

A



Baseline Terrestrial Ecology Report

Southern Lease Exploration Program (2023-2025)

Baseline Terrestrial Ecology Report

GEMCO/South32

15 February 2023

Final



Report No. 20003RP13

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
1	15 February 2023	-	-

Approved by:	Katrina Wolf
Position:	Principal
Signed:	
Date:	15 February, 2023

Table of Contents

Glossary	vii
1. Introduction	1
1.1. Purpose	1
1.2. Island and Regional Context	2
1.3. Description of the Southern Lease	3
2. Regulatory Framework	4
2.1. Commonwealth Legislation	4
2.2. Northern Territory Legislation and Guidelines	5
3. Methodology	8
3.1. Desktop Assessment	8
3.2. Recent Field Surveys within the Southern Lease	10
3.3. Likelihood of Occurrence Assessment	20
3.4. Fauna Habitat Mapping	20
3.5. Data Suitability and Limitations	21
4. Results: Overview of Environmental Values	24
4.1. Geology	24
4.2. Soils	24
4.3. Land Systems	25
4.4. Hydrology	26
4.5. Vegetation	26
4.6. Land Uses	26
5. Results: Flora	28
5.1. Vegetation Communities	28
5.2. Threatened Ecological Communities	30
5.3. Flora Species: Overview	31
5.4. Flora Species: Threatened Species	31
6. Results: Fauna	34
6.1. Fauna Habitats	34
6.2. Fauna Species: Overview	48
6.3. Fauna Species: Threatened Species	50
6.4. Fauna Species: Migratory Species	80
7. References	109

Table of Tables

Table 1 Summary of survey effort of recent field surveys.....	18
Table 2 Criteria to assess potential for threatened species to occur.....	20
Table 3 Land systems within the Southern Lease (Lynch et al. 2012).....	25
Table 4 Broad vegetation types within the Southern Lease.....	29
Table 5 Fauna habitats within the Southern Lease and disturbance footprint.....	34
Table 6 Features of close forest (rainforest) habitats within the Southern Lease.....	36
Table 7 Features of laterite woodland and forest habitats within the Southern Lease.....	38
Table 8 Features of sandstone woodland and forest habitats within the Southern Lease.....	40
Table 9 Features of coastal dune/swale complex habitats within the Southern Lease.....	42
Table 10 Features of riparian/wetland habitats within the Southern Lease.....	44
Table 11 Features of estuarine complex habitats within the Southern Lease.....	47
Table 12 Threatened fauna species database records within the locality.....	50
Table 13 Summary of the likelihood of occurrence of threatened fauna species.....	52
Table 14 Summary of Masked Owl (northern) records within the Southern Lease.....	56
Table 15 Summary of Mertens' Water Monitor records within the Southern Lease.....	78
Table 16 Migratory fauna species database records within the locality.....	81
Table 17 Summary of the likelihood of occurrence of migratory fauna species.....	83
Table 18 Summary of Salt-water Crocodile records within the Southern Lease.....	87
Table 19 Summary of Eastern Osprey records within the Southern Lease.....	92
Table 20 Summary of Common Sandpiper records within the Southern Lease.....	95
Table 21 Summary of Common Greenshank records within the Southern Lease.....	104
Table 22 Summary of previous survey reports utilised within this assessment.....	A.4
Table 23 Vegetation map units within the Southern Lease.....	A.13
Table 24 Likelihood of occurrence assessment.....	A.24
Table 25 Flora species list.....	A.85
Table 26 Fauna species list.....	A.101

Table of Photographs

Photograph 1 Closed forest (rainforest) habitat within the Southern Lease (May 2019).....	37
Photograph 2 Laterite woodland and forest habitat within the Southern Lease (May 2018).....	39
Photograph 3 Sandstone woodland and forest habitat within the Southern Lease (May 2016).....	41
Photograph 4 Sandstone woodland and forest habitat within the disturbance footprint (October 2021).....	41
Photograph 5 Coastal dune/swale complex habitat (woodland) within the Southern Lease (August 2017).....	43
Photograph 6 Coastal dune/swale complex habitat (shrubland) within the Southern Lease (May 2018).....	43
Photograph 7 Riparian habitat within the Southern Lease (May 2016).....	45
Photograph 8 Wetland habitat within the Southern Lease (May 2016).....	46

