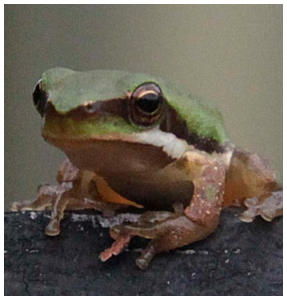
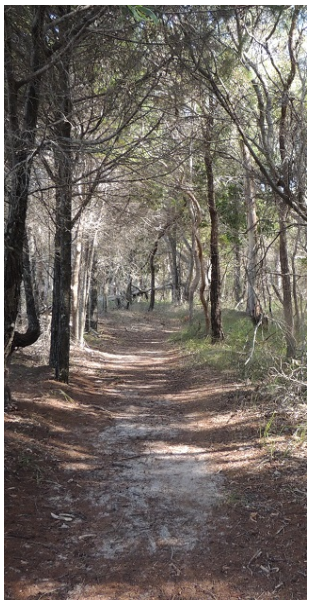




Redland City Council

Coochiemudlo Island wetland

Wallum frog assessment

Final Report

February 2019

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Project background

Coochiemudlo Coastcare Group has raised concerns with Redland City Council over the ecological health of the Coochiemudlo wetland; a small but ecologically significant wetland on the east coast of Coochiemudlo Island, in southern Moreton Bay. The wetland lies immediately east of the former Coochiemudlo Island landfill, which was an active but unmanaged landfill site between 1972 and 1994. The landfill has subsequently been capped and converted to a community recreation site - Laurie Burns Recreation Area. There are concerns within the community that leachate from the former landfill has contaminated waters within the wetland, reducing the ecological values of the wetland for native fauna and flora.

The wetland represents potentially suitable habitat for three wallum-dependent frog species; the wallum sedge frog (*Litoria olongburensis*), wallum froglet (*Crinia tinnula*) and wallum rocket frog (*Litoria freycineti*). All three species are all listed as vulnerable under the Queensland *Nature Conservation Act, 1992* (NC Act) and the wallum sedge frog is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). All three species have relatively specific water chemistry requirements, only breeding in ephemeral waterbodies with low pH, high tannin and low nutrient levels (Ehman, 1997; Meyer *et al.,* 2006). As a result, these species are particularly susceptible to indirect degradation of water quality.

To investigate the concerns, Redland City Council has commissioned GHD to undertake a comprehensive review of environmental risk posed by the former landfill. This includes surface water monitoring within the wetland area and groundwater monitoring up- and down-gradient of the former landfill. To support the assessment, Council has also commissioned an ecological assessment of the wetland. This aims to document the current ecological condition of the wetland and consider the potential occurrence of wallum frog species, based on the condition of habitats. This report presents the results of that ecological assessment.

1.2 Purpose and scope of this report

This report intends to provide context to the water quality and environmental risk assessment that is currently being undertaken by GHD on behalf of Redland City Council. The report details the methods and findings of the ecological assessment of the Coochiemudlo wetland. The report has a narrow focus; specifically investigating the value of habitats within the wetland for the wallum sedge frog, wallum froglet and wallum rocket frog. The assessment included the following scope items:

- A desktop review of environmental databases and government mapping layers
- A review of relevant literature and information on the ecology of the wetland and resident amphibian populations
- A field survey to document the quality and distribution of potential wallum frog habitats within the Coochiemudlo wetland based on the nature and condition of vegetation and waterbodies and their value as breeding and foraging sites for wallum-dependent frog species.
- Targeted surveys to detect wallum frog species including the wallum froglet, wallum sedge frog and wallum rocket frog and preliminary ecological assessment of the Coochiemudlo wetland based on visual observations.

1.3 Study Area

Coochiemudlo Island is located approximately 1 km north-east of Victoria Point in southern Moreton Bay. Coochiemudlo wetland is located on the north-eastern side of the island. For the purposes of this assessment, the Study Area refers to the extent of the Coochiemudlo wetland and surrounding woodland vegetation as mapped in Figure 1. The Coochiemudlo wetland is bounded to the north by Innis Street, to the south by James Street, to the west by the Laurie Burns Recreation Reserve and Coochiemudlo Waste Transfer Station and to the east by the Coochiemudlo beachfront.

1.4 Limitations

The survey was commissioned at the end of the breeding season for *Litoria olongburensis.* Surveys were undertaken immediately to minimise any delay in appropriate environmental management of the site. The late timing of the survey meant conditions were not ideal for detecting all wallum frog species, as breeding and calling activity was generally lower than it would have been if the survey had been undertaken earlier in the breeding season.

This report: has been prepared by GHD for Redland City Council and may only be used and relied on by Redland City Council for the purpose agreed between GHD and the Redland City Council as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Redland City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in Section 1.2 of the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

1:4,000 (at A4)

0 20 40 60 80 100

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Redland City Council
Coochiemudlo Island
Frog Survey Report

Job Number	41-27018
Revision	0
Date	07 Dec 2018

Location

Figure 1

G:\41\27018\GIS\Maps\MXD\41_27018_088_coochie_Location_rev0.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRME: Cadastre (2017), WMS Imagery (2015), Roads (2018); GA: Mainlands, Watercourse Areas (2007); GHD: Site Boundary (2018). Created : xml

2. Methods

2.1 Approach

A combination of desktop assessments and field surveys were used to document the habitat values and likely occurrence of wallum frog species within the Coochiemudlo wetland.

2.2 Desktop assessment

A desktop assessment was undertaken to collate information on the ecological values of the Coochiemudlo wetland. This involved an assessment of government databases and mapping layers and a review of relevant literature.

2.2.1 Database and mapping searches

The following government databases and mapping sources were reviewed to obtain information on the ecological values of the Coochiemudlo wetland:

- **Protected Matters Search Tool:** The Commonwealth Department of Environment and Energy's Protected Matters Search Tool (PMST) was used to identify nationally listed species and communities that are predicted to occur within a 2 km radius of the approximate centre of the Study Area.
- **Wildlife Online database:** The Queensland Department of Science, Information Technology and Innovation (formerly DSITI; now part of DES) Wildlife Online database was searched to retrieve historical records of flora and fauna species historically recorded within a 2 km radius of the approximate centre of the Study Area.
- **Biomaps:** This mapping tool developed by DSITI (now part of DES) was used to review specific locations, collection date and details of records of species of conservation significance.
- **Regulated Vegetation Map:** The Queensland DNRME Vegetation Management Regional Ecosystem (RE) and Remnant Map spatial layer (version 10.1) was viewed to determine the extent, type and status under the VM Act of REs mapped within the Study Area.
- **Regional Ecosystem Map:** The Queensland Herbarium (DES) Regional Ecosystem Map (Version 10) was viewed to determine the extent, type and biodiversity status of REs mapped from 2015 imagery within the Study Area.
- **Essential Habitat Map:** The Queensland DNRME Essential Habitat Map spatial layer (version 6.0) was viewed to determine if vegetation within the Study Area has been identified as essential habitat for a conservation significant species of wildlife listed under provisions of the NC Act.
- **Species Profile Search:** The DES Species Profile Search was undertaken to obtain spatial data records for conservation significant species intersecting the Study Area. The search was also undertaken to gain an understanding of the location and collection date of any protected plant records in proximity to the disturbance footprint.

2.2.2 Literature review

The following reports were reviewed to identify relevant environmental and ecological values of the Study Area

- Caneris (1997) Coochiemudlo Island Melaleuca wetland fauna survey; prepared for Redland City Council by Adrian Caneris.

- Friend and Associates *et al.,* (2004) Coochiemudlo Island Land Management Plan, prepared for Redland City Council by Rob Friend and Associates, EPM Consulting, John Smout Social Planning and Verge Urban Landscape Architects.
- Green, (2016) Melaleuca wetlands, Coochiemudlo Island Fauna Survey 2016, prepared for Coochiemudlo Island Coastcare and Redland City Council by Ronda Green
- Deveco, (2017) Review of Environmental Issues in the Catchment of the Coochiemudlo Island Melaleuca Wetland, prepared for Coochiemudlo Island Coastcare by Deveco Pty Ltd.

2.2.3 Community consultation

Consultation was undertaken with members of the Coochiemudlo Coastcare group including Vivienne and Graham Roberts-Thomson and David Paxton on 20 March 2018. This involved requests for information on historical frog records and the history of land management at the Coochiemudlo wetland.

2.3 Field survey

Field surveys of the Coochiemudlo wetland were undertaken over two days and nights in March 2018. These comprised habitat assessments and targeted surveys for amphibians.

2.3.1 Field survey conditions

The field surveys were undertaken on 20 and 22 March 2018, coinciding with the end of the wallum sedge frog's typical calling period, which extends between September and March (DEWHA, 2010). Survey conditions were warm and humid and generally conducive to detecting amphibians, with the qualification that the survey was at the end of the breeding season of many local frog species, and therefore did not coincide with peak breeding and calling activity. Weather conditions on the two survey events are detailed below, using weather data from the nearest Bureau of Meteorology (BOM) weather station – Redland (BOM station 140007).

20 March, 2018: Conditions on 20 March were warm and dry. Temperatures ranged between 20.1℃ and 29.0℃ and only 0.2 mm of rainfall was recorded. The survey was undertaken over 11 hours between 10 am and 9 pm. No rainfall was experienced within the Coochiemudlo wetland during the survey. Individual frogs were occasionally heard calling in the evening.

22 March, 2018: A second survey was undertaken on 22 March, following heavy rainfall the preceding day and night. Temperatures ranged between 19.9℃ and 27.6℃. A total of 43.0 mm of rainfall was recorded on 22 March, with most of this falling in the early hours of the morning prior to the survey. The survey was undertaken over 4 hours between 5 pm and 9 pm. Light rainfall was recorded for a period of approximately 5 minutes during the survey. Moderate numbers of frogs were calling spontaneously in the evening

Field surveys combined a habitat assessment and targeted survey for frogs as detailed below.

2.3.2 Habitat assessment

The suitability of habitats for wallum frog species was assessed, documenting the following characteristics of the Coochiemudlo wetland:

- Validation of the RE mapping using quaternary assessment
- The nature and hydroperiod of the wetland
- The structural complexity and type of aquatic and riparian vegetation
- The level of weed infestation

- The presence of predatory fish species, particularly the introduced mosquitofish (*Gambusia holbrooki*)
- The presence/absence of indicator species for wallum frog habitat – *Drosera spatulata* (a sundew) and *Tenuibranchiurus glypticus* (swamp crayfish)
- Water quality including pH, conductivity, turbidity and presence of tannin
- Presence of suitable microhabitats for each of the wallum frog species:
  - Wallum sedge frog – dense low sedges, ferns and reeds
  - Wallum rocket frog – areas of open sandy substrate adjacent to surface water
  - Wallum froglet – dense reeds and sedges

These were used to map the distribution of potential breeding and foraging habitat for wallum frog species and determine the likelihood of occurrence of each wallum frog species.

