitat	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Solanum johnsonianum</i>	E	E	Species or species habitat may occur within area (10 – 50 km)	No Records	<i>Solanum johnsonianum</i> is distributed within communities dominated or co-dominated by <i>Acacia harpophylla</i> (Brigalow), on heavy cracking soils. Other associated species include <i>Eucalyptus thozetiana</i> with understorey of <i>Geijera parviflora</i> (Bean, 2004; Queensland Herbarium, 2012, cited in DES 2018b).	<u>Unlikely</u> The Project is located south of the distribution of the species. Potential suitable habitat may occur within the study area in small patches. There are no records of the species within 50 km of the Project.

Appendix D Likelihood of Occurrence for Fauna Species of Conservation Significance

Likelihood of Occurrence for Fauna Species of Conservation Significance

Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
Amphibians						
<i>Adelotus brevis</i> Tusked frog	-	V	-	10 (10-50 km)	The Tusked frog inhabits wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams. Also recorded from dams and garden ponds in urban and peri-urban areas (Rowland 2013).	<u>Potential</u> The study area occurs within the vicinity of the known range of the Tusked frog and there is a possibility the study area provides areas of suitable habitat. However, the closest records of the species in the area are from Blackdown Tableland NP, located over 20km southwest of the study area.
Reptiles						
<i>Delma torquate</i> Adorned delma	V	V	Species or species habitat likely to occur within area (0-10 km)	1 (10-50 km)	The Collared Delma normally inhabits eucalypt dominated woodland and open forest where it is associated with suitable micro-habitats (exposed rocky outcrops). The ground cover is predominantly native grasses, such as Kangaroo Grass (<i>Themeda triandra</i>), Barbed-wire Grass (<i>Cymbopogon refractus</i>), Wiregrass (<i>Aristida</i> sp.) and Lomandra (<i>Lomandra</i> sp.) (Peck & Hobson, 2007, cited in TSSC 2008).	<u>Potential</u> This species was returned in the 10 km PMST search as may occur. This species is known to occur between 10 and 50 km, at the Blackdown Tablelands NP. However, desktop searches identified marginal suitable habitat for this species in the study area.
<i>Denisonia maculate</i> Ornamental snake	V	V	Species or species habitat may to occur within area (0-10 km)	2 (10-50 km)	The Ornamental Snake's preferred habitat is within, or close to, habitat that is favoured by its prey - frogs. The species is known to prefer woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions in Queensland Regional Ecosystem Land Zone 4, but also lake margins and wetlands (Agnew 2010 pers. comm.; Brigalow Belt Reptiles Workshop 2010; Wilson & Knowles 1988)	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, and as known to occur between 10 and 50 km. Desktop searches did not identify suitable habitat for this species.

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
					cited in DEE 2018). Gilgai formations are found where deep-cracking alluvial soils with high clay contents occur (Brigalow Belt Reptiles Workshop 2010, cited in DoEE 2018).	
<i>Egernia rugosa</i> Yakka skink	V	V	Species or species habitat known to occur within area (0-10 km)	No records	Dry open forests, woodlands and rocky areas in the Brigalow Belt, where it occurs in fallen timber, wood piles, uprooted trees, deep rock crevices, deeply eroded gullies or disused rabbit warrens (DoEE 2018).	<u>Unlikely</u> This species or species habitat was returned in the 10 km PMST search as known to occur, however no records were returned in the database and online searches. There nearest ALA records are from over 50km west of the study area. Some marginally suitable habitat may be found on the study area.
<i>Furina dunmali</i> Dunmall's snake	V	V	Species or species habitat may occur within area (0-10 km)	No records	Dunmall's Snake inhabits a broad range of habitats including; Forests/woodlands on black alluvial cracking clay/clay loams. Dominant vegetation includes Brigalow (<i>Acacia harpophylla</i>), Wattles (<i>A. burowii</i> , <i>A. deanii</i> , <i>A. leioclyx</i>), native Cypress (<i>Callitris spp.</i>) or Bull-oak (<i>Allocasuarina luehmannii</i>), <i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> and <i>E. melanophloia</i> , and <i>Callitris glaucophylla</i> (DoEE 2018).	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, however no records were returned in the database and online searches. There nearest ALA records are from over 50km west of the study area. Desktop searches identified potentially suitable habitat for this species on the study area.
<i>Strophurus taenicauda</i> Golden-tailed gecko	-	NT	-	10 (10-50 km)	The Golden-tailed Gecko inhabits dry sclerophyll forests featuring ironbarks, cypress pine and brigalow. It is described as an arboreal species sheltering behind loose dead bark, in hollows, or clinging to exposed slender branches in dapple sunlight (Wilson 2005).	<u>Potential</u> This species has been recorded within 50 km of the study area. The study area contains suitable habitat for this species.
Birds						
<i>Actitis hypoleucos</i>	Ma	SL	Species or species habitat	No records	Varied coastal and interior wetlands – narrow muddy edges of billabongs, river pools,	<u>Unlikely</u>

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
Common Sandpiper			may occur within area (0-10 km)		mangroves, among rocks and snags, reefs or rocky beaches (Morcombe 2002).	This species has not been recorded on the study area and has no records within 50 km of the study area on Wildlife Online or ALA. Suitable habitat for this species is unlikely to be available on the study area.
<i>Anseranas semipalmata</i> Magpie Goose	Ma	-	Species or species habitat may occur within area (0-10 km)	No records	The Magpie Goose occupies large seasonal wetlands and well-vegetated dams with rushes and sedges; wet grasslands and floodplains (Pizzey & Knight 2007).	<u>Unlikely</u> This species has not been recorded within 50 km of the study area. Some seasonal habitat may occur on the study area, however preferred habitat is distributed on coastal margins.
<i>Apus pacificus</i> Fork-tailed swift	Ma, Mi	SL	Species or species habitat likely to occur within area (0-10 km)	No records	Low to very high airspace over varied habitat, rainforest to semi-desert, most active just ahead of summer storm fronts (Morcombe 2002).	<u>Unlikely</u> This species has not been recorded within 50 km of the study area on Wildlife Online or ALA. Potential habitat may occur on the study area, however occurrence is highly concentrated on coastal margins, and sporadic through inland Australia.
<i>Ardea alba</i> Great egret	Ma	-	Species or species habitat likely to occur within area (0-10 km) Breeding known to occur within area (10-50 km)	No records	Common throughout Australia, with the exception of the most arid areas. Known to prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands (Morcombe 2002).	<u>Potential</u> This species has not been recorded within 50 km of the study area on Wildlife Online or ALA. Seasonally suitable habitat is likely to occur on the study area and in the greater region.
<i>Ardea ibis</i> Cattle egret	Ma	-	Species or species habitat may occur within area (0-10 km)	No records	Widespread and common in north, north-eastern and south-eastern Australia. The species is found in grasslands, woodlands and wetlands, and is not common in arid areas. Utilises pastures and croplands, especially where drainage is poor. Will also	<u>Potential</u> This species has not been recorded within 50 km of the study area on Wildlife Online or ALA. Potential suitable habitat is

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
					forage in garbage dumps, and often associates with livestock (Morcombe 2002).	available on the study area and in the greater region.
<i>Calidris acuminata</i> Sharp-tailed sandpiper	Ma, Mi	SL	Species or species habitat may occur within area (0-10 km) Species or species habitat likely to occur within area (10-50 km)	No records	Fresh or salt wetlands – the muddy edges of wetlands and dams (Morcombe 2002). In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions (DoEE 2018).	<u>Potential</u> This species was returned in the 10 km PMST search as may occur, and as likely to occur between 10 and 50 km. No records of presence were recorded within 50km of the study area. Species occurrence is concentrated on coastal margins, but still common throughout inland Australia where suitable habitat is available. Limited seasonal habitat may occur in the study area.
<i>Calidris ferruginea</i> Curlew sandpiper	CE, Mi, Ma	E	Species or species habitat may occur within area (0-10 km)	No records	Inhabiting wetland environments, the Curlew sandpiper is commonly found on sandy shores, lagoons, tidal mudflats, saltmarshes, swamps, lakes, and sewage farms (Pizzey and Knight 2007). They forage at the edge of shallow pools and can wade through water 15-60 mm deep (DoEE 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. This species is distributed around most of the coastline of Australia.	<u>Unlikely</u> Habitat within the study area is not suited for this species as the study area is not coastal and will not provide the resources required to sustain this species. Although this species has been recorded in association with inland waterbodies, it is very rare.
<i>Calidris melanotos</i> Pectoral sandpiper	Ma, Mi	SL	Species or species habitat may occur within area (0-10 km)	No records	Usually coast wetlands, both fresh and saline, but also inland on permanent and temporary wetlands; utilises sites with mudflats, fringing vegetation, swamps with heavy overgrowth of vegetation (Morcombe 2002).	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, however as no records were returned in the database and online searches. The nearest ALA records are near Mackay and Yeppoon. Potentially

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
						marginal suitable habitat is likely to occur within the study area.
<i>Calyptorhynchus lathami erebus</i> Glossy black-cockatoo (northern)	-	V	-	19 (10-50 km)	The Glossy black-cockatoo (northern) prefers woodland areas dominated by she-oak <i>Allocasuarina</i> or open sclerophyll forests and woodlands with a stratum of <i>Allocasuarina</i> beneath <i>Eucalyptus</i> , <i>Corymbia</i> or <i>Angophora</i> . This species occurs in the north and central east coast of Queensland, including Blackdown Tableland (Glossy Black Conservancy 2010).	<u>Potential</u> Wildlife online records indicate 19 occurrences of this species within 10 to 50 km of the study area. The PMST did not identify this species as it is not listed under the EPBC Act. Suitable habitat occurs in the broader region but has not been mapped as present within the study area.
<i>Cuculus optatus</i> Oriental Cuckoo	Mi	SL	Species or species habitat may occur within area (0-10 km)	No records	Rainforest margins, monsoon forest, vine scrubs, riverine thickets, wetter, densely canopied eucalypt forests, paperbark swamps and mangroves (Morcombe 2002).	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, however no records were returned in the database and online searches. Suitable habitat is unlikely to occur within the study area.
<i>Chrysococcyx osculans</i> Black-eared cuckoo	Ma	-	Species or species habitat likely to occur within area (0-10 km)	No records	This species inhabits areas of dry open forests, scrublands, mallee, mulga, lignum, and riverside thickets. This species is widespread across the mainland of Australia.	<u>Potential</u> This species was returned in the 10 km PMST search as likely to occur, however no records were returned in the database and online searches. Potential habitat for this species may occur within the study area.
<i>Erythrotriorchis radiatus</i> Red goshawk	V	E	Species or species habitat known to occur within area (0-10 km)	15 (10-50km)	The red goshawk prefers a mix of vegetation types with its habitat including tall open forest, woodland, lightly treed savannah and the edge of rainforest. In partly cleared parts of eastern Queensland, it is associated with gorge and escarpment country (DES 2018b).	<u>Potential</u> Wildlife Online records identify 15 occurrences of this species within 10 to 50 km. PMST identified species/species habitat as known to occur within 10 km of the study area.

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Gallinago hardwickii</i> Latham's snipe	Ma, Mi	SL	Species or species habitat may occur within area (0-10 km)	-	This species prefers open freshwater wetlands, typically with low dense vegetation. Can be found in a variety of vegetation communities including but not limited to tussock grasslands, coastal and alpine heathlands, tea-tree scrub and open forests.	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, no records were returned in the database and online searches. Limited suitable habitat is likely to occur within the study area.
<i>Geophaps scripta scripta</i> Squatter pigeon (southern)	V	V	Species or species habitat known to occur within area (0-10 km)	14 (0-10 km) 44 (10-50 km)	Open grassy woodlands on sandy soils interspersed with low gravelly ridges, never far from water (Morcombe 2002).	<u>Likely</u> This species has been recorded several times within 10 km of the study area. Suitable habitat exists within the study area. The species is typically locally abundant in areas where it is known from and not cryptic in nature.
<i>Grantiella picta</i> Painted honeyeater	V	V	Species or species habitat may occur within area (0-10 km)	3 (10-50 km)	The Painted honeyeater typically occupies habitats on deep, productive soils and is reliant on abundant mistletoes as a food source. It favours Acacia dominant woodlands (particularly Brigalow dominant) and often uses Belah and Bullock woodlands and riparian woodlands of Black Box and River Red Gum. The species' breeding range is largely restricted to inland NSW and south of Roma.	<u>Potential</u> Three records identified this species as occurring between 10 and 50 km from the study area. Desktop searches identified potential suitable habitat for this species along creek lines/watercourses within the study area.
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Ma	-	Species or species habitat likely to occur within area (0-10 km)	No records	Coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands. Habitat characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats (DoEE 2018).	<u>Unlikely</u> This species was returned in the 10 km PMST search as likely to occur, but no records within 50 km of the study area. Seasonally suitable habitat may occur within the study area.

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Hirundapus caudacutus</i> White-throated needletail	Ma, Mi	SL	Species or species habitat known to occur within area (10-50 km)	No records	This species in Australia is primarily aerial but does show preferences for certain habitats. This species is found in associated with wooded areas, including open forests and rainforests.	<u>Potential</u> This species was returned in the 50 km PMST search as known to occur. Database searches did not identify any records of this species occurring within 50 km of the study area.
<i>Lathamus discolor</i> Swift parrot	CE	E	-	1 (10-50 km)	This species distribution covers eastern NSW, South-east Queensland, Victoria and Tasmania. This species migrates to south-eastern Queensland during Autumn and Winter. This species forages within eucalypt forests and woodlands.	<u>Potential</u> This species was not identified by the PMST. One record of this species exists within 10 to 50 km from the study area. Limited suitable habitat occurs for this species along the creek lines and watercourses within the study area. The study area occurs at the most upper limit of this species distribution.
<i>Merops ornatus</i> Rainbow bee-eater	Ma	-	Species or species habitat may occur within area (0-10 km)	No records	Open forests and woodlands, shrublands, various cleared or semi-cleared habitats, including farmland and areas of human habitation. Open, cleared or lightly timbered areas that are often located in close proximity to permanent water (DoEE 2018).	<u>Potential</u> This species was listed as may occur within 10 km on the PMST search. Database searches did not identify any records of this species occurring within 50 km of the study area. The study area is likely to contain suitable habitat for this species.
<i>Monarcha melanopsis</i> Black-faced monarch	Ma, Mi	SL	Species or species habitat likely to occur within area (0-10 km)	No records	Rainforests, mangroves, eucalypt forests and woodlands (Morcombe 2002).	<u>Potential</u> This species was returned in the 10 km PMST search as likely to occur, however has not been recorded in the 50 km Wildlife Online search. Suitable habitat potentially occurs within the study area.
<i>Monarcha trivirgatus</i>	Ma, Mi	SL	Species or species habitat	No records	Distribution is focused along the eastern coastline of Queensland and NSW. This	<u>Unlikely</u>

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
Spectacled monarch			may occur within area (10-50 km)		species inhabits areas of wet forests and mangroves.	This species was returned in the 10 km PMST search as may occur, however has not been recorded in the 50 km Wildlife Online search. The study area occurs at the limit of this species range and its preferred habitat is unlikely to occur within the study area.
<i>Motacilla flava</i> Yellow wagtail	Ma, Mi	SL	Species or species habitat may occur within area (0-10 km)	No records	Open habitats, often near water; in Queensland it is usually coastal (Morcombe 2002).	<u>Potential</u> This species was returned in the 10 km PMST search as may occur, however no records were returned in the database and online searches. Suitable habitat has the potential to occur within the Project, though likely only seasonally.
<i>Myiagra cyanoleuca</i> Satin flycatcher	Ma, Mi	SL	Species or species habitat may occur within area (0-10 km)	No records	Forests and woodlands, mangroves, coastal heath scrubs; in breeding season favours dense, wet gullies of heavy eucalypt forests (Morcombe 2002).	<u>Potential</u> This species was returned in the 10 km PMST search as may occur, but no database records within 50 km. Limited suitable habitat may occur within the study area.
<i>Neochmia ruficauda ruficauda</i> Star finch	E	E	Species or species habitat likely to occur within area (0-10 km)	No records	The Star finch occurs in grasslands and grassy woodlands, near permanent water, and often in or near suburban areas (Curtis <i>et al.</i> 2012). The Star Finch is endemic to central Queensland (DoEE 2018).	<u>Unlikely</u> This species was returned in the 10 km PMST search as likely to occur, but no database records within 50 km. Limited to no suitable habitat for this species is likely to occur within in the study area.
<i>Ninox strenua</i> Powerful owl	-	V	-	3 (10-50 km)	This species prefers tall open woodlands and forests. Powerful owls require large hollows to nest. This species inhabits areas along watercourses.	<u>Potential</u> Three records of this species have been recorded between 10 and 50 km from the study area. This species is not listed under the EPBC Act as such did not come up in

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
						the PMST. This species is likely to use only marginal habitat features along major watercourses within the study area.
<i>Numenius madagascariensis</i> Eastern curlew	CE, Mi	E	Species or species habitat may occur within area (10-50 km)	No records	Tidal mudflats, sand spits of estuaries, mangroves, lake shores and ocean beaches (Morcombe 2002).	<u>Unlikely</u> This species has not been recorded within 50 km of the study area on Wildlife Online. Suitable habitat is unlikely to be present on the study area due to the study area lying outside suitable coastline environs, with only scattered records inland.
<i>Pedionomus torquatus</i> Plains wanderer	CE	V	-	1 (10-50 km)	The Plains wanderer is a ground-dwelling bird species that inhabits native grasslands. This species is often absent from areas that are too dense or sparse.	<u>Potential</u> This species was not identified in the PMST, and only one record of this species was identified within 10 to 50 km from the study area. Desktop searches identified no native grasslands within the study area boundary.
<i>Psephotus pulcherrimus</i> Paradise parrot	PE	EX	-	9 (10-50 km)	Historically this species occurred in central and southern Queensland. This species inhabited undulating river valleys in sparse open eucalypt woodlands and forests.	<u>Unlikely</u> This species is now extinct. Historic records are from over 50 years ago.
<i>Poephila cincta cincta</i> Black-throated finch (white-rumped subspecies)	E	E	Species or species habitat may occur within area (0-10 km)	4 (10-50 km)	This species inhabits open grassy woodlands and forests (Curtis <i>et al.</i> 2012), scrubby plains and Pandanus flats with deep cover of grasses. Its habitat is never far from water. It is known to occur south of Townsville, particularly around Townsville and Charters Towers (DoEE 2018).	<u>Potential</u> This species was returned in the 10 km PMST search as may occur. Wildlife Online records identify four occurrences of this species within 10 to 50 km.
<i>Rhipidura rufifrons</i> Rufous fantail	Ma	SL	Species or species habitat	No records	In east and southeast Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests. They are also recorded from parks and	<u>Unlikely</u>

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
			may occur within area (0-10 km)		gardens when on passage. In north and northeast Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semideciduous vine thickets or thickets of <i>Melaleuca</i> spp. (DoEE 2018).	This species was returned in the 10 km PMST search as may occur, but no database records within 50 km. Limited suitable habitat is unlikely to occur within the study area.
<i>Rostratula australis</i> Australian painted snipe	E, Ma	V	Species or species habitat may occur within area (0-10 km)	No records	This species is found in shallow inland wetlands, either freshwater or brackish, which are either permanently or temporarily filled, throughout many parts of Australia (DoEE 2018).	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, and as likely to occur between 10 and 50 km. No records of presence were recorded within 50 km of the study area. The study area is unlikely to provide potential habitat for this species.
<i>Turnix melanogaster</i> Black-breasted button-quail	V	V	Species or species habitat may occur within area (0-10 km)	7 (10-50 km)	The preferred habitat for the black-breasted button-quail includes vine thickets and rainforests that are periodically water-stressed such as semi-evergreen vine thicket, low microphyll vine forest, <i>Araucarian microphyll</i> or notophyll vine forest, Brigalow and Belah low thickets or woodlands with a dense understorey and little groundcover and littoral habitats.	<u>Potential</u> This species was returned in the 10 km PMST search as may occur, and as likely to occur between 10 and 50 km. Seven records of this species have been registered within 10 to 50 kms. Potential suitable habitat may occur within the study area.
Mammals						
<i>Antechinus argentus</i> Silver-headed antechinus	E	V	-	23 (10-50 km)	The silver-headed antechinus is known from three isolated subpopulations located in centraleastern Queensland - the plateau at the eastern escarpment of Kroombit Tops NP. located 70 km south-west of Gladstone; Blackdown Tableland National Park, located 220 km west of Gladstone (Mason <i>et al.</i> 2016); and Bulburin National Park (A Baker pers. comm. 2017b; H Hines pers. comm.	<u>Unlikely</u> Records of this species were reported from within 50 of the Project, however, this species is known from only 3 subpopulations located over 150 km south of the Project. The species was not returned in the PMST search as potential species or habitat occurring within the Project area.

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Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
					2017), located 80 km south-east of Gladstone (TSSC 2018).	
<i>Chalinolobus dwyeri</i> Large-eared pied bat	V	V	Species or species habitat may occur within area (0-10 km)	2 (10-50 km)	This species occurs in areas with extensive cliffs and caves, primarily in the Central Queensland sandstone belt. Suitable habitat consists of sandstone gorges in tall open eucalypt forest, dry sclerophyll forests and woodlands, rainforest edges, wet sclerophyll forest and <i>Callitris</i> dominant forest.	<u>Potential</u> This species was returned in the 10 km PMST search as may occur, and as likely to occur between 10 and 50 km. The study area potentially contains suitable habitat for this species.
<i>Dasyurus hallucatus</i> Northern quoll	E	-	Species or species habitat likely to occur within area (0-10 km)	No records	The northern quoll lives in a range of open woodland and open forest types preferring rocky areas. Northern quolls have also been recorded in vine forest, mangroves, sugarcane farms and urban areas. Their greatest breeding success is known to occur at sites near water (DES 2018b).	<u>Unlikely</u> This species was returned in the 10 km PMST search as likely to occur. The study area may contain small areas of suitable habitat for this species. No confirmed records of this species have been found to occur within 50 km of the study area.
<i>Macroderma gigas</i> Ghost bat	V	E	Species or species habitat likely to occur within area (0-10 km)	No records	Ghost bats currently occupy habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. During the daytime they roost in caves, rock crevices and old mines. (TSSC 2016b). They occupy the northern tropical areas of Queensland, Northern Territory and Western Australia.	<u>Unlikely</u> This species was returned in the 10 km PMST search as likely to occur. The study is unlikely to contain suitable habitat for this species and is located outside of the species distribution. No confirmed records of this species have been found to occur within 50 km of the study area.
<i>Nycophilus corbeni</i> Corben's long-eared bat	V	V	Species or species habitat may occur within area (0-10 km)	No records	This species is found across semi-arid southern Australia to southern Queensland and inhabits a range of dry woodland and shrubland communities in arid and semi-arid regions. This bat species roosts mostly in tree hollows (Menkhorst & Knight 2011).	<u>Unlikely</u> This species was returned in the 10 km PMST search as may occur, however, the study area is located outside of the species distribution. No records of presence were recorded within 50 km of the study area. Based on desktop mapping investigations areas containing hollow bearing trees are

D

Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
						likely limited to along watercourses within the study area.
<i>Onychogalea fraenata</i> Bridled nail-tail wallaby	E	E	Species or species habitat known to occur within area (0-10 km)	15 (0-10 km) 41 (10-50 km)	Within Taunton National Park, bridled nailtail wallabies are found in open grassy eucalypt woodland dominated by poplar box (<i>Eucalyptus populnea</i>), dense acacia forest dominated by brigalow (<i>Acacia harpophylla</i>), transitional vegetation intermediate between the woodland and forest areas of very dense brigalow regrowth (Lundie-Jenkins, G., & J. Lowry 2005)	<u>Likely</u> Despite not being reported on the Wildlife online search for 10km, this species is known to occur in the Taunton NP. Desktop searches identified potential suitable habitat for this species in small isolated patches throughout the study area.
<i>Petauroides Volans</i> Greater glider	V	V	Species or species habitat likely to occur within area (0-10 km)	1 (0-10 km) 71 (10-50 km)	Eucalypt dominated habitats, ranging from low, open forests on the coast to tall forests in the ranges and low woodland westwards of the Dividing Range (DES 2018b).	<u>Likely</u> Based on desktop mapping investigations areas containing hollow bearing trees are likely limited to along watercourses within the study area. One Wildlife online records of presence was recorded within 10 km of the study area, and 71 records exist within 10 to 50 kms.
<i>Phascolarctos cinereus</i> Koala	V	V	Species or species habitat likely to occur within area (0-10 km)	1 (0-10 km) 14 (10-50 km)	The Koala inhabits Eucalypt forests and woodlands on the east coast of Australia (Curtis <i>et al.</i> 2012). Koalas require areas of eucalypt species that are highly connected, to ensure shelter from predators.	<u>Potential</u> The study area occurs within the known range of the Koala and provides possible areas of suitable habitat along a narrow strip of <i>Eucalyptus</i> spp following the watercourses in the study area. One Wildlife online record of presence was recorded within 10 km of the study area, and 14 records exist within 10 to 50 kms.

D

Scientific Name Common Name	Status		Database Searches		Habitat and Distribution	Desktop Likelihood of Occurrence
	EPBC Act	NC Act	PMST	Wildlife Online Records		
<i>Pteropus poliocephalus</i> Grey-headed flying-fox	V	-	Foraging, feeding or related behaviour may occur within area (10-50 km)	No records	Roost in native vegetation near water, including mangrove, rainforest, melaleuca or casuarina (Churchill 2008). Typically commute within 15 km to feed on flowering and fruiting plants, including blossoms of various species of eucalypt, angophora, tea-tree and banksia (DES 2018b).	<u>Unlikely</u> No records within 50 km of the study area on Wildlife Online or ALA. Seasonally suitable foraging habitat may exist within the study area, however, no known records or roosts occur within 50 km.

D

Appendix E Fauna Survey Sites



Site Name	DF01
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 727223 7381160
Habitat type	Habitat type 2
Associated RE	11.7.2
Habitat Description	<i>Acacia</i> spp. woodland with <i>Eucalyptus crebra</i> as emergent on lateritic duricrust.
Disturbance Present	Moderate to light grazing and evidence of old fire.
Dominant Vegetation Species	<p>Dominant Trees: <i>Acacia sherleyi</i> (Lancewood), <i>Acacia rhodoxylon</i> (Rosewood) and <i>Eucalyptus crebra</i> as emergent.</p> <p>Dominant Shrubs: <i>Erythroxylum australe</i>, and saplings of the canopy species.</p> <p>Dominant Ground Cover: <i>Calyptochloa gracilima</i> and <i>Aristida caput-medusae</i></p>



Site Name	DF02
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 727380 7382738
Habitat type	Habitat type 3
Associated RE	11.3.25
Habitat Description	<i>Eucalyptus tereticornis</i> open woodland in floodplain between main creek and drainage line.
Disturbance Present	Adjacent land cleared, moderate grazing, erosion nearby and invasive species (Parthenium weed, Rubber vine and Velvet tree pear).
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus tereticornis</i> and <i>Cassia brewsterii</i> Dominant Shrub: <i>Cassia brewsterii</i> Dominant Ground Cover: <i>Megathyrsus maximus</i>



Site Name	DF03
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 726387 7383525
Habitat type	Habitat type 1
Associated RE	11.5.2
Habitat Description	<i>Eucalyptus crebra</i> and <i>Acacia rhodoxylon</i> on sandy plains.
Disturbance Present	Moderate grazing, evidence of old fire and invasive species (<i>Harrisia</i> cactus and Velvet tree pear).
Dominant Vegetation Species	<p>Dominant Trees: <i>Eucalyptus crebra</i> and <i>Acacia rhodoxylon</i></p> <p>Dominant Shrubs: <i>Erythroxylum australe</i></p> <p>Dominant Ground Cover: <i>Cleistochloa</i> sp. (<i>Duaringa</i> K.B.Adison 42) and <i>Aristida caput-medusae</i></p>



Site Name	DF04
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 729993 7383135
Habitat type	Habitat type 3
Associated RE	11.5.2/11.3.25
Habitat Description	Floodplain next to creek line with <i>Eucalyptus crebra</i> on the floodplain and <i>E. tereticornis</i> woodland by the creek line.
Disturbance Present	Tracks, erosion, moderate grazing and invasive species (Rubber vine)
Dominant Vegetation Species	<p>Dominant Trees: <i>Eucalyptus tereticornis</i>, <i>Eucalyptus crebra</i> and <i>Bauhinia carronii</i></p> <p>Dominant Shrubs: <i>Bauhinia carronii</i> and <i>Terminalia oblongata</i></p> <p>Dominant Ground Cover: <i>Dichantium sericeum</i> and <i>Megathyrus maximus</i></p>



Site Name	DF05
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 728432 7382299
Habitat type	Habitat type 3
Associated RE	11.3.25
Habitat Description	<i>Eucalyptus tereticornis</i> and <i>Bauhinia carronii</i> woodland on floodplain between creek lines.
Disturbance Present	Moderate grazing and invasive species (Velvet tree pear).
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus tereticornis</i> and <i>Bauhinia carronii</i> Dominant Shrubs: <i>Bauhinia carronii</i> and <i>Carissa spinarum</i> Dominant Ground Cover: <i>Cenchrus ciliaris</i>



Site Name	DF06
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 729350 7388339
Habitat type	Habitat type 2
Associated RE	11.7.2
Habitat Description	<i>Acacia rhodoxylon</i> woodland on undulating soil with ephemeral drainage lines.
Disturbance Present	Road nearby, dieback, invasive species (Velvet tree pear).
Dominant Vegetation Species	<p>Dominant Trees: <i>Acacia rhodoxylon</i></p> <p>Dominant Shrubs: <i>Owenia acidula</i>, <i>Erythroxylum australe</i> and <i>Carissa spinarum</i></p> <p>Dominant Ground Cover: <i>Aristida caput medusae</i></p>



Site Name	DF07
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 729388 7387547
Habitat type	Habitat type 1
Associated RE	11.5.2
Habitat Description	<i>Eucalyptus crebra</i> and <i>Corymbia clarksoniana</i> on undulating terrain on top of hill besides an ephemeral drainage feature.
Disturbance Present	Agriculture (clearing prior 1986 pers. comm.), road nearby, evidence of fire (big fire around 2014 less than 100m away, across the road) and invasive species (Velvet tree pear).
Dominant Vegetation Species	<p>Dominant Trees: <i>Eucalyptus crebra</i>, <i>Corymbia clarksoniana</i>, <i>Alphitonia excelsa</i>, <i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i> and <i>Acacia rhodoxylon</i></p> <p>Dominant Shrubs: <i>Petalostigma pubescens</i>, <i>Erythroxylum australe</i> and <i>Carissa spinarum</i></p> <p>Dominant Ground Cover: <i>Cenchrus ciliaris</i> and native grasses</p>



Site Name	DF08
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 728436 7387550
Habitat type	Habitat type 2
Associated RE	11.7.2
Habitat Description	<i>Acacia lanceolata</i> and <i>Acacia rhodoxylon</i> woodland with <i>Eucalyptus crebra</i> as emergent at foothill of a rocky scarpment.
Disturbance Present	Moderate disturbance due to a nearby track (not in use any longer because of erosion), some evidence of selective logging, moderate grazing and invasive species (Velvet tree pear)
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus crebra</i> , <i>Acacia shirleyi</i> , <i>Acacia rhodoxylon</i> Dominant Shrubs: <i>Psyrax forsteri</i> Dominant Ground Cover: <i>Calyptochloa gracilima</i>



Site Name	DF09
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 731322 7387731
Habitat type	Habitat type 1
Associated RE	11.5.2
Habitat Description	<i>Allocasuarina luehmannii</i> with <i>Eucalyptus crebra</i> and <i>Corymbia clarksoniana</i> on sand plains with ephemeral drainage features.
Disturbance Present	Tracks nearby, moderate grazing, clearing land nearby, evidence of fire and invasive species (Velvet tree pear).
Dominant Vegetation Species	<p>Dominant Trees: <i>Eucalyptus crebra</i>, <i>Allocasuarina luehmannii</i> and <i>Corymbia clarksoniana</i></p> <p>Dominant Shrubs: <i>Melaleuca nervosa</i> and <i>Petalostigma pubescens</i></p> <p>Dominant Ground Cover: <i>Aristida calycina</i> and <i>Eragrostis lacunaria</i></p>



Site Name	DF10
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 727566 7386375
Habitat type	Habitat type 4
Associated RE	11.3.2
Habitat Description	<i>Eucalyptus populnea</i> woodland on alluvial plains.
Disturbance Present	Adjacent to dam for cattle, heavy presence of stock, tracks nearby, erosion on drainage features and invasive species (Harrisia cactus, Velvet tree pear and Mother of Millions (small infestation)).
Dominant Vegetation Species	<p>Dominant Trees: <i>Eucalyptus populnea</i></p> <p>Dominant Shrubs: <i>Erythroxylum australe</i>, <i>Archidendropsis basaltica</i> and <i>Carissa spinarum</i></p> <p>Dominant Ground Cover: Poaceae sp. (grazed)</p>



Site Name	DF11
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 730436 7381462
Habitat type	Habitat type 2
Associated RE	11.7.2
Habitat Description	<i>Acacia rhodoxylon</i> woodland on sandy plains with emergent <i>Eucalyptus crebra</i> .
Disturbance Present	Agriculture (clearing) and roads and tracks nearby.
Dominant Vegetation Species	Dominant Trees: <i>Acacia rhodoxylon</i> Dominant Shrubs: <i>Carissa spinarum</i> Dominant Ground Cover: <i>Aristida calycina</i>



Site Name	DF12
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 731898 7381098
Habitat type	Habitat type 3
Associated RE	11.3.25
Habitat Description	<i>Eucalyptus tereticornis</i> woodland fringing drainage lines.
Disturbance Present	Agriculture (clearing) and roads and tracks nearby and evidence of fire.
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus tereticornis</i> Dominant Shrubs: <i>Acacia cretata</i> Dominant Ground Cover: <i>Bothriochloa ewartiana</i>



Site Name	DF13
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 729657 7377985
Habitat type	Habitat type 1
Associated RE	11.5.2
Habitat Description	<i>Eucalyptus crebra</i> woodland with <i>Allocasuarina luehmannii</i> in the understorey.
Disturbance Present	Agriculture (clearing) and roads and tracks nearby and evidence of fire.
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus crebra</i> and <i>Allocasuarina luehmannii</i> Dominant Shrubs: <i>Acacia cretata</i> and <i>Corymbia clarksoniana</i> sapplings Dominant Ground Cover: <i>Themeda triandra</i>



Site Name	DF14
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 730367 7380949
Habitat type	Habitat type 4
Associated RE	11.3.2
Habitat Description	<i>Eucalyptus populnea</i> and <i>Eucalyptus melanophloia</i> woodland on alluvial plains.
Disturbance Present	Agriculture (clearing) and roads and tracks nearby and evidence of fire.
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus crebra</i> and <i>Eucalyptus melanophloia</i> Dominant Shrubs: <i>Acacia cretata</i> and <i>Alphitonia excelsa</i> Dominant Ground Cover: <i>Heteropogon contortus</i>



Site Name	DF15
Associated Project Site	Dingo West
Site Location (Zone, Easting, Northing)	55 K 729597 7378351
Habitat type	Habitat type 4
Associated RE	11.3.2
Habitat Description	<i>Eucalyptus populnea</i> open woodland on alluvial plains.
Disturbance Present	Agriculture (clearing) and roads and tracks nearby, heavy grazing (farmer's dam in the vicinity) and evidence of fire.
Dominant Vegetation Species	Dominant Trees: <i>Eucalyptus populnea</i> and <i>Atalaya hemiglauca</i> Dominant Shrubs: <i>Atalaya hemiglauca</i> and <i>Owenia acidula</i> Dominant Ground Cover: <i>Aristida perniciosus</i>

Appendix F Herbarium Identifications



Queensland
Government

Queensland Herbarium

Brisbane Botanic Gardens Mt Coot-tha•Toowong 4066 Queensland•Australia
Telephone +61 7 3896 9326 • Facsimile +61 7 3896 9624
e-mail Queensland.Herbarium@qld.gov.au
<http://www.qld.gov.au/herbarium>

Department of
**Science, Information
Technology and Innovation**

Enquiries Jian Wang
Telephone 07 3896 9318
Your reference
Our reference JW:mh 364/17

31 May 2017

Lucia Lopez
AARC
Suite 56, 1 Swann Road
TARINGA Qld 4068

Dear Lucia

The botanical specimens received by the Queensland Herbarium on 22 May 2017 have been identified as:

DSO2.02; DS04.12; DSO8.12; DSO9,07 DQ11	<i>Afrohybanthus stellarioides</i> # <i>Cerbera dumicola</i> , This species is listed as Near Threatened under Queensland's <i>Nature Conservation Act 1992</i> .
DSO3.05	<i>Capparis canescens</i>
DSO7.09	<i>Glycine tomentella</i>
DSO7.23	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>
DSO4.16; DSO8.02	<i>Cyanthillium cinereum</i>
DSO4.05	<i>Cyanthillium cinereum</i>
DSO4.02	Possibly <i>Glycine</i> sp. (Marburg K.A.Williams 83006), flowers or fruits required for species confirmation
DSO4.21	<i>Ipomoea plebeia</i>
DSO2.05	* <i>Parthenium hysterophorus</i> . This species is a Restricted Invasive Plant (Category 3) under the Queensland <i>Biosecurity Act 2014</i> .
DSO5.03	# <i>Iphigenia indica</i>
DSO5.07	<i>Hypericum gramineum</i>
DSO5.02	<i>Stylidium eriorhizum</i>
DSO7.21	* <i>Senna occidentalis</i>
DSO4.15	#* <i>Bidens pilosa</i>
DSO7.27	<i>Psycdrax forsteri</i>
DSO7.06	# <i>Polycarpaea corymbosa</i> var. <i>minor</i>

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DSO7.14 *Melaleuca nervosa*
DSO4.07 Possibly *Paspalidium constrictum*, the specimen has been diseased.
DSO3.01 *Cleistochloa* sp. (Duarina K.B.Addison 42)
DQ40 *Parsonsia eucalyptophylla*
DQ *Acacia cretata*
DSO7.16 *Acacia cretata*
DSO8.15 #*Sida* sp. (Aramac E.J.Thompson+ JER192)

*Naturalised, non-native species

These specimens have been kept for incorporation into the Herbarium collection, with thanks.