Photograph 9 Estuarine complex habitat within the Southern Lease (May 2016)	47
Photograph 10 Masked Owl photographed in open forest in the Eastern Leases	59
Photograph 11 Northern Quoll captured during camera surveys within the Southern Lease (July 2018)	64
Photograph 12 Ghost Bat (Source: EMS in URS Australia Pty Ltd, 2012)	68
Photograph 13 Brush-tailed Rabbit-rat (Source: K. Brennan in Woinarski and Hill, 2012a)	72
Photograph 14 Northern Hopping-mouse captured during camera trapping near the Cave Paintings (east of existing GEMCO mine) (April 2018)	76
Photograph 15 Mertens' Water Monitor detected by a camera within the Eastern Leases	80
Photograph 16 Salt-water Crocodile detected by a motion-sensor camera within the Eastern Leases	90
Photograph 17 Eastern Osprey (Source: P. Harris in BirdLife International, 2016)	93
Photograph 18 Common Sandpiper (Source: P. Harris in BirdLife International, 2016)	96
Photograph 19 Fork-tailed Swift (Source: K. Nicolson in Atlas of Living Australia, 2018)	99
Photograph 20 Sharp-tailed Sandpiper (Source: K. Jones in DES, 2019)	102
Photograph 21 Common Greenshank (Source: J. Bartoš in BirdLife International, 2016)	105
Photograph 22 Marsh Sandpiper (Source: O. Prosický in BirdLife International, 2016)	108

Table of Appendices

APPENDIX A : EPBC Act Protected Matters Search Tool Results
APPENDIX B : Summary of Previous Survey Reports
APPENDIX C : Vegetation Map Units
APPENDIX D : Likelihood of Occurrence Assessment
APPENDIX E : Flora Species List
APPENDIX F : Fauna Species List

Table of Figures

Figure 1 Location of the Southern Lease
Figure 2 Location of the disturbance footprint
Figure 3 Project layout
Figure 4 Bioregion setting
Figure 5 Location of previous study areas
Figure 6 Location of recent flora surveys within the Southern Lease
Figure 7 Location of recent fauna surveys within the Southern Lease
Figure 8 Surface geology within the Southern Lease

Figure 9 Soils mapping within the Southern Lease

Figure 10 Land systems mapping within the Southern Lease

Figure 11 Hydrology within the Southern Lease

Figure 12 Broad vegetation types within the Southern Lease

Figure 13 NR Maps database records of threatened flora on Groote Eylandt

Figure 14 Habitat types within the Southern Lease

Figure 15 NR Maps database records of threatened fauna on Groote Eylandt

Figure 16 Threatened and migratory fauna records within the Southern Lease

Figure 17 NR Maps database records of migratory fauna on Groote Eylandt

Glossary

Term / Abbreviation	Definition
ALC	Anindilyakwa Land Council
ALR Act	Commonwealth <i>Aboriginal Land Rights (Northern Territory) Act 1976</i>
CAMBA	China–Australia Migratory Bird Agreement
DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water
DEPWS	Northern Territory Department of Environment, Parks and Water Security
Disturbance Footprint	Represents the areas proposed to be directly impacted by the exploration program (Figure 2)
Eastern Leases	Mineral Leases (ML) 31219 and 31220; formerly Exploration Licences in Retention (ELR) 28161 and 28162
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GEMCO	Groote Eylandt Mining Company Pty Ltd
GIS	Geographic Information System
GPS	Global Positioning System
IPA	Indigenous Protected Area
JAMBA	Japan–Australia Migratory Bird Agreement
LiDAR	Light Detection and Ranging
littoral	Refers to environments that are within proximity of the sea or the sea shore (e.g. “littoral rainforests” or “littoral zone”)
Locality	Area within 20 km radius of the centre of the Southern Lease
mesic	Refers to moderate – high moisture environments (such as rainforests) and the plants that are associated with such environments (e.g. “mesic vegetation” or “mesic plants”)
microhabitat	Refers to very small, specialised habitats, such as a clump of grass or a space between rocks
MNES	‘Matters of National Environmental Significance’ that are listed by the EPBC Act
Naïve occupancy	The ratio of the number of sites where a species is detected to total number of sites surveyed, without correcting for imperfect detection
NR Maps	Northern Territory Natural Resource Maps search facility
NT	Northern Territory
NVIS	National Vegetation Information Systems. The NVIS is a comprehensive data system that provides information on the extent and distribution of vegetation types in Australian landscapes. It is an ongoing collaborative initiative between the Australian and state and territory governments to manage national vegetation data to help improve vegetation planning and management within Australia.
physiographic	Refers to the features and attributes of the earth’s land surface
PMST	Protected Matters Search Tool
RC	Reverse Circulation