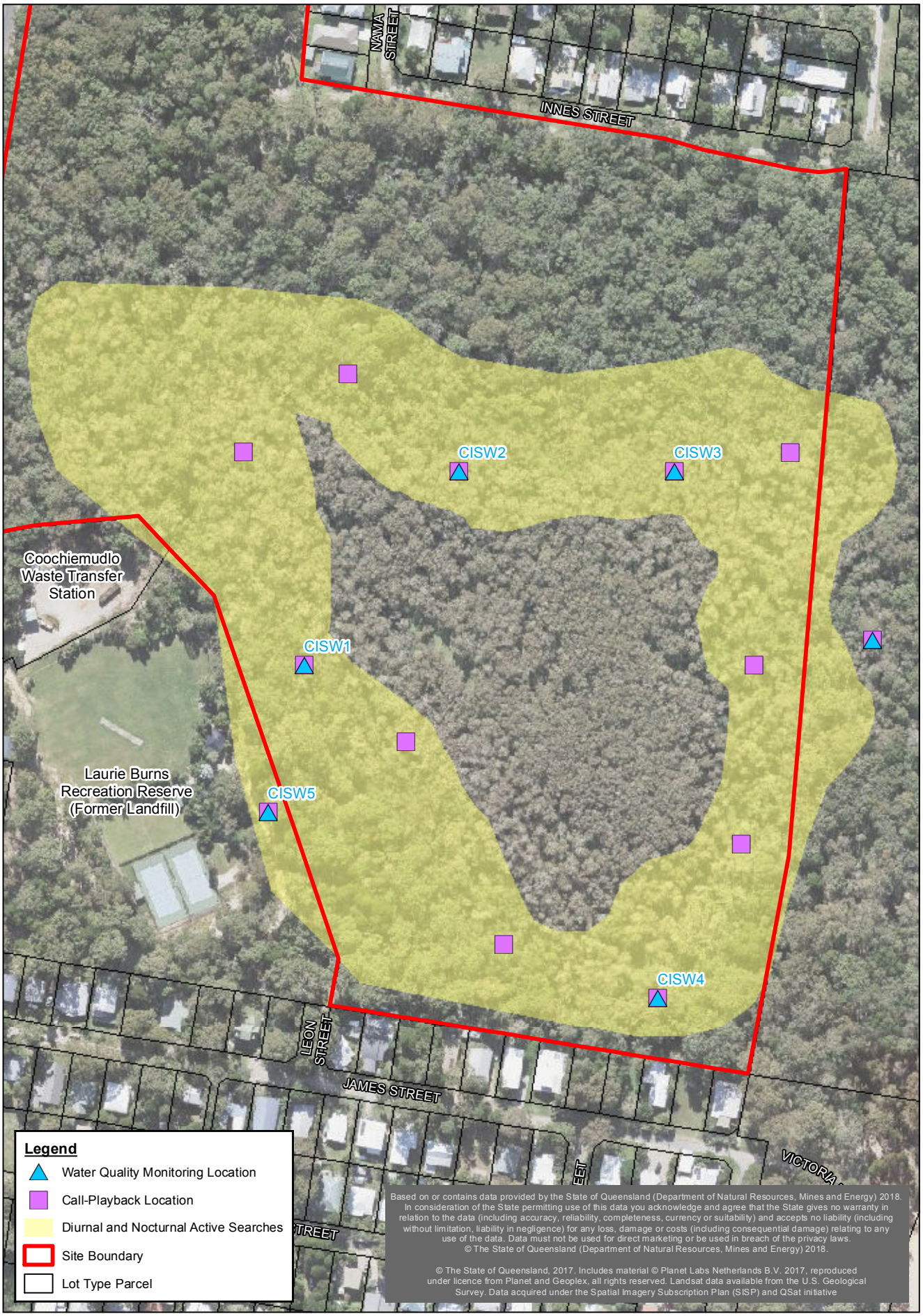
2.3.3 Targeted amphibian surveys

Targeted diurnal and nocturnal surveys were undertaken to detect wallum frogs and other amphibian species within the Coochiemudlo wetland. These combined the following methods:

- Diurnal/nocturnal walking transects were undertaken around the edge of the wetland. Transects intersected the best available areas of wallum frog habitat, at the edge of the wetland where standing water was more ephemeral. Transects were traversed twice each event, during the late afternoon and evening, recording all frogs seen or heard calling. Head torches were used to detect amphibian eye-shine.
- Call-playback was undertaken at 13 point survey locations during the afternoon and evening. This involved broadcasting the calls of the wallum froglet and wallum sedge frog through a handheld speaker. Call playback procedure involved the following steps:
  - An initial listening period of 2 minutes to detect calling frogs
  - Broadcasting the call of the wallum sedge frog for 1 minute
  - A listening period of 1 minute
  - Broadcasting the call of the wallum froglet for 1 minute
  - A listening period of 1 minute

  Each time, the type and approximate number of frogs heard calling were recorded.

The distribution of frog survey effort is shown in Figure 2.



1:2,500 (at A4)

0 20 40 60 80 100

Metres
Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Redland City Council
Coochiemudlo Island
Frog Survey Report

Job Number	41-27018
Revision	0
Date	07 Dec 2018

Distribution of Fauna Survey Effort — Figure 2

G:\41\27018\GIS\Maps\MXD\41_27018_089_coochie_FaunaSurveyEffort_rev0.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRME: Cadastre (2017), WMS Imagery (2015), Roads (2018); GHD: Site Boundary, Call-Playback Location, Active Searches (2018). Created : xml

3. Results

3.1 Desktop assessment results

A review of desktop information indicated that suitable habitat for wallum frog species is mapped within the Coochiemudlo wetland.

3.1.1 Regional Ecosystem mapping

Current (version 10.1) Department of Natural Resources Mines Regional Ecosystem (RE) mapping shows the wetland supports vegetation communities that are among those nominated as specialist habitats for wallum frog species. The distribution of RE communities is shown in Figure 3, and their description and value for wallum frog species is detailed in Table 1.

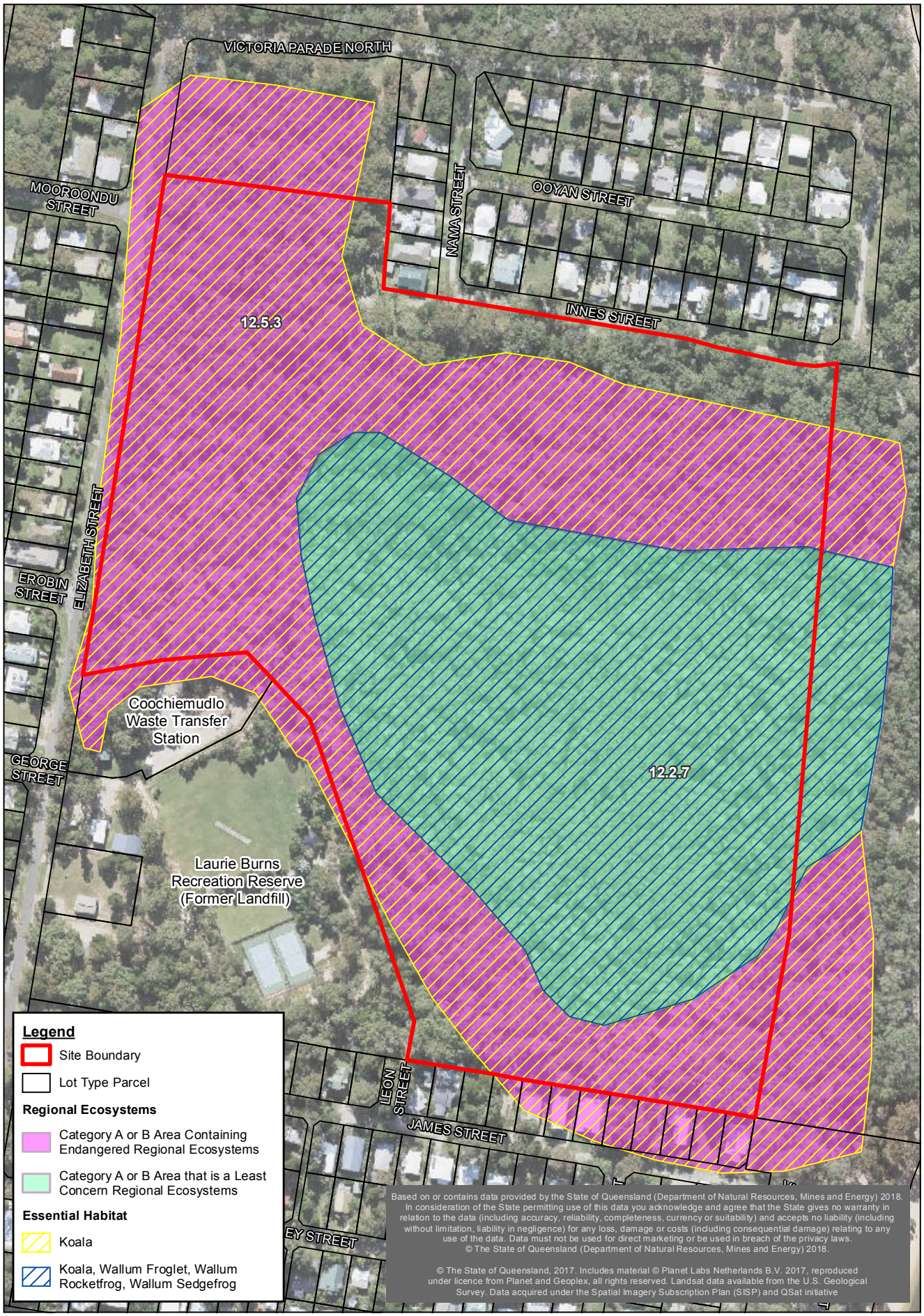
Table 1 Mapped Regional Ecosystem communities within the wetland

RE code	Regional ecosystem description	Value for wallum frogs
12.2.7	*Melaleuca quinquenervia* or rarely *M.dealbata* open forest on sand plains	This RE is listed as known breeding habitat for the wallum sedge frog in the Wallum Sedge Frog Workshop (2010)
12.5.3	*Eucalyptus racemosa subsp. racemosa* woodland on remnant Tertiary surfaces.	Potential non-breeding habitat for wallum frogs.

RE community 12.2.7 is listed as breeding habitat for the wallum sedge frog in the Wallum Sedge Frog Workshop 2010 and the DoEE Species Profile and Threats Database description for the wallum sedge frog. While RE 12.5.3 is not listed as non-breeding habitat for the wallum sedge frog in the 'special values' section of the RE description or in the species habitat requirements listed in the wallum sedge frog, similar RE communities (e.g. 12.2.6) are listed among non-breeding habitat. Given the proximity to breeding habitat and similarity to known non-breeding habitat, this vegetation community has the potential to represent suitable foraging habitat for wallum frog species.

3.1.2 Essential habitat mapping

Essential habitat for seven conservation significant species is mapped within the Coochiemudlo Wetland and surrounding woodland vegetation as detailed in Table 2. The distribution of mapped essential habitat is shown in Figure 3.



1:3,000 (at A4)

0 20 40 60 80 100

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Redland City Council
Coochiemudlo Island
Frog Survey Report

Job Number 41-27018
Revision 0
Date 07 Dec 2018

Mapped Regional Ecosystem Communities and Essential Habitat

Figure 3

G:\41\27018\GIS\Maps\MXD\41_27018_090_coochie_RE_Ehab_rev0.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRME: Cadastre (2017), WMS Imagery (2015), Roads, Essential Habitat v6, Regional Ecosystems v10.1 (2018); GHD: Site Boundary (2018). Created : xml

Table 2 Species with mapped essential habitat within the wetland

Common name	Species	Essential habitat code	EPBC Status	NC Status
Wallum sedgefrog	*Litoria olongburensis*	593	Vulnerable	Vulnerable
Wallum froglet	*Crinia tinnula*	686	-	Vulnerable
Wallum rocket frog	*Litoria freycineti*	603	-	Vulnerable
Koala	*Phascolarctos cinereus*	860	Vulnerable	Vulnerable
Bar-tailed godwit	*Limosa lapponica*	1867	Vulnerable	Vulnerable
Eastern curlew	*Numenius madagascariensis*	1843	Critically endangered	Endangered
Swamp orchid	*Phaius australis*	12722	Endangered	Endangered

3.1.3 Protected Matters search

A search of the Protected Matters database identified 46 conservation significant species listed under the EPBC Act that are predicted to occur within 2 km of the Coochiemudlo wetland. No conservation significant frog species were among those species predicted to occur within 2 km of the Study Area.

The 46 EPBC species predicted to occur within 2 km of the Coochiemudlo wetland comprised:

- 25 bird species including
  - 14 pelagic marine birds (i.e. albatross, prions, petrels)
  - 8 shorebird species (i.e. sandpipers, sand plovers, knots, curlews and godwits)
  - 2 terrestrial species (i.e. regent honeyeater and red goshawk)
  - 1 wetland species (i.e. Australasian bittern)
- 5 mammal species including:
  - 3 whale species (i.e. southern right whale, humpback whale and blue whale)
  - 2 terrestrial mammals (i.e. long-nosed potoroo and grey-headed flying fox)
- 1 fish species (i.e. black rock cod)
- 5 plant species (i.e. hairy joint-grass, stinking cryptocarya, lesser tongue orchid, lesser swamp orchid and quassia)
- 6 marine turtles (i.e. leatherback, flatback, loggerhead, green, hawksbill and olive ridley)
- 4 shark and ray species (white shark, whale shark, grey nurse and green sawfish)

The Protected Matters search results are shown in Appendix A.

It should be noted that this database is a predictive tool, based on bioclimatic modelling and information on species distributions and habitat requirements. It is typically conservative and identifies some EPBC Act listed species that may not occur. The absence of species such as the koala, which has been historically recorded on Coochiemudlo Island indicates the Protected Matters database can also fail to detect species that are known to occur.

3.1.4 Historical records – Wildlife online, Atlas of Living Australia, Biomaps

Six terrestrial conservation significant species have been historically recorded within 2 km of the Coochiemudlo Wetland according to the results of searches of historical databases (i.e. Wildlife Online, Atlas of Living Australia and Biomaps). Species identified in the database searches are detailed in Table 3 and Appendix B.