There is a charge of \$640.80 (6 hrs @ \$106.80 per hr incl GST) for these identifications and a tax invoice and receipt are enclosed.

Yours sincerely



for G.P. Guymer
Director



QUEENSLAND GOVERNMENT

Version 11, 2013

Botanical specimens – cover sheet

Botanical Specimens for Identification

Complete this form (one for each specimen) & send with specimen/s to:

Botanical Information and Advisory Service
Queensland Herbarium, DSITIA
Brisbane Botanic Gardens Mt Coot-tha
Mt Coot-tha Road, TOOWONG QLD 4066
Queensland.Herbarium@science.dsitia.qld.gov.au

Office Use Only	
Date received	22 MAY 2017
Identification no.	364.
Date of despatch	31/5/17

Name: Lucia Lopez

Company / Department: AARC. AustralAsian Resource Consultants

Postal Address Site 56, Swan Rd, Tanigga Postcode 4068

Telephone: +61 7 3217 8772 Fax: _____

Email: lpoveda@~~arc~~aarc.net.au

Please send results by: post email fax telephone

Purpose: weed detection poisonous conservation commercial

Additional information required: _____

Label Information: Specimens sent to the Herbarium for identification are frequently retained in the collection for scientific, distribution and voucher records. The label information below when accompanying each specimen aids the identification process and greatly increases the scientific value of your specimen.

Collector's Name & No.: Lucia Lopez ^{DS06,02 + DS04,12} DS08,12 + DS09,07 Date of collection 08/05/17

Botanical name (if known) Euphorbiaceae? (DS06,02 + DS04,12 + DS08,12 + DS09,07)

Locality (include road name and/or distance and direction from nearest town): 9km W Dingo

Coordinates:
Latitude: _____ °S Longitude: _____ °E
(DD MM SS.SSSS – seconds preferred but not compulsory. Please don't supply decimal degrees or decimal minutes)

Or MGA / AMG Coordinates:	DATUM: GDA94/WGS84 or AGD84 (circle)	Zone:	Easting:	Northing:
---------------------------	--------------------------------------	-------	----------	-----------

Or Map (e.g. 9442) and grid reference (eg 333 666) Map number: _____ Grid reference: _____

Source of Coordinates: GPS Map Gazetteer Other

Situation (e.g. plain, creek bank, mountain) Woodland

Cultivated? YES NO

Vegetation type (e.g. forest, heath, woodland) Open Woodland (One in floodplain, transition 11.72 → 11.325)

Soil / geology / regional ecosystem: 11.7.2

Kind of plant (e.g. tree, vine, herb): Herb.

Description (e.g. height, flower or fruit colour): _____

Abundance: number of individuals number seedlings/ juveniles ha/m² size of clump

Other Notes collected from 1 specimen, all in similar habitat/RE, near geographically

Specimens submitted automatically become the property of the Queensland Herbarium
For more information phone 3896 9326 or email Queensland.Herbarium@science.dsitia.qld.gov.au



Queensland Herbarium

Brisbane Botanic Gardens Mt Coot-tha•Toowong 4066 Queensland•Australia
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e-mail Queensland.Herbarium@qld.gov.au
www.qld.gov.au/herbarium

Department of
**Science, Information
Technology and Innovation**

Enquiries Dan Kelman
Telephone 07 3896 9318
Your reference
Our reference DTK:ss 802/17

6 November 2017

Ms Lucia Lopez Poveda
AARC Environmental Solutions Pty Ltd
Suite 5
1 Swann Road
TARINGA QLD 4068

Dear Lucia

The botanical specimens received by the Queensland Herbarium on 23 October 2017, have been identified as:

- D 10-10 *Ehretia membranifolia*
- D 10-11 **Sonchus oleraceus*
- D 10-3 *Glycine tabacina*
- DS 13-01 *Goodenia* sp.
- DS 13-02 *Acacia leiocalyx* subsp. *leiocalyx*
- DS 14-8 *Archidendropsis basaltica*, the fruit like structures on this specimen are insect galls
- SD 14-4 *Sphaeromorphaea subintegra*

*Naturalised, non-native species

There is a charge of \$165.82 (1.5 hrs @ \$110.55 per hr incl GST) for these identifications. A tax invoice and receipt are enclosed.

Yours sincerely

G.P. Guymer
Director



Department of
Environment and Science

Queensland Herbarium

Brisbane Botanic Gardens Mt Coot-tha • Toowong 4066 Queensland • Australia
Telephone +61 7 3896 9326 • Facsimile +61 7 3896 9624
e-mail Queensland.Herbarium@qld.gov.au
<http://www.qld.gov.au/herbarium>

Enquiries Tony Bean
Telephone 07 3896 9318
Your reference
Our reference ARB:ABP:RB:mh 341/18

10 May 2018

Lucia Lopez Poveda
AARC Environmental Solutions
Suite 5, 1 Swann Road
TARINGA Qld 4068

Dear Lucia

The botanical specimens received by the Queensland Herbarium on 26 April 2018 have been identified as:

Dingo Project

PCUS/1	* <i>Sporobolus pyramidalis</i> . This species is a Restricted Invasive Plant (Category 3) under the Queensland <i>Biosecurity Act 2014</i> .
PS17-15	<i>Aristida gracilipes</i>
DS21-2	<i>Panicum effusum</i>
DS17-22	<i>Ehretia membranifolia</i>
DB-3	<i>Goodenia disperma</i>
DS17-5	<i>Eriochloa procera</i>
DB-1	<i>Laxmannia gracilis</i>
DS18-5	<i>Cyperus concinnus</i>
RCDS/1	<i>Cyperus trinervis</i>
DS17-1	<i>Enneapogon</i> sp. probably <i>Enneapogon lindleyanus</i>
DB-2	<i>Cyanthillium cinereum</i>
DB-4	<i>Murdannia graminea</i>
DS19-2	* <i>Emilia sonchifolia</i> var. <i>sonchifolia</i>
DS16-6	Poaceae sp. indeterminate. Fertile material is required for complete identification.

*Naturalised, non-native species

There is a charge of \$1216.05 (11 hrs @ \$110.55 per hr incl GST) for these identifications.

Yours sincerely

G.P.Guymer
Director

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Appendix G Bat Call Analysis



Microbat Call Identification Report

Prepared for (“Client”):	AustralAsian Resource Consultants
Survey location/project name:	Dingo area
Survey dates:	5-11 May 2017
Client project reference:	
Job no.:	AARC-1703
Report date:	12 June 2017

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Methods

Data received and post-processing

This survey was conducted at four sites over six consecutive nights, using two Anabat Express detectors (Titley Scientific, Brisbane) provided by *Balance! Environmental*. Table 1 provides a summary of detector log data, matched to site information provided by the client.

AnalookW (Corben 2015) was used to download the raw ZCA data and log files and to generate Anabat zero-crossing (ZC) call sequence files. This process yielded more than 68,000 sequence files.

Due the large size of the data set, and high noise-to-signal ratio evident in an initial manual scan of the data, a generic noise filter (after Corben 2009) was used to extract only those files that contained recognisable bat call sequences. This reduced the analysable data set to just under 1000 files containing potentially-identifiable bat calls.

Call identification

All sequence files that passed the noise filter were viewed in *AnalookW*, with species identification achieved manually by comparing the call spectrograms with those of reference calls from central and northern Queensland and with reference to published call descriptions (e.g. Reinhold *et al.* 2001; Pennay *et al.* 2004). Calls with fewer than four clearly-defined, non-fragmented pulses were excluded from the analysis.

Species' identification was also guided by considering probability of occurrence based on general distribution information (Churchill 2008; van Dyck *et al.* 2013) and/or *Atlas of Living Australia* on-line database records (<http://www.ala.org.au>).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at <http://www.ausbats.org.au/>. Species nomenclature follows Reardon *et al.* (2015).

Table 1 Summary of echolocation survey effort at Dingo, 5-11 May 2017.

Detector	Date	Site	GPS coordinate		Time		Battery Volts	
			Latitude	Lonitude	Start	Finish	Start	Finish
Anabat-1	5/05/2017	FS02	Incorrectly recorded offsite		17:16	06:54	5.25	4.94
	6/05/2017	FS02	-23.6500	149.2288	17:01	06:54	5.00	4.89
	7/05/2017	FS02	-23.6503	149.2289	17:01	06:55	4.95	4.86
	8/05/2017	FS04	-23.6463	149.2544	17:02	06:57	4.91	4.79
	9/05/2017	FS04	-23.6463	149.2546	17:02	06:57	4.86	4.70
	10/05/2017	FS04	-23.6463	149.2545	17:01	06:58	4.76	4.56
Anabat-2	5/05/2017	FS01	-23.6649	149.2280	17:04	06:55	6.18	5.64
	6/05/2017	FS01	-23.6649	149.2281	17:03	06:56	5.76	5.46
	7/05/2017	FS01	-23.6649	149.2281	17:02	6:11	5.65	5.34
	8/05/2017	FS03	-23.6433	149.2192	17:02	06:57	5.52	5.27
	9/05/2017	FS03	-23.6433	149.2192	17:02	06:57	5.41	5.19
	10/05/2017	FS03	-23.6433	149.2193	17:01	06:58	5.30	5.09

Results & Discussion

Detector log files indicate that both detectors recorded continuously from sunset to sunrise on each night of survey; however, no sequence files were retrieved from the raw data file recorded on Anabat-2 on the night of 9th May (second night at site FS03). The cause of this failure is not apparent from log data recorded by the detector.

At least thirteen and probably fourteen species were recorded during the Dingo survey of May 2017 (see Table 2).

The only species not positively identified was *Chalinolobus nigrogriseus*, which shares many call characteristics with *Scotorepens greyii*. The latter species was reliably identified for sites FS01, FS02 and FS03, but a number of calls from sites FS02 and FS03 had characteristics intermediate between these two species. All other species were positively identified from at least one call recorded during the survey; although all species were not recorded at every site.

Many calls could not be resolved to species level, due to similarities between the calls of several species that are likely to occur in the study area. These calls were allocated to species groups and each member of the group listed as “possible” unless other calls were unequivocally identified.

The species groups used in this analysis included:

- *Chalinolobus gouldii* / *Mormopterus ridei* / *Scotorepens balstoni*;
- *Chalinolobus nigrogriseus* / *Scotorepens greyii*;
- *Chalinolobus picatus* / *Scotorepens greyii*; and
- *Saccolaimus flaviventris* / *Chaerephon jobensis*.

None of the species recorded in this survey are listed as threatened under State or Commonwealth legislation; however, it was interesting to note the presence of three species that generally rely on subterranean roosts (*Rhinolophus megaphyllus*, *Vespadelus troughtoni* and *Miniopterus orianae oceanensis*). These three species were all recorded at FS03, with *M. o. oceanensis* also recorded at sites FS01 and FS02. A cursory survey of *Google Earth* imagery suggests that natural subterranean roosts are probably not present in the immediate vicinity of the study area, so it is assumed these bats are roosting in man-made structures (e.g. culverts and bridges along the nearby Capricorn Highway) and then commuting to the study area to forage. All three species are also present in Blackdown Tableland National Park, south of the study area, although it is unlikely that *R. megaphyllus* or *V. troughtoni* would commute 15-20km from there to forage in the study area.

References

- Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.
- Corben, C. (2009). *Basic Use of Filters in AnalookW*. Unpublished technical guide provided with *AnalookW* software.
- Corben, C. (2015). *AnalookW for bat call analysis using ZCA*. Version 4.1z, 20 September 2015.
- Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.
- Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.
- Reardon, T.B., Armstrong, K.N. and Jackson, S.M. (2015). *A current taxonomic list of Australian Chiroptera*. Version 2015-05-10. URL: <http://ausbats.org.au/>
- Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.
- van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

Table 2 Microbat species recorded during the Dingo survey, 5-11 May 2017.

- ◆ = 'definite' - at least one call from the site was attributed unequivocally to the species
- = 'probable' - calls similar to those of the species were recorded, but could not be reliably identified

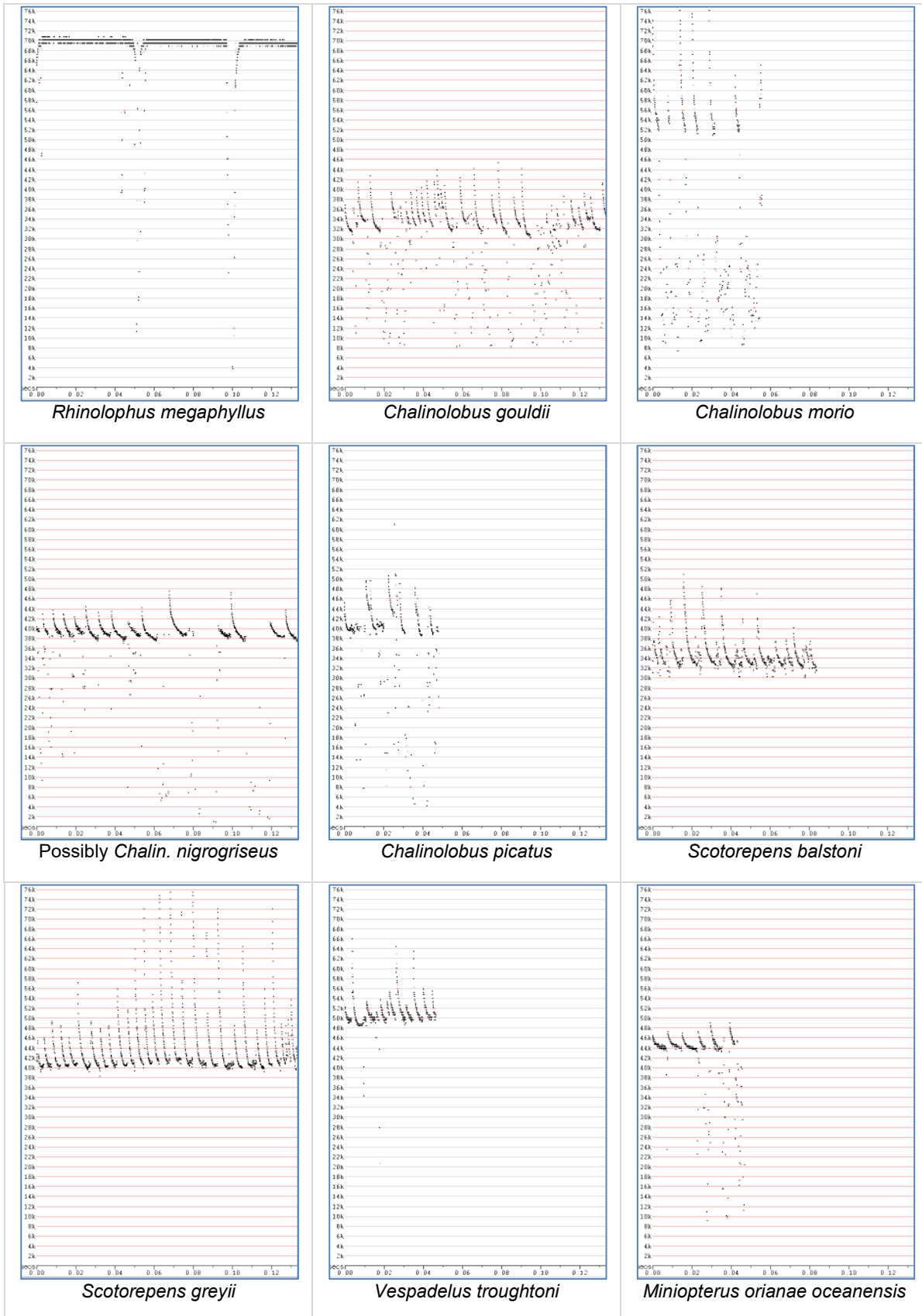
Site	FS01			FS02			FS03			FS04		
	5-May	6-May	7-May	5-May	6-May	7-May	8-May	9-May	10-May	8-May	9-May	10-May
Total sequence files	13047	8249	14330	7062	2907	7948	520	0	83	13685	121	81
Calls identified	28	44	28	273	223	174	51	0	57	21	16	40
<i>Rhinolophus megaphyllus</i>									◆			
<i>Chalinolobus gouldii</i>	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆
<i>Chalinolobus morio</i>				◆								
<i>Chalinolobus nigrogriseus</i>				□	□	□	□		□			
<i>Chalinolobus picatus</i>	□	◆	□	□	□	□	◆		◆			◆
<i>Scotorepens balstoni</i>	□	◆	◆	□			◆					
<i>Scotorepens greyii</i>	◆	◆	□	◆	◆	◆	◆		◆			
<i>Vespadelus troughtoni</i>									◆			
<i>Miniopterus orianae oceanensis</i>	◆	◆	◆			◆			◆			
<i>Austronomus australis</i>		◆		◆	◆	◆			◆	◆	◆	◆
<i>Chaerephon jobensis</i>	□	◆	□	◆	◆	◆	◆		◆	◆	◆	◆
<i>Mormopterus lumsdenae</i>				◆	◆	◆	◆		◆	◆		◆
<i>Mormopterus ridei</i>	◆	◆	□	□	□	□	◆		◆	□	□	◆
<i>Saccolaimus flaviventris</i>	□	□	□	◆	◆	□	□		◆	◆	◆	◆

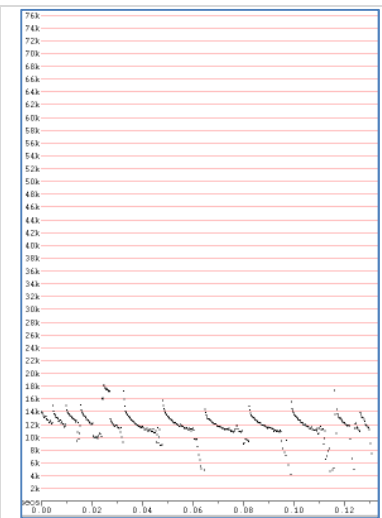
Glossary

Technical terms used in this report are described in the following table.

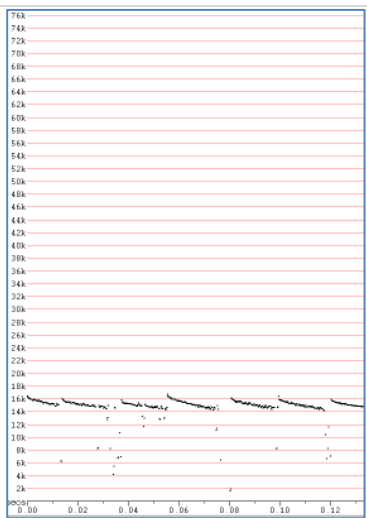
Approach phase	The part of a bat <i>call</i> emitted as the bat starts to home in on a detected prey item; a transitional series of <i>pulses</i> between the <i>search phase</i> and <i>feeding buzz</i> , that become progressively steeper and shorter in duration.
Call	Refers to a single bat call, made up of a series of individual sound <i>pulses</i> in one or more <i>phases</i> (<i>search, approach, feeding buzz</i>).
CF (=Constant Frequency)	A type of <i>pulse</i> in which the dominant component consists of a more-or-less 'pure tone' of sound at a Constant Frequency; with <i>shape</i> appearing flat on the sonogram. Often also contains a brief <i>FM</i> component at the beginning and/or end of the CF component (<i>viz.</i> FM-CF-FM).
Characteristic frequency (Fc)	The frequency of the flattest part of a <i>pulse</i> ; usually the lowest frequency reached in the <i>qCF</i> component of a pulse. This is often the primary diagnostic feature for species identification.
Duration	The time period from the beginning of a <i>pulse</i> to the end of the pulse.
Feeding buzz	The terminal part of a <i>call</i> , following the <i>approach phase</i> , emitted as the bat catches a prey item; a distinctive, rapid series of very steep, very short-duration pulses.
FM (=Frequency Modulated)	A type of <i>pulse</i> in which there is substantial change in frequency from beginning to end; <i>shape</i> ranges from almost vertical and linear through varying degrees of curvature.
FC range	Refers to the range of frequencies occupied by the <i>characteristic frequency</i> section of <i>pulses</i> within a call or set of calls.
Frequency sweep or "band-width"	The range of frequencies through which a <i>pulse</i> sweeps from beginning to end; Maximum frequency (Fmax) – minimum frequency (Fmin).
Knee	The transitional part of a <i>pulse</i> between the initial (usually steeper) frequency sweep and the <i>characteristic frequency</i> section (usually flatter); time to knee (Tk) and frequency of knee (Fk) can be diagnostic for some species.
Pulse	An individual pulse of sound within a bat <i>call</i> ; the <i>shape, duration</i> and <i>characteristic frequency</i> of a pulse are the key diagnostic features used to differentiate species.
Pulse body	The part of the <i>pulse</i> between the <i>knee</i> and <i>tail</i> and containing the <i>characteristic frequency</i> section.
Pulse shape	The general appearance of a <i>pulse</i> on the sonogram, described using relative terms related to features such as slope and degree of curvature. See also <i>CF, qCF</i> and <i>FM</i> .
qCF (=quasi Constant Frequency)	A type of <i>pulse</i> in which there is very little change in frequency from beginning to end; <i>shape</i> appears to be almost flat. Some pulses also contain an <i>FM</i> component at the beginning and/or end of the qCF component (<i>viz.</i> FM-qCF).
Search phase	The part of a bat <i>call</i> generally required for reliable species diagnosis. A consistent series of <i>pulses</i> emitted by a bat that is searching for prey or and/or navigating through its habitat. Search phase pulses generally have longer duration, flatter slope and more consistent shape than <i>approach phase</i> and <i>feeding buzz</i> pulses.
Sequence	Literally, a sequence of <i>pulses</i> that may be from one or more bats; but generally refers to a <i>call</i> or part (e.g. <i>phase</i>) of a call.
Tail	The final component of a <i>pulse</i> , following the <i>characteristic frequency</i> section; may consist of a short or long sweep of frequencies either upward or downward from the Fc; or may be absent.

Appendix 1 Representative call sequences from the Dingo survey, 5-11 May 2017.
 (AnalogW 'F7 compressed' display: x=time(s); y=frequency(kHz); time between pulses removed)

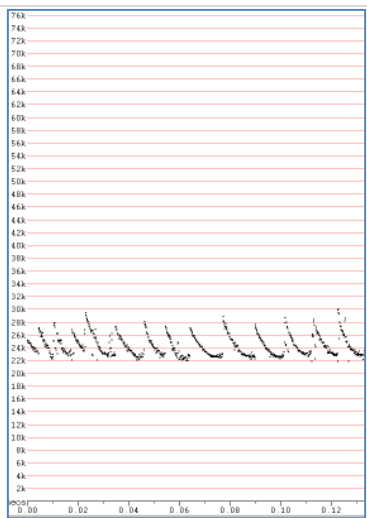




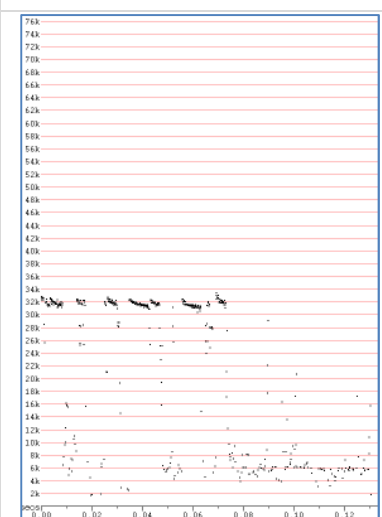
Austronomus australis



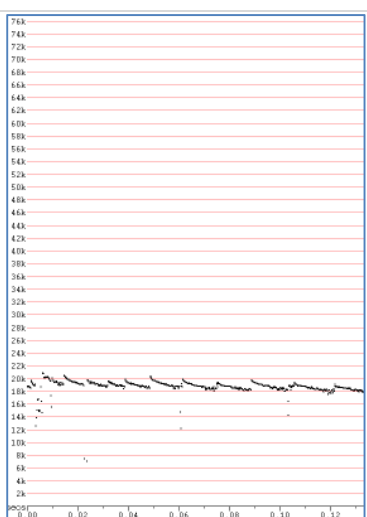
Chaerephon jobensis



Mormopterus lumsdenae



Mormopterus ridei



Saccolaimus flaviventris



Microbat Call Identification Report

Prepared for (“Client”):	AustralAsian Resource Consultants
Survey location/project name:	West of Dingo
Survey dates:	19-29 September 2017
Client project reference:	
Job no.:	AARC-1706
Report date:	12 October 2017

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Methods

Survey summary

The survey was conducted at six sites (see Figure 1) over 11 consecutive nights, using Anabat Express detectors (Titley Scientific, Brisbane). Deployment details are summarised in Table 1.

Table 1 Deployment schedule for the Dingo bat-detector survey September 2017.

Derived from detector LOG files and survey summary information provided by the client.

Detector name & Serial No.	Site	Latitude & Longitude	Date	Time		Battery Volts	
				Start	Stop	Start	Stop
Anabat 1 SN434354	FS05	-23.6537 149.2393	19/09/2017	17:28:05	6:25:04	6.29	5.79
			20/09/2017	17:28:24	6:24:01	5.87	5.62
			21/09/2017	17:28:44	6:22:59	5.77	5.52
	FS08	-23.6068 149.2386	23/09/2017	17:29:23	6:20:56	5.72	5.42
			24/09/2017	17:29:43	6:19:54	5.61	5.33
			25/09/2017	17:30:03	6:18:52	5.52	5.25
			26/09/2017	17:30:24	6:17:51	5.43	5.20
	FS10	-23.6174 149.2305	27/09/2017	17:30:46	6:16:52	5.36	5.11
			28/09/2017	17:31:07	6:15:50	5.34	5.05
29/09/2017			17:31:28	6:14:50	5.28	4.96	
Anabat 2 SN434344	FS06	-23.5994 149.2475	19/09/2017	17:28:03	6:25:01	6.31	5.76
			20/09/2017	17:28:23	6:23:59	5.83	5.60
			21/09/2017	17:28:42	6:22:57	5.74	5.49
	FS07	-23.6066 149.2481	22/09/2017	17:29:01	6:21:55	6.25	5.71
			23/09/2017	17:29:21	6:20:53	5.84	5.55
			24/09/2017	17:29:41	6:19:52	5.76	5.42
	FS09	-23.6046 149.2692	25/09/2017	17:29:57	6:18:46	5.54	5.33
			26/09/2017	17:30:17	6:17:44	5.57	5.25



Figure 1 Bat detection sites in the Dingo survey area, 19-29 September 2017

Data post-processing

Balance! Environmental received eighteen raw Anabat ZCA files and associated LOG files for post-processing and analysis. *AnalookW* (Corben 2015) was used to convert the ZCA files to 4365 Anabat call sequence files for use in species identification.

Call identification

All Anabat sequence files were viewed in *AnalookW*, with a subset of all call types recorded each night at each site selected for further analysis. Species identification was achieved manually by comparing the call spectrograms of the selected files with those of reference calls from central and southern Queensland and to published call descriptions (e.g. Reinhold *et al.* 2001; Pennay *et al.* 2004).

Calls with fewer than four clearly-defined, non-fragmented pulses were excluded from the analysis.

Species' identification was also guided by considering probability of occurrence based on general distribution information (Churchill 2008; van Dyck *et al.* 2013) and/or *Atlas of Living Australia* on-line database records (<http://www.ala.org.au>).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at <http://www.ausbats.org.au/>.

Species nomenclature follows Jackson & Groves (2015). Note that this treatment of Australian mammal taxonomy elevates the sub-genus names proposed by Reardon *et al.* (2014) for the *Mormopterus* free-tailed bats to genus level, hence *Ozimops* (*O. lumsdenae*, *O. petersi*, *O. ridei*) and *Setirostris* (*S. eleryi*) are used herein.

Results & Discussion

Detection success

More than 75% of the sequence files (3374/4365) were recorded by Anabat 1 (SN434354), with sites FS08 and FS10 producing over half of the total recorded bat calls. The detector sensitivity setting was the same (115) on both detectors for all nights, so, assuming microphone equivalence and similar deployment set-up, this marked difference in call detection probably reflects a real difference in bat activity levels related to habitat suitability and, possibly, bat abundance.

Location data show sites sampled by Anabat 1 were near water (FS05 and FS10) or on lateritic escarpment with potential subterranean roosting habitat (FS08); whereas sites FS06, FS07 and FS09 (Anabat 2) were distant from water and in more open vegetation sites (see Figure 1). Proximity to water has been shown to be a key determinant in roost-selection and foraging activity of bats (e.g. see Kalcounis-Rüppell *et al.* 2005; Rainho & Palmeirim 2011; Blakey *et al.* 2017). Furthermore, a significant proportion of the calls recorded at site FS08 were from the Eastern Cave Bat, *Vespadelus troughtoni*, which roosts in shallow caves and overhangs (Parnaby *et al.* 2008), such as those observed by the client in the vicinity of FS08.

Species identified

Species identification was attempted on 227 call sequence files.

At least 14 and up to 19 species were recorded during these surveys (see Table 2). Thirteen call types were positively identified to individual species, while one type was reliably identified to the genus *Nyctophilus* but could not be further differentiated. Two *Nyctophilus* species potentially occur in the study area: *N. geoffroyi* and *N. gouldi*.

Some calls could not be reliably identified due to similarities in the call characteristics of several species that may occur in the study area. Where such unresolved calls were encountered, they were allocated to species groups. All group members are listed as “probable” in Table 1, unless additional calls of one or more group members were positively identified for the same site. The groups used in this analysis included:

- *Chalinolobus gouldii* / *Ozimops petersi* / *O. ridei*;
- *C. gouldii* / *Scotorepens balstoni*;
- *Chalinolobus picatus* / *Scotorepens greyii* / *Vespadelus baverstocki*;
- *Scotorepens greyii* / *Setirostris eleryi*;
- *Vespadelus troughtoni* / *Chalinolobus morio*; and
- *Taphozous troughtoni* / *Mormopterus lumsdenae*.

Table 2 Microbat species recorded during the surveys near Dingo, 19-29 September 2017.

- ◆ = 'definite' - at least one call from the site was attributed unequivocally to the species
- = 'probable' - calls similar to those of the species were recorded, but could not be reliably identified

Detector: Site:	Anabat 1 (SN434354)			Anabat 2 (SN434344)		
	FS05	FS08	FS10	FS06	FS07	FS09
Total sequence files:	690	1356	1328	240	411	340
Number of calls identified:	42	41	51	27	40	26
<i>Rhinolophus megaphyllus</i>		◆	◆	◆		
<i>Chalinolobus gouldii</i>	◆	□	◆	◆	◆	◆
<i>Chalinolobus morio</i>			◆			
<i>Chalinolobus picatus</i>	◆	◆	◆	□	◆	◆
<i>Nyctophilus</i> sp.	◆	◆	◆	◆	◆	
<i>Scotorepens balstoni</i>	□	□	□		□	□
<i>Scotorepens greyii</i>	◆	◆	◆	□	◆	◆
<i>Vespadelus baverstocki</i>			□	□	□	□
<i>Vespadelus troughtoni</i>	◆	◆	◆			
<i>Miniopterus orianae oceanensis</i>	◆		◆	◆	◆	◆
<i>Austronomus australis</i>	◆					
<i>Chaerephon jobensis</i>	◆	◆	◆	◆	◆	◆
<i>Ozimops lumsdenae</i>	◆	◆	◆	◆	◆	◆
<i>Ozimops petersi</i>	◆	□	◆	◆	□	◆
<i>Ozimops ridei</i>	◆	□	◆	◆	◆	◆
<i>Setirostris eleryi</i>	□		□			□
<i>Saccolaimus flaviventris</i>	◆	◆	◆	◆	◆	◆
<i>Taphozous troughtoni</i>	□		□			

References

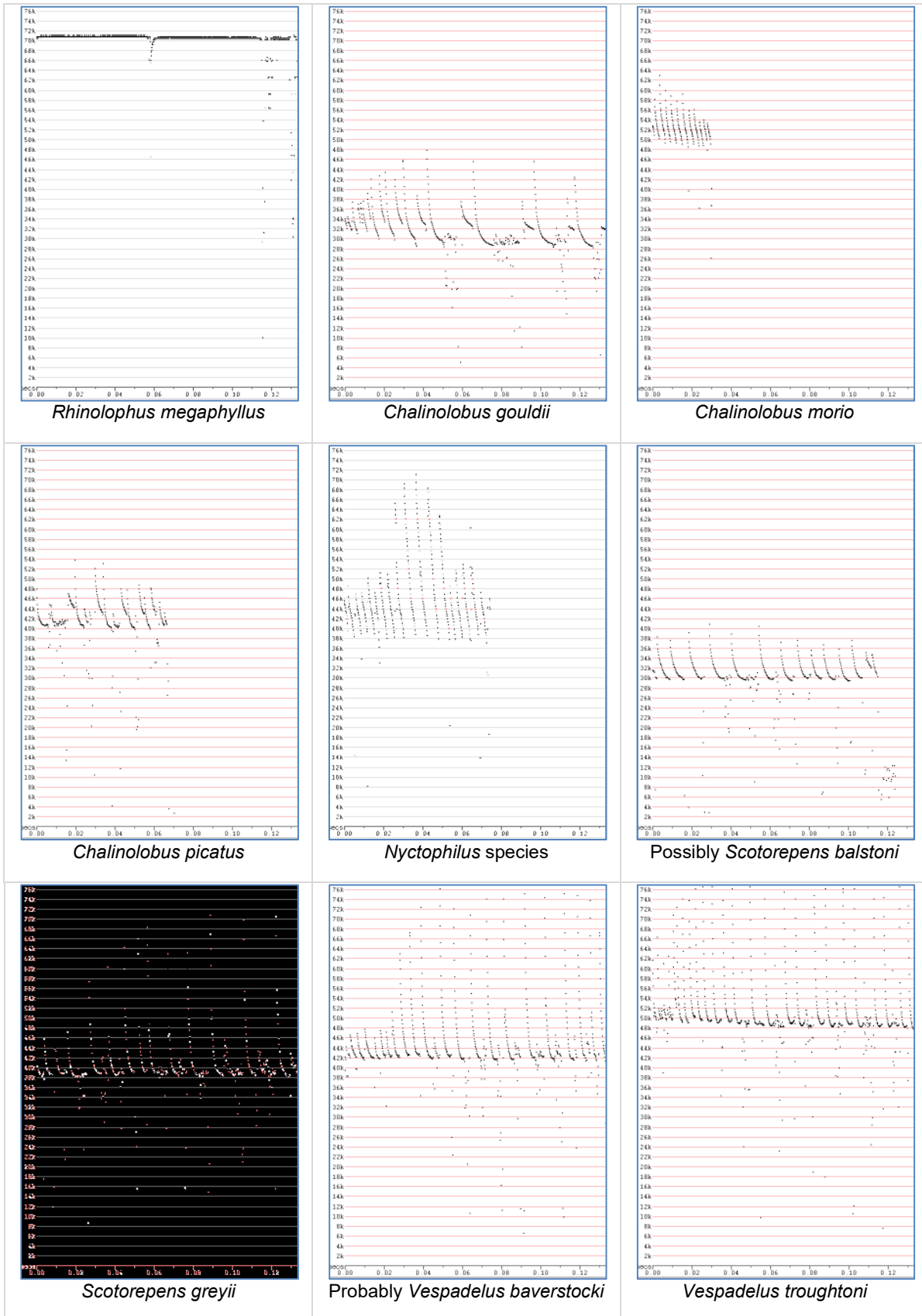
- Blakey, R.V., Kingsford, R.T., Law, B.S. & Stoklosa, J. (2017). Floodplain habitat is disproportionately important for bats in a large river basin. *Biol. Conserv.* **215**: 1–10.
- Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.
- Corben, C. (2015). *AnaLookW for bat call analysis using ZCA*. Version 4.1z, 20 September 2015.
- Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.
- Kalcounis-Rüppell, M.C., Psyllakis, J.M. & Brigham, R.M. (2005). Tree roost selection by bats: an empirical synthesis using meta-analysis. *Wildl. Soc. Bull.* **33**(3): 1123-1132.
- Milne, D.J., Fisher, A., Pavey, C.R. (2006). Models of the habitat associations and distributions of insectivorous bats of the Top End of the Northern Territory, Australia. *Biol. Conserv.* **130**: 370–385.
- Parnaby, H., Law, B.S., Pennay, M. & Kutt, A.S. (2008). Eastern Cave Bat *Vespadelus troughtoni*. Pp. 571-572 in *The Mammals of Australia* 3rd Edition (van Dyck, S. & Strahan, R., ed.); Reed New Holland; Sydney.
- Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.
- Rainho, A. & Palmeirim, J.M. (2011). The Importance of Distance to Resources in the Spatial Modelling of Bat Foraging Habitat. *PLoS ONE*, **6**(4): e19227. doi:10.1371/journal.pone.0019227
- Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**: 41-43.
- Reardon, T. B., McKenzie, N. L., Cooper, S. J. B., Appleton, B., Carthew, S. and Adams, M. (2014). A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats *Mormopterus* (Chiroptera : Molossidae). *Aust. J. Zool.* **62**, 109–136.
- Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.
- van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

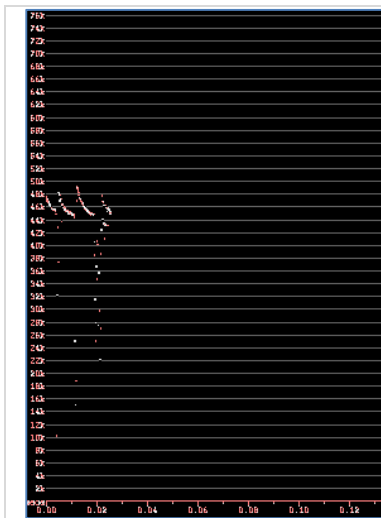
Glossary

Technical terms used in this report are described in the following table.