Term / Abbreviation	Definition
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
Southern Lease	Exploration Licence (EL2455) shown on Figure 1
sp.	Singular of 'species' and used when the species was unable to be identified
spp.	Plural of 'species' and used when referring to a number of species within a genus
TEC	Threatened Ecological Community
TPWC Act	<i>Territory Parks and Wildlife Conservation Act 1976</i>
TSMP	Groote Archipelago Threatened Species Management Plan
VMU	Vegetation Map Unit

1. Introduction

Cumberland Ecology was commissioned by the Groote Eylandt Mining Company Pty Ltd (GEMCO) to undertake a baseline terrestrial ecology assessment of GEMCO's Southern Lease Exploration Licence (EL2455) area of Groote Eylandt. This report also makes reference to GEMCO's proposed Southern Lease Exploration Program (2023-2025) (the 'exploration program'). The exploration program is proposed to be undertaken within the Southern Lease Exploration Licence. This report utilises the following terms:

- Southern Lease: represents the Southern Lease Exploration Licence (EL2455) and is shown in **Figure 1**; and
- Disturbance footprint: represents the areas proposed to be directly impacted by the exploration program (**Figure 2** and **Figure 3**).

This report presents the results of the baseline terrestrial ecology assessment undertaken by Cumberland Ecology. The assessment included desktop studies, as well as results from recent ecological surveys undertaken within the Southern Lease and surrounds.

1.1. Purpose

The baseline terrestrial ecology assessment seeks to gain a comprehensive understanding of the terrestrial ecological values (including vegetation communities, fauna habitat and threatened species) of the Southern Lease. The purpose of this report is to document the findings of the baseline terrestrial ecology assessment of the Southern Lease.

Specifically, the objectives of this terrestrial ecology report are to:

- Present the findings of ecological surveys undertaken within the Southern Lease;
- Identify and map the location of threatened flora and fauna species;
- Assess the likelihood as to whether threatened flora and fauna species (under both Northern Territory (NT) and Commonwealth legislation), could occur within the Southern Lease, and specifically within the disturbance footprint;
- Provide baseline ecology information on Matters of National Environmental Significance (MNES) within the Southern Lease; and
- Describe the presence or likely occurrence of introduced and invasive species (both flora and fauna) in the Southern Lease.

This report is intended to support a referral under the NT *Environment Protection Act 2019*, to be submitted to the Northern Territory Environment Protection Authority (NT EPA). This report will also support a Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral to be submitted for the exploration program. In addition, it fulfils the requirements of GEMCO's Exploration Agreement with the Anindilyakwa Land Council (ALC) to prepare a baseline ecology assessment of the Southern Lease.

1.2. Island and Regional Context

The Southern Lease is located on Groote Eylandt in the Northern Territory (NT), the third largest island off the Australian mainland. It is part of an archipelago to the east of Arnhem Land that has international significance because of the integrity of its flora and fauna. According to the NT Government (NRETAS 2009), Groote Eylandt and other islands in the archipelago have conservation values including:

- Nationally and internationally significant sites for nesting seabirds and turtles;
- Approximately 900 species of vascular plants and 330 vertebrates; and
- Known occurrences of a suite of threatened species including the nationally listed Northern Hopping-mouse (*Notomys aequilo*), Brush-tailed Rabbit-rat (*Conilurus penicillatus*) and Northern Quoll (*Dasyurus hallucatus*).

The main reason for the conservation significance of the island is thought to be the absence or near absence of key threatening processes that occur on the Australian mainland (NRETAS 2009). Of particular note, many of the feral animals that have impacted native flora and fauna on the mainland are absent from Groote Eylandt. In particular, feral cattle (*Bos taurus*), horses (*Equus caballus*), donkeys (*Equus asinus*), Water Buffalo (*Bubalus bubalis*), the Cane Toad (*Rhinella marina*), Rusa Deer (*Cervus timorensis*), feral pigs (*Sus scrofa*), and the European Red Fox (*Vulpes vulpes*) are not established on the island.