Table 3 Conservation significant species historically recorded within 2 km

Common name	Species	EPBC Status	NC Status	Records
Koala	*Phascolarctos cinereus*	Vulnerable	Vulnerable	2
Curlew sandpiper	*Calidris ferruginea*	Critically Endangered	Endangered	4
Eastern curlew	*Numenius madagascariensis*	Critically Endangered	Endangered	11
Western Alaskan bar-tailed godwit	*Limosa lapponica baueri*	Vulnerable	Vulnerable	5
Grey-headed flying-fox	*Pteropus poliocephalus*	Vulnerable	-	10
Swamp orchid	*Phaius australis*	Endangered	Endangered	1

Historical records of wallum frog species

No wallum frog species have been historically recorded within the Coochiemudlo wetland or the surrounding 2 km radius according to the historical database searches. The nearest historical records for each of the three wallum frog species known to occur in the region are:

- Wallum sedge frog and wallum froglet – 8 km to the east-south-east at Big Canalpin Swamp on North Stradbroke Island; recorded in the year 2000
- Wallum rocket frog – 8.7 km to the north-east at Lake Kounpee on North Stradbroke Island; recorded in the year 2000

3.1.5 Literature review

A summary of relevant literature is detailed below. This has focussed principally on the ecological value of the Coochiemudlo wetland as habitat for wallum frogs.

Coochiemudlo Islands Melaleuca wetland Fauna Survey report – Caneris 1997

Adrian Caneris was commissioned by Redland City Council to undertake a 3 day, 2 night survey of the wetland in January 1997. Methods included small mammal trapping (220 trap nights), harp trapping, pitfall trapping, spotlighting, bird surveys and active searches for reptiles. Conditions were relatively dry in the survey period. A total of 95 fauna species were recorded including 76 birds, 7 mammals, 7 reptiles and 5 amphibians. No wallum frog species were recorded during the survey. Amphibians recorded included the green tree frog (*Litoria caerulea*), desert tree frog (Litoria rubella), graceful tree frog (*Litoria gracilenta*), eastern sedge frog (*Litoria fallax*), striped marsh frog (*Limnodynastes peronii*) and cane toad (*Rhinella marina*). No conservation significant fauna species were recorded during the survey.

Coochiemudlo Island Land Management Plan – Rob Friend and Associates, EPM Consulting, John Smout Social Planning and Verge Urban Landscape Architecture 2004

Redland City Council commissioned preparation of the Land Management Plan for Coochiemudlo Island in 2004 through a collaboration between Rob Friend and Associates, EPM Consulting, John Smout Social Planning and Verge Urban Landscape Architecture. The Plan included an assessment of flora and fauna values across the island including the Coochiemudlo wetland. The report cited background information provided by Caneris, 1997. The Land Management Plan identified ecological values of the Melaleuca Wetland Precinct and suggested the principal land management objective was conservation of biodiversity. Key land management recommendations to achieve this objective included:

- Implementing an appropriate fire management program
- Undertaking active management of significant environmental weeds within the area
- Managing dumping of garden waste
- Managing stormwater quality that enters the wetlands.

The Land Management Plan also identified the existence of fire hazards in the Wetland Precinct and the need to implement ecological burning of bushland remnants across the island to maintain biodiversity. Cane toads were also identified as a significant issue in the wetland and recommended community cane toad eradication and controls.

Melaleuca Wetlands, Coochiemudlo Island Fauna Survey – Green 2016

Ronda and Darren Green led community-assisted fauna surveys of the Coochiemudlo wetland over four seasons in 2016. The surveys were commissioned by Coochiemudlo Coastcare group to document the resident and migratory bird, reptile, mammal and amphibian communities within the wetland to provide a basis for ongoing environmental management. Surveys included small mammal trapping (480 trap nights), pitfall trapping, bird surveys, active searches, spotlighting, sand tracking and deployment of anabats, remote surveillance cameras and song meters. The survey yielded relatively low results compared with previous surveys of the wetland (Caneris, 1990). A total of 77 species were recorded including 12 native and 2 exotic mammals species, 51 birds, 8 native and 1 exotic reptile species and 2 native and 1 exotic amphibian species. The majority of mammal species were microchiropteran bats. Only two native ground-dwelling mammals were recorded; the northern brown bandicoot (*Isoodon macrourus*) and short-beaked echidna (*Tachyglossus aculeatus*). The low survey results were attributed to dry conditions in the year of survey. No wallum frog species were recorded during the surveys. Amphibians detected were the eastern sedge frog (*Litoria fallax*), striped marsh frog (*Limnodynastes peronii*) and the feral cane toad (*Rhinella marina*). One conservation significant species was recorded during the survey: the grey-headed flying-fox (*Pteropus poliocephalus*), listed as vulnerable under the EPBC Act.

Review of Environmental Issues in the Catchment of the Coochiemudlo Island Melaleuca Wetlands – Deveco, 2017

Deveco Pty Ltd was commissioned by Coochiemudlo Coastcare Group to review water quality assessments of the former landfill site that had been commissioned by Redland City Council. The principal aim of the assessment was to consider the potential for export of contaminants into the adjacent Coochiemudlo wetland. The report was critical of the level of assessment that had been undertaken in previous surveys and the thresholds that had been used to measure adverse impact. The report considered the potential occurrence of the wallum sedge frog (*Litoria olonburensis*) and the need to apply more conservative thresholds, given this species' requirement for breeding sites with low pH (3.53 – 4.61) and intolerance of heavy metal contamination. The report recommended an increased level of surface water monitoring.

Review of James Street Drain Management Report – FRC Environmental

FRC Environmental was engaged by Council in September 2012 to assess potential environmental impacts and environmental permitting obligations required for weed management along a drainage channel on James Street on the southern boundary of Coochiemudlo wetland. A site inspection was undertaken by FRC Environmental on 15 October 2012. This confirmed that an area of weeds and common sedges (*Phragmites australis*) had been removed from the drainage channel and a silt curtain established at its' downstream end. Adjacent weeds including Singapore daisy (*Sphagneticola trilobata*) and umbrella trees (*Schefflera actinophylla*) were prevalent. The actions were assessed against the *Environment Protection and Biodiversity Conservation Act, 1999*, *Nature Conservation Act, 1992*, *Fisheries Act, 1994* and the *Land Protection (Pest and Stock Route Management) Act 2002*. It was determined that no breaches of the EPBC Act or NC Act has occurred. The drainage channel was not tidal and so ongoing removal and management of vegetation did not require permits under the *Fisheries Act*. Impacts on the drainage line were considered unlikely to impact the downstream Moreton Bay Ramsar wetland site. The drainage line was also outside of the area mapped as a High Ecological Significance wetland under the NC Act. Placement of a silt curtain and ongoing physical removal of vegetation from the drainage line were considered to be consistent with the intent of Policy 3 of the Queensland Coastal Plan. Based on the site visit, Singapore daisy was not considered to be affecting the integrity of the downstream wetland. Accordingly, it was considered unlikely that Council would be issued with a pest control notice. The Coochiemudlo wetland was also deemed not to be within the Moreton Bay Marine Park Map. Accordingly, the area would not need to be managed on an ongoing basis under a marine park permit. The drainage line was considered to not meet the requirements of a watercourse under the *Water Act, 2000*. As such, approvals under the Water Act would not be required for ongoing maintenance of the drainage line. While there were no breaches or obligations under existing legislation, the report made the following recommendations for management of the area:

- Taking all reasonable steps to avoid and minimise run-off and sedimentation with erosion and sediment control measures
- Establishing native vegetation within the drain to stabilise sediments
- Establishing a dense cover of native sedges downstream of the drainage line to act as a natural buffer to the wetland
- Routinely removing weeds from the drainage line.

Review of the suitability and toxicity of chemicals used for weed control on Coochiemudlo Island – Griffith University

In May 2015, Redland City Council commissioned Griffith University to undertake a review of the suitability and toxicity of chemicals for safe weed control on Coochiemudlo Island. The assessment was undertaken given the known sensitivity of the environments on Coochiemudlo Island and the need for environmentally sensitive weed control options. The review assessed four herbicides (Brush Off, Starane Advanced, Weedmaster DUO and Amicide 625) and two wetting agents (Synertrol horti oil and LI 700) that have been in use on the Island. For each application, ecotoxicity levels for native animals were assessed at different application rates. One exceedance was noted. 190L of the herbicide Amicide 625 (no longer used by Council) was applied at a rate of 4 mL/L in 2013. While this level was consistent with NSW guidelines, it exceeded the rate of 3 mL/L recommended in Qld. Given the minor scale of the exceedance and the targeted (spot application), the exceedance was considered to cause no environmental harm. Weedmaster DUO was also applied at a rate of 13 mL/L, which although consistent with the recommended rate to target the two hardiest grassy weeds present, a reduced concentration of 10mL/L was considered suitable to reduce total glyphosate use. All other weed

applications were within guideline levels. The report concluded that weed control measures were appropriate and that the minor risks to the environment associated with weed control were far outweighed by the potential environmental damage that would result in the absence of ongoing weed control.

Review of Integrated weed management plan for Coochiemudlo Island – Ecosure 2017

In 2017, Ecosure was commissioned by Council to prepare an integrated weed management plan for Coochiemudlo Island. This was developed in collaboration with residents, concerned citizens, the Quandamooka Yoolooburrabee Corporation and technical specialists to provide a framework to assist stakeholders in actively managing weeds across the island into the future. Consultation was undertaken with community groups as part of the project to identify efficient methods of ongoing weed management notably through collaboration with Coastcare and Bushcare groups. The community consultation established a goal to effectively control and manage weeds with a 10-year timeframe.

To assist the management of weeds across Coochiemudlo Island, the area was divided into five management zones. Coochiemudlo wetland was located within Management Zone 1. The initial assessment noted that while the wetland is in good health, weeds were prevalent along the south-western portion of the site. Weeds were escaping from the Waste transfer station and the conditions of increased nutrient levels were encouraging proliferation of weeds including Guinea grass (*Megathyrsus maximus*), molasses grass (*Melinus minutifolia*), Singapore daisy (*Sphagneticola trilobata*), easter cassia (*Senna pendula var. glabrata*), painted spurge (*Euphorbia cyathaphora*), fishbone fern (*Nephrolepis cordifolia*) and corky passionfruit (*Passiflora suberosa*). The goal for weed management of Coochiemudlo wetland was for a systematic control of weeds in a way that is sensitive to the ecological values of the wetland. Weed control priorities included:

- Establishment of photo reference sites in the south-west corner to assess progress
- Preliminary control of woody and viney weeds using cut, scrape and paint techniques
- Physical removal of exotic ground-cover weeds in preparation of spot-spraying with herbicides
- Reliance on physical removal of weeds with no spraying of herbicides within a 10 m radius of *Phaius australis* individuals.
- Ongoing weed maintenance and spot-spraying should be undertaken in areas of high weed infestation. The south-west corner will require regular maintenance (i.e. every 4-6 weeks for the first year, every 6-8 weeks for year 2, every 8 weeks for year 3, every 8-12 weeks for year 4 etc until the area reaches a point of minimal maintenance.

3.1.6 Community consultation

Consultation with members of the Coochiemudlo Coastcare group provided access to key resources (i.e. Green, 2014; Caneris, 1997) and the following important anecdotal records:

- A historical record of a frog thought to be the wallum sedge frog was identified from the wetland in 2012. A photograph of the frog (Plate 1) was identified by Andrew Amey of the Queensland Museum as *Litoria olongburensis*. This was subsequently considered to be the eastern sedge frog Litoria fallax by Harry Hines of the former Department of Environment and Heritage Protection. Andrew Amey deferred to Harry Hines, given his experience with the wallum sedge frog.
- It was reported that prior to connection with the sewerage mains, residential sewerage along James and Innis Street was directed into the Coochiemudlo wetland. Construction

of the sewerage mains along James Street is reported to have changed the local surface water flows, impeding the northward flow of natural surface waters into the wetland

- It was reported that contractors managing Council roads had recently slashed weeds and sprayed biocides directly into the drainage line that runs north into the wetland from James Street. Discussions with Council note that the activities were consistent with the methods recommended in the James Street drainage management report (FRC Environmental, 2012) and Coochiemudlo Integrated Weed Management Plan (Ecosure, 2017). Herbicide application utilised spot-applications consistent with safe guidelines detailed the Review of the suitability and toxicity of chemicals used for weed control on Coochiemudlo Island (Griffith University, 2015). Notification of weed management activities is typically undertaken via email one week prior to any weed management, communication is made with members of community groups and signage is erected on location during any weed control activities.

Plate 1 Photo of possible wallum sedgefrog (confirmed as eastern sedge frog) observed within the wetland in 2012

3.2 Field survey results

3.2.1 Habitat assessments

The results of the habitat assessment confirmed the presence of suitable breeding and foraging habitat for wallum frog species. Five broad habitats were observed within the Coochiemudlo wetland in terms of their ecological value for frogs:

- Semi-permanent wetland with Melaleuca and open understorey
- Semi-permanent wetland with Melaleuca and tall reeds
- Ephemeral wetland with Melaleuca and low reeds/sedges
- Melaleuca wetland fringe with dense weed infestation

- Eucalypt woodland with shrubby understorey

The distribution of these broad habitats is shown in Figure 4. The ecological values of each habitat type are detailed below.