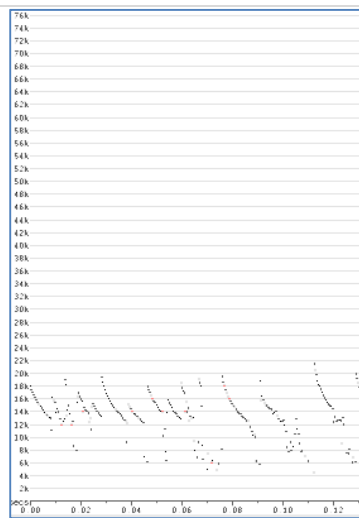
Approach phase	The part of a bat <i>call</i> emitted as the bat starts to home in on a detected prey item; a transitional series of <i>pulses</i> between the <i>search phase</i> and <i>feeding buzz</i> , that become progressively steeper and shorter in duration.
Call	Refers to a single bat call, made up of a series of individual sound <i>pulses</i> in one or more <i>phases</i> (<i>search, approach, feeding buzz</i>).
CF (=Constant Frequency)	A type of <i>pulse</i> in which the dominant component consists of a more-or-less 'pure tone' of sound at a Constant Frequency; with <i>shape</i> appearing flat on the sonogram. Often also contains a brief <i>FM</i> component at the beginning and/or end of the CF component (<i>viz.</i> FM-CF-FM).
Characteristic frequency (Fc)	The frequency of the flattest part of a <i>pulse</i> ; usually the lowest frequency reached in the <i>qCF</i> component of a pulse. This is often the primary diagnostic feature for species identification.
Duration	The time period from the beginning of a <i>pulse</i> to the end of the pulse.
Feeding buzz	The terminal part of a <i>call</i> , following the <i>approach phase</i> , emitted as the bat catches a prey item; a distinctive, rapid series of very steep, very short-duration pulses.
FM (=Frequency Modulated)	A type of <i>pulse</i> in which there is substantial change in frequency from beginning to end; <i>shape</i> ranges from almost vertical and linear through varying degrees of curvature.
FC range	Refers to the range of frequencies occupied by the <i>characteristic frequency</i> section of <i>pulses</i> within a call or set of calls.
Frequency sweep or "band-width"	The range of frequencies through which a <i>pulse</i> sweeps from beginning to end; Maximum frequency (Fmax) – minimum frequency (Fmin).
Knee	The transitional part of a <i>pulse</i> between the initial (usually steeper) frequency sweep and the <i>characteristic frequency</i> section (usually flatter); time to knee (Tk) and frequency of knee (Fk) can be diagnostic for some species.
Pulse	An individual pulse of sound within a bat <i>call</i> ; the <i>shape, duration</i> and <i>characteristic frequency</i> of a pulse are the key diagnostic features used to differentiate species.
Pulse body	The part of the <i>pulse</i> between the <i>knee</i> and <i>tail</i> and containing the <i>characteristic frequency</i> section.
Pulse shape	The general appearance of a <i>pulse</i> on the sonogram, described using relative terms related to features such as slope and degree of curvature. See also <i>CF, qCF</i> and <i>FM</i> .
qCF (=quasi Constant Frequency)	A type of <i>pulse</i> in which there is very little change in frequency from beginning to end; <i>shape</i> appears to be almost flat. Some pulses also contain an <i>FM</i> component at the beginning and/or end of the qCF component (<i>viz.</i> FM-qCF).
Search phase	The part of a bat <i>call</i> generally required for reliable species diagnosis. A consistent series of <i>pulses</i> emitted by a bat that is searching for prey or and/or navigating through its habitat. Search phase pulses generally have longer duration, flatter slope and more consistent shape than <i>approach phase</i> and <i>feeding buzz</i> pulses.
Sequence	Literally, a sequence of <i>pulses</i> that may be from one or more bats; but generally refers to a <i>call</i> or part (e.g. <i>phase</i>) of a call.
Tail	The final component of a <i>pulse</i> , following the <i>characteristic frequency</i> section; may consist of a short or long sweep of frequencies either upward or downward from the Fc; or may be absent.

Appendix 1 Representative call sequences from the Dingo area survey, September 2017.
 (AnalogW 'F7 compressed' display: x=time(s); y=frequency(kHz); time between pulses removed)

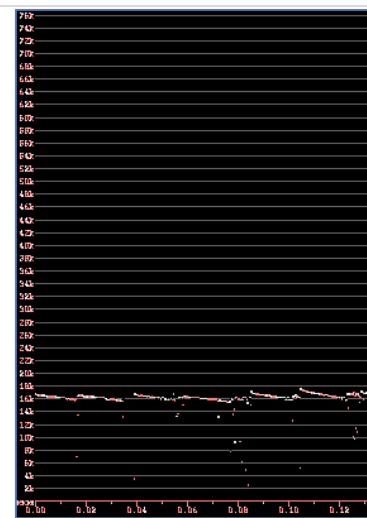




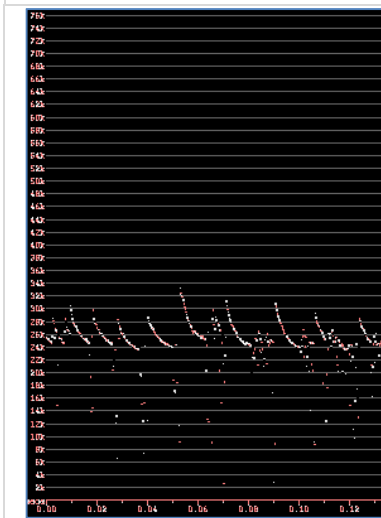
Miniopterus orianae oceanensis



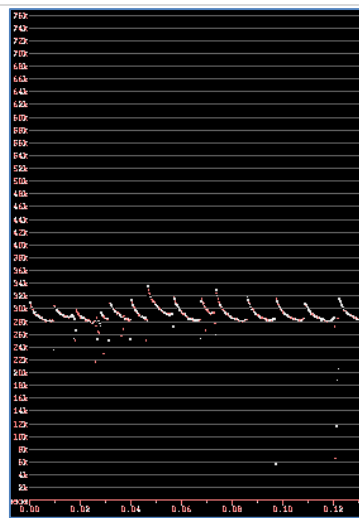
Austronomus australis



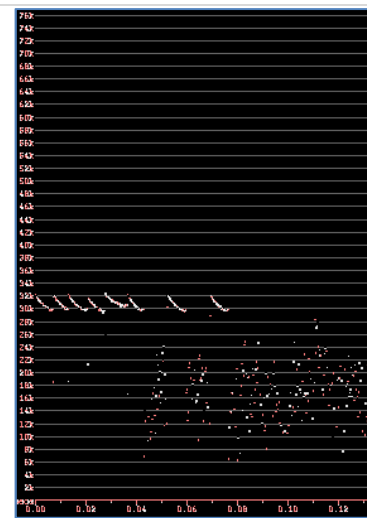
Chaerephon jobensis



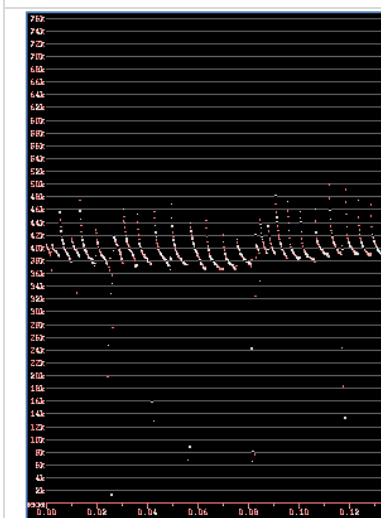
Ozimops lumsdenae



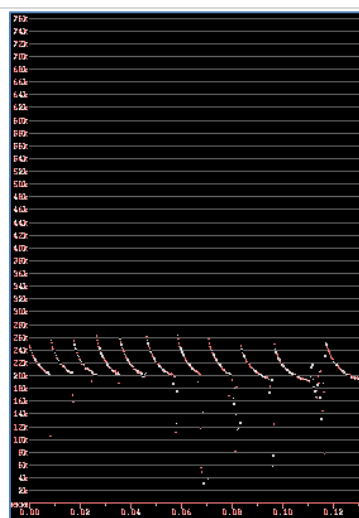
Ozimops petersi



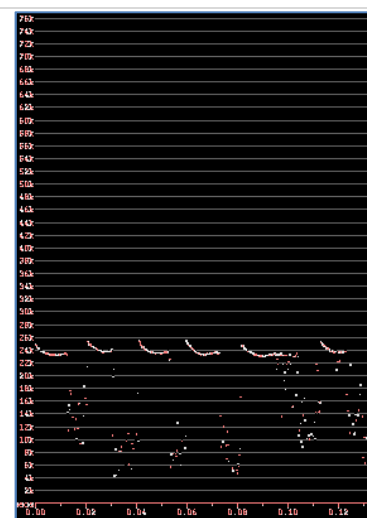
Ozimops ridei



Possibly *Setirostris eleryi*



Saccolaimus flaviventris



Possibly *Taphozous troughtoni*



Microbat Call Identification Report

Prepared for (“Client”):	AustralAsian Resource Consultants
Survey location/project name:	Dingo West Stage 3
Survey dates:	17-22 April 2018
Client project reference:	
Job no.:	AARC-1805
Report date:	30 May 2018

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Methods

Survey summary

The survey was conducted at four sites (see Figure 1) over six consecutive nights, using Anabat Express detectors (Titley Scientific, Brisbane). Deployment details are summarised in Table 1.

Table 1 Deployment schedule for the Dingo West Stage 3 bat-detector survey, 17-22 April 2018.

Derived from detector LOG files and survey summary information provided by the client.

Site name	Coordinates		Detector Serial No.	Deployment date	Operating time	
	Latitude	Longitude			Start	Finish
FS11	-23.661	149.2592	SN434344	17-Apr	18:11:59	6:22:13
				18-Apr	18:11:16	6:22:47
				19-Apr	18:10:32	6:23:21
FS12	-23.664	149.2731	SN434354	17-Apr	18:11:56	6:22:10
				18-Apr	18:11:12	6:22:44
				19-Apr	18:10:29	6:23:17
FS13	-23.6924	149.2521	SN434354	20-Apr	18:09:49	6:23:54
				21-Apr	18:09:02	6:24:27
				22-Apr	18:08:15	6:24:59
FS14	-23.6659	149.2584	SN434344	20-Apr	18:09:46	6:23:54
				21-Apr	18:08:59	6:24:27
				22-Apr	18:08:12	6:24:59



Figure 1 Bat detection sites in the Dingo West survey area, 17-22 April 2018.

Data post-processing

Balance! Environmental received 12 raw Anabat ZCA files and associated LOG files for post-processing and analysis. *AnalookW* (Corben 2017) was used to convert the ZCA files to Anabat call sequence files (ZC files). This process yielded 25,023 ZC files, which were passed through a generic noise filter in *AnalookW* to extract only those files that contained potentially-identifiable bat calls. This filtration process extracted 3588 ZC files for analysis.

Call identification

All Anabat sequence files that passed the noise filter were viewed in *AnalookW*, with a subset of all call types recorded at each site selected for further analysis. Species identification was achieved manually by comparing the call spectrograms of the selected files with those of reference calls from central and southern Queensland and to published call descriptions (e.g. Reinhold *et al.* 2001; Pennay *et al.* 2004).

Calls with fewer than four clearly-defined, non-fragmented pulses were excluded from the analysis.

Species' identification was also guided by considering probability of occurrence based on general distribution information (Churchill 2008; van Dyck *et al.* 2013) and/or *Atlas of Living Australia* on-line database records (<http://www.ala.org.au>).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at <http://www.ausbats.org.au/>.

Species nomenclature follows Jackson & Groves (2015), which elevates the sub-genus names proposed by Reardon *et al.* (2014) for the *Mormopterus* free-tailed bats to genus level, hence *Ozimops* (*O. lumsdenae* and *O. ridei*) is used herein.

Results & Discussion

Species identification was attempted on 658 call sequence files.

Table 2 provides a summary of species recorded at each site. Twelve species were positively identified, with one further call type allocated reliably to the *Nyctophilus* genus, within which species' calls cannot be differentiated. Two *Nyctophilus* species probably occur in the study area: *N. geoffroyi*; and *N. gouldi*.

Nine call types could not be reliably identified due to similarities in the call characteristics of several species that may occur in the study area. These unresolved calls were allocated to species groups (see lower half of Table 2), most of which contained species that were also identified positively (see upper part of Table 2); however, two groups included species that were not otherwise identified in this analysis:

- *Taphozous troughtoni* / *Ozimops lumsdenae*
 - Calls similar in frequency and pulse-shape to those allocated to *O. lumsdenae*, but more uniform pulse-shape throughout sequence and often much flatter pulse-shape
- *Vespadelus troughtoni* / *Chalinolobus morio*
 - Just one call allocated to this group, with no other evidence of either species from the entire data set
 - Call was brief and somewhat fragmented, with indeterminate pulse shape

Table 2 Microbat species recorded during the Dingo West Stage 3 survey, 17-22 April 2018.

Number of calls allocated to each species or group

Site name:	FS11	FS12	FS13	FS14	Total calls for species
Species positively identified					
<i>Rhinolophus megaphyllus</i>	1				1
<i>Chalinolobus gouldii</i>	25	64	17	13	119
<i>Chalinolobus nigrogriseus</i>		10	1		11
<i>Chalinolobus picatus</i>	17	25	3	2	47
<i>Nyctophilus</i> species	1	4	3		8
<i>Scotorepens balstoni</i>		5	6		11
<i>Scotorepens greyii</i>	3	25	6	9	43
<i>Vespadelus baverstocki</i>		6	8	5	19
<i>Miniopterus orianae oceanensis</i>	1	6		1	8
<i>Chaerephon jobensis</i>	9	11	22	14	56
<i>Ozimops lumsdenae</i>	19	28	16	19	82
<i>Ozimops ridei</i>	13	3	7	7	30
<i>Saccolaimus flaviventris</i>	24	31	15	8	78
Unresolved calls					
<i>C. gouldii</i> / <i>O. ridei</i>	6	11	1	1	19
<i>C. gouldii</i> / <i>S. balstoni</i>	7	11	1	2	21
<i>C. nigrogriseus</i> / <i>S. greyii</i>	2	16	2	2	22
<i>C. picatus</i> / <i>S. greyii</i>	12	10	4	15	41
<i>C. picatus</i> / <i>V. baverstocki</i>		5		2	7
<i>S. flaviventris</i> / <i>C. jobensis</i>	3		1		4
<i>S. flaviventris</i> / <i>O. lumsdenae</i>	2	1	2	1	6
<i>T. troughtoni</i> / <i>O. lumsdenae</i>	7	8	7	2	24
<i>Vespadelus troughtoni</i> / <i>Chalinolobus morio</i>				1	1
Total calls identified for site	152	280	122	104	658

References

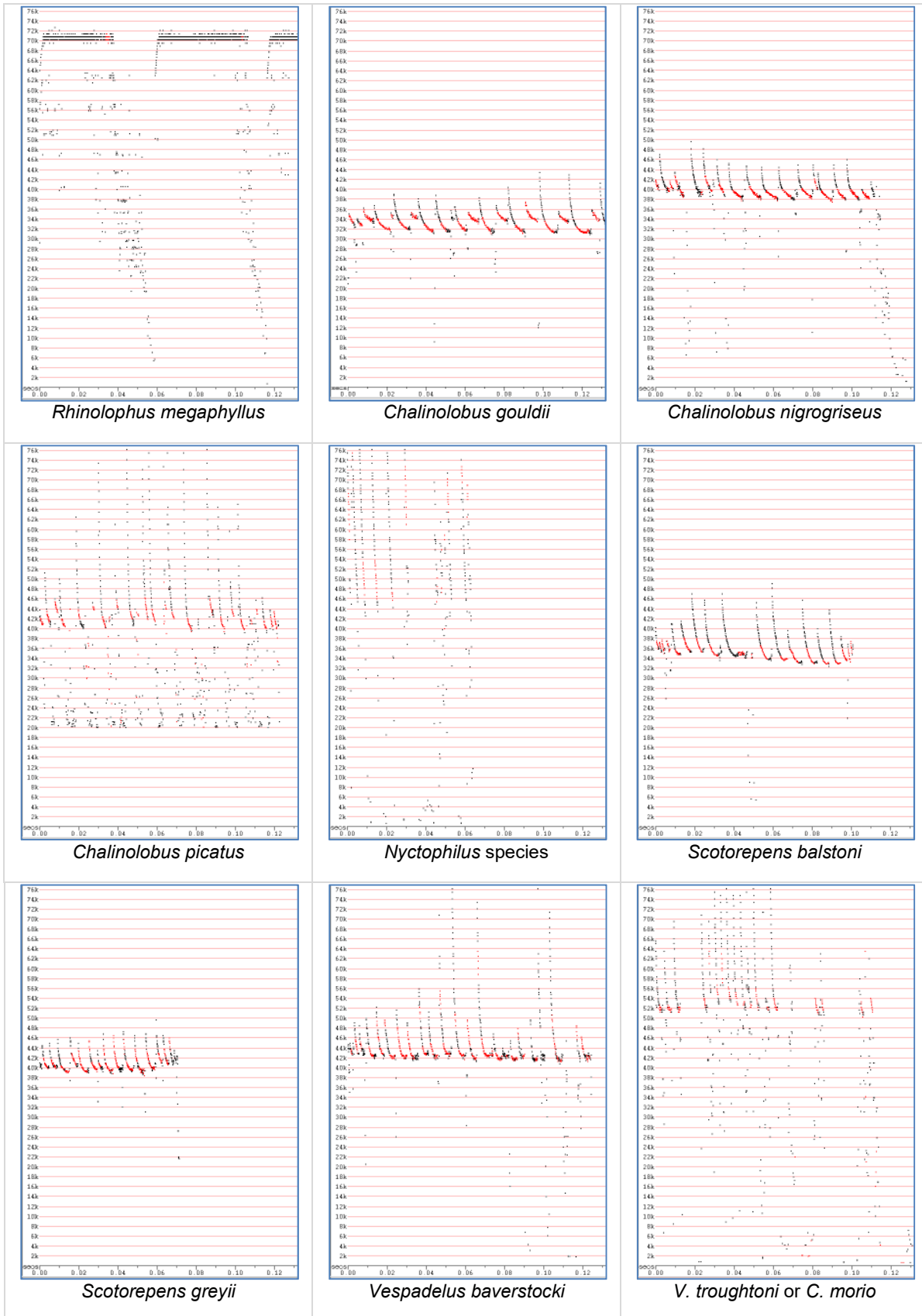
- Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.
- Corben, C. (2017). *AnaLookW for bat call analysis using ZCA*. Version 4.2n, 16 March 2017.
- Jackson, S. and Groves, C. (2015). *Taxonomy of Australian Mammals*. CSIRO Publishing, Melbourne.
- Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.
- Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**: 41-43.
- Reardon, T. B., McKenzie, N. L., Cooper, S. J. B., Appleton, B., Carthew, S. and Adams, M. (2014). A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats *Mormopterus* (Chiroptera : Molossidae). *Aust. J. Zool.* **62**, 109–136.
- Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.
- van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

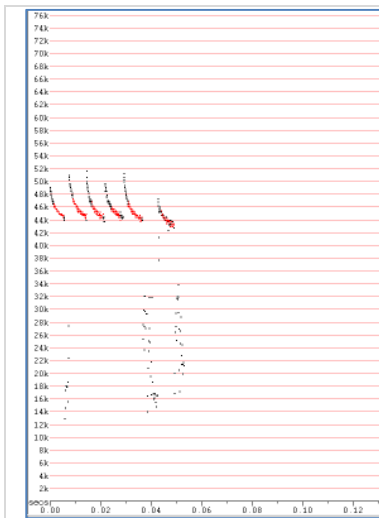
Glossary

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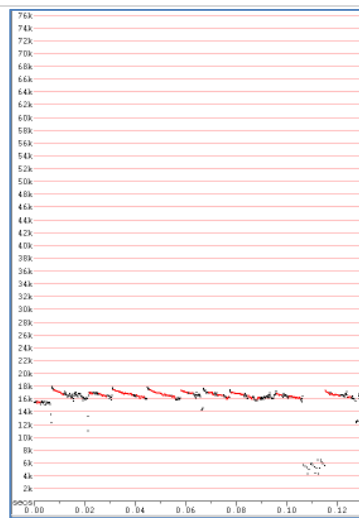
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Call	Refers to a single bat call, made up of a series of individual sound <i>pulses</i> in one or more <i>phases</i> (<i>search, approach, feeding buzz</i>).
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Duration	The time period from the beginning of a <i>pulse</i> to the end of the pulse.
Feeding buzz	The terminal part of a <i>call</i> , following the <i>approach phase</i> , emitted as the bat catches a prey item; a distinctive, rapid series of very steep, very short-duration pulses.
FM (=Frequency Modulated)	A type of <i>pulse</i> in which there is substantial change in frequency from beginning to end; <i>shape</i> ranges from almost vertical and linear through varying degrees of curvature.
FC range	Refers to the range of frequencies occupied by the <i>characteristic frequency</i> section of <i>pulses</i> within a call or set of calls.
Frequency sweep or "band-width"	The range of frequencies through which a <i>pulse</i> sweeps from beginning to end; Maximum frequency (Fmax) – minimum frequency (Fmin).
Knee	The transitional part of a <i>pulse</i> between the initial (usually steeper) frequency sweep and the <i>characteristic frequency</i> section (usually flatter); time to knee (Tk) and frequency of knee (Fk) can be diagnostic for some species.
Pulse	An individual pulse of sound within a bat <i>call</i> ; the <i>shape, duration</i> and <i>characteristic frequency</i> of a pulse are the key diagnostic features used to differentiate species.
Pulse body	The part of the <i>pulse</i> between the <i>knee</i> and <i>tail</i> and containing the <i>characteristic frequency</i> section.
Pulse shape	The general appearance of a <i>pulse</i> on the sonogram, described using relative terms related to features such as slope and degree of curvature. See also <i>CF, qCF</i> and <i>FM</i> .
qCF (=quasi Constant Frequency)	A type of <i>pulse</i> in which there is very little change in frequency from beginning to end; <i>shape</i> appears to be almost flat. Some pulses also contain an <i>FM</i> component at the beginning and/or end of the qCF component (<i>viz.</i> FM-qCF).
Search phase	The part of a bat <i>call</i> generally required for reliable species diagnosis. A consistent series of <i>pulses</i> emitted by a bat that is searching for prey or and/or navigating through its habitat. Search phase pulses generally have longer duration, flatter slope and more consistent shape than <i>approach phase</i> and <i>feeding buzz</i> pulses.
Sequence	Literally, a sequence of <i>pulses</i> that may be from one or more bats; but generally refers to a <i>call</i> or part (e.g. <i>phase</i>) of a call.
Tail	The final component of a <i>pulse</i> , following the <i>characteristic frequency</i> section; may consist of a short or long sweep of frequencies either upward or downward from the Fc; or may be absent.

Appendix 1 Representative call sequences from the Dingo West Stage 3 survey, April 2018.
 (AnalogW 'F7 compressed' display: x=time(s); y=frequency(kHz); time between pulses removed)

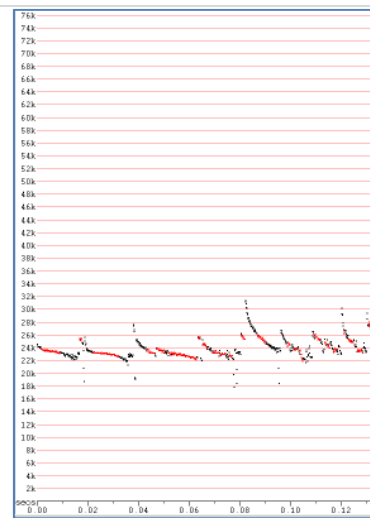




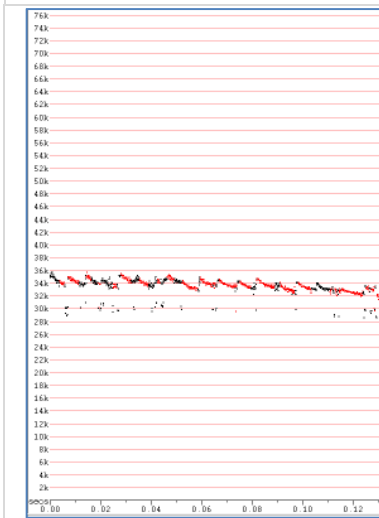
Miniopterus orianae oceanensis



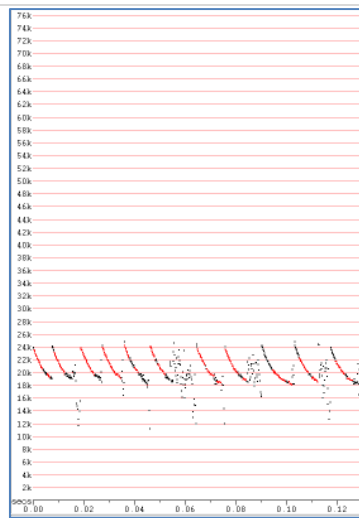
Chaerephon jobensis



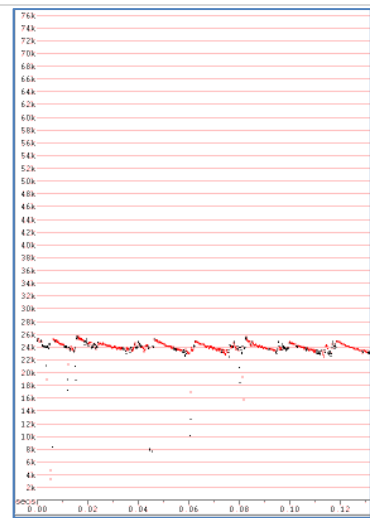
Ozimops lumsdenae



Ozimops ridei



Saccolaimus flaviventris



T. troughtoni / O. lumsdenae

Appendix H Flora Species List

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Acanthaceae	<i>Brunoniella australis</i>		LC	-			x	x
Acanthaceae	<i>Pseuderanhenum variable</i>	Pastel flower	LC	-		x	x	
Acanthaceae	<i>Rostellularia adscendens</i>	Pink tongues	LC	-	x		x	x
Amaranthaceae	<i>Alternanthera nana</i>	Hairy joyweed	LC	-	x			
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena weed	I	-	x			x
Amaranthaceae	<i>Sclerolaena birchii</i>	Galvanised burr	LC	-				x
Amaranthaceae	<i>Maireana microphylla</i>		LC	-				x
Amaryllidaceae	<i>Crinum flaccidum</i>	Murray lily	LC	-	x			
Apocynaceae	<i>Alstonia constricta</i>	Bitterbark	LC	-		x	x	
Apocynaceae	<i>Carissa spinarum</i>	Currant bush	LC	-	x	x	x	x
Apocynaceae	<i>Cerbera dumicola</i>		NT	-		x		
Apocynaceae	<i>Cryptostegia grandiflora</i>	Rubber vine	RI	-			x	
Apocynaceae	<i>Parsonia eucalyptophylla</i>	Gargaloo	LC	-		x		
Apocynaceae	<i>Parsonia straminea</i>	Monkey rope	LC	-	x	x	x	
Asparagaceae	<i>Eustrephus latifolius</i>	Wombat berry	LC	-			x	
Asparagaceae	<i>Laxmannia gracilis</i>	Slender wire lily	LC	-	x			
Asparagaceae	<i>Lomandra longifolia</i>		LC	-		x	x	x
Asteraceae	<i>Asteraceae</i> sp.				x			
Asteraceae	<i>Bidens pilosa</i>		I	-			x	
Asteraceae	<i>Chrysocephalum apiculatum</i>	Yellow buttons	LC	-	x			
Asteraceae	<i>Cyanthillium cinereum</i>		LC	-	x	x	x	x
Asteraceae	<i>Emilia sonchifolia</i>		I	-				
Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>		I	-			x	
Asteraceae	<i>Parthenium hysterophorus</i>	Parthenium weed	RI	WoNS			x	
Asteraceae	<i>Pterocaulon redolens</i>		LC	-	x			
Asteraceae	<i>Pterocaulon sphacelatum</i>	Applebush	LC	-			x	
Asteraceae	<i>Senecio brigalowensis</i>		LC	-			x	
Asteraceae	<i>Sonchus oleraceus</i>	Common sowthistle	I	-			x	
Asteraceae	<i>Sphaeromorphaea subintegra</i>		LC	-				x
Boraginaceae	<i>Ehretia membranifolia</i>	Weeping koda	LC	-			x	x
Cactaceae	<i>Harrisia martinii</i>		RI	-				x

H

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Cactaceae	<i>Opuntia tomentosa</i>	Velvety tree pear	RI	WoNS	x			x
Caesalpiniaceae	<i>Bauhinia carronii</i>		LC	-			x	
Caesalpiniaceae	<i>Cassia brewsterii</i>		LC	-	x		x	
Caesalpiniaceae	<i>Senna aciphylla</i>	Australia senna	LC	-				x
Caesalpiniaceae	<i>Senna occidentalis</i>	Coffee senna	I	-	x		x	
Campanulaceae	<i>Wahlenbergia glabra</i>		LC	-	x			
Capparaceae	<i>Capparis canescens</i>		LC	-	x			
Capparaceae	<i>Capparis lasiantha</i>	Nipan	LC	-	x			x
Capparaceae	<i>Capparis mitchellii</i>		LC	-				x
Caryophyllaceae	<i>Polycarpea corymbosa</i> var. <i>minor</i>		LC	-	x			
Casuarinaceae	<i>Allocasuarina luehmannii</i>	Bull oak	LC	-	x			
Celastraceae	<i>Denhamia cunninghamii</i>	Yellow berry bush	LC	-				x
Celastraceae	<i>Denhamia oleaster</i>		LC	-				x
Chenopodiaceae	<i>Chenopodiaceae</i> sp.				x			
Chenopodiaceae	<i>Enchylaena tomentosa</i>	Ruby saltbush	LC	-				x
Chenopodiaceae	<i>Salsola australis</i>		LC	-				x
Chesalpiniaceae	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>		I	-	x			
Colchicaceae	<i>Iphigenia indica</i>		LC	-			x	
Combretaceae	<i>Terminalia oblongata</i>		LC	-			x	
Commelinaceae	<i>Commelina diffusa</i>	Wandering jew	LC	-	x		x	
Commelinaceae	<i>Murdannia graminea</i>	Murdannia	LC	-	x			x
Convolvulaceae	<i>Evolvulus alsinoides</i>	Tropical speedwell	LC	-	x	x	x	
Convolvulaceae	<i>Ipomea polymorpha</i>	Woolly glycine	LC	-	x			
Convolvulaceae	<i>Ipomoea plebeia</i>	Bellvine	LC	-			x	
Crassulaceae	<i>Bryophyllum</i> sp.	Mother of millions	RI	-				
Cucurbitaceae	<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian gherkin	I	-	x			
Cyperaceae	<i>Cyperaceae</i> sp.				x			
Cyperaceae	<i>Cyperus concinnus</i>		LC	-				

H

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Cyperaceae	<i>Cyperus fulvus</i>		LC	-	x			
Cyperaceae	<i>Cyperus gracilis</i>		LC	-			x	x
Cyperaceae	<i>Fimbristylis</i> sp.		LC	-	x			
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common fringe-rush	LC	-	x			
Erythroxylaceae	<i>Erythroxylum australe</i>	Cocaine bush	LC	-	x	x		x
Euphorbiaceae	<i>Euphorbia tannensis</i> subsp <i>eremophila</i>		LC	-	x	x		
Euphorbiaceae	<i>Ricinus communis</i>	Castor oil bush	I	-				
Fabaceae	<i>Crotalaria medicaginea</i>	Trefoil rattlepod	LC	-	x			
Fabaceae	<i>Crotalaria pallida</i> *		I	-				x
Fabaceae	<i>Desmodium macrocarpum</i>		LC	-	x			
Fabaceae	<i>Erythrina vespertilio</i>	Bat wing coral tree	LC	-			x	
Fabaceae	<i>Glycine</i> sp. (Marburg K.A.Williams 83006)*		LC	-			x	
Fabaceae	<i>Glycine tabacina</i>	Glycine pea	LC	-				
Fabaceae	<i>Glycine tomentella</i>	Woolly glycine	LC	-	x			
Fabaceae	<i>Indigofera colutea</i>	Sticky indigo	LC	-				x
Fabaceae	<i>Indigofera linnaei</i>	Birdsville indigo	LC	-				x
Fabaceae	<i>Jacksonia rhadinochloa</i>	Miles dogwood	LC	-			x	
Fabaceae	<i>Macroptilium atropurpureum</i>	Siratro	I	-			x	
Fabaceae	<i>Medicago</i> sp.		I	-				x
Fabaceae	<i>Neptunia gracilis</i>		LC	-				x
Fabaceae	<i>Rhynchosia minima</i>		LC	-			x	x
Fabaceae	<i>Stylosanthes aspera</i>		I	-	x			
Fabaceae	<i>Stylosanthes glabra</i>		I	-			x	
Fabaceae	<i>Stylosanthes scabra</i>		I	-	x		x	x
Fabaceae	<i>Vigna lanceolata</i>		LC	-	x		x	
Fabaceae	<i>Zornia</i> sp.		LC	-	x			
Goodeniaceae	<i>Goodenia disperma</i>		LC	-	x			