Groote Eylandt is located in the Groote Sub-region of the Arnhem Coast Bioregion (DSEWPac 2012). The Arnhem Coast Bioregion comprises a coastal strip extending from just east of the Cobourg Peninsula to just north of the township of Numbulwar in south eastern Arnhem Land, and includes many offshore islands including Groote Eylandt (**Figure 4**). The Arnhem Coast Bioregion has a tropical monsoonal climate with a distinct wet and dry season, and high temperatures throughout the year (DEWHA 2008).

The vegetation within the Arnhem Coast Bioregion is characterised by eucalypt woodlands, monsoon vine forests and coastal communities such as mangroves (DEWHA 2008). Coastal vegetation includes well developed heathlands, mangroves and saline flats, with some floodplain and wetland areas (DLRM 2014). Inland from the coast, the dominant vegetation type is eucalypt tall open forest, typically dominated by *Eucalyptus miniata* (Darwin Woollybutt) and *Eucalyptus tetradonta* (Darwin Stringybark), with smaller areas of monsoon rainforest and eucalypt woodlands (DLRM 2014). Well-developed coastal dune systems and rugged Cretaceous sandstone areas have been recorded on Groote Eylandt (DLRM 2014).

The whole of Groote Eylandt is Aboriginal land under the Commonwealth *Aboriginal Land Rights (Northern Territory) Act 1976* (ALR Act). Furthermore, the Groote Eylandt Archipelago has been declared an Indigenous Protected Area (IPA); an area of Indigenous-owned land or sea where Traditional Owners have entered into an agreement with the Federal Government to promote biodiversity and cultural resource conservation (DotEE 2019b).

The bioregion is located entirely within Aboriginal land (DEWHA 2008). Commercial land uses within the bioregion include bauxite and manganese mining, as well as tourism (DEWHA 2008). No national parks occur within the bioregion (DLRM 2014).

1.3. Description of the Southern Lease

The Southern Lease is traversed by Arnduwamurrumanja Creek (a tributary of the Emerald River), Salt Creek, and Second Creek, as well as the Yenbakwa, Amagula, Innokumanja and Amiyelkuwa Rivers (**Figure 2**). It is characterised by areas of flat to undulating sand plains surrounded by low hills of outcropping quartzitic rock to the east, and the coastline to the west and south.

The vegetation and habitats within the Southern Lease are relatively pristine and are strongly influenced by topography and drainage. Eucalypt open forests and woodlands dominate the well-drained areas with Melaleuca-dominated vegetation occurring in swampy and riparian areas, and coastal vegetation and tidal flats occurring at locations in proximity to the coastline. Fire also plays a very significant role in determining vegetation composition in the open forest and woodland habitats, with a large proportion of the Southern Lease regularly burnt by the Traditional Owners. Overall, the vegetation is in a very good condition and is characterised by a high species and structural diversity, although the structure of the understorey and the condition of the ground layer has been modified by a regime of frequent fires. The Southern Lease provides a range of habitats for fauna species and is contiguous with native vegetation in other areas of Groote Eylandt.

There are some areas of disturbance within the Southern Lease, including exploration activities that took place between 2016 and 2022 in the north western portion of the lease. These activities were localised to the south of the Emerald River and to the west of the Amagula River. Other forms of anthropogenic disturbance include the Yenbakwa Road and the Wurrumenbumanja outstation (see **Figure 2**). A small number of access tracks occur, predominantly within the western half of the Southern Lease.

2. Regulatory Framework

2.1. Commonwealth Legislation

2.1.1. Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's principal piece of environmental legislation and is administered by the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW). It is designed to protect national environmental assets, known as MNES, which include threatened species of flora and fauna, endangered ecological communities, migratory species as well as other protected matters. Among other things, it defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna and communities.

Approval is required under the EPBC Act for any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES (including nationally threatened ecological communities (TECs) and species, and listed migratory species).