Semi-permanent wetland with Melaleuca and open understorey

This habitat type is located in the centre of the wetland and coincides with deeper pools that are likely to have greater permanence than surrounding parts of the wetland. Vegetation in this part of the wetland is characterised by a mature canopy of *Melaleuca quinquenervia* and relatively sparse shrub and ground layer. The absence of reeds, sedges and macrophytes in this area, means it provides limited breeding, foraging, calling and perching substrate for the wallum sedge frog (Plate 2). This area does not represent breeding habitat for the wallum sedge frog. The semi-permanent nature of the waterbody at this location is also likely to make it less suitable as a breeding habitat for wallum frog species. However, the wallum froglet, which typically tolerates a broader range of ecological conditions than other wallum frog species (Meyer *et al*., 2006) may utilise the area, particularly during drier years, when this section of the wetland becomes more ephemeral. The abundance of low overhanging canopy vegetation is likely to provide suitable breeding and calling habitat for tree frog species such as the green tree frog (*Litoria caerulea*) and graceful treefrog (*Litoria gracilenta*). The area was not accessible at the time of survey due to the depth of water in surrounding areas. The area is likely to have low-moderate value for wallum frogs, providing breeding habitat only for the wallum froglet. *Potential value for wallum frogs: Low- moderate. Potential breeding habitat for wallum froglet.*

Plate 2 Semi-permanent wetland with Melaleuca and open understorey

Semi-permanent wetland with Melaleuca and tall reeds

A band of dense tall reeds and sedges occurs within the inner fringe of the Coochiemudlo wetland (Plate 3). This corresponds with deeper pools that are likely to have increased permanence. The increased waterbody permanence is likely to reduce the value of this area as breeding habitat for wallum frogs. This area represents suitable breeding habitat for the common eastern sedge frog (*Litoria fallax*).The outer fringes of this habitat intergrade with shallower areas and are likely to have value as foraging habitat for the wallum sedge frog. *Potential value for wallum frogs: Low. Potential foraging habitat for the wallum sedge frog at the outer fringes only.*

Plate 3 Semi-permanent wetland with Melaleuca and tall reeds

Ephemeral wetland with Melaleuca and low reeds/sedges

The outer fringes of the Coochiemudlo wetland supports a band of ephemeral waterbodies that are likely to represent potentially suitable breeding habitat for wallum frog species. The area has a canopy of *Melaleuca quinquenervia* but also has a dense ground layer of low sedges and reeds (Plate 4). The wetland in this area is likely subject to periodic cycles of wetting and drying in response to local rainfall and surface water flows. Low sedges in this area provide calling, breeding and feeding sites for the wallum sedge frog and the complex ground layer provides suitable refugial cover and breeding sites for the wallum froglet. The wallum rocket frog is typically reliant on the availability of open substrate for calling. Only limited microhabitats were observed for this species. Waterbodies in this habitat type generally displayed characteristics favoured by wallum frog species, with clear, tannin-stained water on sandy substrate. Waterbodies appear to have suitable hydrology, providing breeding pools with relatively short hydroperiods. The area has the potential to provide breeding and foraging habitat for all three wallum frog species. Preliminary water quality testing indicated that pH and other water chemistry parameters are within the broad tolerances of the species. More detailed monitoring is being undertaken to assess the suitability of local water quality parameters. *Potential value for wallum frogs: Potentially suitable breeding and foraging habitat for the wallum sedge frog, wallum froglet and to a lesser extent the wallum rocket frog.*

Plate 4 Ephemeral wetland with Melaleuca and low reeds/sedges

Melaleuca wetland fringe with dense weed infestation

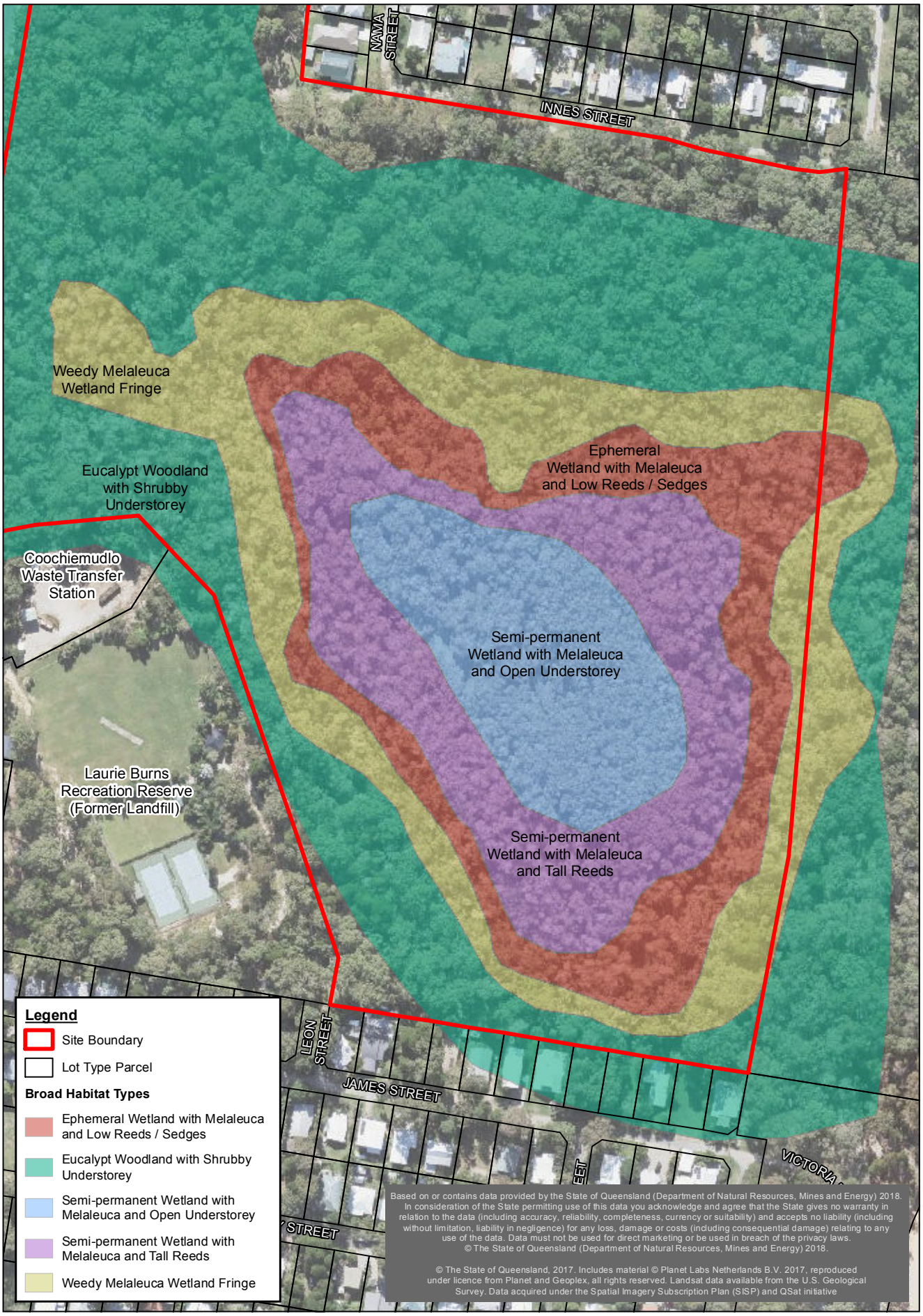
The outer edges of the Melaleuca wetland have been degraded to varying levels by encroachment by environmental weeds (Plate 5). Ephemeral waterbodies occur in this area and would provide breeding sites for frog species. However the level of weed infestation is likely to exclude wallum frog species from this area. Singapore daisy (*Sphagneticola trilobata*) was the most abundant and widespread weed species observed. Other dominant weeds included fishbone fern (*Nephrolepus cordifolia*), silverleaf desmodium (*Desmodium uncinatum*) and signal grass (*Urochloa decumbens*). Other weeds such as balloon cotton bush (*Gomphocarpus physocarpus*), castor oil plant (*Ricinus communis*) and umbrella trees (*Schefflera actinophylla*) were observed in lower densities. A range of mixed garden escapes were observed along the southern fringes of the wetland, immediately north of James Street and east of the Laurie Burns Recreation Area. The eastern fringes of the wetland were overgrown with monkey rope vine (*Parsonsia straminea*). Although this is a native species, it is growing in a weedy habit and is likely to limit the ecological values of the wetland for frogs and native plant species in this localised area. Wallum frog species are generally intolerant of weeds (Meyer *et al.,* 2006). The occurrence of weeds is typically an indication of elevated soil nutrient levels that are unsuited to wallum frogs. *Potential value for wallum frogs: Limited.*

Plate 5 Melaleuca wetland fringe with dense weed infestation

Eucalypt woodland with scrubby understorey

The outer edges of the Melaleuca wetland are bordered to the north, south and west by mixed Eucalypt woodland (Plate 6). This area had a mature canopy dominated by scribbly gum (*Eucalyptus racemosa*), Queensland blue gum (*Eucalyptus tereticornis*) and swamp mahogany (*Lophostomen suaveolens)*. This area had a complex understorey supporting a range of native shrub and fern species. The absence of substantial waterbodies means this area has limited value as breeding habitat for wallum frogs. Areas that occur closer to the wetland represent potential foraging habitat for wallum frogs. Small depressions would provide soaks and seeps typically used as breeding sites by small fossorial frog species such as Pseudophryne and Uperoleia species. *Potential value for wallum frogs: Potential foraging habitat for wallum frogs.*

Plate 6 Eucalypt woodland with shrubby understorey



1:2,500 (at A4)

0 20 40 60 80 100

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Redland City Council
Coochiemudlo Island
Frog Survey Report

Job Number	41-27018
Revision	0
Date	07 Dec 2018

Distribution of Broad Habitat Types

Figure 4

G:\41\27018\GIS\Maps\MXD\41_27018_092_coochie_BroadHabitatTypes_rev0.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRME: Cadastre (2017), WMS Imagery (2015), Roads (2018); GHD: Site Boundary, Broad Habitat Types (2018). Created : xml

3.2.2 Frog survey results

Five amphibian species were recorded in field surveys of the Coochiemudlo wetland and surrounds:

- Eastern sedge frog (*Litoria fallax*)
- Striped marsh frog (*Limnodynastes peronii*)
- Green tree frog (*Litoria caerulea*)
- Eastern banjo frog (*Limnodynastes dumerilii*)
- Cane toad (*Rhinella marina*)

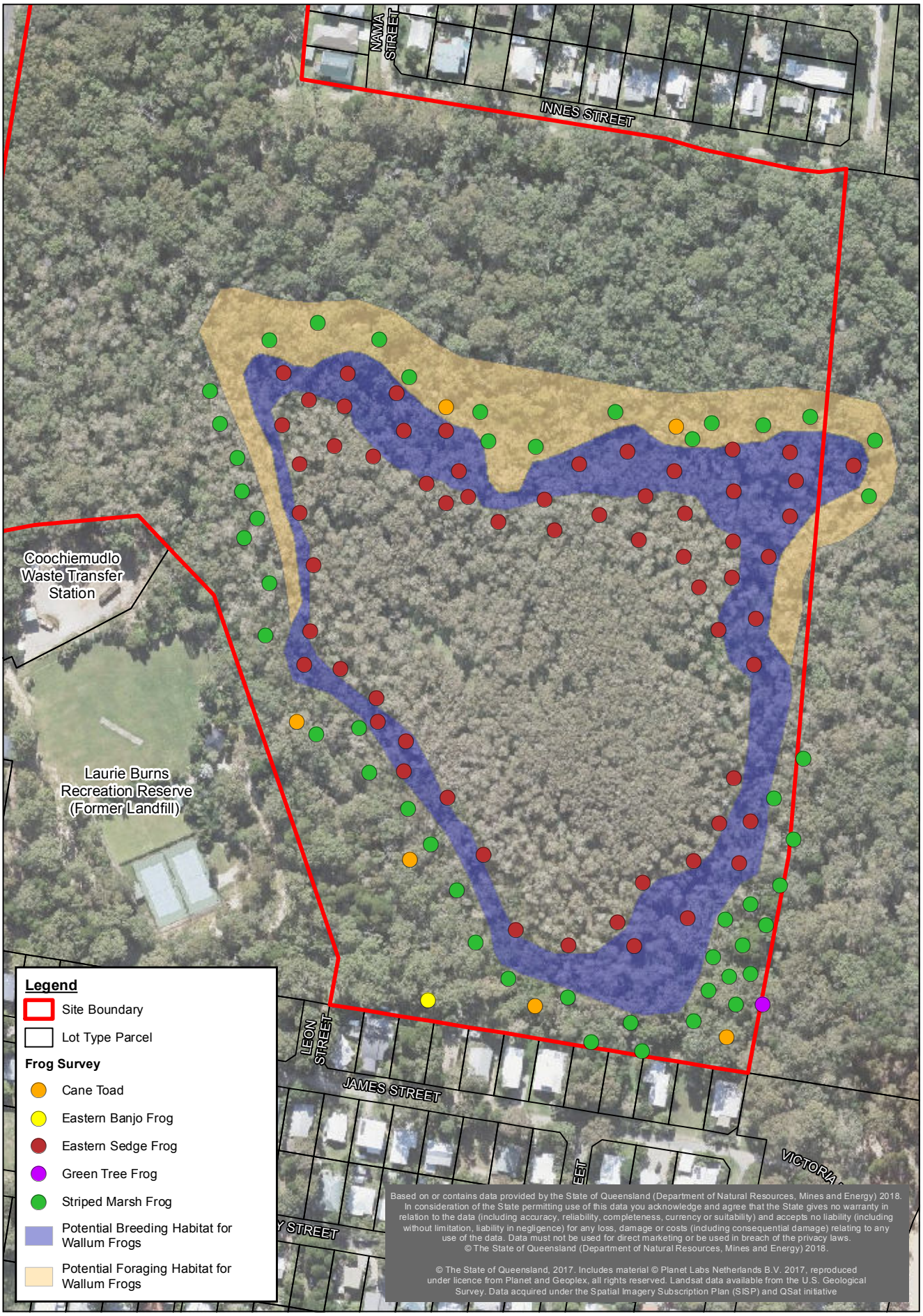
Most frogs were detected from calls. Frogs were calling on both survey nights. Calling activity was limited on the first night of survey, with only small numbers of individuals calling due to drier conditions. Larger numbers of frogs were calling on the second night of survey, following heavy rainfall earlier that morning. The eastern sedge frog and striped marsh frog were the most abundant species recorded. The general distribution of frogs recorded during the field survey is shown in Figure 5. Large numbers of striped marsh frogs were heard calling within the inundated fringes of the wetland, particularly on the second night of survey. A number of striped marsh frogs were also observed moving across roads and gardens adjacent to the wetland. Eastern sedge frogs were ubiquitous throughout the wetland wherever reeds and sedges were present. An individual green tree frog was heard calling from the south-east corner of the wetland and an eastern banjo frog were heard calling from a garden along James Street. Only small numbers of cane toads were observed during the survey. All individuals were small adults. No juvenile or metamorph toads were observed. No wallum frog species were recorded during the surveys. Suitable breeding and foraging habitat for wallum frogs (Plate 4, Plate 7) was observed in a narrow band around the wetland and to its north (Figure 5).