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Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Goodeniaceae	<i>Goodenia rotundifolia</i>		LC	-	x		x	
Goodeniaceae	<i>Goodenia</i> sp.				x			
Hemerocallidaceae	<i>Dianella longifolia</i>		LC	-	x			
Hypericaceae	<i>Hypericum gramineum</i>		LC	-			x	
Lauraceae	<i>Cassytha pubescens</i>	Downy devil's twine	LC	-				x
Malvaceae	<i>Abutilon oxycarpum</i>	Straggly lantern-bush	LC	-				x
Malvaceae	<i>Grewia retusifolia</i>		LC	-		x		
Malvaceae	<i>Hibiscus divaricatus</i>		LC	-	x			
Malvaceae	<i>Hibiscus sturtii</i> var <i>sturtii</i>		LC	-	x			
Malvaceae	<i>Malvastrum americanum</i>	Malvastrum	I	-	x		x	x
Malvaceae	<i>Sida atherophora</i>		LC	-	x	x	x	x
Malvaceae	<i>Sida playtcalyx</i> *	Lifesaver burr	LC	-				
Malvaceae	<i>Sida cordifolia</i>		I	-	x	x	x	x
Malvaceae	<i>Sida rhombifolia</i>	Paddy's lucerne	I	-	x		x	
Malvaceae	<i>Sida</i> sp. (Aramac E.J.Thompson+JER192)		LC	-	x	x	x	
Malvaceae	<i>Sida spinosa</i>	Spiny sida	I	-			x	
Malvaceae	<i>Sida subspicata</i>			-	x	x	x	
Meliaceae	<i>Owenia acidula</i>	Emu apple	LC	-				
Mimosaceae	<i>Acacia</i> sp.					x		
Mimosaceae	<i>Acacia</i> (sappling)				x			
Mimosaceae	<i>Acacia cretata</i>		LC	-	x	x	x	x
Mimosaceae	<i>Acacia excelsa</i>	Ironwood	LC	-	x			
Mimosaceae	<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>		LC	-	x			
Mimosaceae	<i>Acacia pendula</i> *	Myall	LC	-				x
Mimosaceae	<i>Acacia rhodoxylon</i>	Ring rosewood	LC	-	x	x	x	x
Mimosaceae	<i>Acacia sherleyi</i>	Lancewood	LC	-	x	x		
Mimosaceae	<i>Acalypha eremorum</i>	Soft acalypha	LC	-			x	

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Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Mimosaceae	<i>Archidendropsis basaltica</i>	Red lancewood	LC	-				x
Mimosaceae	<i>Vachellia farnesiana</i>	Mimosa bush	I	-				
Moraceae	<i>Ficus opposita</i>	Sandpaper fig	LC	-			x	
Myrtaceae	<i>Corymbia clarksoniana</i>		LC	-	x	x	x	x
Myrtaceae	<i>Corymbia dallachiana</i>		LC	-				x
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton bay ash	LC	-	x		x	x
Myrtaceae	<i>Eucalyptus</i> (sappling)		LC	-			x	
Myrtaceae	<i>E. crebra/E. populnea</i> (hybrid)		LC	-			x	
Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved red ironbark	LC	-	x	x	x	
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint	LC	-	x			
Myrtaceae	<i>Eucalyptus melanophloia</i>		LC	-				x
Myrtaceae	<i>Eucalyptus populnea</i>	Poplar box	LC	-	x		x	x
Myrtaceae	<i>Eucalyptus tereticornis</i>	River blue gum	LC	-			x	x
Myrtaceae	<i>Melaleuca</i> sp.			-			x	
Myrtaceae	<i>Melaleuca nervosa</i>		LC	-	x			
Nyctaginaceae	<i>Boerhavia dominii</i>	Tarvine	LC	-				x
Oleaceae	<i>Jasminum didymum</i>		LC	-				x
Oxalidaceae	<i>Oxalis corniculata</i>	Yellow wood sorrel	I	-	x	x	x	
Pentapetaceae	<i>Melhania oblongifolia</i>		LC	-				x
Phyllanthaceae	<i>Phyllanthaceae</i> sp.							
Phyllanthaceae	<i>Phyllanthus virgatus</i>		LC	-	x	x	x	x
Picrodendraceae	<i>Petalostigma pubescens</i>	Quinine tree	LC	-	x	x	x	x
Poaceae	<i>Alloteropsis cimicina</i>		LC	-	x		x	
Poaceae	<i>Aristida</i> sp.			-	x			
Poaceae	<i>Aristida calycina</i>		LC	-	x	x		x
Poaceae	<i>Aristida caput-medusae</i>		LC	-	x	x	x	
Poaceae	<i>Aristida gracilipes</i>		LC	-				x

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Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Poaceae	<i>Aristida jerichoensis</i>		LC	-	x		x	
Poaceae	<i>Aristida perniciosa</i>		LC	-				x
Poaceae	<i>Aristida pruinosa</i>		LC	-				
Poaceae	<i>Bothriochloa decipiens</i>		LC	-	x		x	
Poaceae	<i>Bothriochloa ewartiana</i>	Desert bluegrass	LC	-			x	x
Poaceae	<i>Bothriochloa pertusa</i>		I	-			x	
Poaceae	<i>Calyptochloa gracilima</i>		LC	-	x	x	x	
Poaceae	<i>Cenchrus ciliaris</i>	Buffel grass	I	-	x	x	x	x
Poaceae	<i>Chrysopogon fallax</i>		LC	-	x	x	x	
Poaceae	<i>Cleistochloa sp.</i> (<i>Duaringa K.B.Adison 42</i>)		LC	-	x	x		
Poaceae	<i>Cymbopogon refractus</i>	Barbed-wire grass	LC	-	x			
Poaceae	<i>Cynodon dactylon</i>	Native couch	I	-	x			x
Poaceae	<i>Dichanthium sericeum</i>	Queensland bluegrass	LC	-			x	
Poaceae	<i>Digitaria brownii (dead)*</i>		LC	-	x			
Poaceae	<i>Digitaria diminuta</i>		LC	-		x	x	
Poaceae	<i>Digitaria divaricatissima</i>	Spreading umbrella grass	LC	-			x	
Poaceae	<i>Digitaria sp</i> (not enough material for a positive ID)				x			
Poaceae	<i>Dinebra ligulata</i>		LC	-		x		
Poaceae	<i>Enneapogon lindleyanus</i>		LC	-		x	x	x
Poaceae	<i>Enteropogon acicularis</i>	Curly windmill grass	LC	-	x			
Poaceae	<i>Entolasia stricta</i>	Wiry panic	LC	-		x	x	
Poaceae	<i>Eragrostis sp. (not enough material to ID)</i>				x			
Poaceae	<i>Eragrostis elongata</i>		LC	-	x			
Poaceae	<i>Eragrostis lacunaria</i>	Purple lovegrass	LC	-	x	x	x	x
Poaceae	<i>Eragrostis sororia</i>	Woodland lovegrass	LC	-	x		x	x
Poaceae	<i>Eriachne mucronata</i>		LC	-	x			

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Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Poaceae	<i>Eriochloa procera</i>	Slender cupgrass	LC	-				x
Poaceae	<i>Eulalia aurea</i>	Silky browntop	LC	-	x			
Poaceae	<i>Heteropogon contortus</i>	Black spear grass	LC	-		x	x	x
Poaceae	<i>Megathyrsus maximus</i>		I	-	x		x	
Poaceae	<i>Melinis repens</i>	Red natal grass	I	-	x		x	x
Poaceae	<i>Panicum decompositum</i>		LC	-			x	
Poaceae	<i>Panicum effusum</i>		LC	-			x	x
Poaceae	<i>Paspalidium caespitosum</i>	Brigalow grass	LC	-	x	x		x
Poaceae	<i>Paspalidium constrictum*</i>		LC	-			x	
Poaceae	<i>Paspalidium sp.</i>				x			
Poaceae	<i>Perotis rara</i>	Comet grass	LC	-	x		x	
Poaceae	<i>Sporobolus caroli</i>	Fairy grass	LC	-	x	x	x	x
Poaceae	<i>Sporobolus creber</i>	Western rat's tail Grass	LC	-				x
Poaceae	<i>Themeda triandra</i>	Kangaroo grass	LC	-			x	x
Poaceae	<i>Urochloa mosambicensis</i>	Sabi grass	LC	-	x	x	x	x
Poaceae	<i>Urochloa sp.</i>				x		x	
Poaceae	<i>Poaceae sp. (grazed)</i>				x			x
Polygonaceae	<i>Duma florulenta</i>		LC	-				x
Portulacaceae	<i>Portulaca bicolor</i>		LC	-				
Portulacaceae	<i>Portulaca filifolia</i>		LC	-			x	
Portulacaceae	<i>Portulaca pilosa</i>		I	-				
Proteaceae	<i>Grevillea striata</i>	Beefwood	LC	-	x		x	
Pteridaceae	<i>Cheilanthes sieberi subsp sieberi</i>	Poison rock fern	LC	-			x	
Pteridaceae	<i>Cheilanthes sp.</i>							
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree	LC	-	x	x	x	x
Rhamnaceae	<i>Ventilago viminalis</i>	Supplejack	LC	-				
Rubiaceae	<i>Coelospermum reticulatum</i>		LC	-	x	x	x	
Rubiaceae	<i>Everistia vacciniifolia</i>		LC	-	x		x	

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Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	VC1	VC2	VC3	VC4
Rubiaceae	<i>Psudras forsteri</i>		LC	-	x	x		
Rubiaceae	<i>Psudras johnsonii</i>		LC	-			x	x
Rubiaceae	<i>Psudras oleifolia</i>		LC	-		x		
Rubiaceae	<i>Spermacoce brachystema</i>		LC	-	x		x	
Rubiaceae	<i>Coelospermum reticulatum</i>		LC	-				x
Rutaceae	<i>Flindersia dissosperma</i>		LC	-				
Rutaceae	<i>Rutaceae sp.</i>							x
Sapindaceae	<i>Atalaya hemiglauca</i>	Whitewood	LC	-			x	x
Scrophulariaceae	<i>Myoporum acuminatum</i>	Coastal boobialla	LC	-				
Stylidiaceae	<i>Stylidium eriorhizum</i>		LC	-				
Verbenaceae	<i>Glandularia aristigera</i>	Mayne's pest	I	-				
Violaceae	<i>Afrohybanthus stellarioides</i>		LC	-	x	x	x	
Violaceae	<i>Afrohybanthus enneaspermus</i>		LC	-				x

* Possibly this species
 LC Least Concern
 NT Near Threatened
 I Introduced
 WoNS Weed of National Significance
 RI Restricted invasive plant

Appendix I Fauna Species List

Family	Scientific Name	Common Name	NC Act/LP Act	EPBC Act	2017 - Autumn						2017 - Spring						2018 - Autumn								
					OPPS	DF01	DF02	DF03	DF04	Total	OPPS	DF05	DF06	DF07	DF08	DF09	DF10	Total	OPPS	DF11	DF12	DF13	DF14	DF15	Total
Amphibians																									
Bufonidae	<i>Rhinella marina</i>	Cane toad	I	-			5		8	13		13	4			8	25		5	1		10	16		
Hylidae	<i>Litoria rubella</i>	Naked tree frog	LC	-						0		1					1		1				1		
Hylidae	<i>Litoria caerulea</i>	Common green tree frog	LC	-			7		2	9							0		1			1	2		
Hylidae	<i>Litoria latopalmata</i>	Broad-palmed frog	LC	-			1			1							0						0		
Hylidae	<i>Litoria inermis</i>	Bumpy rocket frog	LC	-	1					1	1						1		1		2	6	9		
Limnodynastidae	<i>Limnodynastes salmini</i>	Salmon-striped frog	LC	-						0		1					1						0		
Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	Spotted grass frog	LC	-						0		2					2		2		3		5		
Limnodynastidae	<i>Platyplectrum ornatum</i>	Ornate burrowing frog	LC	-			249	2	25	276		1					1		3		5		8		
TOTAL AMPHIBIANS					1	0	262	2	35	300	1	18	4	0	0	0	8	31	0	0	13	1	10	17	41
Reptiles																									
Elapidae	<i>Cryptophis boschmai</i>	Carpentaria snake	LC	-						0				2			2				1		1		
Elapidae	<i>Demansia psammophis</i>	Yellow-faced whip snake	LC	-						0		1					1						0		
Elapidae	<i>Furina ornata</i>	Orange-naped snake	LC	-						0						1	1						0		
Elapidae	<i>Hoplocephalus bitorquatus</i>	Pale-headed snake	LC	-					1	1							0						0		
Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown snake	LC	-	1					1	1	1					2						0		
Pythonidae	<i>Aspidites melanocephalus</i>	Black headed python	LC	-																					
Agamidae	<i>Pogona barbata</i>	Bearded dragon	LC	-		1				1	1						1		1				2		
Agamidae	<i>Diporiphora australis</i>	Tommy roundhead	LC	-						0			2		4		6			3			3		
Varanidae	<i>Varanus tristis orientalis</i>	Freckled monitor	LC	-						0						1	1						0		
Carphodactylidae	<i>Nephrurus asper</i>	Prickly knob-tailed gecko	LC	-						0				1			1						0		
Diplodactylidae	<i>Diplodactylus vittatus</i>	Eastern stone gecko	LC	-						0			1				1						0		
Diplodactylidae	<i>Lucasium steindachneri</i>	Box-patterned gecko	LC	-						0					2		2						0		
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko	LC	-		1		4	2	7			1	2	2	1	2	8		1			1		
Gekkonidae	<i>Gehyra dubia</i>	Dubious dtella	LC	-				1	1	2				1		1	2					1	1		
Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard	LC	-		1				1							0						0		
Scincidae	<i>Carlia munda</i>	Shade-litter rainbow skink	LC	-						0							0			1			1		
Scincidae	<i>Carlia rubigo</i>	Orange-flanked rainbow-ski	LC	-		4	1	4	3	12		3		3	3		9			2			2		
Scincidae	<i>Cryptoblepharus pulcher</i>	Elegant snake-eyed skink	LC	-				1		1			1				1						0		
Scincidae	<i>Morethia boulengeri</i>	South-eastern morethia	LC	-						0		1					1						0		
Scincidae	<i>Ctenotus robustus</i>	Eastern striped skink	LC	-						0							0		1		2	2	5		
Scincidae	<i>Morethia taeniopleura</i>	Fire-tailed skink	LC	-				2		2							0						0		
Scincidae	<i>Pygmaescincus timlowi</i>	Dwarf litter-skink	LC	-						0			1				1			2			2		
LIZARDS					0	7	1	12	6	26	1	4	2	9	7	7	4	34	0	3	3	6	2	3	17
SNAKES					1	0	0	0	1	2	1	2	0	2	0	0	1	6	0	0	0	1	0	1	
TOTAL REPTILES					1	7	1	12	7	28	2	6	2	11	7	7	5	40	0	3	3	6	3	18	

Family	Scientific Name	Common Name	NC Act Status	EPBC Act status	2017 - Autumn					2017 - Spring					2018 - Autumn							
					OPPS	DF01	DF02	DF03	DF04	Total	OPPS	DF05	DF06	DF07	DF08	DF09	DF10	Total	OPPS	DF11	DF12	DF13
Birds																						
Acanthizidae	<i>Gerygone olivaceae</i>	White-throated gerygone	LC	-		2	2	1	2	7		1	1	1	1	2	6			1		1
Acanthizidae	<i>Smicromis brevirostris</i>	Weebill	LC	-						0				1			2		1		1	3
Accipitridae	<i>Aquila audax</i>	Wedge-tailed eagle	LC	-	1					1	2						2	13		1		14
Accipitridae	<i>Haliastur sphenurus</i>	Whistling kite	LC	-	1					1	1						1			1		1
Accipitridae	<i>Milvus migrans</i>	Black kite	LC	-	1					1	1						1	10			1	11
Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl nightjar	LC	-						0		1	1	2			4		1		1	2
Alcedinidae	<i>Todiramphus macleayii</i>	Forest kingfisher	LC	-						0		2			2	2	8			1		1
Anatidae	<i>Anas superciliosa</i>	Pacific black duck	LC	-						0		1					1					0
Ardeidae	<i>Ardea modesta</i>	Eastern great egret	LC	-	1					1	1						1					0
Ardeidae	<i>Ardea pacifica</i>	White-necked heron	LC	-						0		1					1					0
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced heron	LC	-	1					1	1						1					0
Artamidae	<i>Cracticus nigrogularis</i>	Pied butcherbird	LC	-		2	2			4		1	2		2		5		2		2	4
Artamidae	<i>Cracticus tibicen</i>	Australian magpie	LC	-		2	2	1	2	7			1		1		3			2	1	5
Artamidae	<i>Cracticus torquatus</i>	Grey butcherbird	LC	-		1		1	2	4		1	2	2	2	2	9		3		1	4
Burninidae	<i>Burhinus grallarius</i>	Bush stone-curlew	LC	-						0			1	2			3					0
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested cockatoo	LC	-			1		1	2				1			1			1		1
Cacatuidae	<i>Calyptorhynchus banksii</i>	Red-tailed black-cockatoo	LC	-			1			1							0					0
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah	LC	-						0		1					1					0
Cacatuidae	<i>Nymphicus hollandicus</i>	Cockatiel	LC	-	1					1	1						1	1				1
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike	LC	-		1				1		1	1				2				1	2
Campephagidae	<i>Coracina papuensis</i>	White-bellied cuckoo-shrike	LC	-						0				1			1					0
Campephagidae	<i>Lalage tricolor</i>	White-winged triller	LC	-						0	1						1					0
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted nightjar	LC	-	1					1	1						1					0
Charadriidae	<i>Vanellus miles</i>	Masked lapwing	LC	-						0		1					1					0
Contropodidae	<i>Centropus phasianinus</i>	Pheasant coucal	LC	-						0					1		1					0
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered dove	LC	-				1	1	2			1	1	1		3					0
Columbidae	<i>Geopelia striata placida</i>	Peaceful dove	LC	-		1		2	2	5		1	1	2	2	2	10				1	1
Columbidae	<i>Geophaps scripta scripta</i>	southern Squatter pigeon	V	V	2				1	3	9					2	11	1				1
Columbidae	<i>Ocyphaps lophotes</i>	Crested pigeon	LC	-				1	1	2			2	2	1		6					0
Columbidae	<i>Phaps chalcoptera</i>	Common bronzewing	LC	-						0				1			1					0
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged chough	LC	-						0	1						1					0
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird	LC	-	1					1	1		1			2	4		1	1		2
Corvidae	<i>Corvus coronoides</i>	Australian raven	LC	-		2	1	2	2	7		2	1		2		6				1	1
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed cuckoo	LC	-						0				1			1					0

Family	Scientific Name	Common Name	NC Act/LP Act Status	EPBC Act status	2017 - Autumn					2017 - Spring							2018 - Autumn								
					OPPS	DF01	DF02	DF03	DF04	Total	OPPS	DF05	DF06	DF07	DF08	DF09	DF10	Total	OPPS	DF11	DF12	DF13	DF14	DF15	Total
					Dromaiidae	<i>Dromaius novaehollandiae</i>	Emu	LC	-	1					1	1					1	20			
Estrildidae	<i>Taeniopygia bichenovii</i>	Double-barred finch	LC	-		1	1	2		4		2		1		3			1				1		
Estrildidae	<i>Taeniopygia guttata</i>	Zebra finch	LC	-						0						0							0		
Falconidae	<i>Falco berigora</i>	Brown falcon	LC	-	1					1	1					1							0		
Falconidae	<i>Falco cenchroides</i>	Nankeen kestrel	LC	-	1					1						0							0		
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing kookaburra	LC	-			1	1	8	10		1		2	1		5		1				1		
Maluridae	<i>Malurus lamberti</i>	Variagated fairy-wren	LC	-			1			1				1		1							0		
Maluridae	<i>Malurus melanocephalus</i>	Red-backed fairywren	LC	-						0		2				2					1	1	2		
Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced honeyeater	LC	-		1				1		1				1							0		
Meliphagidae	<i>Lichenostomus virescens</i>	Singing honeyeater	LC	-				1		1						0							0		
Meliphagidae	<i>Lichmera indistincta</i>	Brown honeyeater	LC	-						0		1				1							0		
Meliphagidae	<i>Manorina flavigula</i>	Yellow-throated miner	LC	-	1					1	1					1							0		
Meliphagidae	<i>Manorina melanocephala</i>	Noisy miner	LC	-		1			2	3		1				2	3		1	1			3		
Meliphagidae	<i>Melithreptus albogularis</i>	White-throated honeyeater	LC	-		1	2	1		4					1		1						0		
Meliphagidae	<i>Philemon citreogularis</i>	Little friarbird	LC	-						0						0			1		1		2		
Meliphagidae	<i>Philemon corniculatus</i>	Noisy friarbird	LC	-		2				2		1			2	3			1		1		2		
Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	LC	Ma		1				1		2	1	2		6							0		
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	LC	-		1	1			2		1	1			4			2				2		
Monarchidae	<i>Myiagra inquieta</i>	Restless flycatcher	LC	-				1		1		1				1							0		
Monarchidae	<i>Myiagra rubecula</i>	Leaden flycatcher	LC	-						0		2	1	2	1	8			1			1	2		
Neositidae	<i>Daphoenositta chrysoptera</i>	Varied sittella	LC	-						0	1				1	2							0		
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed oriole	LC	-		1				1				1	1	2							0		
Oriolidae	<i>Sphecotheres vieillotii</i>	Australasian figbird	LC	-						0		1				1							0		
Otididae	<i>Ardeotis australis</i>	Australian bustard	LC	-						0	1					1							0		
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey shrike-thrush	LC	-		1		1		2		1		1		2					1		1		
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous whistler	LC	-				1		1				2		4					2		2		
Pardalotidae	<i>Pardalotus striatus</i>	Striated pardalote	LC	-		2	1	2	2	7		2	2	1		7		2	2		2	1	7		
Phasianidae	<i>Coturnix ypsilophora</i>	Brown quail	LC	-	1					1	1					1							0		
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	LC	-						0	1					1							0		
Petroicidae	<i>Microeca fascinans</i>	Jacky winter	LC	-	1					1	1					1							0		
Podargidae	<i>Podargus strigoides</i>	Tawny frogmouth	LC	-						0	5		1		1	7							0		
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned babbler	LC	-				1		1				1	1	4				1	1		2		
Psittacidae	<i>Aprosmictus erythropterus</i>	Red-winged parrot	LC	-	1					1	2					2			1			1	2		
Psittacidae	<i>Platyercus adscitus</i>	Pale-headed rosella	LC	-				1		1		1	1		1	4		1		1			2		
Psittaculidae	<i>Trichoglossus moluccanus</i>	Rainbow lorikeet	LC	-		2		1	1	4		1	1	1		4			2				2		
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey fantail	LC	-		2	1	2	2	7		1		1		2							0		
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous fantail	SL	Mi, Ma						0	1					1							0		
Strigidae	<i>Ninox boobook</i>	Southern boobook	LC	-					1	1	1	1		1		4			2				2		
Alcedinidae	<i>Dacelo leachii</i>	Blue-winged kookaburra	LC	-						0						0			1				1		
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted woodswallow	LC	-						0						0			1				1		

Family	Scientific Name	Common Name	NC Act Status	EPBC Act status	2017 - Autumn						2017 - Spring						2018 - Autumn								
					OPPS	DF01	DF02	DF03	DF04	Total	OPPS	DF05	DF06	DF07	DF08	DF09	DF10	Total	OPPS	DF11	DF12	DF13	DF14	DF15	Total
Corvidae	<i>Corvus orru</i>	Torresian crow	LC	-						0						0		1		1	1		3		
Gruidae	<i>Grus rubicunda</i>	Brolga	LC	-						0						0	4						4		
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird	LC	-						0						0						1	1		
Megaluridae	<i>Cincloramphus cruralis</i>	Brown songlark	LC	-						0						0	2						2		
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie wagtail	LC	-		1	1	2		0						0			1		1	1	3		
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoe bird	LC	-						0						0			1		1	1	3		
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked ibis	LC	-			1			1						0							0		
Tytonidae	<i>Tyto alba</i>	Barn owl	LC	-		2	2			4						0							0		
Tytonidae	<i>Tyto javanica</i>	Eastern barn owl	LC	-						0						0					1		1		
TOTAL BIRDS					17	30	21	26	30	120	37	36	22	29	26	22	21	193	51	15	21	14	16	11	128
Mammals																									
Macropodidae	<i>Macropus giganteus</i>	Eastern grey kangaroo	LC	-	1			2		3	2					2	128							128	
Macropodidae	<i>Notamacropus dorsalis</i>	Black-striped wallaby	LC	-						0	1		7			8								0	
Macropodidae	<i>Osphranter robustus</i>	Wallaroo	LC	-	1					1	1			1		5	24							24	
Macropodidae	<i>Notamacropus rufogriseus</i>	Red-necked wallaby	LC	-						0						0	15							15	
Macropodidae	<i>Wallabia bicolor</i>	Swamp wallaby	LC	-						0	0					1	1							0	
Muridae	<i>Pseudomys delicatulus</i>	Delicate mouse	LC	-	1	1				2	0					0								0	
Phalangeridae	<i>Trichosurus vulpecula</i>	Common brushtail possum	LC	-			1			1						0								0	
Muridae	<i>Hydromys chrysogaster</i>	Rakali / water rat	LC	-						0						0			1					1	
Potoroidae	<i>Aepyprymnus rufescens</i>	Rufous rat-kangaroo	LC	-						0	1			3		4								0	
Pseudocheiridae	<i>Petauroides volans</i>	Greater glider	V	V			1			1		1				1			2					2	
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked echidna	SL	-	1					1	3		1			4								0	
Canidae	<i>Canis lupus dingo</i>	Dingo	C2	-	1					1	1					1								0	
Felidae	<i>Felis catus</i>	Feral cat	C2	-						0	1	2				4			1					1	
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit	C2	-	1					1	2			2		4								0	
Muridae	<i>Mus musculus</i>	House mouse	I	-		2	1	1	1	5					1	1	2				1			1	
Suidae	<i>Sus scrofa</i>	Feral pig	C2	-	1				1	2	1					1								0	
Pteropodinae	<i>Pteropus scapulatus</i>	Little red flying fox	LC	-						0				3		3								0	
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern horseshoe bat	LC	-				U		1			U		U	3		U						1	
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat	LC	-		U	U	U	U	4		U	U	U	A	U	U	6		U	U	U	U	4	
Vespertilionidae	<i>Chalinolobus nigrogriseus/Scortorepens greyii</i>																		A	A	A	A	A	4	
Vespertilionidae	<i>Vespardelus trougtoni/Chalinolobus mario</i>																					A	A	1	
	<i>Taphozous trougtoni/Ozimops lumsdenae</i>																			A	A	A	A	4	
	<i>Saccolaimus flaviventris/Ozimops lumsdenae</i>																			A	A	A	A	4	
	<i>Saccolaimus flaviventris/Chaerephon jobensis</i>																			A	A			1	

Family	Scientific Name	Common Name	NC Act Status	EPBC Act status	2017 - Autumn					2017 - Spring					2018 - Autumn									
					OPPS	DF01	DF02	DF03	DF04	Total	OPPS	DF05	DF06	DF07	DF08	DF09	DF10	Total	OPPS	DF11	DF12	DF13	DF14	DF15
Vespertilionidae	<i>Chalinolobus picatus/Vespadelus baverstocki</i>																		A		A		2	
Vespertilionidae	<i>Chalinolobus picatus/Scotorepens greyii</i>																		A	A	A	A	4	
Vespertilionidae	<i>Chalinolobus gouldii/Scotorepens balstoni</i>																		A	A	A	A	4	
	<i>Chalinolobus gouldii/Ozimops ridei</i>																		A	A	A	A	4	
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate wattled bat	LC	-			U							U	1								0	
Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat	LC	-			A	A							0					U	U		2	
Vespertilionidae	<i>Chalinolobus picatus</i>	Little pied bat	LC	-		U	A	U	U			U	A	U	U	U	U	U	U	U	U	U	4	
Vespertilionidae	<i>Nyctophilus geoffroyi</i>		LC	-																				
Vespertilionidae	<i>Nyctophilus sp. (N. geoffroyi or N. gouldi)</i>		LC	-							U	U	U	U	U	U	U	U	U	U	U	U	3	
Vespertilionidae	<i>Scotorepens balstoni</i>	Western broad-nosed bat	LC	-		U	A	U			A		A	A	A	A	A	U	U	U			2	
Vespertilionidae	<i>Scotorepens greyii</i>	Little broad-nosed bat	LC	-		U	U	U			U	A	U	U	U	U	U	U	U	U	U	U	4	
Vespertilionidae	<i>Vespadelus baverstocki</i>	Inland forest bat	LC	-								A	A		A	A	U	U	U	U			3	
Vespertilionidae	<i>Vespadelus troughtoni</i>	Eastern cave bat	LC	-				U			U			U	U	U	U	U	U	U	U	U	0	
Miniopteridae	<i>Miniopterus orianae oceanensis</i>		LC	-											0			U	U		U		3	
Miniopteridae	<i>Miniopterus schreibersii oceane</i>	Eastern bent-wing bat	LC	-		U	U	U			U	U	U	U	U	U	U	U	U	U	U	U	0	
Molossidae	<i>Austronomus australis</i>	White-striped free-tailed Bat	LC	-		U	U	U	U		U												0	
Molossidae	<i>Chaerephon jobensis</i>	Northern free-tailed bat	LC	-		U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U	4	
Molossidae	<i>Mormopterus (Setirostris) eleryi</i>	Hairy-nosed free-tailed bat	LC	-							A				A	A							0	
Molossidae	<i>Ozimops lumsdenae</i>	Northern free-tailed bat	LC	-			U	U	U		U	U	U	U	U	U	U	U	U	U	U	U	4	
Molossidae	<i>Ozimops petersi</i>	Inland free-tailed bat	LC	-							U	U	A	A	U	U	U	U	U	U	U	U	0	
Molossidae	<i>Ozimops ridei</i>	Ride's free-tailed bat	LC	-		U	A	U	U		U	U	U	A	U	U	U	U	U	U	U	U	4	
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail-bat	LC	-		A	U	A	U		U	U	U	U	U	U	U	U	U	U	U	U	4	
Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail-bat	LC	-							A				A	U	U	U	U	U	U	U	0	
FERAL/DOMESTICATED/INTRODUCED SPECIES					3	2	1	1	2	9	2	0	0	2	1	2	12	5	0	1	0	1	0	2
NATIVE MAMMALS (NON-BATS)					4	1	2	2	0	9	1	1	7	4	0	3	24	172	0	3	0	0	0	175
BATS					0	9	12	13	7	41	15	12	12	15	12	17	83	0	17	19	18	17	0	71
TOTAL MAMMALS					7	12	15	16	9	59	18	13	19	21	13	22	119	167	17	23	18	18	0	243

LC - Least Concern

SL - Special Least Concern

V - Vulnerable

I - Introduced

Blue - Pests

A - Ambiguous identification

U - Unambiguous identification

- probable identification of species from hair samples

* species identified from tracks, scats or other traces

^ Probable species ID from bat calls

Family	Scientific Name	Common Name	NC Act Status	EPBC Act status	Bat Survey Autumn 2018														
					HP 1	HP 2	HP 3	HP 4	HP 5	HP 6	HP 7	HP 8	MN 1	MN 2	MN 3	Total			
Pteropodinae	<i>Pteropus scapulatus</i>	Little red flying fox	LC	-															
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern horseshoe bat	LC	-															
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat	LC	-							1							1	
Vespertilionidae	<i>Chalinolobus nigrogriseus/Scotorepens greyii</i>																		
Vespertilionidae	<i>Vespadelus troughtoni/Chalinolobus morio</i>																		
	<i>Taphozous troughtoni/Ozimops lumsdenae</i>																		
	<i>Saccolaimus flaviventris/Ozimops lumsdenae</i>																		
	<i>Saccolaimus flaviventris/Chaerephon jobensis</i>																		
Vespertilionidae	<i>Chalinolobus picatus/Vespadelus baverstocki</i>																		
Vespertilionidae	<i>Chalinolobus picatus/Scotorepens greyii</i>																		
Vespertilionidae	<i>Chalinolobus gouldii/Scotorepens balstoni</i>																		
	<i>Chalinolobus gouldii/Ozimops ridei</i>																		
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate wattled bat	LC	-								1						1	
Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat	LC	-															
Vespertilionidae	<i>Chalinolobus picatus</i>	Little pied bat	LC	-							1							1	
Vespertilionidae	<i>Nyctophilus geoffroyi</i>		LC	-								1						1	
Vespertilionidae	<i>Nyctophilus sp. (N. geoffroyi or N. gouldi)</i>		LC	-															
Vespertilionidae	<i>Scotorepens balstoni</i>	Western broad-nosed bat	LC	-															
Vespertilionidae	<i>Scotorepens greyii</i>	Little broad-nosed bat	LC	-					5	2	1	1					2	11	
Vespertilionidae	<i>Vespadelus baverstocki</i>	Inland forest bat	LC	-															
Vespertilionidae	<i>Vespadelus troughtoni</i>	Eastern cave bat	LC	-															
Miniopteridae	<i>Miniopterus orianae oceanensis</i>		LC	-															
Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	Eastern bent-wing bat	LC	-															
Molossidae	<i>Austronomus australis</i>	White-striped free-tailed Bat	LC	-															
Molossidae	<i>Chaerephon jobensis</i>	Northern free-tailed bat	LC	-															
Molossidae	<i>Mormopterus (Setirostris) eleryi</i>	Hairy-nosed free-tailed bat	LC	-															
Molossidae	<i>Ozimops lumsdenae</i>	Northern free-tailed bat	LC	-															
Molossidae	<i>Ozimops petersi</i>	Inland free-tailed bat	LC	-															
Molossidae	<i>Ozimops ridei</i>	Ride's free-tailed bat	LC	-															
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail-bat	LC	-															
Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail-bat	LC	-															
BATS										5	4	3	1				2	15	
TOTAL MAMMALS																			

LC - Least Concern

Appendix J Weed Species and Management Plans

Harrisia cactus

Moonlight cactus

Harrisia martinii, *Harrisia tortuosa* and *Harrisia pomanensis*



Harrisia cactus can form dense infestations that will reduce pastures to a level unsuitable for stock. Harrisia cactus will choke out other pasture species when left unchecked.

The spines are a problem for stock management, interfering with mustering and stock movement.

Harrisia cactus produces large quantities of seed that is highly viable and easily spread by birds and other animals. As well as reproducing from seed, harrisia cactus has long trailing branches that bend and take root wherever they touch the ground. Any broken-off portions of the plant will take root and grow.

Legal requirements

Harrisia cactus (*Harrisia martinii*, *Harrisia tortuosa* and *Harrisia pomanensis*) are restricted invasive plants under the *Biosecurity Act 2014*. It must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.