2.1.2. International Treaty Obligations on Migratory Species

Australia is signatory to several agreements relating to migratory species. Migratory species listed under the following agreements and conventions are protected in Australia by being listed as MNES (Migratory Controlling Provision) under the EPBC Act:

- China–Australia Migratory Bird Agreement (CAMBA);
- Japan–Australia Migratory Bird Agreement (JAMBA);
- Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA); and
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

The CAMBA and JAMBA agreements list terrestrial, water and shorebird species which migrate between Australia and the respective countries. In both cases, the majority of listed species are shorebirds (DotE 2014).

Both agreements require the parties to protect migratory birds by:

- Limiting the circumstances under which migratory birds are taken or traded;
- Protecting and conserving important habitats;
- Exchanging information; and
- Building cooperative relationships.

The JAMBA agreement also includes provisions for cooperation on the conservation of threatened birds. Australian government and non-government representatives meet every two years with Japanese and Chinese counterparts to review progress in implementing the agreements and to explore new initiatives to conserve migratory birds (DotE 2014).

The ROKAMBA formalises Australia's relationship with the Republic of Korea in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (DotE 2014).

In addition to these bilateral agreements, Australia is also a signatory of the Bonn Convention. This convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range (CMS 2015).

2.2. Northern Territory Legislation and Guidelines

2.2.1. Territory Parks and Wildlife Conservation Act 1976

The *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) is the primary piece of legislation for managing the protection and conservation of biodiversity, and the sustainable use of wild populations (of predominantly terrestrial species) in the NT. The TPWC Act is administered by the NT Department of Environment, Parks and Water Security (DEPWS).

The TPWC Act makes provision for the study, protection, conservation and sustainable utilisation of wildlife throughout the NT. This legislation covers the classification and management of wildlife; classification and control of feral animals; permits for taking wildlife and entering land; designation and management of protected areas, including joint management with Traditional Owners; and private sanctuaries.

The management of wildlife under the TPWC Act is to be carried out in accordance with the Principles of Management (Section 31 of the TPWC Act), which promote:

- (a) the survival of wildlife in its natural habitat;*
- (b) the conservation of biological diversity within the Territory;*
- (c) the management of identified areas of habitat, vegetation, ecosystem or landscape to ensure the survival of populations of wildlife within those areas;*
- (d) the control or prohibition of:*
 - (i) the introduction or release of prohibited entrants into the Territory; and*
 - (ii) any other act, omission or thing that adversely affects, or will or is likely to adversely affect, the capacity of wildlife to sustain its natural processes; and*
- (e) the sustainable use of wildlife and its habitat.*

Under the TPWC Act, threatened flora and fauna species in the NT are classified under the following conservation categories:

- Extinct;
- Extinct in the Wild;
- Critically Endangered;

- Endangered;
- Vulnerable;
- Near Threatened;
- Least Concern;
- Data Deficient; and
- Not Evaluated.

These categories and associated assessment criteria are aligned with the classification system and criteria developed by the International Union for the Conservation of Nature for determining the conservation status of species.

Under the TPWC Act, species are considered as 'threatened' wildlife if they are classified as Extinct in the Wild, Critically Endangered, Endangered or Vulnerable and are assigned protected wildlife status. The categories utilised under the TPWC Act are independent of the listing of wildlife under the EPBC Act as they relate only to their occurrence within the NT.

2.2.2. Weeds Management Act 2001

The *Weeds Management Act 2001* (WM Act) makes provision for the control and eradication of declared weeds in the NT. The Act is administered by DEPWS.

Weeds that have been identified to have an impact on the NT's economic, environment, cultural and social values are declared under the WM Act. A weed may be declared as:

- Class A: To be eradicated;
- Class B: Growth and spread to be controlled; and
- Class C: Not to be introduced to the NT.

All Class A and Class B weeds are also considered to be Class C weeds.

2.2.3. Land Clearing Guidelines 2021

The NT *Land Clearing Guidelines* (DEPWS 2021a) play a role in guiding good land development practice in the NT by establishing standards for the management (i.e. clearing and retention) of native vegetation. Application of the guidelines will assist in preventing environmental degradation associated with clearing and help to support the sustainable development of the NT's natural resource based economy.

The purpose of the guidelines is to provide:

- Recommendations regarding best practice clearing of native vegetation;
- A standardised suite of environmental parameters requiring consideration; and

- Advice to consent authorities.