3.2.3 Water quality

Visual observations suggest water quality is generally favourable for wallum frog species. Suitable breeding sites with clear tannin stained ephemeral waterbodies were observed along the fringes of the wetland (Plate 7). Visible evidence of water pollution was observed in the wetland immediately north of James Street, on the southern end of the wetland (Plate 8). Scum was floating on the water in this location. Water quality sampling has been undertaken at five locations across the wetland and will be reported separately. Preliminary surface water chemistry parameters tested on the day of survey indicate pH levels were generally within the range tolerated by wallum frog species (i.e. < 6.0 (Meyer *et al.,* 2006). However, they were higher than the optimal pH range (i.e. 3.53 – 4.61) identified by Shuker *et al*., (2016).

Plate 7 High quality water conditions observed in the wetland

Plate 8 Low quality water conditions observed north of James Street



1:2,500 (at A4)

0 20 40 60 80 100

Metres
Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Redland City Council
Coochiemudlo Island
Frog Survey Report

Job Number	41-27018
Revision	0
Date	07 Dec 2018

Frog Survey Results

Figure 5

G:\41\27018\GIS\Maps\MXD\41_27018_093_coochie_FrogSurveyResults_rev0.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRME: Cadastre (2017), WMS Imagery (2015), Roads (2018); GHD: Site Boundary, Frog Survey Results (2018). Created : xml

4. Discussion

Wallum frog species have not been recorded within Coochiemudlo wetland in the current survey (March, 2018) or in previous surveys of the wetland undertaken by Caneris in January 1997 or Green in the summer, autumn, winter and spring of 2014. Conditions in the wetland appear suitable for wallum frog species. The broad vegetation types are consistent with breeding habitat for all three species. Although the outer edges of the wetland have been degraded by weed infestation and eutrophication, suitable microhabitats typically used by wallum frogs for calling, breeding and foraging were present in other parts of the wetland. Small ephemeral waterbodies within the wetland appear to have suitable hydrology (i.e. ephemeral pools with short hydroperiod), water conditions (i.e. clear, tannin-stained water) and microhabitats (i.e. low native sedges and reeds) to provide suitable breeding and foraging sites for wallum frogs. Preliminary water quality samples taken from these potential breeding sites indicate pH and salinity levels are within the upper tolerances of wallum frog species.

The absence of wallum frog species from surveys undertaken to date does not necessarily mean the species are unlikely to occur. Like many frog species, wallum frogs are only active in favourable conditions, typically warm, humid afternoons and evenings after recent rainfall within the early-mid breeding season (Meyer *et al.,* 2006). The species can be difficult to detect in rapid surveys that fall outside those conditions. Previous surveys of the wetland (Caneris, 1997 and Green, 2014), coincided with dry conditions that are likely to have limited frog detectability. Although the current survey coincided with warm, wet conditions, the survey was near end of the wet season, when many local frog species, including the wallum sedge frog have already bred and are therefore less active. The Coochiemudlo wetland has not yet been surveyed under optimal conditions to detect wallum frog species. Surveying the wetland under optimal conditions would provide greater certainty regarding the likely occurrence of wallum frogs.

Observations of the nature and quality of habitats within the Coochiemudlo wetland suggest that a combination of numerous factors could have degraded its potential value as habitat for wallum frogs over time, if the species ever occurred at the site. These factors include unfavourable hydrological conditions and nutrient levels associated with run-off and sedimentation from urban areas, alteration of local surface water flows, potential low-level impacts on groundwater from the landfill site, weed infestation from adjacent residential areas, competition with common frog species and the small, isolated nature of the wetland. Given the lack of historical records of the species, it is uncertain whether wallum frogs have ever occurred within the Coochiemudlo wetland. The small size of the wetland and its isolation from other wallum frog populations would make any resident wallum frog population highly susceptible to decline from stochastic events. While there is insufficient evidence to determine the precise reason for the absence of wallum frogs, typical causal factors for the degradation of wallum habitats have been discussed separately below and their possible relevance to the site considered.

4.1.1 Unfavourable hydrology

While suitable habitats, microhabitats and waterbody conditions for wallum frog species were present within the Coochiemudlo wetland, these were restricted to localised pockets within a relatively narrow band towards the outer edge of the wetland. Vegetation observed in the centre of the wetland, (i.e. tall sedges and open Melaleuca swamps) indicates that waterbodies in that location are likely to be too permanent for wallum frogs. Wallum frog species only breed in ephemeral waterbodies and are unlikely to occur in areas with increased waterbody permanence (Meyer *et al.,* 2006). It is uncertain whether the semi-permanent nature of the wetland is a natural condition or has been altered over time through changes in stormwater run-off from surrounding residential areas. Construction of hardened road surfaces typically

increases stormwater run-off to adjacent wetlands. Anecdotal information from local residents also suggests that construction of sewerage mains along James Street has restricted local flows of water to the wetland at that location. Changes in hydrology can have complex effects on wetland values. A detailed hydrological assessment would be required to fully understand the dynamics of the Coochiemudlo wetland. Nevertheless, large parts of the wetland currently have unfavourable hydrology to support wallum frog breeding habitat.

4.1.2 Weed infestation

Among those areas on the outer fringes of the Coochiemudlo wetland that do have suitable hydrology for wallum frogs, large sections have been degraded to varying degrees by weed infestation. Wallum frog species typically do not persist in weed infested areas (Meyer *et al.,* 2006). This can be directly attributed to the physical smothering of substrates and calling sites by weed species or simply represent a co-correlation with areas of high eutrophication. Wallum frogs have specific soil/water chemistry requirements, occurring only in low nutrient areas (Meyer *et al.,* 2006). Wallum frogs are therefore typically absent from high nutrient areas where weeds tend to proliferate. Increased run-off of pollutants, particularly nitrates, can inhibit larval growth and survivorship among frog species (Mann and Bidwell, 1999). Anecdotal information from local residents suggests that prior to establishing a formal sewage network, sewage was discharged directly into the wetland from surrounding residential properties. This is likely to have significantly elevated local nutrient levels. Water quality monitoring has been undertaken as part of the broader project and has indicated local nutrient levels within the wetland are consistent with those typically found in urban wetlands (GHD, 2018).

4.1.3 Run-off and sedimentation

Many frog species are susceptible to indirect impacts on water and soil chemistry that can result from increased run-off and sedimentation (Mann and Bidwell, 1999). Stormwater run-off from residential areas, golf courses and sporting grounds introduces fertilisers and biocides into frog breeding habitats. Influxes of nutrients (particularly nitrates) and biocides can significantly inhibit amphibian larval growth and development (Mann and Bidwell, 1999). Due to their highly specific water chemistry requirements, wallum frogs are particularly susceptible to indirect degradation of water quality resulting from run-off and sedimentation (Meyer *et al.,* 2006). Evidence of poor water quality was observed north of James Street at the southern extent of the wetland, in areas immediately adjacent to a drainage line that feeds into the wetland. Run-off may have had an adverse effect on the quality of frog habitats in this local area. Water quality sampling has been undertaken and identified slightly elevated nutrient levels consistent with the urban setting (GHD, 2018).

4.1.4 Competitive frog species

The two frog species encountered in current and previous surveys of the Coochiemudlo wetland: the eastern sedge frog (*Litoria fallax*) and striped marsh frog (*Limnodynastes peronii*) are common in southeast Queensland. Both species have broad ecological tolerances and are known to persist in degraded wetlands (Schell and Burgin, 2003; White, 2006). The striped marsh frog is a recognised bio-indicator of wetland degradation that can be more abundant in degraded areas than it is in pristine habitats (Schell and Burgin, 2003; White, 2006). The abundance and ubiquity of this species could indicate that Coochiemudlo wetland may have water quality issues that may exclude wallum frogs. The eastern sedge frog is a known competitor of *Litoria olongburensis* (James, 1996; Hines *et al*., 1999; Meyer *et al*., 2006). Wallum sedge frogs typically only outcompete this common frog in waterbodies that are too acidic for *Litoria fallax* to occur. The abundance and ubiquity of common, habitat-generalist frog species would suggest that conditions within Coochimudlo wetland may be unsuitable for wallum frog species.

4.1.5 Inappropriate fire regimes

Inappropriate fire regimes are listed among the typical threatening processes responsible for declines in wallum frogs and the degradation of wallum habitat in general (Meyer *et al.,* 2006). Coastal wallum habitat has adapted to specific fire regimes, typically requiring mosaic burns with a minimum fire free period of at least 8 – 10 years to maintain diversity (McFarland, 1988). Appropriate fire management has been undertaken at the Coochiemudlo wetland, with burning undertaken consistent with the State Government Fire Management Guidelines for the Regional Ecosystem communities present. Recent mosaic burns have been undertaken at the northern end of the Coochiemudlo wetland. Inappropriate fire is therefore not considered a potential cause for the apparent absence of wallum frogs from the Coochiemudlo wetland. Appropriate fire management is recommended to maximise biodiversity values within the Coochiemudlo wetland. Given the small size of the wetland, firebreaks and mosaic burning would be needed to protect the wetland from burning out in one event. Burning should not be undertaken in dry conditions, when wallum frogs are more vulnerable to impact (Lewis and Goldingay, 2005). Wet areas represent a refuge to wallum frogs during fire events (Lewis and Goldingay, 2005).

4.1.6 Inherent susceptibility to extinction

The small, isolated nature of the Coochiemudlo wetland would make resident wallum frog populations more susceptible to localised extinction than similar populations found on the mainland and larger sand islands. These populations typically have greater size and connectivity to alternative habitats. If present, resident wallum frog populations on Coochiemudo Island would be entirely dependent on the quality and condition of local habitats to persist. One catastrophic event such as fire or prolonged drought would be sufficient to cause the extinction of the local wallum frog population. The cumulative impact of multiple factors degrading the wetland over time, and reducing the area of suitable habitat to increasingly restricted pockets of the wetland would also increase the susceptibility of local wallum frogs to localised extinction. The apparent absence of wallum frogs from the island is therefore not altogether unexpected. Other resident wildlife populations have disappeared from Coochiemudlo Island. Koalas were known to occur on the island several decades ago but have not been observed since (Gasteen, 1994). The isolation and resulting sensitivity of the habitat highlights the importance of appropriate environmental management within Coochiemudlo wetland.