At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Harrisia cactus is a perennial. The spiny fleshy stems are jointed and form tangled mats about half a metre high. Many branches often lie flat and take root where they touch the ground. Each section is ribbed lengthwise with six ribs; each rib has low, thick, triangular humps at regular intervals. These humps have cushions of grey felty hairs, three to five short spines lying flat, and one to three erect, stiff, very sharp spines 2.5–3 cm long.

The large flowers open at night. Flowers are pink and funnel-shaped with a tinge of white. These grow singly near the ends of the stems on a scaly but spineless slender grey-green tube 12–15 cm long.

Round, red fruits 4–5 cm across have scattered bumps with hairs and spines. Numerous small black seeds are embedded in the white, juicy pulp of the fruit, which splits open when ripe.

Harrisia cactus roots are of two types. Shallow feeding roots up to 3 cm thick and 30 cm to 2 m long grow mostly horizontally off a crown, up to 15 cm below ground level. Swollen tuberous storage roots descend to a depth of 15–60 cm.

Life cycle

Harrisia cactus bears a bright red fruit containing 400–1000 small black seeds. Plants are easily established from seed and germinate soon after rain.

Seedlings quickly produce a swollen tuberous food storage root that develops as the plant grows. Branches take root where they touch the ground and new plants will grow from broken branches and sections of underground tubers.

Counts of tubers in dense cactus infestations have shown over 125 000 per hectare. Each plant houses many dormant underground buds that are all capable of reshooting when the tip growth dies; any small portion of the tuberous root left in the soil will grow.

Methods of spread

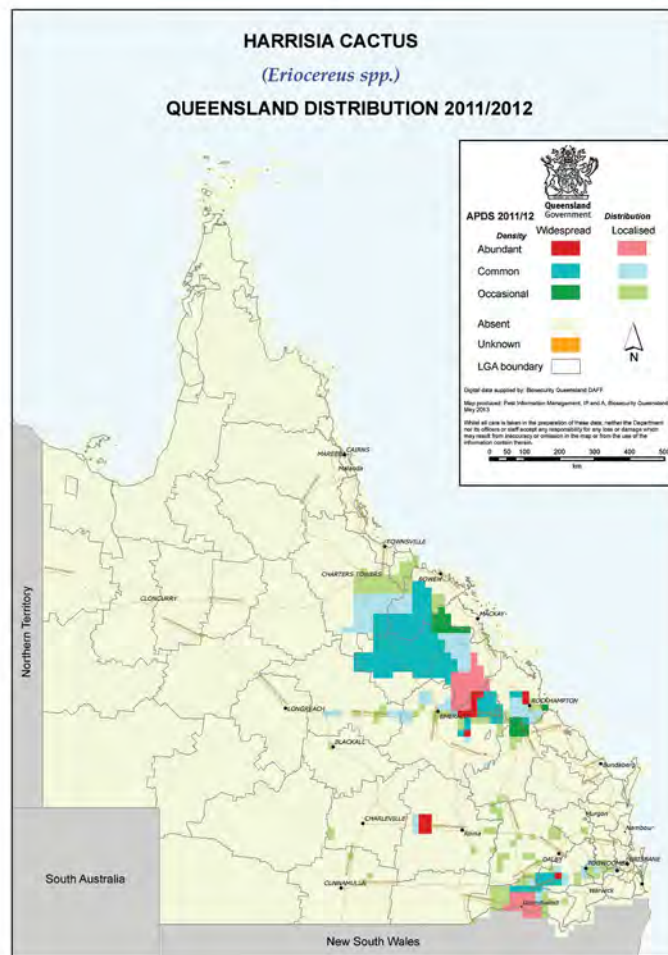
Fruit and seed are readily eaten by birds, mammals and to a lesser extent by feral pigs.

Habitat and distribution

Harrisia cactus is a native of Argentina and Paraguay, South America. It was introduced to Australia as a pot plant in the 1890s. In 1935 it was first recognised as a serious pest in the Collinsville district and by the 1950s was rapidly spreading south.

Harrisia cactus is mainly a pest of brigalow and associated softwood country. However, infestations are now appearing in box and ironbark stands and also in pine forests.

Map 1. Distribution of harrisia cactus in Queensland



The cactus is shade tolerant and reaches its maximum development in the shade and shelter of brigalow scrub, though established infestations can persist once scrub is pulled.

Harrisia cactus is found in the Collinsville, Nebo, Moranbah, Dingo, Blackwater and Goondiwindi districts, with minor infestations occurring at Millmerran, Greenmount, Gatton, Ipswich, Rockhampton, Rannes, Mount Morgan, Alpha and Mitchell.

Control

Managing harrisia cactus

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by harrisia cactus. This fact sheet provides information and some options for controlling harrisia cactus.

Control of this plant is difficult as it has a deep underground tuberous root system and use of a combination of physical, biologic and herbicide controls is recommended.

Physical control

Dig out plants completely and burn. Ensure that all tubers that can grow are removed and destroyed.

Ploughing is not considered an effective means of control unless followed by annual cropping.

Biological control

Two introduced insects have become established in the field:

- a stem-boring longicorn beetle (*Alcidion cereicola*)
- a mealy bug (*Hypogeococcus festerianus*).

The stem-boring beetle only attacks older woody stems. In the Collinsville area, large beetle colonies developed and contributed to the collapse of dense areas of cactus. Populations of *Alcidion cereicola* have declined with the reduction in the cactus in recent years.

The most successful biological control agent is the mealy bug *Hypogeococcus festerianus* which is now present in harrisia cactus in Collinsville, Dingo, Moranbah, Blackwater, Nebo, Charters Towers and Goondiwindi districts, with small colonies established at Alpha, Capella, Rannes, Gatton, Greenmount, Millmerran and Rockhampton.

How mealy bug works

The mealy bug aggregates and feeds in the tips of stems and buds, where it limits growth and causes distortion. This results in the knotting of the stem. The plant's response is to utilise energy reserves within the tuber system to produce new growth. Eventually the plant dies, as it is unable to support the continuous high energy demands.

Dry weather reduces the effectiveness of the mealy bug. When dry, the plant's tuber system becomes dormant. Consequently, mealy bug damage does not result in new growth and the energy reserves within the plant are not affected. Instead the bug may damage all vegetative parts and eventually die out. The tuber will remain dormant until adequate moisture returns, when it will reshoot.

How to spread the bug

Mealy bug disperses naturally via wind, although landholder assistance is necessary for its continuous spread, particularly between patches. The bug is manually spread by cutting infected stems and placing them into healthy plants. The best pieces for starting new colonies are large knobs of twisted and distorted cactus that contain many mealy bugs well protected inside knots. Stem tips covered by white, woolly masses of bug are also good. To collect the bug, cut infected stems approximately 15 cm from the distorted knob and place segments in green, plump sections of the healthy plant. Avoid placing mealy bug in stressed or dried out stems. Small cactus plants require at least one large knot, with larger plants requiring three knots per plant. Where possible, landholders should infest every cactus clump as this ensures a rapid reduction in growth and fruiting potential. When cactus infestations are light, chemical control may be a preferable option.

Cut pieces can be transported in boxes or open vehicles. They are not delicate, but are best kept in the shade. Avoid keeping them in large heaps, in direct sunlight, under tarpaulins or in closed containers for long periods. Such conditions will promote rotting of the stems, leading to poor results or failures. Ideally, stems should be put out within three days and a maximum of five days.

When to infest

Best results come by infesting new areas during spring and early summer, from September to December. Maximum growth and spreading occurs in the summer months of December to February. During the drier and colder months of April to August the mealy bug does not die, but little growth and multiplication occurs. Introduction of mealy bug during autumn and winter will not be lost, but little effect is seen until the following summer.

How soon to expect results

Mealy bugs are generally more active and effective on harrisia cactus growing underneath shrubs and trees, so results will be seen more quickly in these areas than in cactus growing in the open. Best results are obtained when infesting plants that have actively growing new shoots.

During wet summers in northern and central Queensland, the growing points of stems will begin to curl after about six weeks.

By the end of the first summer, damage (severe twisting) will be widespread in infested plants. If the initial infestation was sufficiently heavy, no fruit or growth will occur during the second year, and the cactus will begin to die during the third year. Seedlings and regrowth shoots will continue to be present but by the end of the fourth year there should be very little cactus left.

In the southern portion of the state, where temperatures are lower, the mealy bug still provides control but the process takes longer. However, the mealy bug will do better on cactus in the open, rather than in the shade, as temperatures are higher in the open.

Herbicide control

Foliar application of registered herbicides provides effective control, but can be costly over large areas. Before using any herbicide always read the label carefully. All herbicides must be applied strictly in accordance with the directions on the label (see to Table 1).

Further information

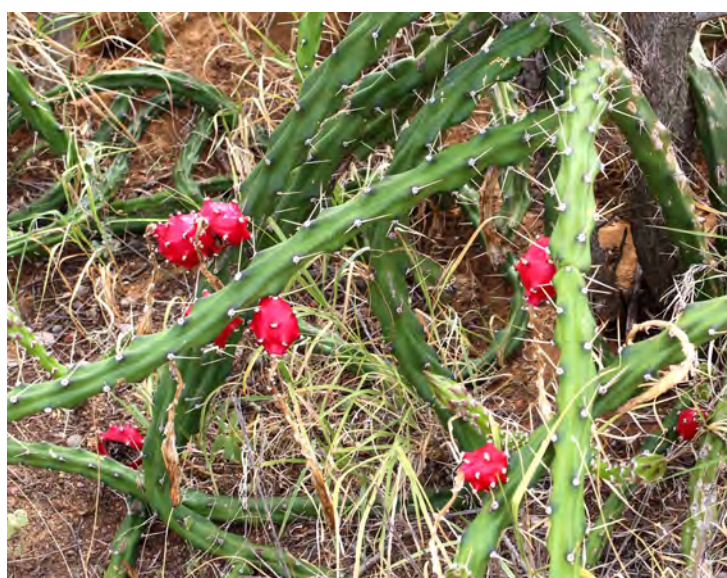
Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



Table 1. Herbicides for the control of harrisia cactus

Situation	Herbicide	Rate	Comments
Non-crop land and rights-of-way	Dichlorprop as K salt (600 g/L)	1 L/60 L water	Good soil moisture essential Spray plant when actively growing to run-off point A follow-up treatment may be necessary
Native pastures, rights-of-way, commercial and industrial areas	Metsulfuron-methyl (600 g/kg) (e.g. Brush-Off®)	20 g/100 L water + surfactant	Spray plant when actively growing to run-off point A follow-up treatment may be necessary
Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr as butotyl (240 g/L) + Picloram as ioe (120 g/L) (e.g. Access®)	1 L/60 L diesel	Spray plant when actively growing Apply as overall spray, wetting all areas of the plant to ground level
Non-agricultural areas (native pastures), commercial and industrial areas and rights-of-ways	Aminopyralid as K salt 375 g/kg + Metsulfuron methyl 3 g/kg (e.g. Stinger)	40 g/100 L water	Spray to thoroughly wet using 1000 to 1400 L/ha Follow-up treatment may be necessary
Commercial and industrial areas, around buildings and rights-of-way	Triclopyr as butotyl 75 g/L + Metsulfuron-methyl 28 g/L (e.g. Zelam Brush Weed®)	500 mL/100 L	Spray to thoroughly wet using 1000 to 1500 L/ha Follow-up treatment may be necessary
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr as tea 200 g/L + Picloram as tipa 100 g/L (e.g. Slasher) or Triclopyr as tea 200 g/L + Picloram as tipa 100 g/L + Aminopyralid 25 g/L (e.g. Tordon RegrowthMaster) (e.g. Tordon DSH®)	2.5 L/100 L water	Spray plant when actively growing (September–March) Treat all stems thoroughly

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.



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Mimosa bush

Acacia farnesiana



Mimosa bush can spread readily and grow quickly. As it often forms thorny thickets, it can be a considerable nuisance during mustering and can also hinder stock access to water.

Mimosa does offer shade in open downs country and can be useful as a supplement to grass during the dry season. It may therefore be a useful plant in some areas if its spread can be controlled to prevent thicket formation. The maintenance of healthy pasture competition is the best mechanism to achieve this.

Legal requirements

Mimosa bush is not a prohibited or restricted invasive plant under the *Biosecurity Act 2014*. However, by law, everyone has a general biosecurity obligation (GBO) to take reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control.

Local governments must have a biosecurity plan that covers invasive plants and animals in their area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.



Description

Mimosa bush is a rounded shrub or small tree generally growing 2 to 3 m high, occasionally to 5 m. It often forms thorny thickets, and is nearly always multi-stemmed. The branches grow in a zigzag shape and are usually a grey-brown colour with prominent white spots.

Leaves are a ferny type, with 1–6 pairs of leaf ‘branches’ each with 5–20 pairs of narrow, rounded leaflets 4–8 mm long. Leaves are sometimes more of a yellowish green than a pure green. Thorns are found in pairs at the base of each leaf and can grow up to 10 cm long.

Golden yellow to orangeish flowers are ball-shaped, about 1 cm across, and grow on stalks, usually two stalks at the base of each leaf. Flowers develop into clusters of cigar-shaped pods, slightly curved and up to 6 cm long. The pods are dark brown or black and woody at maturity, with seeds embedded in the pith. Pods do not split open and tend to stay on the plant for a length of time.

Mimosa bush can be confused with the declared weeds mesquite (*Prosopis* spp.) and prickly acacia (*Vachellia nilotica*), particularly when young (see the ‘identification of prickly bushes’ fact sheet from www.biosecurity.qld.gov.au).

Distribution

Mimosa bush, a native of central and south America, is naturalised in Australia. Mimosa bush is widespread in Queensland, and found in all but the wettest and driest parts of the State. Seeds sprout readily and plants grow rapidly. Mimosa bush does well in dry localities and on loamy or sandy soils, forming thickets along watercourses. Mimosa bush withstands drought well, is readily eaten by stock, and has good regrowth after grazing.



Mimosa bush is not a long-lived plant. It is readily attacked by many native insects and is prone to dieback on an irregular basis. In some parts of the world mimosa bush is cultivated for perfume production.

Control

Basal bark spray

For stems up to 15 cm diameter, carefully spray completely around base of plant to a height of 30 cm above ground level. Thoroughly spray into all crevices. Larger trees may be controlled by spraying to a greater height, up to 100 cm above ground level.

The best time for treatment is during autumn when plants are actively growing and soil moisture is good.

Cut stump treatment

At any time of year, cut stems off horizontally as close to the ground as possible. Immediately (within 15 seconds) swab cut surface with herbicide mixture.

Bore drains

Channels and drains must be empty of water. Spray a one metre strip into the mud in channel or drain. Wait at least three days for diuron to bond to mud before slowly allowing water in again. Water must not be used in domestic water supply or supplied to desirable shade trees for 7–14 days after re-opening the drain.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



Table 1. Herbicides for the control of mimosa bush

Situation	Herbicide	Rate	Optimum time	Comments
Basal bark/ cut stump	Fluroxypyr eg. Starane Advanced®, etc Triclopyr + picloram e.g. Access®	Refer to product label	Basal bark: for plants up to 5 cm basal diameter	
	Triclopyr + picloram e.g. Access®	1 L/60 L diesel	Basal bark: for plants up to 5 cm basal diameter	Ensure all stems on multi-stemmed plants are treated.
Soil application	Tebuthiuron (PERMIT 13891) e.g. Tebular 200GR herbicide®, Graslan herbicide®, etc	2.0 g/m ² or 20 kg/ha		For use in pastures, roadside and rights of way. Application just prior to rainfall gives best results. Avoid damage to off target species – refer to herbicide label for product restraints and critical comments.
High volume spray	500 g/L clopyralid present as the triisopropanol amine (PERMIT 11638) e.g. Lontrel herbicide®, Nufarm Archer®, Farmoz Victory herbicide®, etc	500 mL of product per 100 L of water (plus non-ionic surfactant at 0.1%)	Spray when plants are actively growing and in full leaf	For use in pastures, rights of way, powerline areas. Full covering of foliage with spray is essential. Withholding period: do not graze treated areas, or cut for stock feed, for seven days after application.
Bore drains	Diuron e.g. Diuron 500SC®, etc	Refer to product label	Do not apply between 1 December and 30 March each year.	Do not apply more than once per calendar year. Do not open drains for 72 hours following treatment. Do not apply if heavy rains are predicted within three days of application. Application should be limited to 1 m strips along the sides of bore drains. Withholding period – do not allow animals to drink water from treated bore drains for three days, before slaughter for human consumption

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.



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Mother-of-millions

Bryophyllum delagoense (syn. *B. tubiflorum*, *Kalanchoe delagoensis*) and *Bryophyllum* × *houghtonii*



Mother-of-millions are native to Madagascar and are escaped ornamental plants. Five species are commonly naturalised in Queensland. It is well adapted to dry areas because of its succulent features.

As the name suggests, one plant can reproduce a new generation from masses of embryoids (plantlets) that are formed on the leaf edges. This makes these plants hard to eradicate and follow up controls are essential.

These plants, especially their flowers, are poisonous to stock and occasionally cause a significant number of cattle deaths. The plant flowers from May to October (during the drier months of the year) and the scarcity of feed at this time may cause cattle to consume lethal amounts of mother-of-millions.

Legal requirements

Mother-of-millions is a restricted invasive plant under the *Biosecurity Act 2014*. It must not be given away, sold, or released into the environment without a permit.

Bryophyllum pinnatum (resurrection plant, live-leaf) is not a restricted invasive plant. However the Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.



At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Mother-of-millions are erect, smooth, fleshy succulent plants growing to 1 m or more in height.

All species form tall flower spikes in winter with clusters of bell-shaped flowers. Each species has a distinctive leaf shape, but all produce small plantlets along the edges of the leaves. These plantlets drop readily, develop roots and establish quickly to form a new colony.

Bryophyllum delagoense syn. *B. tubiflorum* and *Kalanchoe delagoensis* (common mother-of-millions, mission bells, Christmas bells) has grey-brown, fleshy, tubular-like leaves with up to seven projections at the tip of each leaf. The flowers are orange-red and occur in a cluster at the top of a single stem. Seeds can germinate for some years.

Bryophyllum × *houghtonii* syn. *B. daigremontianum* × *B. delagoense*, *Kalanchoe* × *houghtonii* (hybrid or crossbred mother-of-millions) has similar flowers arranged in a branched cluster at the top of the stem. Its leaves are boat shaped with thick stalks and notches along the edges of the leaves.

A third species, *Bryophyllum pinnatum* (resurrection plant, live-leaf) has yellow-green, oval, fleshy leaflets with wavy edges and up to five leaflets per leaf. Its flowers are yellowish-green, often tinged with pink, and occur in loose clusters on stalks growing at intervals along the upper portion of the stem.

Life cycle

Mother-of-millions flowers in Winter and reproduces by seed and by tiny plantlets that are produced at the tips of its fleshy (succulent) leaves. Dislodged leaves and broken leaf parts can also take root and give rise to new plants.

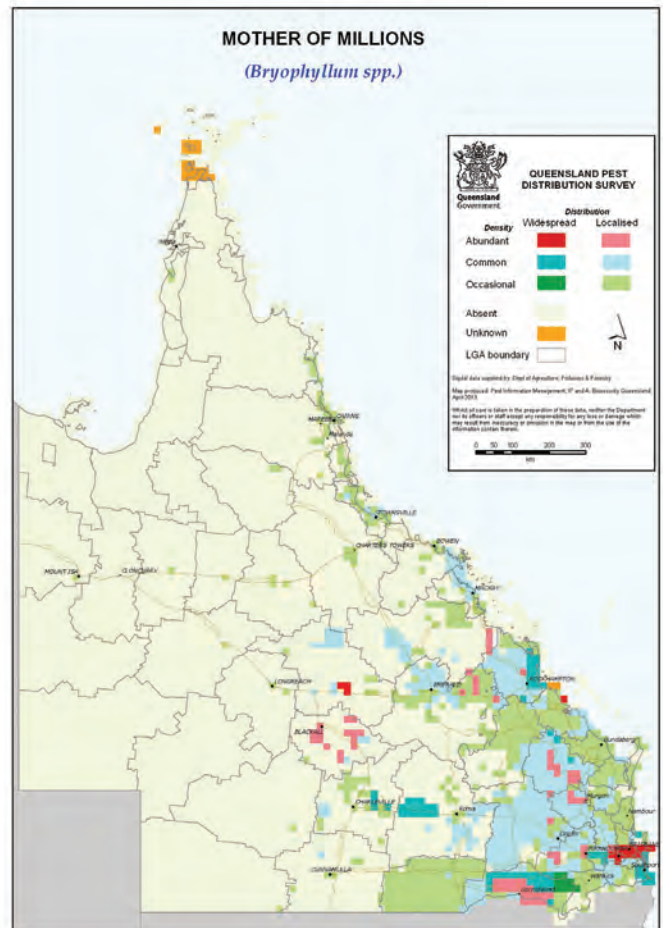
Methods of spread

Mother-of-millions is commonly spread by gardeners and in garden waste. The tiny seeds are probably wind and water dispersed and its leaves and plantlets may also be dislodged and spread by animals, vehicles, machinery, soil and slashers.

Habitat and distribution

Native to Madagascar, these popular succulent garden plants have escaped cultivation and spread in various areas of Queensland. They have become a problem in pasture lands in the central highlands around Clermont, Emerald and Dingo, and the Burnett, Moreton and Darling Downs scrub regions. The plants establish well in leaf litter or other debris on shallow soils in shady woodlands, and often grow on roadsides, along fence lines and around old rubbish dumps. They can spread from these areas, especially in flood, and establish if pastures are run down.

Map 1. Distribution of mother-of-millions in Queensland



They are adapted to dry conditions and can survive long periods of drought.

Toxicity

These plants are toxic, especially their flowers, and occasionally cause a significant number of cattle deaths. When cattle are under stress or in unusual conditions they are more likely to eat plants that they would not normally eat. Shifting cattle to new paddocks, moving stock through infested rubbish dumps and wastelands, and reduction of availability of feed due to flood or drought can all contribute to cattle eating mother-of-millions and being poisoned.

Poisoned cattle show signs of dullness, loss of appetite, diarrhoea and heart failure. Some cattle may drool saliva or dribble urine. There are two responses to poisoning:

- acute—where cattle die within a day
- chronic—where cattle may take up to five days to die.

Some cattle may make a slow recovery if insufficient plant material was eaten.

Poisoned cattle must be treated within 24 hours of consuming the plant. The treatment is intense and needs to be given by a veterinarian, or under their direction, because of the drugs and materials used.

Control

Managing mother-of-millions

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by mother-of-millions. This fact sheet provides information and some options for controlling mother-of-millions.

Prevention and early detection

The best form of weed control is prevention. Always treat weed new infestations when small—do not allow weeds to establish. Weed control is not cheap, but it is cheaper to do it now rather than next year, or the year after. Proper planning ensures better value for each dollar spent.

Permanent control of mother-of-millions infested areas is best ensured by establishing more desirable plants in that location to compete successfully with future mother-of-millions seedlings and plantlets. This is best achieved through soil preparation, replanting, fertilising and using the area more productively.

Ensure scattered infestations and small dumping areas on properties are regularly checked and cleaned up. Day-to-day hygiene management will help prevent establishment of these weeds.

Co-operative control upstream and downstream of problem areas will help prevent re-infestation from other areas.

To prevent poisoning, keep stock (especially hungry stock) away from infested areas until the plants are controlled.

Mechanical control

For small areas, pull up plants by hand and burn on a wood heap. Alternatively, bag the plants and dump them in a bin, the contents of which are buried at council refuse tips rather than being recycled into mulch.

Fire

When suitable (e.g. after grading firebreaks), burn infestations and the accompanying debris on which mother-of-millions plants thrive. This is the most economical form of control, encourages grass competition and lessens the problem for following years, requiring only spot spraying with selective herbicides.

Biological control

The South African citrus thrip is present in Queensland and is quite widespread through the south of the state. The thrip damages the outer tissue of the mother-of-millions plant and also lays its eggs under the outer tissue. Where high populations of thrips exist, the number of viable plantlets and flowers forming on mother-of-millions is reduced.

The thrips populations vary from year to year, according to mother-of-millions populations and climate. The South African citrus thrips should not be seen as a long term control strategy—only a control option to complement other techniques such as herbicide treatment and burning.

The department is undertaking further research to identify potential biological control agents to support with management.

Herbicide control

Before using any herbicide always read the label carefully. All herbicides must be applied strictly in accordance with the directions on the label. Where the addition of a wetting agent is recommended, always use a commercial wetting agent or surfactant.

Mother-of-millions may be controlled with herbicides at any time of the year, but infestations are easiest to see in winter when the plants are in flower. Treating infestations at this time of year also has the benefit of preventing new seeds from developing on common mother-of-millions.

Table 1 details the herbicides registered for mother-of-millions control.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



Bryophyllum x houghtonii (left) and *Bryophyllum delagoense* (right)



South African citrus thrips damage to mother-of-millions

Table 1. Herbicides for the control of mother-of-millions

Situation	Herbicide	Rate	Comments
Pastures and non-crop land	2,4-D acid (e.g. Affray 300)	7 L/1000 L water per ha 70 mL/10 L water	High volume foliar spray (handgun) High volume foliar spray (knapsack)
Pastures, rights-of-way and industrial	2,4-D amine 700 g/L (e.g. Amicide Advance 700)	360 mL/100L water	Hand gun and knapsack only. Thorough coverage is essential. Use a surfactant (e.g. Nufarm Activator) (consult label).
Pastures, rights-of-way, non-crop land, forests, non-agricultural land and commercial and industrial areas	Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (e.g. Grazon Extra)	500 mL/100 L water 50 mL/10 L water	High volume foliar spray (hand gun, knapsack). Always add a wetting agent (e.g. BS-1000 or Chemwet 1000) at 100 mL/100 L water. Apply at flowering.
	Fluroxypyr 200 g/L (e.g. Flagship 200)	600 mL/100 L water + surfactant (consult label)	Apply to seedlings and young plants before flowering.
	Fluroxypyr 333 g/L (e.g. Starane Advanced)	360 mL/100 L water + surfactant (consult label)	
	Fluroxypyr 400 g/L (e.g. Comet 400)	300 mL/100 L water + surfactant (consult label)	

Notes

Thorough, even coverage of leaves and plantlets is necessary.

Note that many 2,4-D products are not registered for control of mother-of-millions in Queensland. Only use products registered for the purpose.

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.



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Parthenium

Parthenium hysterophorus



Parthenium is a vigorous species that colonises weak pastures with sparse ground cover. It will readily colonise disturbed, bare areas along roadsides and heavily stocked areas around yards and watering points. Parthenium can also colonise brigalow, gidgee and softwood scrub soils. Its presence reduces the reliability of improved pasture establishment and reduces pasture production potential.

Parthenium is also a health problem as contact with the plant or the pollen can cause serious allergic reactions such as dermatitis and hay fever.

Parthenium is listed as a Weed of National Significance.

Legal requirements

Parthenium is a restricted invasive plant under the *Biosecurity Act 2014*. It must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Parthenium is an annual herb with a deep tap root and an erect stem that becomes woody with age. As it matures, the plant develops many branches in its top half and may eventually reach a height of 2 m.

Its leaves are pale green, deeply lobed and covered with fine soft hairs.

Small creamy white flowers occur on the tips of the numerous stems. Each flower contains four to five black seeds that are wedge-shaped, two millimetres long with two thin, white scales.

Life cycle

Parthenium normally germinates in spring and early summer, produces flowers and seed throughout its life and dies around late autumn. However, with suitable conditions (rain, available moisture, mild temperatures), parthenium can grow and produce flowers at any time of the year. In summer, plants can flower and set seed within four weeks of germination, particularly if stressed.

Methods of spread

Parthenium seeds can spread via water, vehicles, machinery, stock, feral and native animals and in feed and seed. Drought conditions aid the spread of seed with increased movements of stock fodder and transports.

Habitat and distribution

Parthenium is capable of growing in most soil types but becomes most dominant in alkaline, clay loam soils.

The plant is well established in Central Queensland and present in isolated infestations west to Longreach and in northern and southern Queensland.

Infestations have also been found in northern and central parts of New South Wales and it is capable of growing in most states of Australia.

Control

Managing parthenium

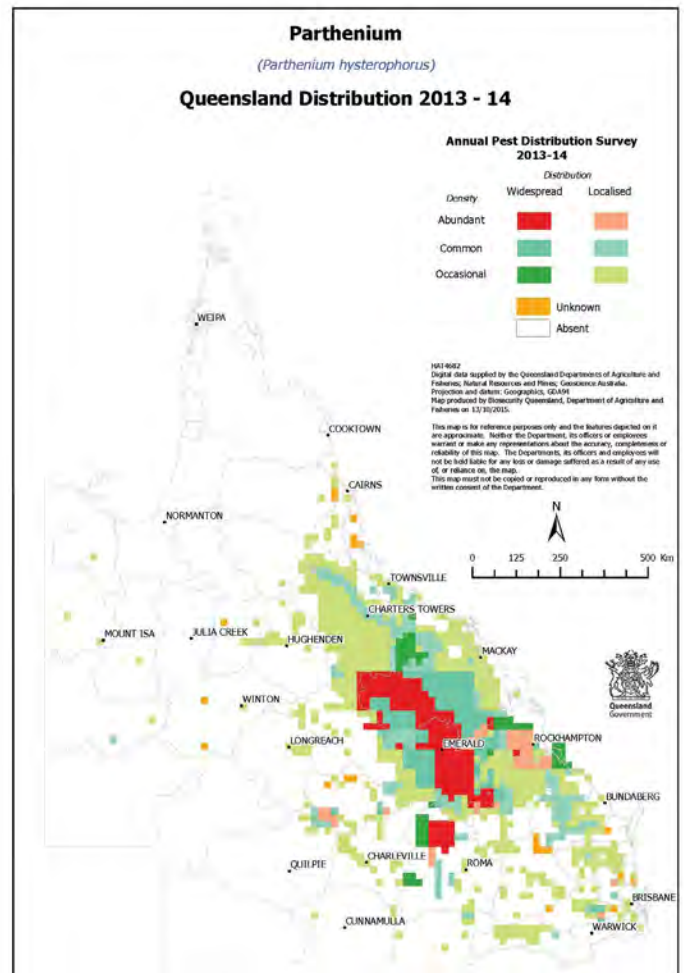
The GBO requires a person to take reasonable and practical steps to minimise the risks posed by parthenium. This fact sheet provides information and some options for controlling parthenium.

Prevention and weed seed spread

Pastures maintained in good condition, with high levels of grass crown cover, will limit parthenium colonisation. Drought, and the subsequent reduced pasture cover, creates the ideal window of opportunity for parthenium colonisation when good conditions return.

Vehicles and implements passing through parthenium infested areas should be washed down with water. Particular care should be taken with earthmoving machinery and harvesting equipment. The wash down procedure should be confined to one area, so that plants that establish from dislodged seed can be destroyed before they set seed.

Map 1. Distribution of parthenium in Queensland



Extreme caution should be taken when moving cattle from infested to clean areas. Avoid movement during wet periods as cattle readily transport seed in muddy soil. On arrival, cattle should be held in yards or small paddocks until seed has dropped from their coats and tails prior to their release into large paddocks. Infestations around yards can be easily spotted and controlled whereas infestations can develop unnoticed in large paddocks.

Particular care should be taken when purchasing seed, hay and other fodder materials. Always keep a close watch for the emergence of parthenium or other weeds on areas where hay has been fed out.

Property hygiene is important. Owners of clean properties should ensure that visitors from infested areas do not drive through their properties. If your property has parthenium on it, ensure that it is not spread beyond the boundary or further within the property.

Manual control

Hand pulling of small areas is not recommended. There is a health hazard from allergic reactions and a danger that mature seeds will drop off and increase the area of infestation.

Pasture management

Grazing management is the most useful method of controlling large-scale parthenium infestations. Maintain pastures in good condition with high levels of ground and grass crown cover. This may require rehabilitation of poor pastures, followed by a sound grazing maintenance program.

Sown pasture establishment—Poor establishment of sown pastures can allow parthenium colonisation.

Pasture agronomy—Aerial seeding prior to scrub pulling is normally beneficial.

Overgrazing—High grazing pressure caused by drought or high stock numbers decreases the vigour and competitiveness of pastures and allows the entry and spread of parthenium. Maintenance of correct stock numbers is most important in controlling parthenium.

Pastures spelling—In situations of serious infestation, pasture spelling is essential for rehabilitation. Total spelling is much more effective than simply reducing the stocking rate. However, overgrazing of the remainder of the property must be avoided.

The most appropriate time for pasture spelling is the spring–summer growing period, with the first 6–8 weeks being particularly important. If the condition of perennial grasses (native or sown) is low, spelling for the entire growing season may be required or introduced grasses may need to be re-sown. Herbicide treatment can hasten the rehabilitation process by removing a generation of parthenium seedlings and allowing grass seedlings to establish without competition. In the presence of parthenium, grass establishment is poor.

Grazing during winter should not increase the parthenium risk. Most tropical grasses are dormant and can tolerate moderate grazing during this period. However, parthenium may germinate and grow at this time.

Fencing—One of the main problems in controlling parthenium is the large paddock size and the variability of country within paddocks. The resulting uneven grazing pressures encourage parthenium to colonise the heavily grazed country. Ideally, similar land types should be fenced as single units. Fencing can be used to great effect to break up large paddocks, allowing more flexible management such as pasture spelling or herbicide application, options not available previously.

Burning—Burning is not promoted as a control strategy for parthenium. However, research suggests that burning for pasture management (e.g. woody weed control) should not result in an increased infestation if the pasture is allowed to recover prior to the resumption of grazing. Stocking of recently burnt areas known or suspected to contain parthenium decreases pasture competition and favours parthenium, ultimately creating a more serious infestation.

Biological control

The combined effects of biological control agents reduced the density and vigour of parthenium and increased grass production.

There are currently a number of insect species and two rust pathogens that have been introduced to control parthenium—a selection of these are outlined below. *Epiblema strenuana* is a moth introduced from Mexico established in all parthenium areas. The moth's larvae feed inside the stem, forming galls that stunt the plant's growth, reduce competitiveness and seed production.

Listronotus setosipennis is a stem-boring weevil from Argentina but is of limited success in reducing parthenium infestations.

Zygogramma bicolorata is a defoliating beetle from Mexico which is highly effective where present. It emerges in late spring and is active until autumn.

Smicronyx lutulentus (Mexico) lays eggs in the flower buds where the larvae feed on the seed heads. *Conotrachelus albocinereus* (stem-galling weevil from Argentina) produces small galls and is still becoming established in Queensland.

Bucculatrix parthenica (leaf mining moth from Mexico) larvae feed on leaves, leaving clear windows in the leaf. *Carmentia ithacae* is a stem boring moth from Mexico which is becoming established at favourable sites in the northern Central Highlands.

Puccinia abrupta is a winter rust from Mexico that infects and damages leaves and stems. It is currently established over a wide area from Clermont south. It requires a night temperature of less than 16 degrees and 5–6 hours of leaf wetness (dew). Sporadic outbreaks occur where weather conditions are suitable.

Puccinia melampodii is a summer rust from Mexico that weakens the plant by damaging the leaves over the summer growing season. It is currently established and spreading at a number of sites from north of Charters Towers to Injune in the south.

Herbicide control

Non-crop areas

Parthenium should be sprayed early before it can set seed. A close watch should be kept on treated areas for at least two years.

Small and/or isolated infestations should be treated immediately. Herbicide control will involve a knockdown herbicide to kill plants that are present and a residual herbicide to control future germinations. Repeated spraying may be required even within the one growing season to prevent further seed production.



Extensive infestations will require herbicide treatment in conjunction with pasture management. Timing of spraying is critical so that parthenium is removed when plants are small and before seeding has occurred. Grasses should be actively growing and seeding so that they can recolonise the infested area.

Table 1. shows the herbicides registered for parthenium control and application rates. All herbicides must be applied strictly in accordance with the directions on the label.

Cropping areas

Controlling parthenium in cropland requires selective herbicide use and/or crop rotations. For further information on parthenium control in crops consult your local biosecurity officer.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.