The guidelines aim to provide greater clarity and certainty around the acceptability of clearing applications to ensure consistent and transparent decision making. This is achieved by setting out matters for consideration in assessing applications and through applying the principles of natural justice to the process. The guidelines also identify native vegetation that is sensitive or significant. Sensitive vegetation is a term in the *Land Clearing Guidelines* applied to ecosystems easily impacted by neighbouring or adjacent land uses or management. Significant vegetation is a term applied to spatially restricted habitat types that are important to a relatively large number of wildlife species (DEPWS 2021a). The *Land Clearing Guidelines* note that significant vegetation can be sensitive, but not all significant vegetation is sensitive. Sensitive or significant vegetation can include rainforest; monsoon vine forest or vine thicket; sandsheet heath; riparian vegetation; mangroves; wetlands; and vegetation containing large trees with hollows suitable for fauna.

The guidelines are administered by DEPWS and the NT Department of Infrastructure, Planning and Logistics. The guidelines are recognised formally under the NT *Planning Act 1999* and referenced in the NT Planning Scheme and the NT Pastoral Land Clearing Guidelines.

Mining and exploration activities are controlled by the NT *Mining Management Act 2001* and mining/exploration activities are subject to a separate environmental approval process under the NT *Mining Management Act 2001*. Mining applications are not, therefore, subject to the NT *Planning Act 1999* or any formal requirements in relation to the *Land Clearing Guidelines* (DEPWS 2021a). Nevertheless, there are sections of the guidelines that provide useful information on minimising the impact of environmental degradation resulting from clearing of native vegetation.

3. Methodology

This section describes the methodology adopted for the baseline terrestrial ecology assessment. Investigations for the assessment entailed a literature review and database assessment followed by review of previous fieldwork undertaken within the Southern Lease and for nearby areas of Groote Eylandt. The methods used for each component are explained in more detail below.

3.1. Desktop Assessment

3.1.1. Database Analysis

A database analysis was conducted through consultation of the DCCEEW EPBC Protected Matters Search Tool (PMST) (DCCEEW 2022f) and the NT Natural Resource Maps (NR Maps) search facility (DEPWS 2022). The EPBC PMST generated a list of potentially occurring MNES listed species under the EPBC Act within a 20 km radius of the centre of the Southern Lease (i.e. the locality), which fully encompassed the Southern Lease (including the disturbance footprint) (see **Appendix A**). The NR Maps search facility was used to generate records of flora and fauna, (including threatened species), known to occur across Groote Eylandt. This information was used for the purposes of confirming the previous records of each species within the locality. The abundance, distribution and age of records within the locality provided supplementary information to assess the likelihood of those threatened species to occur within the Southern Lease.

A map of threatened ecological communities in the NT (DSEWPac 2013) was also consulted to determine the potential presence of threatened ecological communities within the Southern Lease.

3.1.2. Literature Review

Available literature on the ecology of Groote Eylandt was reviewed, including available government data and in-house reports made available from GEMCO. Numerous ecological studies have been conducted within and in proximity to the Southern Lease, including several recent detailed flora and fauna investigations. Key documents reviewed for this terrestrial ecology report included:

- Cumberland Ecology (2023): 2021 Camera Fauna Monitoring Program – Summary Report;
- Cumberland Ecology (2021): GEMCO Western Leases and Surrounds – Vegetation Mapping Report;
- Heiniger et al. (2020): Status of mammals on Groote Eylandt: Safe haven or slow burn?;
- Cumberland Ecology (2019a): GEMCO/South32 Southern Lease Small Mammal Research Project – Report;
- Anindilyakwa Land & Sea Rangers (2019): Northern Hopping Mouse Surveys: Final Report to Territory NRM July 2019;
- Heiniger and Gillespie (2017): Survey of Threatened Mammal and Feral Cat Surveys on Groote Eylandt. Unpublished Report to the Anindilyakwa Land Council;
- Cumberland Ecology (2016): Southern Lease Project – Baseline Terrestrial Ecology Report;
- Cumberland Ecology (2015): Eastern Leases Project – Terrestrial Ecology Assessment Report;
- URS Australia Pty Ltd (2012): Flora and Fauna Surveys of Western Groote Eylandt;

- G. Webb Pty Limited (1992): Flora and Fauna Surveys on the Western Side of Groote Eylandt, N.T. (1991-92);
- Brocklehurst and Cowie (1992): Flora Survey of the GEMCO Mining Lease on the Western Side of Groote Eylandt, Northern Territory; and
- Langkamp et al. (1981): Ecological gradients in forest communities on Groote Eylandt, Northern Territory, Australia.