4.1.7 Summary

The survey has confirmed that suitable habitat for wallum frogs occurs within the Coochiemudlo wetland. However areas of suitable habitat (i.e. ephemeral waterbodies with suitable native sedges) are restricted to a relatively small band of habitat distributed around the periphery of the wetland. These areas had suitable waterbody characteristics, vegetation, and water chemistry to provide potential breeding sites for wallum frogs. However, most of the wetland was unlikely to support wallum frogs. Waterbodies in the centre of the wetland were too permanent and those at the outer edges of the wetland were too degraded by eutrophication and weed infestation to support wallum frogs.

Whether wallum frogs occur in the wetland is uncertain. Wallum frogs have not been recorded in the current survey or in previous surveys of the wetland (Caneris, 1997; Green, 2014). Frogs that are abundant include a bio-indicator of degraded wetlands: the striped marshfrog (*Limnosynastes peronii)* and a known competitor of the wallum sedge frog: the eastern sedge frog (*Litoria fallax*), that rarely co-occurs with it. Although these results indicate that wallum frogs may be unlikely to occur within the wetland, all surveys to date have been undertaken outside of peak breeding (and calling) conditions for wallum frogs. Further surveys should be undertaken within the peak breeding season to verify their likely presence/absence.

Regardless, it is evident that large parts of the wetland have been degraded by inappropriate land management actions. Numerous factors are likely to have contributed to the degradation of the wetland over time. Development of residential areas and the landfill has been somewhat less formalised than mainland areas. Over time, the lack of management is likely to have contributed to the degradation of the wetland, meaning that wetland-dependent species are inherently susceptible to local declines, as they have no alternative habitat to move to in times of stress. Among wetland-dependent species, habitat specialists such as wallum frogs are most at risk, as they have less capacity to tolerate sub-optimal conditions.

Concerns over the potential for leachate from the former uncontrolled landfill site are valid. However, comprehensive water quality monitoring assessments commissioned by Redland City Council found no evidence of degradation in water quality due to the landfill site (GHD, 2018). The report found that water quality levels within the Coochiemudlo wetland were generally consistent with normal levels for wetlands within an urban setting, with no significant change in water quality parameters in proximity to the former landfill site (GHD, 2018).

4.1.8 Management recommendations

The results of the current survey suggest that numerous factors are likely to have contributed to the degradation of habitats within the Coochiemudlo wetland over time. A range of management actions could be implemented to enhance the value of the wetland. These include:

- Reinstating natural hydrology and overland flows to increase the surface area of ephemeral waterbodies within the wetland by
  - Investigating the current and historical hydrology of the wetland and where possible
  - Implementing corrective landscaping and stormwater mitigation measures
- Controlling run-off of nutrients and biocides into the wetland through
  - Developing and implementing appropriate land management strategies for Laurie Burns Recreation Reserve, Council roads and other adjacent public spaces – including selective use of 'frog-friendly' herbicides, appropriate timing of spraying and establishment of no-go areas
  - Effectively communicating the land management strategy to all branches of Council and contractors that are engaged in management of public spaces adjacent to Coochiemudlo wetland
  - Establishing strategic sediment detention basins and buffering vegetation in high-risk areas (i.e. areas subject to external inputs from residential stormwater and other surface water flows) identified through a hydrological assessment
  - Raising public awareness of the potential adverse impacts on the wetland associated with the use of fertilisers and biocides in local residential lawns and gardens
- Controlling weed infestations in the periphery of the wetland through:
  - Restricting nutrient inputs to weed affected areas to reduce levels of eutrophication to make conditions less conducive to weed infestation
  - Continue implementing the Integrated Weed Management Plan for Coochiemudlo Island in collaboration with Coastcare and other community groups
  - Rehabilitating areas with native sedges and reeds, favouring plant species utilised by wallum frogs such as *Baumea articulata, B. juncea, B. rubiginosa, Juncus usitatus, Lepironia articulata*
  - Raising public awareness of the adverse effects that result from dumping of garden green waste

  - Implementing spot-audits of weed management to ensure compliance with Council weed management and communication protocols
- Managing surface water quality and chemistry parameters to the following broad levels:
  - pH between 3.53 and 4.61
  - Tannic acid staining > 9.5 mg/L
  - Low levels of monomeric Aluminium consistent with siliceous sand and wallum waters
  - Low trace heavy metals consistent with wallum waters
  - Low levels of dissolved Calcium consistent with wallum water (i.e. < 80 µM of Ca^2)
  - Salinity consistent with wallum waters (i.e. < 50 ppm)
- Continue appropriate fire management consistent with State Fire Management Guidelines in collaboration with the Department of Environment and Science. This would include:
  - Season: Late summer to mid-winter (after rain)
  - Planned and occasional unplanned burns
  - Interval: Heath 8 – 12 years, Sedge 12 – 20 years, Mixed grass and shrubs 6 – 20 years
  - 25-70% mosaic burns to avoid burning the entire wetland in one event
  - High soil moistures (or the presence of standing water on the ground) is required to avoid peat-type fires.

5. References

Caneris A. (1997) Coochiemudlo Island Melaleuca wetland fauna survey; Report prepared for Redland City Council.

Deveco (2017). Review of Environmental Issues in the Catchment of the Coochiemudlo Island Melaleuca Wetland. Prepared for Coochiemudlo Island Coastcare

Ecosure, (2017) Integrated Weed Management Plan – Coochiemudlo Island, Report for Redland City Council September 2017

Ehmann, H. (1997). Wallum Sedge Frog. Pp 182-187 *in Threatened Frogs of New South Wales: Habitats, Status and Conservation.* Frog and Tadpole Study Group of New South Wales Inc. Sydney, NSW.

FRC Environmental (2012) James Street Drain Management Report. Report for Redland City Council, October 2012.

Friend and Associates, EPM Consulting, John Smout Social Planning and Verge Urban Landscape Architects (2004). Coochiemudlo Island Land Management Plan. Prepared for Redland City Council.

Gasteen, (1994). *Ecological assessment of Government Reserve no. 2117.* Report prepared with funded assistance from Friends of Coochiemudlo Island and Redland Shire Council.

GHD, (2018) Coochiemudlo Island Former Landfill. Monitoring and Environmental Risk Review Report. Report for Redland City Council, September 2018.

Green, R. (2016). Coochiemudlo Island Fauna Survey 2016. Report prepared for Coochiemudlo Island Coastcare and Redland City Council

Griffith University (2015) Review of the suitability and toxicology of chemicals used for weed control on Coochiemudlo Island.

Hines, H., M. Mahony and K. McDonald (1999). An assessment of frog declines in wet subtropical Australia. **In:** Campbell, A., ed. *Declines and Disappearances of Australian Frogs*. Page(s) 44-63. Canberra: Environment Australia.

James, C. (1996). Conservation genetics of island and mainland populations of the sedge frogs *Litoria cooloolensis* and *Litoria olongburensis*. *Unpublished report to Queensland Department of Environment and Heritage*. Department of Zoology, Centre for Conservation Biology, University Of Queensland.

Lewis, B.D. and R.L. Goldingay (2005). Population monitoring of the vulnerable Wallum sedge frog *(Litoria olongburensis)* in north-eastern New South Wales. *Australian Journal of Zoology*. 53:185-194.

Mann, R. and J. Bidwell (1999). Toxicological issues for amphibians in Australia. **In:** Campbell, A., ed. *Declines and Disappearances of Australian Frogs*. Canberra: Environment Australia.

McFarland D.C. (1988) Fire and the vegetation composition and structure of subtropical heathlands in south-eastern Queensland, *Australian Journal of Botany*, 36: 533-546.

Meyer, E., J.M. Hero, L. Shoo and B. Lewis (2006). *National recovery plan for the wallum sedgefrog and other wallum-dependent frog species*. Report to Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane

Schell C.B and S. Burgin (2003) Swimming against the current: the brown striped marsh frog *Limnodynastes peronii* success story. *Australian Zoologist*, 32 (3): 401-405.

Shuker, J.D., Simpkins, C.A. and Hero, J-M (2016) Determining environmental limits of threatened species: the example of the wallum sedgefrog *Litoria olongburensis ECOSPHERE* 2: 1384.

White, A. (2006) Frogs as bio-indicators. In *Blue Mountains Bioindicators Project.* NSW National Parks and Wildlife Service, pp. 114-142.

Appendices

Appendix A – Protected Matters search results

Australian Government
Department of the Environment and Energy

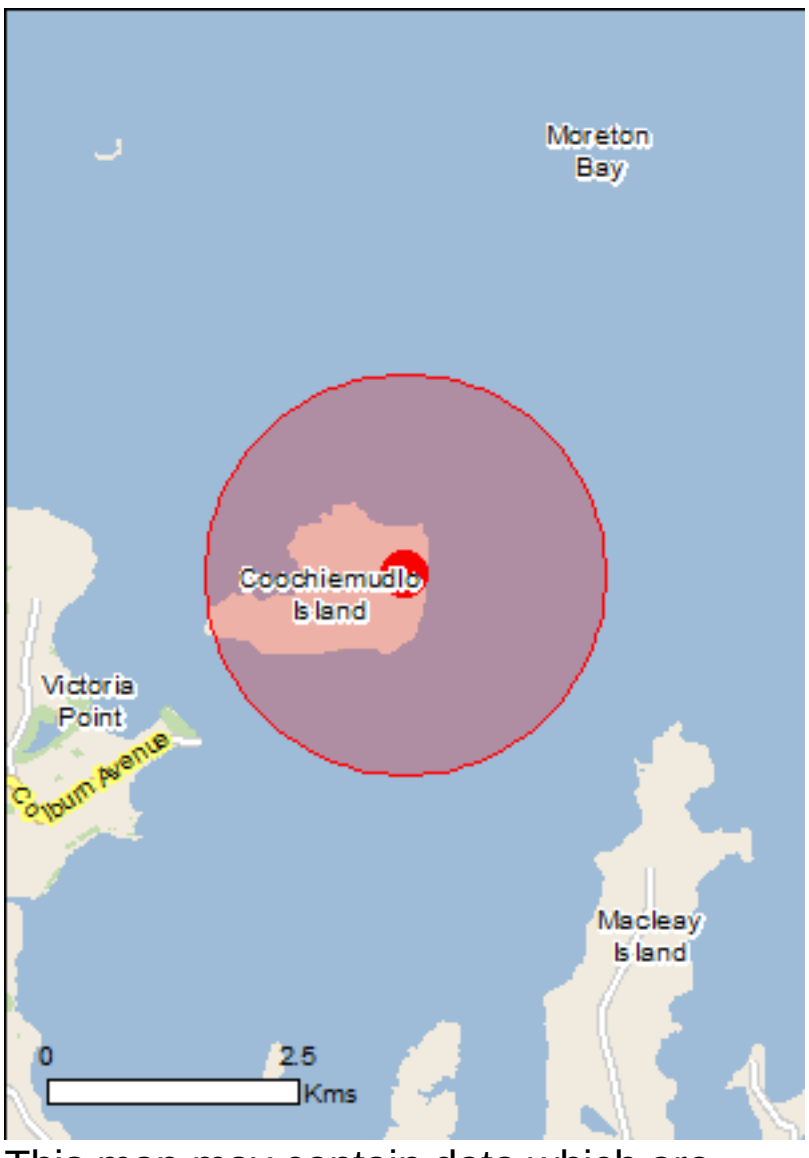
EPBC Act Protected Matters Report

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

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

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

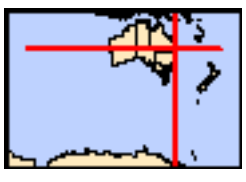
Report created: 26/03/18 16:41:14



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

Coordinates

Buffer: 2.0Km



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:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	46
Listed Migratory Species:	74

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:	104
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within Ramsar site

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
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area

Name	Status	Type of Presence
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Anous stolidus](#) Common Noddy [825]		Species or species habitat may occur within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
[Sternula albifrons](#) Little Tern [82849]		Species or species habitat may occur within area
[Thalassarche cauta](#) Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
[Thalassarche eremita](#) Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
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 known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa incana Wandering Tattler [831]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known 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 likely to occur within area
Anous stolidus Common Noddy [825]		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
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
[Calidris tenuirostris](#) Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area
[Charadrius bicinctus](#) Double-banded Plover [895]		Species or species habitat known to occur within area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
[Charadrius ruficapillus](#) Red-capped Plover [881]		Species or species habitat known to occur within area
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
[Cuculus saturatus](#) Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
[Diomedea gibsoni](#) Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Heteroscelus brevipes](#) Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
[Heteroscelus incanus](#) Wandering Tattler [59547]		Species or species habitat known to occur within area
[Himantopus himantopus](#) Black-winged Stilt [870]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Laticauda laticaudata a sea krait [1093]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		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
Plants		
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Moreton Bay	QLD

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-27.5686 153.3365

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix B – Wildlife Online search results

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: -27.5686
Longitude: 153.3365
Distance: 2
Email: Simon.Hodgkison@ghd.com
Date submitted: Monday 26 Mar 2018 15:41:07
Date extracted: Monday 26 Mar 2018 15:40:03