Table 1. Herbicides for the control of parthenium

Situation	Herbicide	Rate	Comments
Pastures, rights-of-way and industrial land	2,4-D as amine 625 g/L (e.g. Ken-Amine 625)	320 mL/100 L water	Spot spray Apply to young actively growing plants, ensuring thorough coverage
	2,4-D as amine 700 g/L (e.g. Amicide Advance 700)	285 mL/100L water	
Non agricultural areas (native pastures), commercial and industrial areas, rights-of-way	Aminopyralid 375 g/kg plus metsulfuron-methyl 300 g/kg (Stinger)	10 g/100 L water plus wetting agent Consult label	Spray to thoroughly wet all foliage but not to cause run-off
Fields and fallow, various crops (see label)	Atrazine 500 g/L (e.g. Kenso Atrazine 500)	3.6–6 L/ha Rate varies with situation Consult label	Boom spray. Pre and post emergent application Restrictions apply. Consult label for details of specific conditions. Max 3 kg a.i./ha/yr
Roadside and rights-of-way		6 L/ha	Boom spray. Pre and post emergent application Restrictions apply. Consult label for details of specific conditions. Max 3 kg a.i./ha/yr
Fields and fallow, various crops (see label)	Atrazine 900 g/kg (e.g. Atradex WG)	2–3.3 kg/ha Rate varies with situation Consult label	Boom spray. Pre and post emergent application Restrictions apply. Consult label for details of specific conditions. Max 3 kg a.i./ha/yr
Roadside and rights-of-way		3.3 kg/ha	Boom spray. Pre and post emergent application. Restrictions apply. Consult label for details of specific conditions. Max 3 kg a.i./ha/yr
Non-crop areas, commercial and industrial areas, pastures and rights-of-way	2,4-D 300 g/L + picloram 75 g/L (e.g. Tordon 75-D)	125 mL/100 L	Spot spray during rosette stage Use at least 3000 L/ha in dense infestations Consult label
		3 L/ha	Boom spray during rosette stage Consult label
Native pastures, rights-of-way, commercial and industrial land	metsulfuron methyl 600g/L (e.g. Associate)	5 g/100 L water + wetter	Hand gun. Spray to thoroughly wet all foliage but not to cause runoff
		7 g/ha + wetter	Boom spray. For pastures only. Treat in rosette stage. Consult label for details
Wheat, barley, triticale and cereal rye		5–7 g/h	Boom spray. Lower rate up to 4-leaf stage, higher rate 4-leaf stage to rosette
Native pastures, rights-of-way, commercial and industrial land	Triclopyr 75 g/L + metsulfuron-methyl 28 g/L (e.g. Zelam Brush Weed)	125 mL/100 L water	Spot spray plants from rosette to flowering Consult label for critical comments
Commercial and industrial areas, rights-of-way, around agricultural buildings	Hexazinone 750 g/kg (e.g. Velpar DF)	1 kg/ha 2 g/10 L/20 m ²	Boom spray or spot spray
Around agricultural buildings	Hexazinone 250 g/L (e.g. Velpar L)	3.5 L/ha or 7 L/10 L/20 m ²	
Grass pastures, fallows, various crop and non-crop situations (consult label for details)	Dicamba 500 g/L (e.g. Kamba 500) Dicamba 700 g/kg	Rates vary with situation Consult label	Boom spray or spot spray Consult label for details and critical comments

A number of the listed herbicides are available as different formulations, but some may not be registered for parthenium. Check the label for registration, rate and critical comments. Only use products that list parthenium on the label. The registered rates are for non-crop uses. Consult label for in-crop recommendations. For power hand spray or knapsack use, spray plants to the point of runoff.

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.



This fact sheet is developed with funding support from the Land Protection Fund.

Fact sheets are available from Department of Agriculture and Fisheries (DAF) service centres and our Customer Service Centre (telephone 13 25 23). Check our website at www.biosecurity.qld.gov.au to ensure you have the latest version of this fact sheet. The control methods referred to in this fact sheet should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, DAF does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.

Opuntoid cacti

Austrocyllindropuntia, *Cylindropuntia* and *Opuntia* species



Three types (genera) of opuntoid cacti have naturalised in Australia and are now considered Weeds of National Significance: *Austrocyllindropuntia*, *Cylindropuntia* and *Opuntia*. They are drought resistant because of their succulent nature, their lack of leaves and their thick, tough skins. These features result in plants that use the majority of their internal tissues for water storage and their outer parts to reduce water loss and damage by grazing and browsing animals. They can remain vigorous in hot, dry conditions that cause most other plants to lose vigour or even die. Some species develop underground bulbs that enable the plant to resist fire and mechanical damage.

Dense infestations compete with native vegetation, limiting the growth of small shrubs and groundcover species. The plant's sharp spines or barbs can cause injury to stock and native animals and contaminate wool and hides, reducing or preventing grazing activities and productivity.

Large stands of cacti provide harbour for pest animals, such as foxes and rabbits and, due to their spiny nature, can limit access for stock mustering and recreational activities. The spines are capable of causing serious injury to animals and humans.



Legal requirements

All Cholla cacti (*Cylindropuntia* spp.) and prickly pear (*Opuntia* spp.) not listed below are prohibited invasive plants and the *Biosecurity Act 2014* requires that all sightings to be reported to Biosecurity Queensland within 24 hours. By law, everyone has a general biosecurity obligation (GBO) to take all reasonable and practical steps to minimise the risk of these cacti spreading until they receive advice from an authorised officer.

The following species are restricted invasive plants under the Act. The Act requires that all sightings of these cacti must be reported to Biosecurity Queensland within 24 hours of the sighting. By law, everyone has a GBO to take all reasonable and practical steps to minimise the risk of spread of these cacti until they receive advice from an authorised officer.

- Hudson pear (*Cylindropuntia rosea* and *C. trunicata*)
- Jumping cholla (*Cylindropuntia prolifera*)
- Bunny ears (*Opuntia microdasys*)
- Riverina pear (*Opuntia elata*)

The following species are restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

- Cane cactus (*Austrocyllindropuntia cylindrical*)
- Eve's pin cactus (*Austrocyllindropuntia subulata*)
- Coral cactus (*Cylindropuntia fulgida*)
- Devil's rope pear (*Cylindropuntia imbricata*)
- Snake cactus (*Cylindropuntia spinosior*)
- Common pest pear, spiny pest pear (*Opuntia stricta* Syn. *O. inermis*)
- Drooping tree pear (*Opuntia monacantha* Syn. *O. vulgaris*)
- Tiger pear (*Opuntia aurantiaca*)
- Velvety tree pear (*Opuntia tomentosa*)
- Westwood pear (*Opuntia streptacantha*)

Indian fig (*Opunia ficus-indica*) is not prohibited or restricted invasive plant.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Opuntoid cacti vary significantly in their form and habit, ranging from low-growing shrubs under 50 cm to erect trees up to 8 m tall.

Plants are normally leafless succulent shrubs. Stems are divided into segments (pads or joints) that are flat and often incorrectly called leaves.

Young shoots have true leaves resembling small fleshy scales that fall off as the shoot matures.

Flowers are large, normally seen during spring and can be yellow, orange, red, pink, purple or white depending on the species. Fruits vary between species and can be red, purple, orange, yellow or green.

Areoles (spots with clusters of spines) are found on both the pads (joints, segments) and fruit. In addition to spines, areoles often have clusters of sharp bristles (glochids) and tufts of fibre ('wool'). Each areole contains a growing point that can produce roots or shoots.

Hudson pear (*Cylindropuntia rosea* and *C. trunicata*)

Densely branched cactus up to 1.5 m tall and 3 m wide. Spines are extremely sharp, 4.5 cm long, enclosed in whitish papery sheaths. Spines on *C. rosea* are white and *C. trunicata* are brown. Flowers on *C. rosea* are pink-purple, and on *C. trunicata* they are pink-yellow, 5 cm wide. Stem segments are green to grey-green, cylindrical, 90 cm long, 4 cm wide. Fruit is oval-shaped, up to 4.5 cm long, yellow when ripe.

Jumping cholla (*Cylindropuntia prolifera*)

Low shrub 0.4 to 1 m tall. Spines 7–11, 1–2 cm long, light to dark brown, interlacing, white to light tan sheath firmly attached. Flowers are rose to magenta, 25–30 mm wide. Stem segments are dull green to greenish grey, whorled or subwhorled, cylindrical, 4–15 cm long, 4–5 cm wide, waxy flaky surface when dry. Prominent tubercles and segments easily detached. Fruit obovoid to globose, solitary or forming chains, up to 20–50 mm long, green. Seed not seen in Australia.

Bunny ears (*Opuntia microdasys*)

Dense shrub 40–60 cm tall, occasionally more. Stems are pad-like, 6–15 cm long, 4–12 cm wide. No central stem, pads always grow in pairs, giving appearance of bunny ears. Has no spines, but instead has numerous white or yellow glochids (hair-like prickles), 2–3 mm long, in dense clusters. Flowers are yellow, 3 cm wide. Fruits are fleshy, globular, 3 cm long, red-purple.

Riverina pear (*Opuntia elata*)

Branched shrub with erect branches to 2 m tall. Spines absent or 1–3 short spines, whitish yellow present at some areoles. Flowers are orange, 3–4 cm wide. Stem segments are glossy green, sometimes with a purple tinge (especially around the areoles and margins). Often more than 2 cm thick, 5–25 cm long. Fruit club shaped, up to 6 cm long, purplish red.

Cane cactus (*Austrocyllindropuntia cylindrica*)

Dark green shrub, 0.5–1.5 m tall. Branches 35–40 mm diameter. Leaves on new growth, deciduous, 3–5 mm long, but up to 10 mm on regrowth. Spines without papery sheath, 3–6 major ones per areole, 9–25 mm long, and 3–4 minor ones, to 5.5 mm long. Flowers are red to red-orange. Fruit solitary or in small chains of 2–4. 30–60 mm long, dark green to yellow-green.

Eve's pin cactus (*Austrocyllindropuntia subulata*)

Robust shrub to 3 m tall. Branches 40–50 mm diameter. Spines without papery sheath, 1 per areole on new growth, additional smaller ones (up to five) developing in successive years, mostly 35–70 mm long. Flowers are pink. Stem segments are glossy green, sometimes with a purple tinge (especially around the areoles and margins). Often more than 2 cm thick, 5–25 cm long. Fruit large, solitary or in small chains of 2–4, green, 50–135 mm long.

Coral cactus (*Cylindropuntia fulgida*)

Coral cactus grows as a branching shrub 1–1.5 m high. The stems of coral cactus are divided into green cylinder-like pads that are fist-like and obtuse at their apex. Mature coral cactus pads widen, become distorted and wavy, and resemble a piece of coral. Areoles along the pads have a number of short white spines.

Coral cactus produces small (1–2 mm wide) scarlet flowers. The fruit is yellow-green and 2–5 cm wide.

Devil's rope pear (*Cylindropuntia imbricata*)

This open-branching shrub grows 1.5–3 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 37 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined, rope-like appearance. The areoles are found on these ridges and produce 3–11 pale yellow or white spines, with the longest being 2.5 cm long. Papery sheaths cover these spines.

The flowers are a dull, red-purple colour and found at the ends of pads. The yellow fruit resembles a small, 5 cm wide custard apple and has a spineless areole at the top.

Snake cactus (*Cylindropuntia spinosior*)

This open-branching shrub grows 1–2 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 20 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined rope-like appearance. The areoles are found on the bottom of these ridges and produce 5–10 pale yellow to brown spines, with the longest being 3 cm long.

The flowers are light red to dark rose and commonly 5–7 cm wide. Snake cactus produces fruit that is yellow and 2–5 cm wide.

Common pest pear, Spiny pest pear (*Opuntia stricta*)

This bushy, spreading plant grows up to 1.5 m high and forms large clumps. The stems are divided into oval, blue-green spineless pads 20 cm long and 10 cm wide. Areoles are in diagonal lines along the pads 2.5 cm to 5 cm apart and have a cushion of brown wool containing bristles but usually no spines. When spines occur they are stout, yellow and up to 4 cm long.

Flowers that are 7.5 cm wide, bright lemon yellow and green at the base. The fruit is oval-shaped, has a deep cavity on one end and tapers at the other. It is purple, 6 cm long and 3 cm wide, with carmine-coloured (dark red) seeds and a fleshy pulp.

Drooping tree pear (*Opuntia monacanta*)

This erect succulent shrub with fibrous roots grows up to 5 m high but is usually 2–3 m high. The branches are divided into glossy light green pads up to 45 cm long, 15 cm wide and 1.5 cm thick. The dark grey trunk grows up to 25 cm in diameter. Drooping tree pear gets its name because the upper segments tend to droop. The areoles on the older pads have 1–5 sharp spines about 5 cm long.

Small, scale-like leaves are found on areoles of very young pads and are quickly shed as the pad grows. Drooping tree pear produces yellow flowers that are 6 cm wide and have red markings on the back. The fruit is pear-shaped and 4–7 cm long with a green skin. The flesh of the fruit is red and pulpy and contains round seeds that are yellow or pale brown. The fruits have areoles with tufts of fine, barbed bristles.

Tiger pear (*Opuntia aurantiaca*)

This succulent low shrub with underground tubers usually grows 30–60 cm high. The stems are divided into very spiny, slightly flattened pads that are 1–30 cm long and 1–5 cm wide. The stems are dark green to purple and red in colour. The areoles have 3–7 brown barbed spines up to 4 cm long surrounded by tufts of short, fine bristles. The pads detach easily and are transported on the skins of animals. Small and scale-like leaves are found on areoles of immature pads.

Tiger pear produces 6 cm wide yellow flowers. The rarely formed fruits are pear-shaped and about 2.5 cm long. When ripe, they are red with purple markings.

Velvety tree pear (*Opuntia tomentosa*)

This tree-like plant forms a central woody trunk over 40 cm wide and grows up to 5 m high. The stems are divided into oblong pads that are dull green and velvety to touch due to the dense covering of short fine hairs. The pads are 15–35 cm long, 8–12 cm wide and 1.5–2 cm thick.

Young plants have 2–4 white or pale yellow spines located in the areoles with one spine reaching a length of 2.5 cm. The areoles usually become spineless as the plant matures. A more spiny variety does exist and has more than 50 spines in each areole on the trunk.

The flowers are a deep orange. The fruit is egg-shaped, about 5 cm long and 3 cm wide, and dull red. The top of the fruit is saucer-shaped with circular lines that meet in the centre and give the fruit a shrivelled appearance. The fruit produces many seeds within a reddish pulp.

Westwood pear or Cardona pear (*Opuntia streptacantha*)

Westwood pear is a shrub-like or tree-like plant that forms clumps by branching from the base and is usually 2–4 m high. The stems are divided into almost circular dull green pads, 25–30 cm long and 15–20 cm wide. The areoles have white spines that vary in number and size when the plant matures.

Young pads have 2–5 white spines 1–2 cm long, accompanied by two hair-like spines 0.5 cm long in the lower part of the areole. Spines increase in number (up to 20) and size (5 cm long) in areoles along the trunk of the plant.

The flowers are yellow and fruits are barrel-shaped, 6 cm long and 5 cm wide with a flat top. The fruit has a purple skin and a rind that is 1 cm thick. Fruits contain red seeds buried in a dark red (carmine) pulp.

Habitat and distribution

Native to the Americas, Opuntoid species are found throughout most Australian states and territories and there is potential for further spread.

In Queensland Opuntoid species are mainly found in low rainfall areas but can be found in gardens, along beaches and on off shore island.

Life cycle

Opuntoids reproduce both sexually and asexually. Birds and other animals readily eat the many seeded fruits and deposit seeds in their droppings. The seeds have hard seed coats that allow them to survive heat and lack of water. Asexual reproduction (cloning) of cacti occurs when pads (joints, segments) or fruits located on the ground take root and produce shoots.

Methods of spread

Animals and floods move broken pads long distances. These pads can survive long periods of drought before weather conditions allow them to set roots. People can spread cacti for ornamental plantings.

Control

Managing opuntoid cacti

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by opuntoid cacti. This fact sheet provides information and some options for controlling opuntoid cacti.

Mechanical and fire control

Mechanical control using machinery is difficult because prickly pear pads can easily re-establish. A hot fire is an effective control method for dense prickly pear infestations. Before burning, consult Biosecurity Queensland to see if this practice is suitable for your pasture and land management practices.

Biological control

Investigations into biological control agents against prickly pear began in 1912. Over 150 insect species were studied throughout the world, with 52 species selected for transport to Queensland. Following intensive host specificity testing, 18 insects and one mite were released in Queensland. Nine insects and the mite remain established in Queensland. These species are:

Cactoblastis cactorum, a stem-boring moth

- *Dactylopius ceylonicus*, a cochineal mealy bug
- *Dactylopius opuntiae*, a cochineal mealy bug
- *Dactylopius confusus*, a cochineal mealy bug
- *Dactylopius tomentosus*, a cochineal mealy bug
- *Dactylopius austrinus*, a cochineal mealy bug
- *Chelinidea tabulata*, a cell-sucking bug
- *Tucumania tapiacola*, a stem-boring moth
- *Archlagocheirus funestus*, a stem-boring beetle
- *Tetranychus opuntiae*, prickly pear red spider mite.

These biological control agents continue to keep several prickly pear species under control. It is important to remember not all the agents attack all species.

The most successful of these agents were the moth *Cactoblastis cactorum* and five cochineal mealy bugs—*Dactylopius ceylonicus*, *D. opuntiae*, *D. confusus*, *D. tomentosus* and *D. austrinus*. The other agents are still around but not in sufficient numbers to provide control.

Cactoblastis cactorum (cactoblastis moth)

Larvae of this moth were introduced from Argentina in 1925. *Cactoblastis* proved to be the most effective agent against the common and spiny pest pears, destroying massive infestations in Australia. Larvae keeps these two pest pears controlled to an acceptable level most of the time, although it is less effective in some coastal and far western areas.

The larvae collectively eat out the contents of the pads, leaving empty pad skins and piles of mushy droppings. The orange and black larvae are occasionally observed on the outsides of pads. *Cactoblastis* also attacks most types of prickly pear but is not effective against them.

Dactylopius spp. (cochineal insects)

All female cochineal insects are small, sessile mealy bugs that spend their adult lives permanently attached to their host plants sucking plant juices. They are covered by a fine, white, waxy secretion and when crushed yield a carmine colouring. The adult males are small, free-flying insects that do not feed.

Dactylopius ceylonicus (monacantha cochineal, Argentine cochineal)

This South American mealy bug was released in 1914 and 1915 to control drooping tree pear. It destroyed the dense infestations existing at that time. It is specific to drooping tree pear and today remains the only effective biological control agent for drooping tree pear. This insect needs to be distributed manually.

Dactylopius opuntiae (prickly pear cochineal)

This mealy bug was introduced from Mexico and southern United States between 1920 and 1922. It is effective against common pest pear, spiny pest pear, velvety tree pear and Westwood pear and remains the main biological control agent against velvety tree pear and Westwood pear. This insect spreads slowly in nature and can be assisted manually.

***Dactylopius confusus* (prickly pear cochineal)**

This mealy bug was introduced from Florida and released in 1933 against spiny pest pear. It remains effective against spiny pest pear in central Queensland but spreads slowly. This insect can be spread manually.

***Dactylopius tomentosus* (devil's rope pear cochineal)**

This mealy bug was introduced from southern United States in 1925 and 1926. It is effective against devil's rope pear but works slowly.

***Dactylopius austrinus* (tiger pear cochineal)**

This mealy bug was introduced from Argentina in 1932. It is specific to and effective against tiger pear. It rapidly reduces tiger pear populations but dies out in a paddock after the destruction of tiger pear. It needs to be reintroduced after tiger pear regrows.

***Chelinidea tabulata* (prickly pear bug)**

This plant-sucking bug was introduced from Texas in 1921. It was effective against dense common pest pear before *Cactoblastis cactorum* was but is now relatively ineffective. This insect also attacks most other prickly pears. The adult is a pale brown bug up to 20 mm long that leaves characteristic round bleached spots on the surface of the cactus.

***Tucumania tapiacola* (prickly pear moth-borer)**

This moth was introduced from Argentina in 1934 against tiger pear. Its solitary larvae feed internally and eat out tiger pear pads with limited effect. It has been observed attacking common pest pear and harrisia cactus.

***Archlagocheirus funestus* (tree pear beetle)**

This stem-boring beetle was introduced from Mexico in 1935. It was effective against velvety tree pear and Westwood pear but has become rare since the dense stands of these prickly pears have gone.

***Tetranychus opuntiae* (prickly pear spider mite)**

This mite was introduced from southern United States and Mexico in 1922. It was effective against common pest pear but is now rare and difficult to find. It causes distinctive scar tissue formation around areoles.

Distributing biological control agents

Cactoblastis

Cactoblastis can be spread manually by distributing eggs or larvae. Cactoblastis moths lay chains of eggs (eggsticks) on prickly pear pads from January to February and from September to November. The eggsticks are distinguished from spines by their curved appearance.

1. Collect the fragile eggsticks carefully.
2. Glue single eggsticks to small pieces of paper using a starch-based adhesive.
3. Pin the egg papers to prickly pear pads. (Eggs take up to one month to hatch.)
4. Collect pads or plants in which larvae are obviously still active.

5. At a release site place all the collected plant material in a small part of the infestation.
6. Subsequent generations of moths will disperse through the infestation.
7. Follow up the biological control with either herbicide or mechanical treatment.

Cochineals

Because several cochineal insects affect some prickly pears and not others, it is essential to know what prickly pear you wish to control.

1. Identify your prickly pear type.
2. Find the same prickly pear type which is being attacked by a cochineal.
3. Collect pads of the prickly pear with the insects.
4. Place affected pads against unaffected prickly pears at the release site.
5. Follow up the biological control with either herbicide or mechanical treatment.

Tiger pear cochineal

Tiger pear cochineal is easy to multiply quickly after collection.

1. Carefully collect a reasonable quantity of unaffected tiger pear in a container (box or bucket).
2. Place a few pieces of cochineal-affected tiger pear into the same container.
3. Cover the container with a cloth and store under cover for a few weeks.
4. Check the cactus occasionally.
5. When most of the tiger pear in the container has cochineal, it is ready to distribute.
6. At the release site place affected pads against unaffected prickly pears.
7. Follow up the biological control with either herbicide or mechanical treatment.

Note: It is best to multiply tiger pear cochineal before release.

Herbicide control

Herbicide options available for the control of opuntioid cacti in Queensland are shown in Table 1.

Landholders and contractors should check if the property is in a hazardous area as defined in the *Agricultural Chemicals Distribution Control Act 1966* prior to spraying.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.

Table 1. Herbicides for the control of opuntoid cacti

Pest name	Situation	Herbicide	Rate	Method
Common prickly pear	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark/cut stump Apply as an overall spray, wetting all areas of plant to ground level
	Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L + picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + picloram 100 g/L + aminopyralid 8g/L (Grazon Extra)	500 mL/100 L	Apply as a thorough foliage spray
		Triclopyr 600 g/L (e.g. Garlon 600)	3 L/100 L or 0.8 L/60 L diesel	
Coral cactus	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark/cut stump Apply as an overall spray, wetting all areas of the plant to ground level
	Pastures, rights-of-way, commercial/industrial areas	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel See permit PER13812 (expires 30/11/2017)	Paint stump immediately after cutting or spray basal bark
Tiger pear	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark/cut stump Apply as an overall spray, wetting all areas of plant to ground level
	Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 600 g/L (e.g. Garlon 600)	3 L/100 L water or 0.8 L/60 L diesel	Apply as a thorough foliage spray
Drooping tree pear	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 300 g/L + picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + picloram 100 g/L + aminopyralid 8g/L (Grazon Extra)	500 mL/100L water	
	Non-crop areas around buildings, commercial and industrial areas, domestic and public service areas, rights-of-way	Amitrole 250 g/L + ammonium thiocyanate 220 g/L (e.g. Amitrole T)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	Tree pears may take up to 12 months to die Respraying may be needed in some cases Consult label
Velvety tree pear	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark/cut stump Apply as an overall spray, wetting all areas of plant to ground level
	Non-crop areas around buildings, commercial and industrial areas, domestic and public service areas, rights-of-way	Amitrole 250 g/L + ammonium thiocyanate 220 g/L (e.g. Amitrole T)	1 mL/3 cm (inject) or 1 L/25 L (small plants/regrowth)	Tree pears may take up to 12 months to die Respraying may be needed in some cases Consult label
Spiny pest pear Westwood pear Devil's rope pear Snake cactus	Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark/cut stump Apply as an overall spray, wetting all areas of plant to ground level



Snake cactus (*Cylindropuntia spinosior*)



Coral cactus (*Cylindropuntia fulgida*)



Hudson pear (*Cylindropuntia rosea*)



Jumping cholla (*Cylindropuntia prolifera*)



Prickly pear (*Opuntia stricta*)



Bunny ears (*Opuntia microdasys*)



Tiger pear (*Opuntia aurantiaca*)



Riveria pear (*Opuntia elata*)



Drooping tree pear (*Opuntia monacanta*)



Devil's rope pear (*Cylindropuntia imbricata*)



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Rubber vine

Cryptostegia grandiflora and *Cryptostegia madagascarensis*



Rubber vine's ability to quickly spread and colonise areas makes it a threat to many areas of northern Australia. Due to this ability, rubber vine is listed as a Weed of National Significance.

Rubber vine generally invades waterways first, where the seeds germinate in moist silt layers after rain. The plant smothers riparian vegetation and forms dense, sometimes impenetrable, thickets.

This decreases biodiversity and prevents access to both stock and native animals. It also creates habitat for feral animals. Infestations expand outward from waterways, hillsides and pastures, resulting in loss of grazing land and increased difficulty in mustering stock.

Rubber vine is poisonous to stock, though seldom eaten. Most deaths due to rubber vine occur after stock have been stressed, or when other feed is scarce.



Legal requirements

Rubber vine (*Cryptostegia grandiflora*) and ornamental rubber vine (*Cryptostegia madagascarensis*) are restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Rubber vine is a vigorous climber with twining, whip-like shoots that can grow unsupported as an untidy, multi-stemmed shrub 1–2 m high, or it can scramble up to 30 m high in trees. The stems, leaves and unripe pods exude a white, milky sap when broken or cut.

Leaves are dark green and somewhat glossy, 6–10 cm long, 3–5 cm wide, and in opposite pairs.

Flowers are large and showy, with five white to light purple petals arranged in a funnel shape.

The seed pods are rigid and grow in pairs at the end of a short stalk. The pods are 10–12 cm long, 3–4 cm wide and each can contain up to 450 brown seeds. Each seed has a tuft of long, white, silky hairs, which enable easy dispersal by wind and water.

Ornamental rubber vine (*Cryptostegia spilanthisoides*) is a shrub up to 3 m tall, if unsupported and stems can climb to 10 m if supported. Bark is sparsely dotted with corky patches. Leaves are dark green, glossy, with pale underside, 2–11 cm long, 1.5–5.5 cm wide, arranged in opposite pairs. Plant produces milky latex sap when leaves, fruit or branches are cut.

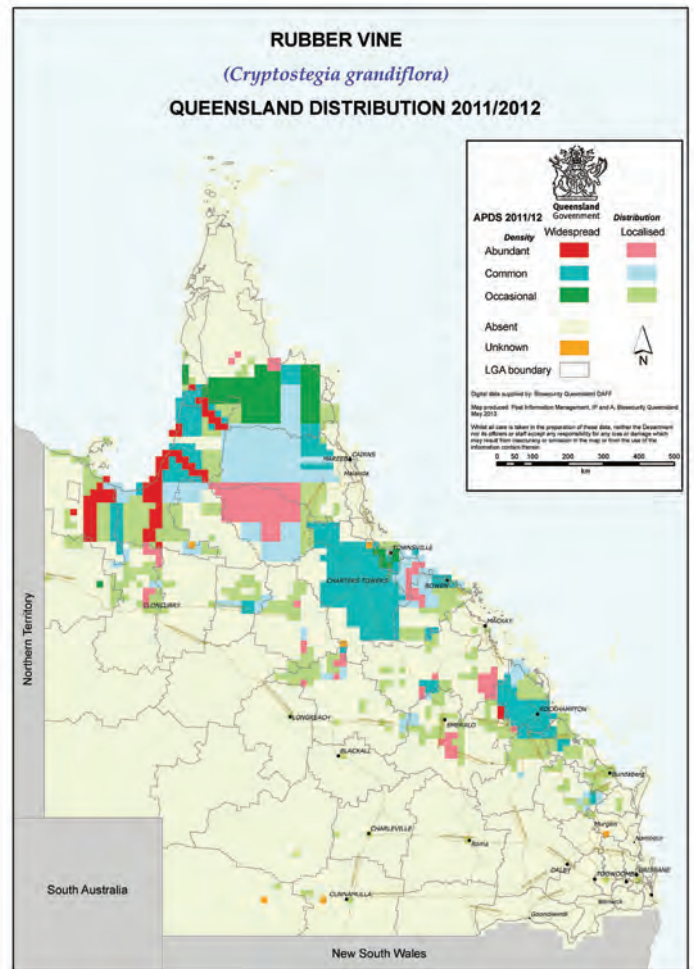
Flowers are pink-purple, 4–6 cm long, found near branchlet ends. Pods are 7–9 cm long, contain seeds 5–5.9 mm long, 1.8–3.5 mm wide, topped with silky tuft of white hairs.

Life cycle

Rubber vine flowers at any time of year if sufficient moisture is available. Usually, June and July are the only non-flowering months. Plant stem diameter must be approximately 20 mm before flowering can occur.

Seed pod formation occurs from spring to late autumn, with peak seed production corresponding to maximum flowering. Eventually, pods dry out and split open, with pod-splitting occurring approximately 200 days after formation.

Map 1. Distribution of rubber vine in Queensland



Seeds are scattered by wind, but also carried downstream by water. Approximately 95% of seed is viable, although germination requires favourable temperature and soil moisture conditions.

Methods of spread

Rubber vine seeds spread by wind and water.

Habitat and distribution

Rubber vine is native to Madagascar, but is now widely distributed throughout tropical and subtropical regions of the world.

The plant was introduced to Australia as an ornamental shrub in 1875 or earlier, and was popular in north Queensland mining settlements due to its luxuriant growth even under harsh conditions. Weedy infestations were recorded around Charters Towers early this century.

Rubber vine prefers areas where annual rainfall is 400–1400 mm, and is well adapted to a monsoonal climate.

Infestations of rubber vine are now found throughout river systems of southern Cape York and the Gulf of Carpentaria, south along the coast to the Burnett River, and isolated infestations occur as far south as Gatton and as far west as the Northern Territory border.

Infestations are common throughout central Queensland, while in western Queensland there are infestations in the Mount Isa, Longreach and Aramac areas. Isolated infestations have been reported in Western Australia.

Control

Managing rubber vine

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by rubber vine. This fact sheet provides information and some options for controlling rubber vine.

Effective control of rubber vine can be achieved by a number of methods, alone or in combination depending on the situation and the severity of infestation. All areas treated must be periodically checked and any regrowth treated or the initial treatment efforts will be wasted.

Rubber vine seed is most commonly spread by wind and running water.

It is thus difficult to prevent seed coming onto uninfested land if there is rubber vine anywhere in the area. Your goal should be to prevent rubber vine from establishing and forming dense infestations. It is essential to regularly inspect all areas of your property, paying particular attention to creeks and gullies.

This is most important where prevailing winds are known to blow from infested areas, or where infestations occur upstream.

Any isolated plants located should be treated promptly.

All control of rubber vine will require follow-up treatments to keep your property clean. As rubber vine spreads quickly, small infestations should be controlled first to prevent them from becoming major problem areas. Dense infestations are difficult and costly to treat.

Follow-up treatment must be budgeted for within the overall control program. Techniques need to be integrated for successful rubber vine management. Consideration should be given to coordinating control over a catchment area.

Five suggested strategies for controlling rubber vine in scattered, medium, and dense infestations are outlined in Table 2.

Fire

Rubber vine infestations can be very effectively controlled by burning. Preparing and managing fuel load prior to burning, and following up in a timely manner after the fires, are critical to the overall success of the program.

It is recommended that you perform two successive annual burns. The first fire will open up the infestation to increase grass growth (fuel load) while killing rubber vine plants. The second fire will clean up the regrowth that occurs after the first fire.

An appropriate fire regime is an effective tool for managing rubber vine over the long term, as well as being an effective follow-up to other control methods.

Mechanical control

Several mechanical techniques are effective in controlling rubber vine. The type of infestation will determine the technique required.

- Scattered or medium-density infestations: Where possible, repeated slashing close to ground level is recommended.
- Dense infestations: During winter, stick-raking or blade-ploughing reduces the bulk of the infestation. Pasture should be sown and windrows burned to kill residual seed. Follow-up treatment is essential. It is important to comply with the relevant state and/or local government native vegetation legislation, and it should be noted that causing even accidental death of vegetation can be a breach of this legislation.

Biological control

Two biological control agents are successfully established, and their impact depends on abundance. Both agents cause abnormal defoliation, creating an 'energy sink', which appears to reduce seed production. These agents usually do not kill established rubber vine plants.

Diseases

Rubber vine rust (*Maravalia cryptostegiae*) is established over a wide area. Yellow spores form under the leaves and are spread mainly by the wind.

It is most active over summer, abundance being directly related to leaf wetness, which is dependent on rainfall and dew. Over summer, a generation is completed every seven days. Rust activity is reduced over the dry season.

Continued heavy infection causes defoliation, appears to reduce seed production, can kill small seedlings and causes dieback of the whip-like stems. Established plants are not killed.

Insects

Also established is the moth *Euclasta whalleyi*, whose larvae are leaf feeders. Observation indicates the moth prefers stressed plants, either from limited soil moisture or high levels of rust infection.

The moth's period of activity is the dry season. A native fly parasite and a disease can reduce the localised abundance of the *Euclasta* larvae.

The larvae are tapered at both ends, grow up to 30 mm long, and are grey-brown with orange dots along their sides. Fine silken threads and black, bead-like droppings are often found near the larval feeding damage.

The creamy-brown moths are active at night and rest at a 45° angle from a surface, with their wings folded. The life cycle from egg to adult takes 21–28 days.

Defoliation reduces the smothering effect on other vegetation and causes an increase in leaf litter and promotes increased grass growth amongst rubber vine, increasing fuel loads required for fire management. Decreased flower and pod production should reduce the ability of rubber vine to spread.

Herbicide control

Basal bark spray

This method gives a high level of control although it is not as effective on multi-stemmed plants as it is difficult to spray each stem completely around the base.

Thoroughly spray around the base of the plant to a height of 20–100 cm above ground level, spraying higher on larger plants.

Optimum results are attained when the plant is actively growing.

Cut stump treatment

This is the most successful method of herbicide control, but also the most labour intensive. The following points should be followed carefully:

- cut the stem off as close to the ground (within 15 cm) as possible; for smaller plants use a machete or similar; larger plants may require a chainsaw
- make sure the cut is horizontal
- immediately spray or swab the cut surface
- a cost-effective method for scattered to medium-density infestations is the use of a brush-cutter.

Soil application

Because of the high risk of killing non-target vegetation, including trees and pasture plants, soil-applied herbicides play a role in controlling rubber vine only in specific situations.

It is important to comply with the relevant state and/or local government native vegetation legislation, and it should be noted that causing even accidental death of vegetation can be a breach of this legislation.