Of these documents, Cumberland Ecology (2016, 2019a, 2021, 2023) includes detailed field surveys undertaken within the Southern Lease which forms the basis of the ecological data presented within this report. These studies are discussed in further detail in **Section 3.2**. The other key datasets drawn upon within this assessment are from Heiniger et al. (2020), Anindilyakwa Land & Sea Rangers (2019), Heiniger and Gillespie (2017), Cumberland Ecology (2015), URS Australia Pty Ltd (2012) and Webb (1992). With the exception of Anindilyakwa Land & Sea Rangers (2019) and Heiniger and Gillespie (2017) which cover multiple locations on Groote Eylandt and do not have a clearly defined study area, the location of the study areas of the key datasets are shown in **Figure 5**. For Heiniger et al. (2020), only the defined study area for feral cats within the Southern Lease is shown on **Figure 5**.

Numerous other reports were consulted during the preparation of this baseline terrestrial ecology report including those presenting the results of targeted surveys (Ward 2006b, a, 2007b, a, Firth 2008, Smith 2009b, Rankmore 2011), baseline reporting (Cumberland Ecology 2019b, 2020), general reporting of species groups on Groote Eylandt (Davies and Tyler 1986, Noske and Brennan 2002) and remote sensing of vegetation (Crane and Hempel 2005). A summary of the suite of previous survey reports utilised within this assessment is provided in **Appendix B**.

A detailed review of threatened species information provided within the Threatened Species Information Sheets published by the NT Government and the Species Profiles and Threats Database published by DCCEEW was also undertaken as part of this assessment.

Information within the reviewed literature was utilised in determining the likelihood of threatened species to occur within the Southern Lease.

3.1.3. Aerial Photography and LiDAR

The most recent available aerial photography (flown by GEMCO in September 2020 and May 2021) and Light Detection and Ranging (LiDAR) of the Southern Lease and immediate surrounds (flown by GEMCO in September 2017) was utilised for this assessment. The aerial photography and LiDAR (i.e. accurate topographic data) was used by GEMCO to map the extent of white rock. The white rock mapping was then utilised for this assessment. The LiDAR data was also used to assist with delineating catchments and waterways.

3.1.4. Vegetation Mapping

DEPWS has undertaken island-wide vegetation mapping of Groote Eylandt and other islands in the Groote archipelago at a scale of approximately 1:50,000. The primary purpose of the study was to produce vegetation and habitat mapping for Groote Eylandt and other islands in the Groote archipelago, at an appropriate scale

for the management of environmental assets within the Anindilyakwa IPA (DEPWS 2021b). The dataset describes vegetation communities at four levels in accordance with the NT National Vegetation Information System mapping, including Class, Structural Formation, Broad Structural Formation and Sub-Formation (DEPWS 2021b).

The DEPWS mapping utilised data from previous studies, including Cumberland Ecology (2015), URS Australia Pty Ltd (2012) and Webb (1992), in conjunction with desktop assessments, additional field surveys (largely undertaken in 2018) and satellite image data and derived products and indices.

A suite of information on vegetation within the Southern Lease and surrounds, collected by Cumberland Ecology between 2017 and 2019 for the small mammal research project (2019a) and vegetation mapping of GEMCO's Western Leases and surrounds (2021) was also provided to DEPWS (then the Department of Environment and Natural Resources) for incorporation into the vegetation mapping. GEMCO also provided the aerial photography and LiDAR data collected in September 2017 to DEPWS.

DEPWS issued GEMCO two versions of the mapping, one in 2017 and one in 2018. The vegetation mapping issued by DEPWS included the classification of vegetation into vegetation map units (VMUs), based on vegetation composition and structure.

The vegetation mapping issued by DEPWS in 2018 was utilised as a base within this assessment, with portions of this mapping subsequently updated as part of vegetation surveys (see **Section 3.2**). DEPWS (2021b) subsequently published the vegetation mapping of Groote Eylandt, however this did not include a detailed description of each VMU.

3.1.5. Geological Mapping

Geological mapping of the Southern Lease was sourced from the NT Department of Mines and Energy (2010) and further verified by GEMCO. This provided an indication of the underlying substrate which was used to inform habitat mapping.