The number of records retrieved = 390

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		3
animals	birds	Acanthizidae	*Gerygone levigaster*	mangrove gerygone		C		10
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		1
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		4
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		4
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		18
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		SL		12
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		2
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		2
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		8
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		18
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		4
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		17
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		SL		1
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		5
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		11
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		1
animals	birds	Ardeidae	*Butorides striata*	striated heron		C		9
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		1
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		1
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		19
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		7
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		6
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		5
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		22
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		2
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		21
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		19
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		7
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		13
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		4
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		10
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		1
animals	birds	Columbidae	*Chalcophaps indica*	emerald dove		C		1
animals	birds	Columbidae	*Columba livia*	rock dove	Y			1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		12
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		18
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			18
animals	birds	Columbidae	*Macropygia amboinensis*	brown cuckoo-dove		C		2
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		7
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		12
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		13
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		11
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		5
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		7
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		7
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		4
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		1
animals	birds	Haematopodidae	*Haematopus longirostris*	Australian pied oystercatcher		C		6
animals	birds	Halcyonidae	*Todiramphus sordidus*	Torresian kingfisher		C		5
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		17
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		7
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		10
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		10
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		8
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		SL		5
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		6
animals	birds	Laridae	*Thalasseus bergii*	crested tern		SL		15
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		18
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		8
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		4
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		3
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		7
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		2
animals	birds	Meliphagidae	*Phylidonyris niger*	white-cheeked honeyeater		C		4
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		21
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		15
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		11
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		14
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		5
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		1
animals	birds	Meliphagidae	*Gavicalis fasciogularis*	mangrove honeyeater		C		10
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		18
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		3
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		9
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		1
animals	birds	Monarchidae	*Myiagra alecto*	shining flycatcher		C		2
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		10
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		17
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		11
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		4
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		12
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		12
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		7
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		19
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		15