The following points should be followed carefully:

- do not use residual herbicides within a distance of two or three times the height of desirable trees
- do not use Graslan along waterways or land with greater than a 20° slope
- a minimum of 50–80 mm of rainfall is required before residual herbicides are taken up by the plant.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



Table 1. Herbicides for the control of rubber vine

Situation	Herbicide	Rate	Comments
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (Grazon Extra) or Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror)	350–500 mL/100 L water	High volume spray Actively growing plants not infected with rust Use the higher rate for dense stands higher than 1.5 m tall at flowering (consult label)
Native pastures, rights-of-way, commercial and industrial areas	Metsulfuron-methyl 600 g/kg (e.g. Associate, Ken-Met 600)	15 g/100 L water	High volume spray on actively growing plants Apply to actively growing bushes up to 3 m tall, October through April Wetting agent is critical Complete coverage is essential May damage pasture legumes (consult label)
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	2,4 D 300 g/L + Picloram 75 g/L (e.g. Tordon 75-D, Commander 75-D)	1.3 L/100 L water	Treat actively growing plants Thoroughly wet leaves and soil around base of plant Less effective than other treatments
Around agricultural buildings and other farm non-crop situations, commercial, industrial, and public service areas, rights-of-way and waster land, away from desirable vegetation	Imazapyr 250 g/L (e.g. Unimaz 250 SL)	4 mL/L water	High volume application to actively growing plants (consult label)
Non agricultural areas (native pastures) commercial and industrial areas and rights-of-way	Aminopyralid 375 g/kg plus Metsulfuron-methyl 300 g/kg (e.g. Stinger)	30 g/100L water plus wetting agent (consult label)	Apply to bushes up to 3 m in height Apply from October to April when bushes are actively growing. Ensure thorough spray coverage of all foliage and leaders Incomplete coverage will result in regrowth
Native pastures, rights-of-way, commercial and industrial areas	Triclopyr 75 g/L + Metsulfuron-methyl 28 g/L (e.g. Zelam Brush Weed)	375 mL/100L	Spray actively growing plants up to 3 m tall, from October to April. Thoroughly spray all foliage and leaders. Incomplete coverage will result in regrowth
Agricultural non-crop areas, commercial and industrial areas, fencelines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + Picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Basal bark plants up to 5 cm basal diameter Treat at any time Thoroughly spray around base of plant
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 600 g/L (e.g. Garlon 600, Triclopyr 600)	1 L/60 L diesel	Basal bark Treat at any time Thoroughly spray around base of plant
Agricultural non-crop areas, commercial and industrial areas, fencelines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + Picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Cut stump Apply immediately cut is made
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 600 g/L (e.g. Garlon 600, Triclopyr 600)	1 L/60 L diesel	Basal bark size and larger plants
Non-crop areas, including: native vegetation, conservation areas, gullies, reserves and parks	Picloram 44.7 g/L + aminopyralid 4.47 g/L (Vigilant II)	Undiluted	Cut stump as close to the ground as possible. Apply immediately according to label instructions
Pastures, rights-of-way and industrial	2,4-D as amine 700 g/L (e.g. Amicide Advance 700)	145 mL/10L water	Cut stump Apply immediately
Other formulations of 2,4-D are also registered for cut-stump treatment of rubber vine. Consult labels for registration details, rates and critical comments.			
	Hexazinone [#] 250g /L (e.g. Bobcat [®] SL, Velpar [®] L)	2 mL/spot, 3 spots for each bush (tree)	Soil application [#] prior to rain See warning below. [#] Must place spots around bush. Less effective on sandy soils
	Tebuthiuron [#] 200 g/kg (e.g. Graslan, Tebuthiuron 200)	1.5 g/m ²	Soil application [#] prior to rain Application prior to rain by hand or backpack spreader
	Triclopyr 300 g/L + Picloram 100 g/L+ Aminopyralid 8 g/L (Grazon Extra) or Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror, Grass-up)	3–5 L/ha	Aerial application (helicopter only) to actively growing plants Triclopyr 300 g/L + Picloram 100 g/L
	Tebuthiuron [#] 200 g/kg registered for aerial application (e.g. Graslan)	7.5–15 kg/ha	Aerial application prior to rain Triclopyr 300 g/L + Picloram 100 g/L

Warning: Soil testing is highly recommended prior to application of these herbicides, as rate and efficacy are dependant on soil type. DO NOT USE SOIL APPLIED HERBICIDES (HEXAZINONE AND GRASLAN) WITHIN A DISTANCE OF TWO TO THREE TIMES THE HEIGHT OF DESIRABLE TREES. DO NOT USE GRASLAN NEAR WATERWAYS OR LAND WITH GREATER THAN A 20° SLOPE.

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.

Table 2. Suggested strategies for the control of rubber vine

Situation	Initial treatment	Follow-up	Comments
Scattered infestations	Basal bark/cut stump	Follow-up with basal bark/cut stump as necessary	Cut stump method preferred where possible
	Foliar spray	Follow-up basal bark/cut stump/foliar spray as necessary	Only foliar spray when there is nil to little rust on the leaves of the plants
	Fire	Follow-up basal bark/cut stump/foliar spray as necessary	For scattered infestations usually recommended only if herbicides not desired, or if have other weeds can be controlled by fire or if fire is utilised to improve pastures
	Repeated slashing		
Medium infestations	Foliar spray	Treat regrowth, seedlings with basal bark/cut stump/foliar spray	Fire and follow-up with basal bark/cut stump/foliar spray as necessary
	Fire	Fire 1 year later and follow-up basal bark/cut stump/foliar spray as necessary	If fuel load is sufficient CAUTION: There are some native tree species which are susceptible to fire Check before burning
	Repeated slashing		
Dense infestations previously cleared areas	Stick rake or blade plough	Sow pasture – basal bark/foliar spray – fire and basal bark/cut stump/foliar spray as necessary	First treatment clears bulk of rubber vine and kills roots; any regrowth or seedlings can then be treated; when grass growth allows fuel build up, fire used as control and individual plants later treated
	Fire	Fire one year later and follow-up basal bark/cut stump/foliar spray as necessary	If fuel load is sufficient CAUTION: There are some native tree species which are susceptible to fire Check before burning
	Aerial spray	Fire 1–2 years later or follow-up with basal bark spray	Bulk of rubber vine killed with aerial spray; allow build up of fuel for fire or treat remaining plants with basal bark spray Contact 13 25 23 before use of this method
	Graslan		
Dense infestations along creeks and rivers	Basal bark/cut stump	Fire or basal bark/cut stump/foliar spray	When bulk of rubber vine killed, allow fuel build up for fire or treat remaining plants individually
	Fire and sow pasture	Fire one year later and follow-up basal bark/cut stump/foliar spray as necessary	If there is a sufficient fuel load to carry a fire, it can open up dense infestations CAUTION: There are some native tree species which are susceptible to fire Check before burning

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Appendix K Pest Species and Management Plans

Cane toad

Bufo marinus



The cane toad is not a declared pest in Queensland, so there is no legal requirement to control them.

Their original introduction in 1935 was to control agricultural pests, but they proved ineffective.

For the past 60 years, cane toads have been expanding their territory in Australia, and are capable of colonising at least four of the mainland Australian states.

As the toad's geographical range continues to expand, concern has increased about their detrimental environmental effects, particularly on the wetlands of the Northern Territory.

Studies into the feasibility of biological control have commenced.

Legal requirements

The cane toad is not a prohibited or restricted invasive animal under the *Biosecurity Act 2014*, however everyone has a general biosecurity obligation (GBO) to take reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control.

Local governments have a biosecurity plan that covers invasive plants and animals in their area and may require additional actions to be taken on certain species; some of these may be applied under local laws. Refer to your local government for more information.



History of introduction and spread

The cane toad or giant toad is an amphibian, native to Central and South America. Cane toads have been introduced throughout the world as a biological control for insect pests of agriculture, most notably sugarcane.

A consignment of cane toads from Hawaii was released into Queensland cane fields in 1935. The introduction was surrounded by controversy as to the potential costs and benefits to Australia.

It was hoped that the toad would control Frenchi and greyback beetles—pests of economic importance to the sugarcane industry.

By 1941, however, it had become evident that the cane toad was exerting only limited control over its intended prey. There were two main reasons for this:

- Greyback beetles are only rarely in contact with the ground and Frenchi beetles invade cane fields at a time when the toads are absent due to a lack of protective cover.
- The cane toad has a wide-ranging and indiscriminate diet, and it was not solely dependant upon its intended prey.

The unlimited food source, suitable environment and low rates of predation allowed dynamic reproduction and spread. Toads were recorded in Brisbane only 10 years after release. The toad continues to thrive and has now invaded the Northern Territory and New South Wales (see Map 1).

Map 1. Distribution of the cane toad in Australia



The cane toad's advance is only limited by environmental factors, such as the availability of water for breeding, tolerable temperatures, suitable shelter and availability of food.

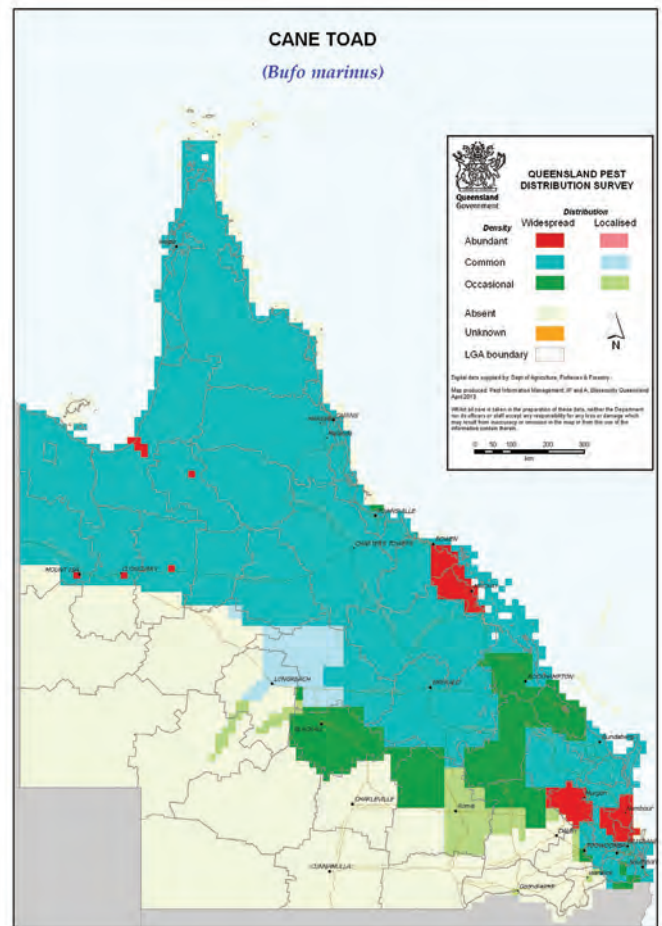
Toads at the frontier of their range of expansion may be larger than those in established populations. This is most probably due to greater food supply, combined with a lower incidence of disease.

Description

In comparison with native frog and toad species, adult cane toads have a distinctive head and face, and are large and heavily built creatures (adults may grow to 20 cm).

Following their aquatic larval stages (eggs and tadpoles), cane toads are generally encountered at night near any

Map 2. Distribution of the cane toad in Queensland

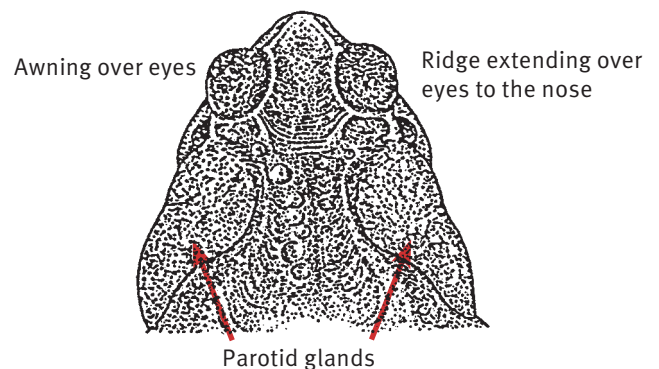


source of light. Cane toads are ground-dwelling—they are poor climbers and unable to jump very high.

A definite visor or awning extends over each eye and a high angular bony ridge extends from the eyes to the nose.

The parotid glands (see Figure 1) are perhaps the most characteristic feature of the adult cane toad. These glands are large, protuberant, and are situated on the head behind each ear. These glands carry a toxin.

Figure 1. Distinguishing features of the cane toad



The cane toad's hands and feet are relatively small and lack discs at the tips of the digits. Webbing is absent between the fingers but is distinct and leathery between the toes.

Colouring on the dorsal (upper) surface may be brown, olive-brown or reddish-brown. The ventral (under) surface varies from white to yellow and is usually mottled with brown.

Warts are present on all cane toads; however, males possess more than females. Warts are dark brown at the caps.

Mating

Mating can occur at any time of the year and depends only on available food and permanent water. The mating call is a continuous purring trill that sounds like a running motor.

In situations where females are scarce or absent, male cane toads may have the ability to undergo a sex change to become fertile females; however, this has not been proved.

Eggs

Both cane toads and native frogs spawn in slow-moving or still water, but their eggs can be easily distinguished.

Cane toad eggs are laid in long, gelatinous ‘strings’ with the developing tadpoles appearing as a row of small black dots along the length. The strings are unique to cane toads, generally appearing as blobs of jelly attached to water plants or debris. Native frogs generally produce egg clusters as mounds of foam floating on the water surface.

Compared with native species, cane toad egg production is dynamic and a single clutch can contain up to 35 000 eggs. Remove any cane toad eggs found in the water and allow to dry out.

Figure 2. Drawing of toad spawn from Wildlife of greater Brisbane



Tadpoles

The cane toad is the only species in Australia that has a pure black tadpole. Native frogs have lighter-coloured undersides with a great range of colours and markings—cane toad tadpoles may turn paler colours to almost transparent at night.

Cane toad tadpoles are small and usually congregate in vast, slow-moving shoals. This ‘shoaling’ behaviour is uncharacteristic of most native species.

Unlike cane toad tadpoles, native species develop lungs at an early stage and periodically rise to the surface in order to exchange their lung gasses. Large groupings of tadpoles that do not break the water surface for air indicate cane toads.

Young toads

Following emergence from the water, the young toadlets usually congregate around the moist perimeter of the water body for about a week before they eventually disperse.

Young toads are very difficult to distinguish from the native *Uperoleia* species, which also have parotid glands, but all *Uperoleia* species have bright red patches in the groin area.

Under ideal conditions toadlets may reach adult size within a year.

Toxicity

Bufo marinus produce venom in glands occurring in most of the skin on their upper surface. The venom is concentrated in the parotid glands as a creamy-white solution, which is released when the animal experiences extreme provocation or direct localised pressure (e.g. grasped by the mouth of a predator).

The parotid solution is highly toxic and when ingested it produces drastic acceleration of the heartbeat, shortness of breath, salivation and prostration. It is extremely painful if accidentally rubbed into the eye.

Ingestion of toads by domestic and most native animals can result in death. In some recorded cases, death has occurred within 15 minutes.

Field observations suggest that some predatory Australian species have learned how to feed safely on cane toads.

Birds have been observed flipping toads over to avoid the parotid glands. Predatory reptiles may have more trouble adapting, being unable to remove a toad from the mouth once they start feeding.

Impacts on wildlife

The cane toad is poisonous at all stages of its life cycle and most native frog larvae and many aquatic invertebrates are dramatically affected by their presence.

Cane toads are voracious feeders that consume a wide variety of insects, frogs, small reptiles, mammals and even birds. Perhaps the only limiting factor to the prey taken is the width of the cane toad’s mouth.

It has been suggested that cane toad competition for food and breeding grounds has been responsible for reducing the populations of some native frogs. However, many native frogs are arboreal (tree-dwelling) and occupy different niches. Cane toads don’t have the native frogs’ ability to ‘shut down’ during dry seasons when resources are limited.

Pressure from cane toads may displace native animals (frogs and other species) where they are already suffering due to manipulation of their habitat by humans and grazing animals. Animals that use waterholes as retreat sites during the dry season are especially vulnerable—toads will congregate here in large numbers.

Public health

Cane toads readily eat animal and human faecal material and, in areas of poor hygiene, they have been known to transmit disease such as salmonella.

Control

Control of cane toads is not enforced as there is currently no available effective broad scale control. Individuals and community groups have carried out removal campaigns to decrease numbers and slow the invasion front.

Fencing is recommended to keep toads out of ponds intended for native fish and frogs; a height of 50 cm is sufficient. Bird wire with 1 cm holes may keep toads out of an area.

Research indicates that spread can be delayed in semi-arid areas by blocking access to water holes.

Individual toads may be killed relatively humanely using a commercial spray available from hardware stores or may be stunned and decapitated (only by experienced operators). The removal of eggs from small water bodies such as frog ponds can be effective.

Researchers have successfully mitigated impacts in recently colonised areas by 'training' predators however, large scale application of this technique is difficult.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



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Dingo

Canis familiaris dingo



The dingo is a primitive canid related to wolves and coyote. The dingo was not a part of the ancestral fauna of Australia. Though its origins are not clear, it is thought to have arrived in Australia 3500–4000 years ago.

It is the largest mammalian carnivore remaining in mainland Australia, and as such fills an important ecological niche. Females weigh about 12 kg and males 15 kg.

The dingo has been regarded as a serious predator of domestic stock since early European settlement in Australia.

Since European settlement domestic dogs have been released or escaped into the environment to cross with dingoes. These hybrids or crosses are colloquially called wild dogs (*Canis lupus familiaris*). Often the term wild dog covers both dingoes and dingo hybrids.

Wild dogs predate on livestock, native fauna and domestic pets.



Legal requirements

The dingo is a restricted invasive animal under the *Biosecurity Act 2014*. It must not be moved, kept, fed, given away, sold, or released into the environment without a permit. The wild dog must not be moved, fed, given away, sold, or released into the environment without a permit.

The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO).

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Red, ginger and sandy-yellow are the dominant coat colours, though dingoes can also be pure white, black and tan or solid black.

It is not difficult to distinguish between most dingoes and hybrids. The presence of domestic genes is suggested by broken colours—brindling and patchiness in the normally pure white feet and chest patch and sable colouration (black hairs along the back and sides).

Dingoes have a more heavily boned skull and larger teeth (especially the canine) than domestic dogs of similar size.

Life cycle

Dingoes have only one breeding season per year (usually April to June), whereas domestic bitches have two or more oestrus cycles per year. However, unless seasons are particularly favourable, or human sources of food are intentionally or inadvertently provided, feral domestic dogs are unlikely to successfully rear two litters per year.

After a nine-week gestation, dingo pups (usually four to six) are born in a hollow log or cave den. Bitches tend to use the same den each year. Pups are suckled at four to six weeks and generally weaned at four months. When large enough to travel, pups are taken from the den to kills, and other dens may be used. The range of pups is increased as they are moved from den to den. In this way the pups are gradually moved around the bitch's home range.

Independence may occur as early as six months of age when parents abandon them, but this results in high juvenile mortality. Pups that become independent around 12 months appear to disperse voluntarily. Being larger and more experienced, mortality is then usually low.

Where dingoes live alone or in small groups (most pastoral and semi-settled areas), mature females will breed successfully each year.

By contrast, dominant female infanticide results in only one litter being successfully raised each year within groups containing several adult females (e.g. undisturbed areas such as the Simpson Desert). The dominant (alpha)

female will kill all pups of the other females, and then use subordinate females to suckle and rear her litter.

Methods of spread

Dingoes in an undisturbed area generally belong to discrete packs (3–12 members), which occupy long-term, non-overlapping territories. The group rarely moves as a pack—rather, members meet and separate again throughout the day. Dingoes are most gregarious during the breeding season.

There is overlap of home ranges within a group. In contrast, boundaries between groups are more rigid, actively defended and infrequently crossed.

Olfactory communication (smell) is important in dingo social organisation. Dingo droppings are deposited along pads in specific areas where other dingoes will encounter them (creek crossings, intersections of roads and fences).

These 'scent posts' appear to delineate the home range boundary and act as a warning to neighbouring groups and individuals.

This strong site attachment of dingoes is contrary to the notion commonly held by property owners that dingoes will travel large distances to kill stock.

Habitat and distribution

Dingo numbers are believed to be higher today than in pre-European times. This is thought to be due to increased food availability via the introduced rabbit and cattle carcasses, and the development of permanent waters in arid areas of the state.

Dingoes/wild dogs are present in all parts of the state.

The distribution of the wild dog in relation to purebred dingoes varies throughout the state. In far western areas, most dingoes sighted appear to be 'pure', with characteristic white points and broad heads. Closer to settled areas a greater number of feral domestic dogs produce a generally hybrid population. It has been estimated that dingoes are 50% pure in south-eastern Queensland and 90–95% pure in south-western and central Queensland.

Radio tracking studies show dingoes occupy a discrete area known as a 'home range'. The dingo visits the edge of this area frequently.

The home range can vary in size according to the productivity of the country—from 9 km² in rainforest areas to 300 km² on the Nullarbor Plain.

The edge of the home range is commonly associated with a major topographic feature (e.g. an escarpment, a major ridge or stream).

The home range is not used uniformly. Activity is centred on areas with highest food density.

Hunting movement is slow and exploratory, in contrast to frequent rapid movement around the home range boundary.

Pads follow well defined paths and are most likely associated with sociality and home range boundary maintenance. Activity is highest at dusk and dawn.

Diet

Dietary research of stomach content and faecal scats has shown dingoes are opportunistic predators.

Medium-size animals such as kangaroos, wallabies, rabbits and possums consistently form the major part of the dingo diet.

Studies by the Western Australia Agriculture Protection Board show dingoes in undisturbed refuge areas killed and ate kangaroos strictly according to need.

On grazing country, however, 'dingoes harassed, bit or killed sheep in large numbers, often without eating any'. The consumption of these sheep carcasses was the exception rather than the rule. Even kangaroos in these areas were sometimes killed in 'play' type behaviour rather than for food.

Such dietary studies could suggest dingo predation of domestic stock is low. There is, however, a need for caution in using such studies to assess dingo impact on stock.

Grouping increases foraging efficiency and appears necessary to exploit larger prey. Dingoes cooperating in groups are more successful in hunting kangaroos than lone dingoes are. While lone dingoes can easily kill sheep, it is less likely a solitary dingo would successfully attack a calf in the presence of a defending cow.

Disease threat

Dingoes are vectors of canid diseases (e.g. distemper, parvovirus) and parasites. The hydatid parasite *Echinococcus granulosus* is a major problem of dogs and domestic stock. It can cause illness and occasionally death in humans.

The dingo could pose a serious risk if the exotic disease rabies was introduced to Australia.

Beneficial considerations

The establishment of watering points during post-European settlement has resulted in a huge increase in the kangaroo population, with consequent strong pasture competition with domestic livestock.

Though it is widely accepted that sheep production is near impossible in the presence of dingoes, many cattle producers will tolerate dingoes because of their believed suppression of kangaroo numbers.

Research has shown that in some cases the dingo has the potential to mitigate population growth of native species during abundant seasons and it could also be an important limiting factor for many feral animal populations (e.g. feral pigs and goats).

There is some evidence that destruction of the dingo could cause increases in other pests to the grazing industry and result in widespread degradation of environmentally sensitive areas. However, this has not been proven.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.





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Feral cat

Felis catus



A descendant of the African wild cat (*Felis silvestris lybica*), the common 'house' cat (*Felis catus*) has now been domesticated for about 4000 years. Although the domestic cat has a long history of association with humans, it retains a strong hunting instinct and can easily revert to a wild (feral) state when abandoned or having strayed from a domestic situation.

Semi-feral cats live around dump sites, alleys or abandoned buildings, relying on humans by scavenging rubbish scraps and sheltering in abandoned structures. The true feral cat does not rely on humans at all, obtaining its food and shelter from the natural environment.

Legal requirements

The feral cat is a restricted invasive animal under the *Biosecurity Act 2014*. This is a cat that is not domesticated. The feral cat must not be moved, fed, given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.



At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

The feral cat differs little in appearance from its domestic counterpart; however, when in good condition, the feral cat displays increased overall muscle development, especially noticeable around the head, neck and shoulders, which gives the animal a more robust appearance. The average body weight of male feral cats is 3–6 kg, while females weigh 2–4 kg. Body weights vary with condition, with some extremely large specimens documented.

Australian feral cats are predominantly short-haired, with coat colours that range between ginger, tabby, tortoiseshell, grey and black. White markings may be present on the feet, belly, chest and throat; completely white feral cats are extremely rare. In established populations, coat colours are the result of a natural, genetically selective process. Terrain, predators and the ability to capture prey limit coat colours to those that provide the most suitable camouflage and cause a predominance of these colours in subsequent offspring. Ginger cats are more likely to be found in the semi-arid and desert areas, while grey and black specimens generally predominate in scrub and more heavily timbered habitats.

The feral cat is most active at night, with peak hunting activity occurring soon after sunset and in the early hours before sunrise. At night the cat displays a distinctive green eyeshine under spotlight, making it easily distinguishable from other animals. During the day it will rest in any number of den sites, which may include hollow logs, dense clumps of grass, piles of debris, rabbit burrows, and even the hollow limbs of standing trees.

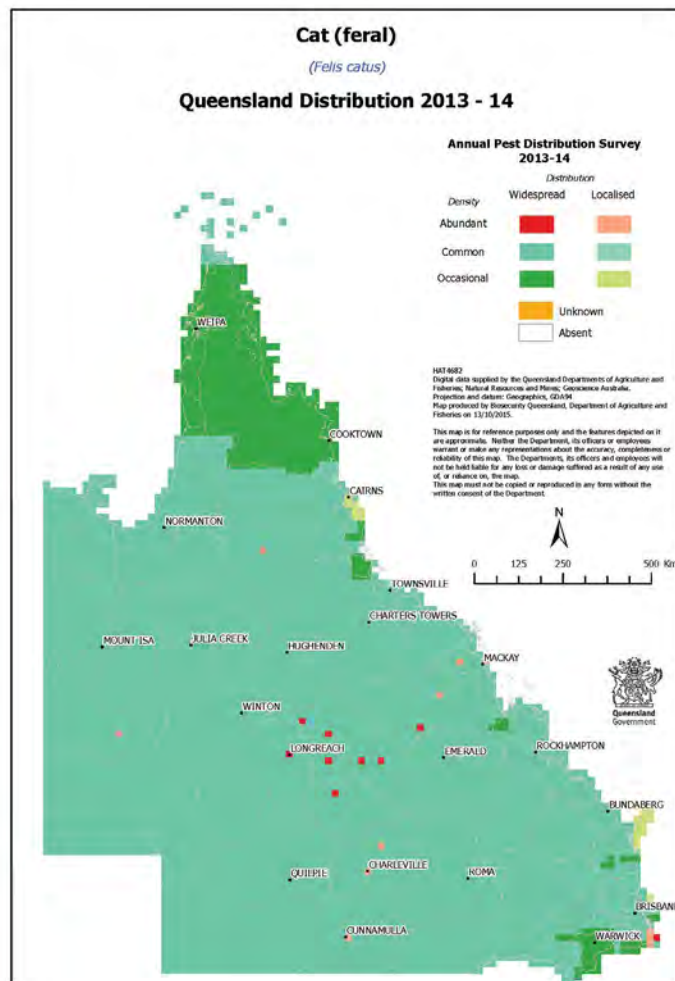
The most obvious and characteristic field signs of feral cats are their scats (droppings). Unlike the domestic cat, the feral cat does not bury its scats, but leaves them exposed at prominent sites to warn other cats of its territorial boundary.

Life cycle

Male cats attain sexual maturity at about 12 months, whereas females are capable of reproduction at approximately seven months. Annually, and under ideal conditions, an adult female can produce up to three litters—each of usually four kittens, but varying from two to seven.

As the breeding instinct is triggered by the increasing length of daylight, litters are less frequent in winter. Most reproduction occurs during the spring and summer months, and is generally limited to two litters per year. Birth follows a gestation period of 65 days, and kittens may be reared in a single den site or may be frequently shifted to other sites within the female's home range. Family and litter bonding begin to break down when the

Map 1. Distribution of feral cats in Queensland



kittens are approximately seven months old. The female's ability to bear litters does not decrease with age, so reproduction continues for the course of her life.

Habitat and distribution

There is some evidence to suggest that the cat was present in Australia long before European settlement. This may have occurred as a result of Dutch shipwrecks and regular visits to northern Australia by early South-East Asian vessels as long as 500 years ago.

Post-settlement dispersal resulted from cats straying from areas of early colonisation. In the late 19th and early 20th centuries, large numbers of cats were purposely released in many rural areas to combat plague numbers of rabbits. Unwanted cats continue to be released into urban and rural areas by irresponsible pet owners.

The feral cat is now present Australia-wide, thriving under all climatic extremes and in vastly different types of terrain.

Feral cats maintain stable home ranges, the sizes of which depend upon the relative abundance of food and the availability of suitable den sites. Dominant male cats may have territories of up to 8 km², while the territories of females are smaller and may even be halved while kittens are being reared.

Scent glands are present on the chin, at the corners of the mouth, and in the anal region. Territorial boundaries are maintained by scent marking with the cheek glands,

pole-clawing, urinating and leaving exposed faecal deposits. Although feral cats are often thought of as being solitary animals, studies show this behaviour is generally limited to hunting activities. At other times feral cats display a degree of social interaction that peaks during the breeding season. Group behaviour has been observed in semi-feral populations, and it has been suggested that such behaviour is exhibited also in feral populations.

Groups usually comprise several related adult females, their young of both sexes, and an adult male—whose range may include other groups of females. Young females usually remain in a group, while young males either leave or are driven from the group as they reach sexual maturity.

Impacts

Effects on wildlife

The energy expended by an adult male cat requires it to consume 5–8% of its body weight in prey per day, while females raising kittens require 20%. Based on these figures, one study concluded that 375 feral cats on Macquarie Island would consume 56 000 rabbits and 58 000 sea birds per year. Where present on the mainland, rabbits may comprise up to 40% of a feral cat's diet. Cats are successful as a control mechanism only when rabbit densities are low. At other times cat predation does little to halt the build-up or spread of rabbit populations; rabbits merely help to support a larger number of cats. When seasonal shortages of rabbits occur there is a corresponding rise in the number of native animals taken by cats.

The feral cat is an opportunistic predator, and dietary studies have shown that small mammals, birds, reptiles, amphibians, insects and even fish can be taken as prey. Cat predation is particularly harmful in island situations, and a number of species have become extinct due to the introduction of cats by early sealers and lighthouse keepers. On the mainland, native animals—which already suffer due to the destruction of their habitats by man and other introduced animals—may be endangered further by cat predation. Actual competition for prey can cause a decline in the numbers of native predatory species such as quolls, eagles, hawks and reptiles. Not only do native animals bear the brunt of predation, but they also suffer the effects of a parasite that reproduces only in the intestine of the cat. This disease (toxoplasmosis) is particularly harmful to marsupials, which may develop blindness, respiratory disorders, paralysis, and suffer the loss of offspring through abortion and stillbirths.

Exotic disease—rabies

Due to their widespread distribution, feral cats may prove to be a major vector for this fatal viral disease if it ever enters Australia. Overseas studies have revealed that wounds inflicted by rabid cats are more dangerous than those caused by rabid dogs. While the bites of rabid dog are generally inflicted on the arms and legs, the cat attacks the head of its victim, biting and clawing viciously. These head and facial bites reduce the time taken for the virus to enter the central nervous system, lessening the chance of success from subsequent remedial treatment.

Control

Managing feral cats

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by feral cats. This fact sheet provides information and some options for controlling cats.

Exclusion fencing

Fencing is the only feasible method of control when special areas need protection from cats. Feral cats have been successfully prevented from climbing over netted fences that use an electrified wire mounted 15 cm from the top and 10 cm outward from the fence. Non-electrified fencing should incorporate a netted ceiling, or a curved overhang, which prevents the cat from climbing straight up and over the fence.

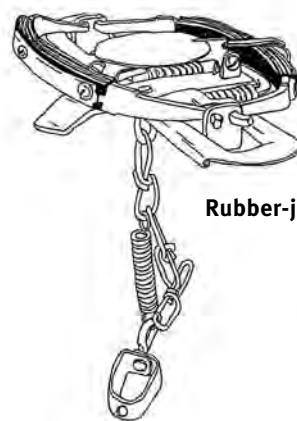
Trapping

Rubber-jawed, leg-hold traps (see below) can be laid in the same manner as they are laid for dingoes and foxes. Leg-hold traps can work well with true feral cats, which would normally avoid the live-capture box traps.

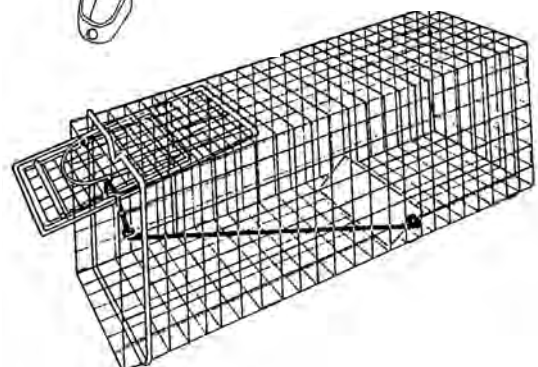
Ideal sites are those where territorial markers, such as faecal deposits and pole-clawing, are noticed. Tuna fish oil has shown some success as an attractant; however, feral cats seem more readily attracted to a site by some visual stimulus such as a bunch of bird feathers hung from a bush or stick.

Semi-feral urban cats are easily trapped in wire 'treadle-type' box traps (see diagram at right). Attractants/lures may be of meat or fish and should be placed so that they cannot be reached through the wire and be retrieved by clawing.

A number of local governments hire cat traps for the purpose of removing stray and feral cats in urban situations.



Rubber-jawed leg-hold trap



Treadle box trap

Lures

Audible recorded lures for feral cats and other predators are available through a number of sources. These recordings mimic the distress call of a small animal and can be used to draw a predator to a bait or trap site.

Shooting

Night shooting is assisted by the cat's distinctive, green eyeshine. Cats have been successfully attracted by the use of a fox whistle.

Poisoning

Fresh meat baits containing 1080 may be used for controlling feral cats under APVMA PERMIT14015. To obtain a copy of this permit visit www.apvma.gov.au.

Only authorised persons can supply 1080 baits to landholders.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



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Feral pig

Sus scrofa



Pigs were introduced to Australia by early settlers. Subsequent accidental and deliberate releases resulted in the wild (feral) population establishing throughout Australia.

Feral pigs cause environmental and agricultural damage, spread weeds and can transmit exotic diseases such as leptospirosis and could spread foot-and-mouth disease.

Legal requirements

The feral pig is a restricted invasive animal under the *Biosecurity Act 2014*. It must not be moved, fed, given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is

called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

An animal ceases being considered an invasive restricted animal (feral) if a person is keeping it and has become a registerable biosecurity entity (RBE) to keep that designated animal. Feral pigs can be considered as designated animals if a person keeps them.



Description

Feral pigs are typically smaller, leaner and more muscular than domestic pigs with well developed shoulders and necks, and smaller, shorter hindquarters.

The body is usually covered in sparse, coarse hair and they have a longer, larger snout, longer tusks, a straighter tail and narrower back than domestic pigs. Feral pigs are mostly black, buff-coloured or spotted black and white.

Growth potential is similar to domestic pigs, although harsh environmental conditions tend to stunt development. Adult female feral pigs usually weigh 60–75 kg, while males usually weigh 90–110 kg. Older boars (razorbacks) can have massive heads and shoulders and a raised and prominent back bone that slopes steeply down to small hams and short hind legs. Some boars develop a crest or mane of stiff bristles extending from their neck down the middle of their back.

Life cycle

Under good seasonal conditions, breeding occurs all year and sows can produce two litters per year. Adult females have a 21-day oestrus cycle, with a gestation period of about 113 days, producing a litter of 4–10 piglets. Sows can make nests of available vegetation just before farrowing. Nests sometimes have a domed roof and are usually less than 2 km from available water. Piglets normally spend the first 1–5 days of life inside the nest, with the sow nearby. Weaning occurs after 2–3 months. Sexual maturity is reached when sows weigh about 25 kg, usually around six months of age.

Mortality of juveniles is high if the mother's dietary protein intake is low (up to 100% mortality in dry seasons). Adult mortality does not vary as much with seasonal conditions, but few animals live more than five years.

Social behaviour

Feral pigs are generally nocturnal, spending daylight hours sheltering in dense cover. Pigs are omnivorous, eating plants and animals and are extremely opportunistic feeders, exploiting any temporarily abundant food.

They prefer green feed and will eat grains, sugarcane and other crops, fruit and vegetables. They root extensively for tubers, worms and soil invertebrates.