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		12
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		5
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			1
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		16
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		7
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		4
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		14
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		14
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		7
animals	birds	Phasianidae	*Pavo cristatus*	Indian peafowl	Y			3
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		2
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		5
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		15
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		16
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		14
animals	birds	Psittacidae	*Platycercus elegans*	crimson rosella		C		2
animals	birds	Psittacidae	*Parvipsitta pusilla*	little lorikeet		C		1
animals	birds	Psittacidae	*Platycercus eximius*	eastern rosella		C		1
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		1
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		10
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		12
animals	birds	Scolopacidae	*Numenius phaeopus*	whimbrel		SL		13
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		8
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		E	CE	4
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		4
animals	birds	Scolopacidae	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit		V	V	5
animals	birds	Scolopacidae	*Tringa brevipes*	grey-tailed tattler		SL		9
animals	birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew		E	CE	11
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		5
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			1
animals	birds	Sturnidae	*Acridotheres tristis*	common myna	Y			1
animals	birds	Sulidae	*Sula dactylatra*	masked booby		SL		1
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		18
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		1
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		20
animals	insects	Pieridae	*Belenois java teutonia*	caper white				1
animals	mammals	Balaenidae	*Eubalaena australis*	southern right whale		C	E	2
animals	mammals	Dugongidae	*Dugong dugon*	dugong		V		2
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		2
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			2
animals	mammals	Muridae	*Rattus rattus*	black rat	Y			1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Peramelidae	*Perameles nasuta*	long-nosed bandicoot		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	2
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		20
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		1
animals	reptiles	Cheloniidae	*Caretta caretta*	loggerhead turtle		E	E	1
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		1
fungi	sac fungi	Acarosporaceae	*Biatorella*			C		1/1
fungi	sac fungi	Brigantiaeaceae	*Brigantiaea tricolor*			C		1/1
fungi	sac fungi	Caliciaceae	*Calicium*			C		1/1
fungi	sac fungi	Cladoniaceae	*Cladonia macilenta*			C		1/1
fungi	sac fungi	Cladoniaceae	*Cladonia*			C		1/1
fungi	sac fungi	Coccocarpiaceae	*Coccocarpia erythroxyli*			C		9/9
fungi	sac fungi	Collemataceae	*Leptogium austroamericanum*			C		1/1
fungi	sac fungi	Collemataceae	*Collema glaucophthalmum*			C		3/3
fungi	sac fungi	Collemataceae	*Leptogium cyanescens*			C		1/1
fungi	sac fungi	Collemataceae	*Physma byrsaeum*			C		1/1
fungi	sac fungi	Collemataceae	*Collema rugosum*			C		3/3
fungi	sac fungi	Collemataceae	*Collema laeve*			C		2/2
fungi	sac fungi	Collemataceae	*Physma*			C		6/6
fungi	sac fungi	Collemataceae	*Collema*			C		1/1
fungi	sac fungi	Graphidaceae	*Graphis librata*			C		1/1
fungi	sac fungi	Graphidaceae	*Thelotrema*			C		1/1
fungi	sac fungi	Haematommaceae	*Haematomma persoonii*			C		3/3
fungi	sac fungi	Lecanoraceae	*Lecanora helva*			C		5/5
fungi	sac fungi	Lecanoraceae	*Protoparmelia australiensis*			C		2/2
fungi	sac fungi	Lecanoraceae	*Lecanora arthothelinella*			C		1/1
fungi	sac fungi	Lecanoraceae	*Lecanora austrotropica*			C		2/2
fungi	sac fungi	Lecanoraceae	*Tephromela atra*			C		1/1
fungi	sac fungi	Lecanoraceae	*Lecanora*			C		1/1
fungi	sac fungi	Lichen	*Lichen*			C		2/2
fungi	sac fungi	Monoblastiaceae	*Anisomeridium anisolobum*			C		1/1
fungi	sac fungi	Opegraphaceae	*Opegrapha*			C		1/1
fungi	sac fungi	Pannariaceae	*Parmeliella mariana*			C		1/1
fungi	sac fungi	Pannariaceae	*Pannaria reflectens*			C		1/1
fungi	sac fungi	Pannariaceae	*Pannaria lurida*			C		2/2
fungi	sac fungi	Parmeliaceae	*Parmelia*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmelia erumpens*			C		4/4
fungi	sac fungi	Parmeliaceae	*Parmelia tenuirima*			C		1/1
fungi	sac fungi	Parmeliaceae	*Bulbothrix goebelii*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema judithae*			C		3/3
fungi	sac fungi	Parmeliaceae	*Parmotrema robustum*			C		9/9
fungi	sac fungi	Parmeliaceae	*Myelochroa aurulenta*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema tinctorum*			C		3/3
fungi	sac fungi	Parmeliaceae	*Relicina sydneyensis*			C		5/5
fungi	sac fungi	Parmeliaceae	*Flavoparmelia euplecta*			C		3/3
fungi	sac fungi	Parmeliaceae	*Parmotrema cristiferum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema reticulatum*			C		6/6
fungi	sac fungi	Parmeliaceae	*Hypotrachyna immaculata*			C		4/4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
fungi	sac fungi	Parmeliaceae	*Parmotrema parahypotropum*			C		5/5
fungi	sac fungi	Parmeliaceae	*Parmotrema norsticticatum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema subtinctorium*			C		1/1
fungi	sac fungi	Parmeliaceae	*Bulbothrix queenslandica*			C		6/6
fungi	sac fungi	Parmeliaceae	*Austroparmelina conlabrosa*			C		2/2
fungi	sac fungi	Parmeliaceae	*Parmotrema saccatilobum*			C		2/2
fungi	sac fungi	Parmeliaceae	*Parmotrema crinitum*			C		5/5
fungi	sac fungi	Pertusariaceae	*Pertusaria thiospoda*			C		1/1
fungi	sac fungi	Pertusariaceae	*Ochrolechia subpallescens*			C		1/1
fungi	sac fungi	Pertusariaceae	*Pertusaria*			C		2/2
fungi	sac fungi	Pertusariaceae	*Ochrolechia*			C		5/5
fungi	sac fungi	Phyllopsoraceae	*Phyllopsora*			C		1/1
fungi	sac fungi	Physciaceae	*Pyxine*			C		2/2
fungi	sac fungi	Physciaceae	*Buellia*			C		2/2
fungi	sac fungi	Physciaceae	*Heterodermia*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia dissa*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia bahiana*			C		1/1
fungi	sac fungi	Physciaceae	*Dirinaria picta*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia parastata*			C		1/1
fungi	sac fungi	Physciaceae	*Physcia poncinsii*			C		1/1
fungi	sac fungi	Physciaceae	*Pyxine berteriana*			C		1/1
fungi	sac fungi	Physciaceae	*Pyxine subcinerea*			C		5/5
fungi	sac fungi	Physciaceae	*Buellia curatellae*			C		1/1
fungi	sac fungi	Physciaceae	*Monerolechia badia*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia gerontoides*			C		2/2
fungi	sac fungi	Physciaceae	*Dirinaria applanata*			C		3/3
fungi	sac fungi	Physciaceae	*Dirinaria confluens*			C		1/1
fungi	sac fungi	Physciaceae	*Heterodermia pseudospeciosa*			C		1/1
fungi	sac fungi	Ramalinaceae	*Ramalina exiguella*			C		2/2
fungi	sac fungi	Ramalinaceae	*Ramalina confirmata*			C		4/4
fungi	sac fungi	Ramalinaceae	*Ramalina inflata subsp. perpusilla*			C		6/6
fungi	sac fungi	Ramalinaceae	*Ramalina*			C		3/3
fungi	sac fungi	Ramalinaceae	*Ramalina leiodea*			C		1/1
fungi	sac fungi	Ramalinaceae	*Ramalina pacifica*			C		1/1
fungi	sac fungi	Teloschistaceae	*Caloplaca*			C		3/3
fungi	sac fungi	Trichotheliaceae	*Porina*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea baileyi*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea ramulosissima*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea*			C		3/3
fungi	sac fungi	Verrucariaceae	*Polyblastia*			C		1/1
fungi		Letrouitiaceae	*Letrouitia flavocrocea*			C		1/1
plants	ferns	Nephrolepidaceae	*Nephrolepis cordifolia*	fishbone fern		C		1/1
plants	higher dicots	Acanthaceae	*Justicia betonica*		Y			1/1
plants	higher dicots	Acanthaceae	*Avicennia marina subsp. australasica*			C		1/1
plants	higher dicots	Acanthaceae	*Crossandra infundibuliformis*		Y			1/1
plants	higher dicots	Amaranthaceae	*Amaranthus viridis*	green amaranth	Y			1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			1/1
plants	higher dicots	Anacardiaceae	*Schinus terebinthifolius*		Y			1/1
plants	higher dicots	Anacardiaceae	*Mangifera indica*	mango	Y			1/1
plants	higher dicots	Apiaceae	*Centella asiatica*			C		1/1
plants	higher dicots	Apocynaceae	*Catharanthus roseus*	pink periwinkle	Y			1/1
plants	higher dicots	Apocynaceae	*Vincetoxicum carnosum*			C		1/1
plants	higher dicots	Apocynaceae	*Cascabela thevetia*	yellow oleander	Y			1/1
plants	higher dicots	Asteraceae	*Erigeron sumatrensis*		Y			2/2
plants	higher dicots	Asteraceae	*Picris angustifolia subsp. carolorum-henricorum*			C		1/1
plants	higher dicots	Asteraceae	*Crassocephalum crepidioides*	thickhead	Y			1/1
plants	higher dicots	Asteraceae	*Gamochaeta pensylvanica*		Y			1/1
plants	higher dicots	Asteraceae	*Centratherum punctatum*		Y			1/1
plants	higher dicots	Asteraceae	*Hypochaeris albiflora*		Y			1/1
plants	higher dicots	Asteraceae	*Baccharis halimifolia*	groundsel bush	Y			1/1
plants	higher dicots	Asteraceae	*Ageratum houstonianum*	blue billygoat weed	Y			1/1
plants	higher dicots	Asteraceae	*Hypochaeris radicata*	catsear	Y			1/1
plants	higher dicots	Asteraceae	*Galinsoga parviflora*	yellow weed	Y			1/1
plants	higher dicots	Asteraceae	*Coreopsis lanceolata*		Y			1/1
plants	higher dicots	Asteraceae	*Calyptocarpus vialis*	creeping cinderella weed	Y			1/1
plants	higher dicots	Balsaminaceae	*Impatiens walleriana*	balsam	Y			1/1
plants	higher dicots	Bignoniaceae	*Dolichandra unguis-cati*	cat's claw creeper	Y			1/1
plants	higher dicots	Bignoniaceae	*Jacaranda mimosifolia*	jacaranda	Y			1/1
plants	higher dicots	Brassicaceae	*Lepidium virginicum*	Virginian peppercress	Y			1/1
plants	higher dicots	Brassicaceae	*Lepidium bonariense*	Argentine peppercress	Y			1/1
plants	higher dicots	Caesalpiniaceae	*Cassia fistula*	Indian laburnum	Y			1/1
plants	higher dicots	Caesalpiniaceae	*Senna pendula var. glabrata*	Easter cassia	Y			1/1
plants	higher dicots	Caryophyllaceae	*Cerastium glomeratum*	mouse ear chickweed	Y			2/2
plants	higher dicots	Caryophyllaceae	*Stellaria media*	chickweed	Y			1/1
plants	higher dicots	Convolvulaceae	*Ipomoea batatas*	sweet potato	Y			1/1
plants	higher dicots	Convolvulaceae	*Ipomoea indica*	blue morning-glory	Y			2/2
plants	higher dicots	Convolvulaceae	*Ipomoea cairica*		Y			1/1
plants	higher dicots	Crassulaceae	*Bryophyllum proliferum*		Y			1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia cyathophora*	dwarf poinsettia	Y			2/2
plants	higher dicots	Euphorbiaceae	*Excoecaria agallocha*	milky mangrove		C		2/2
plants	higher dicots	Euphorbiaceae	*Euphorbia umbellata*		Y			1/1
plants	higher dicots	Euphorbiaceae	*Ricinus communis*	castor oil bush	Y			2/2
plants	higher dicots	Fabaceae	*Genista monspessulana*	Montpellier broom	Y			1/1
plants	higher dicots	Fabaceae	*Crotalaria lanceolata subsp. lanceolata*		Y			1/1
plants	higher dicots	Fabaceae	*Sophora tomentosa subsp. australis*			C		1/1
plants	higher dicots	Fabaceae	*Neonotonia wightii var. wightii*		Y			2/2
plants	higher dicots	Fabaceae	*Crotalaria pallida var. obovata*		Y			1/1
plants	higher dicots	Fabaceae	*Cajanus cajan*	pigeon pea	Y			1/1
plants	higher dicots	Fabaceae	*Indigofera hirsuta*	hairy indigo		C		1/1
plants	higher dicots	Fabaceae	*Desmodium uncinatum*		Y			1/1
plants	higher dicots	Fabaceae	*Tephrosia glomeruliflora*	pink tephrosia	Y			1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Fabaceae	*Macroptilium atropurpureum*	siratro	Y			1/1
plants	higher dicots	Fabaceae	*Trifolium repens var. repens*	white clover	Y			2/2
plants	higher dicots	Gentianaceae	*Centaurium erythraea*	common centaury	Y			1/1
plants	higher dicots	Lamiaceae	*Stachys arvensis*	stagger weed	Y			1/1
plants	higher dicots	Lamiaceae	*Plectranthus caninus*		Y			1/1
plants	higher dicots	Lamiaceae	*Plectranthus amboinicus*	allspice	Y			1/1
plants	higher dicots	Lamiaceae	*Plectranthus verticillatus*		Y			2/2
plants	higher dicots	Malvaceae	*Sida cordifolia*		Y			1/1
plants	higher dicots	Malvaceae	*Sida rhombifolia*		Y			1/1
plants	higher dicots	Malvaceae	*Thespesia populnea*			C		1/1
plants	higher dicots	Malvaceae	*Hibiscus sabdariffa*	rosella	Y			1/1
plants	higher dicots	Malvaceae	*Malvaviscus arboreus*		Y			2/2
plants	higher dicots	Malvaceae	*Hibiscus rosasinensis*		Y			1/1
plants	higher dicots	Meliaceae	*Melia azedarach*	white cedar		C		1/1
plants	higher dicots	Mimosaceae	*Acacia macradenia*	zig-zag wattle		C		1/1
plants	higher dicots	Mimosaceae	*Acacia podalyriifolia*	Queensland silver wattle		C		1/1
plants	higher dicots	Mimosaceae	*Calliandra surinamensis*		Y			1/1
plants	higher dicots	Mimosaceae	*Leucaena leucocephala subsp. leucocephala*		Y			1/1
plants	higher dicots	Moraceae	*Ficus benjamina var. benjamina*	weeping fig		C		2/2
plants	higher dicots	Myrsinaceae	*Lysimachia arvensis*		Y			1/1
plants	higher dicots	Myrsinaceae	*Aegiceras corniculatum*	river mangrove		C		1/1
plants	higher dicots	Myrtaceae	*Eugenia uniflora*	Brazilian cherry tree	Y			1/1
plants	higher dicots	Myrtaceae	*Psidium guajava*	guava	Y			1/1
plants	higher dicots	Myrtaceae	*Eucalyptus siderophloia*			C		1/1
plants	higher dicots	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		1/1
plants	higher dicots	Myrtaceae	*Corymbia torelliana*	cadaghi		C		1/1
plants	higher dicots	Ochnaceae	*Ochna serrulata*	ochna	Y			1/1
plants	higher dicots	Oleaceae	*Notelaea punctata*			C		1/1
plants	higher dicots	Oleaceae	*Jasminum mesnyi*		Y			1/1
plants	higher dicots	Onagraceae	*Ludwigia octovalvis*	willow primrose		C		1/1
plants	higher dicots	Onagraceae	*Oenothera stricta subsp. stricta*		Y			1/1
plants	higher dicots	Passifloraceae	*Passiflora edulis*		Y			1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus tenellus*		Y			1/1
plants	higher dicots	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		1/1
plants	higher dicots	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			1/1
plants	higher dicots	Portulacaceae	*Portulaca pilosa*		Y			1/1
plants	higher dicots	Rhamnaceae	*Cryptandra longistaminea*			C		1/1
plants	higher dicots	Rhizophoraceae	*Bruguiera gymnorhiza*	large-fruited orange mangrove		C		1/1
plants	higher dicots	Rhizophoraceae	*Rhizophora stylosa*	spotted mangrove		C		1/1
plants	higher dicots	Rhizophoraceae	*Ceriops australis*			C		1/1
plants	higher dicots	Rosaceae	*Rubus moluccanus var. trilobus*			C		1/1
plants	higher dicots	Rosaceae	*Rhaphiolepis indica*	Indian hawthorn	Y			1/1
plants	higher dicots	Rosaceae	*Eriobotrya japonica*	loquat	Y			1/1
plants	higher dicots	Rubiaceae	*Richardia brasiliensis*	white eye	Y			1/1
plants	higher dicots	Santalaceae	*Exocarpos latifolius*			C		1/1
plants	higher dicots	Sapindaceae	*Alectryon coriaceus*	beach alectryon		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Sapindaceae	*Dodonaea triquetra*	large-leaved hop bush		C		1/1
plants	higher dicots	Scrophulariaceae	*Myoporum boninense subsp. australe*			C		1/1
plants	higher dicots	Scrophulariaceae	*Buddleja madagascariensis*	buddleia	Y			1/1
plants	higher dicots	Solanaceae	*Solanum nodiflorum*		Y			1/1
plants	higher dicots	Solanaceae	*Solanum mauritianum*	wild tobacco	Y			1/1
plants	higher dicots	Ulmaceae	*Celtis sinensis*	Chinese elm	Y			1/1
plants	higher dicots	Verbenaceae	*Verbena incompta*		Y			1/1
plants	higher dicots	Verbenaceae	*Verbena litoralis var. litoralis*		Y			1/1
plants	higher dicots	Verbenaceae	*Stachytarpheta mutabilis*	pink snakeweed	Y			1/1
plants	higher dicots	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			1/1
plants	higher dicots	Viscaceae	*Notothixos subaureus*	golden mistletoe		C		1/1
plants	higher dicots	Vitaceae	*Cayratia clematidea*	slender grape		C		1/1
plants	lower dicots	Lauraceae	*Cinnamomum camphora*	camphor laurel	Y			2/2
plants	monocots	Anthericaceae	*Chlorophytum comosum*		Y			1/1
plants	monocots	Araceae	*Syngonium podophyllum*		Y			1/1
plants	monocots	Asparagaceae	*Asparagus officinalis*	asparagus	Y			1/1
plants	monocots	Asparagaceae	*Asparagus macowanii*		Y			1/1
plants	monocots	Asparagaceae	*Asparagus plumosus*	feathered asparagus fern	Y			1/1
plants	monocots	Cannaceae	*Canna indica*	Indian shot	Y			1/1
plants	monocots	Commelinaceae	*Tradescantia zebrina*		Y			1/1
plants	monocots	Commelinaceae	*Tradescantia fluminensis*		Y			1/1
plants	monocots	Cyperaceae	*Cyperus albostriatus*		Y			1/1
plants	monocots	Cyperaceae	*Cyperus polystachyos*			C		1/1
plants	monocots	Cyperaceae	*Lepironia articulata*			C		1/1
plants	monocots	Hemerocallidaceae	*Dianella congesta*			C		1/1
plants	monocots	Hemerocallidaceae	*Geitonoplesium cymosum*	scrambling lily		C		1/1
plants	monocots	Hydrocharitaceae	*Halophila ovalis*			C		1/1
plants	monocots	Hydrocharitaceae	*Halophila spinulosa*			C		1/1
plants	monocots	Iridaceae	*Freesia leichtlinii*		Y			1/1
plants	monocots	Iridaceae	*Freesia laxa*		Y			1/1
plants	monocots	Orchidaceae	*Phaius australis*			E	E	1/1
plants	monocots	Orchidaceae	*Bulbophyllum minutissimum*	grain-of-wheat orchid		C		1/1
plants	monocots	Poaceae	*Poa annua*	annual poa	Y			1/1
plants	monocots	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			1/1
plants	monocots	Poaceae	*Cynodon dactylon var. dactylon*		Y			1/1
plants	monocots	Poaceae	*Phyllostachys*			C		1/1
plants	monocots	Poaceae	*Chloris gayana*	rhodes grass	Y			1/1
plants	monocots	Poaceae	*Lolium perenne*	perennial ryegrass	Y			1/1
plants	monocots	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			2/2
plants	monocots	Poaceae	*Sorghum x almum*		Y			1/1
plants	monocots	Poaceae	*Leersia hexandra*	swamp rice grass		C		1/1
plants	monocots	Poaceae	*Paspalum urvillei*	vasey grass	Y			1/1
plants	monocots	Poaceae	*Bromus catharticus*	prairie grass	Y			1/1
plants	monocots	Poaceae	*Urochloa decumbens*		Y			2/2
plants	monocots	Poaceae	*Digitaria didactyla*	Queensland blue couch	Y			2/2
plants	monocots	Poaceae	*Digitaria ramularis*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Axonopus fissifolius*		Y			1/1
plants	monocots	Poaceae	*Sporobolus africanus*	Parramatta grass	Y			2/2
plants	monocots	Poaceae	*Sporobolus natalensis*		Y			1/1
plants	monocots	Poaceae	*Paspalum scrobiculatum*	ditch millet		C		1/1
plants	monocots	Poaceae	*Setaria pumila subsp. pumila*		Y			1/1
plants	monocots	Zingiberaceae	*Alpinia caerulea*	wild ginger		C		1/1
plants	monocots	Zingiberaceae	*Alpinia zerumbet*		Y			1/1
plants	mosses	Orthotrichaceae	*Macromitrium*			C		1/1
protists	brown algae	Phaeophyceae	*Padina gymnospora*			C		1/1
protists	brown algae	Phaeophyceae	*Dictyota acutiloba*			C		1/1
protists	brown algae	Phaeophyceae	*Sporochnus comosus*			C		1/1
protists	brown algae	Phaeophyceae	*Cystoseira trinodis*			C		1/1
protists	brown algae	Phaeophyceae	*Lobophora variegata*			C		1/1
protists	brown algae	Phaeophyceae	*Sporochnus bolleanus*			C		1/1
protists	brown algae	Phaeophyceae	*Dictyopteris australis*			C		1/1
protists	brown algae	Phaeophyceae	*Hydroclathrus clathratus*			C		1/1
protists	brown algae	Phaeophyceae	*Scytosiphon lomentaria*			C		1/1
protists	green algae	Chlorophyceae	*Caulerpa racemosa*			C		1/1
protists	green algae	Chlorophyceae	*Caulerpa taxifolia*			C		1/1
protists	green algae	Chlorophyceae	*Cladophoropsis vaucheriiformis*			C		1/1
protists	green algae	Chlorophyceae	*Codium platyclados*			C		1/1
protists	green algae	Chlorophyceae	*Caulerpa racemosa var. laetevirens*			C		1/1

CODES

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

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

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

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

GHD

OfficeAddressLine1
OfficeAddressLine2
T: OfficeTelephone F: OfficeFax E: OfficeEmail

H:\2018\Coochiemudlo\412701805-REP-A-Coochiemudlo Frog Habitat Assessment.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	S.Hodgkison	J.Dowdeswell		J.Dowdeswell		28/06/18
0	S.Hodgkison	J.Dowdeswell		J.Dowdeswell		06/12/18
1	S.Hodgkison	J.Dowdeswell		J.Dowdeswell		1/02/2019

www.ghd.com