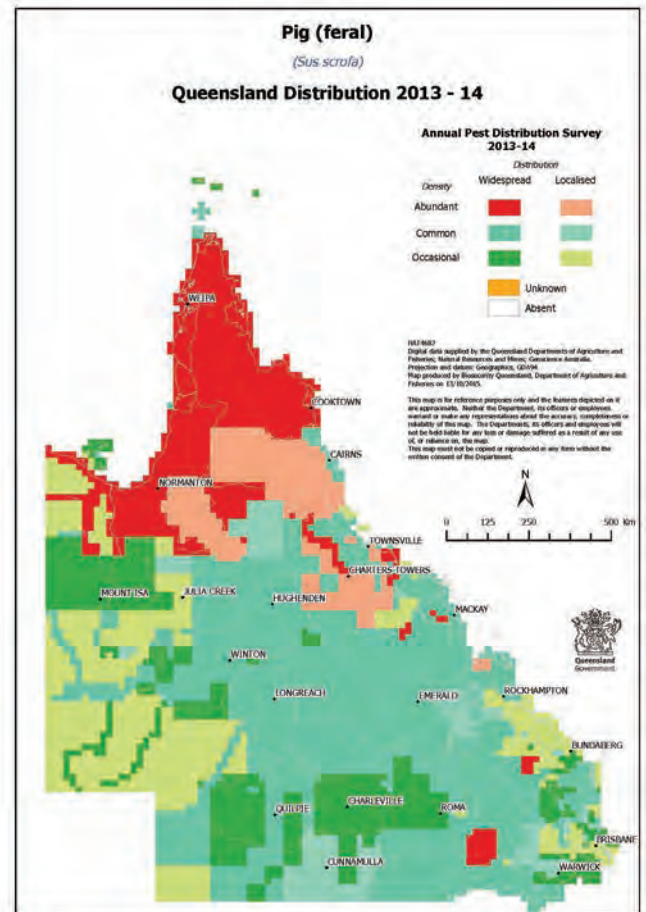
Feral pigs have relatively high energy and protein requirements, particularly during pregnancy and lactation and often move to other parts of their home range during pregnancy.

Habitat and distribution

Feral pigs are found in all habitat types in Queensland. The greatest concentrations of feral pigs are on the larger drainage basins and swamp areas of the coast and inland. In hot weather, pigs need to remain near water.

Population estimates can be achieved by spotlighting, aerial survey or the use of motion cameras.

Map 1. Distribution of feral pigs in Queensland



Evidence of feral pigs includes fresh digging or rooting of the ground, tracks and faeces on and off pads, mud or hair at holes in fences where pigs have pushed through, wallows, tusk marking and mud rubs on trees and fence posts and nests in vegetation made by sows before farrowing.

Female and juvenile pigs usually live in small family groups with a home range of 2–20 km². Adult males are typically solitary, with a home range of 8–50 km². Range size varies with season, habitat, food availability and disturbance. Herds of 400 pigs have been recorded in Cape York.

Impacts

Pigs can damage almost all crops from sowing to harvest, starting with uprooting seed and seedlings to feeding on or trampling mature crop.

They feed on seed, sugar cane and grain crops (except safflower), fruit (especially banana, mango, papaw, macadamia and lychee) and vegetable crops. Research has shown feral pigs can take up to 40% of lambs.

Pastures are damaged by grazing and rooting and pigs can also transport weeds. Wallowing pigs damage and foul the water in tanks and bore drains and silt up troughs. They can also damage fences and dam walls.

Pig activity degrades water quality and the habitat for small terrestrial and aquatic animals. It also creates erosion and allows exotic weeds to establish. Predation of native fauna does occur and examination of faeces has shown remains of marsupials, reptiles, insects, and ground-nesting birds and their eggs.



Feral pig wallow



Feral pig rooting



Feral pig damage to river banks



Feral pig damage to sugar cane

Diseases and parasites

Feral pigs can carry many infectious diseases and internal and external parasites. Some are endemic (already present), while others are exotic to Australia.

Many of the diseases can spread to domestic pigs, other livestock and humans. Feral pigs can transmit sparganosis, melioidosis, leptospirosis, Q fever and brucellosis to humans.

To prevent contracting these diseases it is advisable to either avoid handling feral pigs or use suitable protective clothing (mask, goggles, strong rubber gloves and plastic apron and boots) to minimise contamination with blood, urine and faeces. Rare or undercooked meat should not be eaten; thoroughly cook meat to avoid contracting pathogens. Raw feral pig meat and offal should not be fed to dogs as dogs can be infected with swine brucellosis. Dogs infected with swine brucellosis can also transmit the disease to humans.

Control

Managing feral pigs

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by feral pigs. This fact sheet provides information and some options for controlling feral pigs.

Feral pigs are difficult to control because they are primarily nocturnal, breed rapidly, are generalist omnivores and

have large home ranges and thus control programs need to be conducted over a wide area (often including several properties) to be effective.

Effective control requires an integrated, collaborative approach where all stakeholders participate in planning, implementation and evaluation of the actions taken.

Fencing

Though an expensive option, fencing can offer successful pig control especially for high value crops grown on small areas. Research has indicated that the most successful pig-proof fences are also the most expensive.

The most effective pig-proof fences use fabricated sheep mesh held close to the ground by plain or barbed wire and supported on steel posts.

Electrifying a conventional fence greatly improves its effectiveness if used before pigs have established a path through the fence.

Pigs will often charge an electric fence and unless the fence incorporates fabricated netting they often successfully breach the fence.

For crop protection or to avoid lamb predation, pig-proof fences need to be constructed before the pigs become a problem. Once pigs have adjusted to feeding on grain or lambs in a particular paddock fencing may be ineffective.

Trapping

Trapping is an important technique that is most useful in populated areas, on smaller properties (<5000 ha), and where there are low pig numbers. Trapping can be particularly useful in 'mopping up' survivors from baiting programs. It is most successful when food resources are limited.

Trigger mechanisms for pig traps can be made pig-specific and therefore pose little danger to wildlife or domestic animals.

Advantages

- This is the safest form of control and can be safely undertaken on closely populated areas.
- It's flexible and can be incorporated into routine property activities, making economical use of labour and materials.
- Carcasses can be safely disposed.
- Traps can be moved and re-used; good trapping makes use of opportunities as they arise.
- Normal pig behaviour is not altered, which allows a greater number of the total population in an area to be targeted.
- More humane to pigs and non-target species.
- The number of animals removed can be easily monitored.

Disadvantages

- Can be time consuming and expensive to construct and maintain.
- Must be checked regularly.
- Not practical for large-scale control.
- Some pigs are trap shy.

Tips

- Stop all activities that will disturb normal feeding (i.e. do not undertake any shooting or dogging).
- Pre-feeding (i.e. ensure that pigs are visiting trap and consuming bait) prior to activating traps is an essential part of successful trapping.
- Feeding sites should be placed where feral pigs are active (i.e. water points, holes in fences, areas containing old carcasses on which pigs have been feeding).
- Bait for traps must be food that pigs usually eat in that area. Pigs feeding on one crop (e.g. sugarcane) will often not take to alternative foods. However, new, novel baits are sometimes attractive (e.g. fermented grains).
- The trap can be built around the feeding site, with feeding within the trap undertaken for several nights before it is set.
- Set the trap every night and check each day. If the trap cannot be checked daily then shade and water must be provided.
- Continue to trap until no more pigs are caught. A change of bait can be tried. Again, feed for one or two nights before re-setting the trap.

- Traps may be left permanently in locations used by pigs and can be utilised when fresh signs of pigs appear.
- If the trap is to be moved, start feeding at the new site before re-locating the trap.

Design

There are several trap designs but all are principally an enclosed area with one-way gates (see Figure 1).

The main area of the trap can be any shape and be made from materials on the property. The best material is steel mesh with a grid 100 × 100 mm, with a minimum height of at least 1.5 m. Star pickets need to be placed no more than 1.5 m apart and imbedded far enough to ensure that adult pigs cannot push them over or lift them up out of the ground.

Alternative trap entrances

Funnel entrance

Formed by the two ends of the mesh forming a funnel, the ends are tied together at the top with wire or rope. The pig moves through the funnel forcing the bottom of the mesh ends apart and once it is in the trap the ends spring back together (see Figures 1 and 2).

Tripped gate entrance

A side-hinged gate is pulled shut by springs and is held open by many systems that can be triggered to allow the gate to swing shut. Often trip wires or other systems are used; most of these systems are not selective for feral pigs and can be triggered by any animal attracted to the bait. Once triggered the trap is no longer effective in trapping pigs.

Pig-specific trigger

By far the simplest and most effective trigger system has the gate held open by a bar (often a branch or piece of wood) which is hooked over the wire on the gate and on the side panel (see Figure 3). For a close up of the pig specific trigger (see Figure 4).

Pigs rooting for feed in the trap lift the bar allowing the gate to swing shut. The specific feeding habit of pigs insures they are the only animals that lift the trigger bar.

The gate may be latched to prevent pigs from opening the door once triggered. However, this will prevent more pigs pushing their way in to join those inside.

Shooting

Shooting pigs by helicopter is effective in areas where pigs exist in reasonable numbers and are observable from the air.

Ground shooting is not effective in reducing the pig population unless intense shooting is undertaken on a small, isolated and accessible population of pigs.

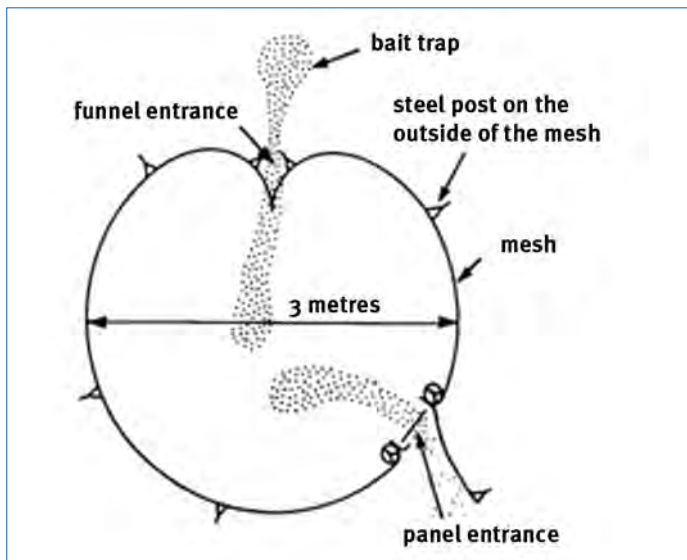


Figure 1. Alternative trap entrances – funnel entrance

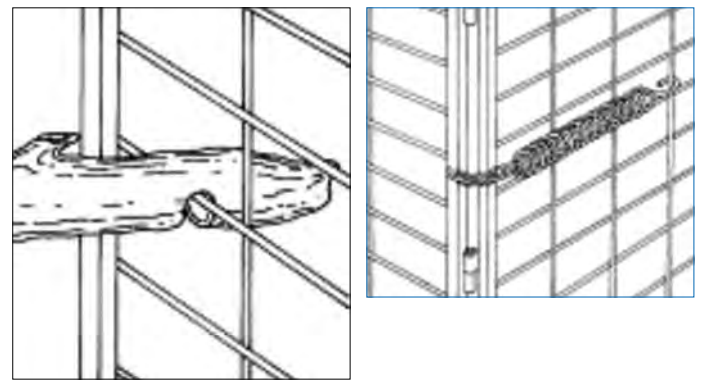


Figure 4. Close up of pig-specific trigger

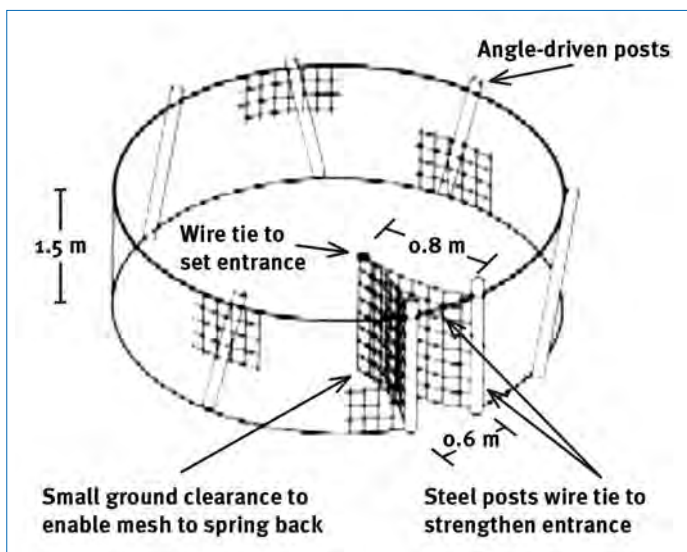


Figure 2. Silo trap with funnel entrance (14 m of silo mesh diameter about 4.5 m)



Feral pig trap

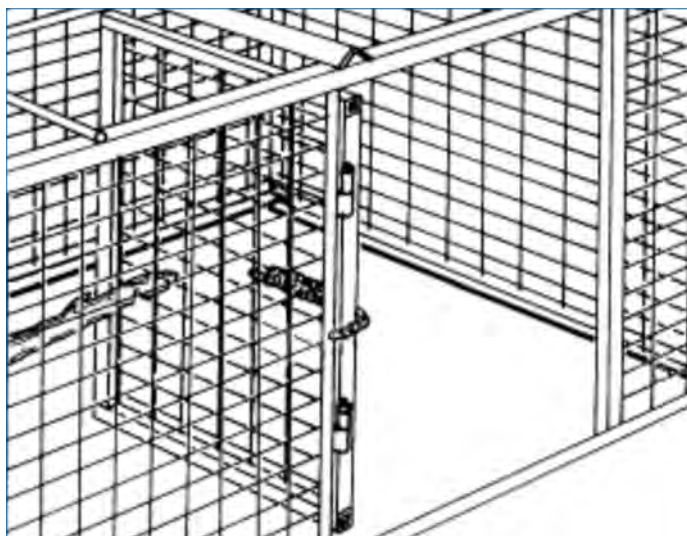


Figure 3. Pig-specific trigger



Trapped feral pigs



Hog hopper – pig specific bait station

Poisoning

Poisoning is the most effective control method available that can quickly reduce a pig population.

Sodium fluoroacetate (1080) can only be supplied by people approved under the Health (Drugs & Poisons) Regulation 1996 for the purpose of controlling declared pest animals. Your local government office should be able to assist you.

Pre-feeding is the most important step in ground-based poisoning operations. Free feeding with non-poisoned bait should be performed for several days prior to laying poisoned baits.

By selecting bait wisely, landholders can be species-selective in their poisoning program and avoid many of the unintentional effects of secondary poisoning.

Bait material such as fermented grains are very attractive to pigs. It is a good idea to establish a free feeding routine so that pigs are the only animals feeding, which helps to keep other non-targets away from the feeding site.

Other options (like pig-specific feeders) are now commercially available, and can assist in reducing non-target species access to bait. Other options include burying baits; feral pigs are one of the few animals that will dig up bait.

Aerial poisoning is also available and typically used for broadscale control in western and northern regional areas. Bait is distributed from an aircraft. This is particularly useful for covering large, remote, areas or restricted ground access. Aerial poisoning is a proven and cost-effective method for reducing pig populations.

A phosphorous-based poison is also available for use in Queensland.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.

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Feral pig exclusion fencing



This fact sheet is developed with funding support from the Land Protection Fund.

Fact sheets are available from Department of Agriculture and Fisheries (DAF) service centres and our Customer Service Centre (telephone 13 25 23). Check our website at www.biosecurity.qld.gov.au to ensure you have the latest version of this fact sheet. The control methods referred to in this fact sheet should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, DAF does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.

Rabbit

Oryctolagus cuniculus



Rabbits are one of Australia's major agricultural and environmental animal pests, costing the country between \$600 million and \$1 billion annually. They compete with native animals, destroy the landscape and are a primary cause of soil erosion by preventing regeneration of native vegetation.

Legal requirements

The rabbit is a restricted invasive animal under the *Biosecurity Act 2014*. It must not be moved, kept, fed, given away, sold, or released into the environment without

a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.



Pet rabbits

Introducing and selling rabbits in Queensland is not permitted (penalties apply). Limited numbers of permits for domestic rabbits are only available from Biosecurity Queensland for research purposes, public display, magic acts or circuses. Before a permit is granted, a number of guidelines need to be fulfilled.

Description

Rabbits are small mammals around 34–45 cm in length usually grey brown with pale belly fur, other colours include piebald, black and ginger. They have long ears 10 cm long and big eyes. They have long hind legs with hind feet measuring 9–11 cm and short front legs. The tail is fluffy brown with white underneath, 4–8 cm. Adult rabbits usually weigh around 1–2.1 kg. The male is called a buck, the female a doe and her young are called kittens.

Life cycle

Does (females) are pregnant for 28–30 days, but are able to mate within hours of giving birth. The average litter is 3–4 kittens but varies from two in a young doe, up to eight or more in a mature doe, and depends on the amount and quality of food available.

Five to six litters are possible in a good season. Young does can breed at four months of age if conditions are suitable.

Habitat and distribution

Rabbits prefer to live in warrens as protection against predators and extremes in temperature. However, they will survive in above-ground harbours such as logs, windrows and dense thickets of scrub (e.g. blackberry and lantana) or under built harbour, old sheds and machinery etc.

In newly colonised areas without warrens, rabbits tend to live in ‘scrapes’ (or ‘squats’)

Rabbits are adaptable and sometimes live in close association with people. They live in built environments such as:

- in and under buildings
- old machinery and storage containers
- in old dumps.

In rural environments rabbits frequently live in:

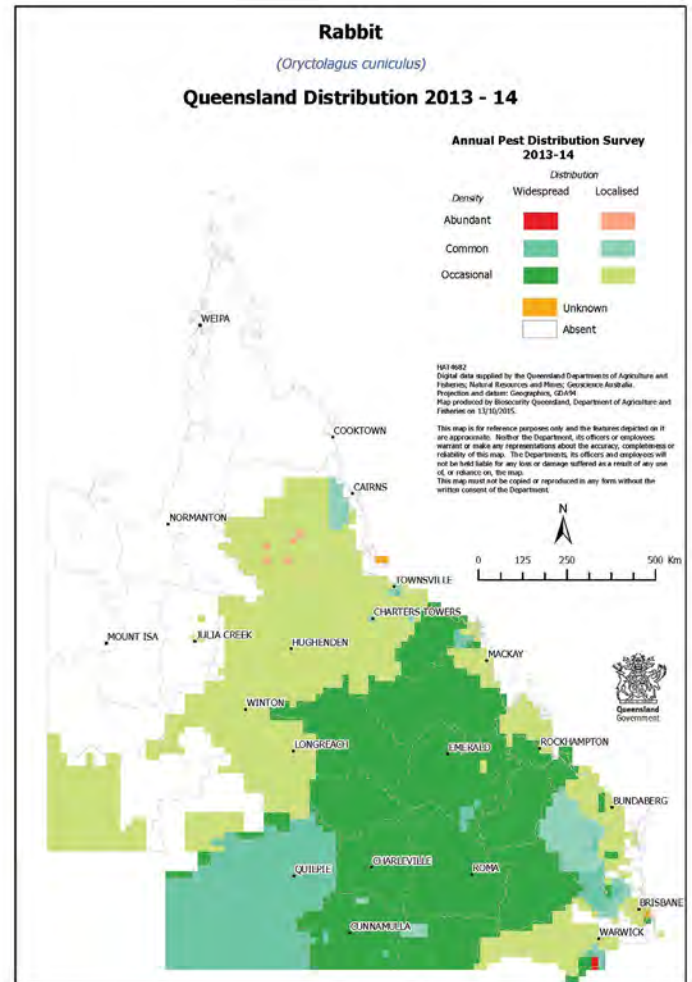
- felled timber and associated windrows
- tussock grasses and rocky areas
- warrens (if soils are easy to dig).

Control

Managing rabbits

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by rabbits. This factsheet information and some options for controlling rabbits.

Map 1. Distribution of rabbits in Queensland



Effective rabbit control cycle

Rabbit control is best done as a joint exercise involving all land managers in the district. Integrated control methods, such as fumigating, ripping warrens and harbour destruction, are essential for the continued long-term reduction of rabbit numbers. Cost-effective, long-term results can be achieved in rabbit control by following a combination of the methods outlined below.

Prevention and early detection

Rabbits will generally eat around 15% of their body weight per day—approximately 250 g. This compares dramatically with the averages for stock—sheep and cattle eat around 3% of their body weight per day. So even a low number of rabbits can be removing large amounts of livestock feed.

For effective long-term rabbit control, concentrate on destroying source areas. Source areas will all have well-established warrens or ready-made structures that are cool and provide protection from predators. A source area must also have a good supply of green feed during the cooler seasons.

Manual control

Harbour destruction

Where there is abundant surface harbour, a high proportion of rabbits may live above ground rather than in underground warrens. Rabbits can make their homes in windrows, dense thickets of shrubs (such as blackberries and lantana) and even in old machinery.

To eliminate these above-ground breeding areas, it may be necessary to:

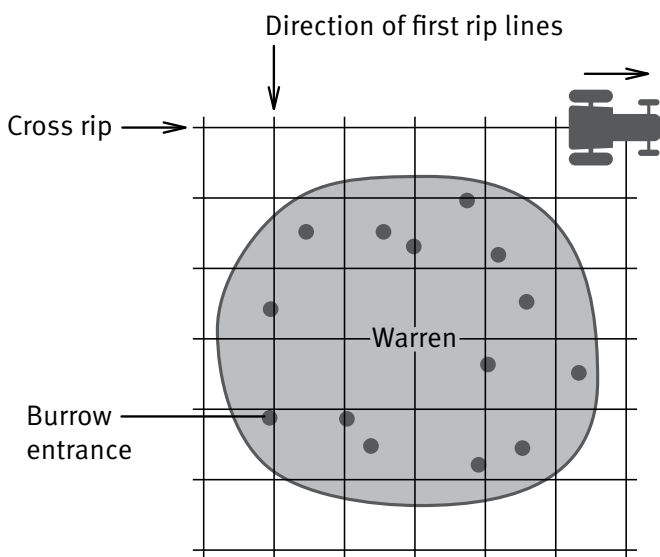
- burn windrows and log piles
- remove noxious weeds through chemical and physical control
- remove movable objects (such as old machinery) from paddocks.

Sometimes removing harbour can expose warrens underneath. If this happens, the warrens need to be ripped.

Mechanical control

Warren ripping

In areas where rabbits live in warrens, ripping is the most effective method of long-term control. Ripping is so successful because warrens can rarely be reopened and rabbits are unable to recolonise these areas.



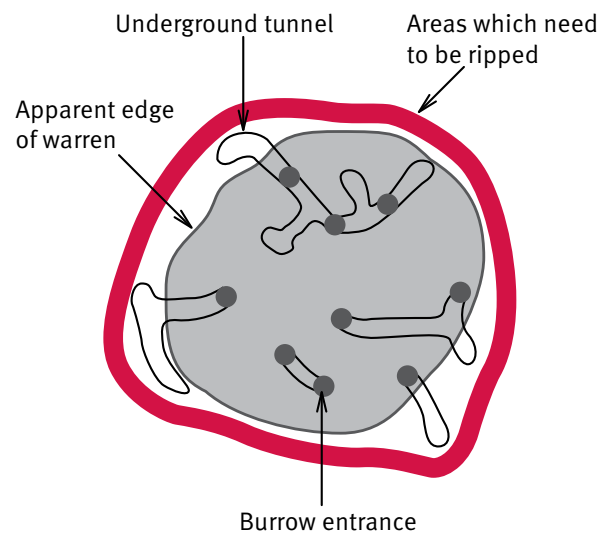
Direction to rip warrens (illustration courtesy Will Dobbie)



Tyne for ripping warrens (photo courtesy Mark Ridge)

To get the best results it is important to chase as many of the rabbits inside the warren as possible. Dogs can be used to drive rabbits into the warren before ripping starts.

The aim of ripping is to completely destroy the warren. It involves using a tractor with a tynd (sharp-pronged) implement—one tyne or many—that rips through the warren and collapses it. Larger tractors and dozers are more appropriate for properties with many warrens as they are able to move faster and rip wider.



Extent to rip warrens (illustration courtesy Will Dobbie)

Obviously, ripping is not suitable for warrens located underneath buildings or on steep rocky country. In such cases, other methods (poison baiting, releasing virus or fumigating burrows) should instead be used to reduce rabbit numbers. Warrens should then be either filled in or covered to stop rabbits from re-establishing. Burrows can be blocked with small boulders or rocks.

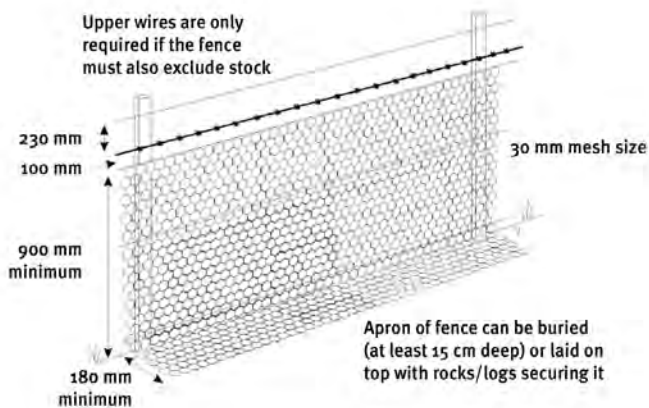


Rock blocking rabbit hole

Exclusion fencing

Rabbit exclusion fences are built with the aim of keeping rabbits out of a particular area. It is appropriate for small, high-value areas that require protection. A fully fenced area will only remain rabbit-free in the long term if all rabbits are removed from the enclosed area after fencing and the fence is regularly maintained and checked for holes.

Electric fencing is a cheaper alternative, but it is not a complete physical barrier and is also prone to damage from other pest animals and stock.



Exclusion fence for rabbits (illustration courtesy DEWHA)

A rabbit-proof fence should be made of wire mesh netting (40 mm or smaller) and needs to be at least 900 mm high. The netting should also be buried to depth of at least 150 mm. Gates into the fenced area need to be rabbit-proof as well.

Trapping

Trapping is an extremely labour-intensive control method and requires a skilled operator to set the traps to successfully capture rabbits.

If you do plan to trap rabbits on your property, common sense and respect for animal welfare are essential. While there are currently no strict guidelines for the use of traps in Queensland, it is an area of growing concern for animal welfare advocates.

Cage trap

A cage trap has a lever that closes the cage when a rabbit steps on it. The rabbits are lured into the cage with bait—usually diced carrot. Traps need to be disabled and left open for two or three nights with bait leading into the cage. This entices rabbits to enter. A trap can be set once a rabbit has consumed a trail of bait all the way into that trap. Traps should be checked and emptied regularly—usually a couple of times a night.

This effective and humane technique is most useful for removing any remaining rabbits from places like hay sheds and after the shed has been fenced to prevent additional rabbits from entering and leaving. Free-feed then trap, and keep the shed rabbit-proof to prevent rabbits recolonising.

Barrel trap

A barrel trap is designed specifically for rabbits. It is cylindrical, made of light mesh, and is about 1 m long and 15 cm in diameter. The trap has one open end with two

hinged trap doors along its side. The open end is placed in the burrow, and the hinged gates close and trap the rabbit after it enters from the burrow.

The trap can be left in the burrow entrance for a number of days. However, it must be checked at least daily so that if a rabbit has been caught it does not suffer and animal welfare responsibilities are met.



Barrel rabbit trap in hole

Biological controls

Rabbit hemorrhagic disease virus (also known as rabbit calicivirus disease)

RHDV is a virus specific to rabbits which works by infecting the lining of the throat, lungs, gut and liver.

RHDV relies primarily on direct rabbit-to-rabbit contact in order to spread. High rabbit numbers are therefore needed before this control method will be effective.

After RHDV has infected an area, it is important to use another method for follow-up control to increase the likelihood that the population is eradicated before it is able to develop resistance and increase its numbers again.

Resistance to RHDV depends primarily on the age of the rabbit. Therefore, it is better for RHDV to go through a rabbit population after rabbits have bred and the young are old enough to be affected by the virus. Rabbits that survive RHDV develop antibodies against the virus. Breeding females can also pass these antibodies on to the young (through antibodies in their milk), conferring temporary protection on rabbits up to 12 weeks old.

Myxomatosis

Myxomatosis is no longer produced as a laboratory strain but field strains are still known to recur and affect rabbit populations.

RHDV1-K5

Recent research by state and federal agencies has identified a new strain of RHDV (called RHDV-K5) that will aid in controlling rabbits that have immunity to current strains.

Shooting

Shooting is most useful when used to 'mop up' after other control methods (such as ripping). To get the best results, shoot at the time of day when rabbits are active. This is usually in the early morning, late afternoon or at night. The best and most economical firearm to use is a .22 calibre rifle.

If your property is within an urban area, you will need to comply with local government regulations and the *Police Powers and Responsibilities Act 2000*, which restrict the use of firearms.

Poison baiting

Baiting is not effective as a sole control method and will not eradicate an entire rabbit population. Numbers will quickly increase again, and you will have to continue baiting year after year with no permanent overall change in the rabbit population.

Rabbits can also become ‘bait shy’ and this method becomes less and less effective over time. Ideally, baiting is best used either before ripping/fumigation to reduce a population, or after ripping/fumigation as a ‘mop-up’.

Baiting works best when rabbits are not breeding. During breeding season the majority of the population feeds over a larger-than-normal area, and it is the young rabbits that are most likely to take baits. While numbers will be reduced, animals of breeding age are not likely to be affected.

1080—sodium fluoroacetate

Pre-feeding is required when using 1080 because rabbits will not readily take new feed. The poison-free bait should be laid at least three times over a one-week period before the poisoned bait is laid. (1080-impregnated carrot baits are the most common form of bait used.) The practice helps to ensure that, when the poisoned bait is laid, it will be eaten by most of the rabbit population.

1080 can only be supplied through persons authorised under the Health Act. Your local Biosecurity officer or your local government office should be able to assist you.

Pindone

Pindone is an anticoagulant registered for rabbit control. This poison works by preventing blood from clotting. In Queensland, it is not recommended for broadacre use and is mainly used in urban areas and near farm buildings.

Pindone works best when given as a series of small doses/feeds over a period of three days. Although pre-feeding is not essential, it does enhance the bait uptake by shy rabbits as they get used to the feed prior to any poison bait being laid. To be effective, pindone requires multiple feeds so that the poison can build up to fatal levels in the rabbit’s body. Feeding over a number of nights provides plenty of opportunity for most of the rabbit population to consume the required lethal dose. Rabbits poisoned with pindone will usually die within 10–20 days.

Pindone baiting does not work well when there is a lot of green pick around for rabbits.

Poison bait trails

It is important that bait trails are laid properly to ensure the best results. ‘Baitlayers’ make it easier to put out bait trails at the correct rate, and they can be towed behind most 4WD vehicles, quad bikes and tractors.

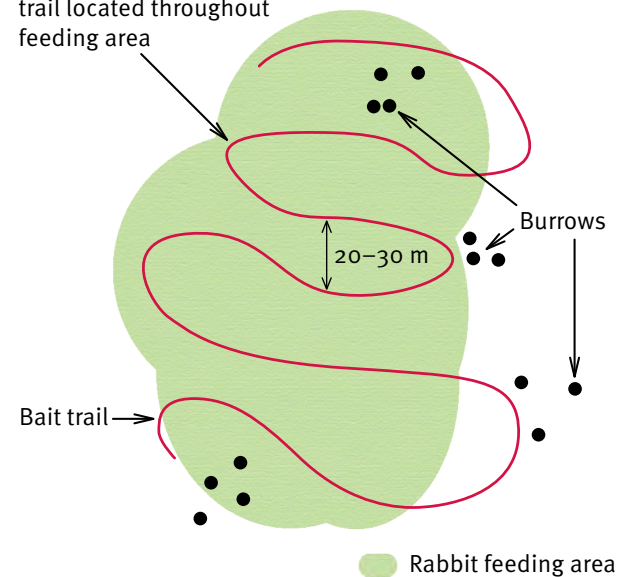
When scratching and laying a trail, consider the following:

- Rabbits like freshly scratched/disturbed soil—this may be because rabbits are territorial and inspect newly disturbed soil, and/or the disturbed vegetation smell attracts them.

- Lay trails around warrens and in the areas where rabbits most often feed.
- Laying trails on slopes and hills requires care—it can cause erosion in some soil types (e.g. granite and traprock). Trails are best laid in a zigzag pattern in steep terrain to minimise erosion.
- A trail that has been scratched for the first feed is easy to follow for the rest of the baiting program.
- The soil should be turned only enough to scratch the surface—don’t plough the ground.
- A trail that has been scratched too deep will spook the rabbits because they will not have full sight of their predators.
- Where vegetation is thick, or it is difficult to find the main feeding areas, lay bait trails in a grid pattern across the site.

As a general rule, avoid crossing the bait trail—it can cause confusion when you try to follow the same trail on subsequent occasions.

Free-feed and poison feed trail located throughout feeding area



Method for laying a bait trail (illustration courtesy Animal Control Technologies)

Bait trails will be most effective if you follow these guidelines:

- Use good quality, non-contaminated bait material. (Simple rule: if you wouldn’t eat it, the rabbit won’t either.)
- Use enough feed to bait all the rabbits in the area. (The pre-feed will give an indication of the potential bait take.)
- Expect a greater uptake of pre-feed and bait material when vegetation is scarce, dried off or soured.
- Ensure that all the preparation equipment is clean and free of any chemical residues or smells—rabbits can be very shy of unusual odours.
- When there are kittens in a warren, lay the bait trail close to the warrens.

Fumigation

Fumigation is labour intensive and time consuming, and is not usually an effective method if used alone. However, as a ‘mop-up’ technique or control method for use in areas

where ripping is not practical (e.g. steep and rocky terrain), it may be a good alternative.

Because this technique relies on directly affecting the rabbits, and does not affect the structure of the warren, it is crucial that as many rabbits as possible are underground when fumigation is carried out. Rabbits usually take refuge in their burrows from mid-morning to mid-afternoon and during hot weather so these are the best times to fumigate. Dogs can also be used to drive rabbits into their warrens.

For best results, fumigation should be carried out in two stages—initially, before the breeding season starts (as this reduces the breeding stock), and then again during the breeding season.

There are two types of warren fumigation—static and pressure. In Queensland, static fumigants are a more popular and safer option for controlling rabbits and will be explained below.

Static fumigation

This method is easy to use, and time- and cost-effective. Static fumigation comes in the form of aluminium phosphide (phosphine) tablets, which can be purchased from most agricultural suppliers. These tablets are small and round (about the size of a marble), and weigh 3 g. Trade names for phosphine include Pestex®, Quickphos® and Gastion®. General directions for the use of phosphine tablets appear below, but always refer to the manufacturer's specific recommendations for use.

To fumigate warrens using phosphine tablets:

1. Find all warren entrances—both active and inactive.
2. Cut back the warren entrance at right angles using a shovel.
3. Separately wrap two tablets in moistened absorbent paper (toilet paper/paper towels).
4. Insert the tablets as far down into the entrance as possible (polypipe and a push rod can be used to help push the tablets down).



Wild rabbit

5. Push some scrunched-up newspaper down the hole to block the entrance and then cover it up with soil and, if possible, a rock.
6. Treat all entrances to the warren (active and inactive) the same way.
7. Check warrens about a week after fumigation and re-fumigate any reopened entrances.

Once in the warren, the moistened tablets react with air to release a toxic gas, which spreads quickly throughout the warren. The phosphine gas itself is invisible and odourless but leakages from the warren can be detected by the smell of ammonia. (This is a safety mechanism that is built into the tablet.) Any leakages need to be blocked immediately.

Shooting

Shooting is most useful when used to 'mop up' after other control methods (such as ripping). To get the best results, shoot at the time of day when rabbits are active. This is usually in the early morning, late afternoon or at night. The best and most economical firearm to use is a .22 calibre rifle.

If your property is within an urban area, you will need to comply with local government regulations and the *Police Powers and Responsibilities Act 2000*, which restrict the use of firearms.

Further information

For further detailed reading information on specific rabbit control techniques or costing your rabbit control please refer to Rabbit control in Queensland; a guide for land managers. Download from the Biosecurity Queensland website at www.biosecurity.qld.gov.au

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.



Escaped or dumped pet rabbits

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