3.1.6. Soil Mapping

Soil mapping of the Southern Lease was sourced from the National Resource Information Centre Digital Atlas of Australian Soils (Bureau of Rural Sciences 2016). Soils mapping was utilised to correlate vegetation types and habitat preferences of particular flora and fauna, to soil types present within the Southern Lease.

3.2. Recent Field Surveys within the Southern Lease

There has been a substantial number of recent (2016-2022) terrestrial ecology field surveys undertaken by Cumberland Ecology in the Southern Lease, including two large scale projects. These surveys have included field surveys targeted to the terrestrial biodiversity values within the Southern Lease. The ecological surveys were initiated to inform the design of exploration activities to avoid and minimise impacts and to provide information to inform the assessment of impacts.

More recently, GEMCO has commenced a Pre-Feasibility Study for a potential future mining project in the Southern Lease and, as part of this, has started additional ecological surveys, particularly within and adjacent

to the disturbance footprint. This work is ongoing and not yet published, however the threatened species records gathered to date as part of this work have been incorporated into this report.

The field surveys undertaken by each of these studies is summarised below. The locations of flora and fauna surveys undertaken as part of these recent surveys are shown in **Figure 6** and **Figure 7**, respectively.

3.2.1. Cumberland Ecology (2016)

Cumberland Ecology undertook a baseline terrestrial ecology assessment of the western part of the Southern Lease in 2016 (**Figure 5**). The field survey was undertaken in May 2016, and comprised both a terrestrial flora survey and terrestrial fauna survey. The field surveys were designed to comply with relevant NT and Commonwealth guidelines. Survey design was also informed by studies undertaken by Cumberland Ecology (2015), URS Australia Pty Ltd (2012) and Webb (1992) in areas located to the north and north-east of the Southern Lease.

The terrestrial flora survey included:

- Vegetation mapping, undertaken in the following stages:
 - Development of a preliminary vegetation map based on a desktop review of available datasets and studies, using aerial photograph interpretation techniques and GIS software;
 - Collection of detailed site data during field surveys to validate the preliminary mapping and to inform final mapping outputs, including 21 primary plots and 766 track notes; and
 - Review and refinement of the preliminary vegetation map based on field datasets.
- Threatened flora searches.

Vegetation communities were classified in accordance with the vegetation communities that were described in Webb (1992). Webb classified the vegetation communities he studied on Groote Eylandt into 28 “Map Units”. These map units were based on the floristic and structural characteristics of the dominant vegetation type within each community. Map units that were not previously described by Webb (1992) were classified to Level III of the National Vegetation Information Systems (NVIS) framework.

The terrestrial fauna survey included:

- Trapping at four fauna survey sites within a 50 x 50 m quadrat for a period of three nights, with each site including 20 Elliott traps, four cage traps, four pitfall traps and associated drift fencing, and four funnel traps. Elliot traps were utilised to target small to medium sized mammals, cage traps were utilised to capture medium-large sized mammals, and pitfall traps and funnel traps were utilised to capture reptiles and frogs;
- Bird census at four fauna survey sites within a 100 x 100 m quadrat, including eight diurnal bird counts and two nocturnal bird counts. Nocturnal bird counts included spotlighting, as well as the use of call playback for the Masked Owl (northern) (*Tyto novaehollandiae kimberli*). An additional two locations were surveyed for the Masked Owl (northern) (*Tyto novaehollandiae kimberli*) using spotlighting and call playback;

- Active searches at four fauna survey sites within a 50 x 50 m quadrat, including three searches during the day and two searches at night using spotlights. Active searches targeted reptiles, amphibians and mammals;
- Ultrasonic call detection surveys for microchiropteran bats (microbats) undertaken at four fauna survey sites and two additional locations for a period of one to three nights;
- Harp trapping for microbats at three locations for a period of two to three nights;
- Spotlighting along major tracks from a slow-moving vehicle targeting birds, mammals and reptiles;
- Motion-sensor cameras at four short-term locations (five nights) and 10 long-term locations (approximately two months). Cameras targeted small, trap shy ground-dwelling fauna;
- Incidental observations throughout the study area; and
- Habitat assessments at four fauna survey sites within a 100 x 100 m quadrat.

The location of the study area utilised by Cumberland Ecology (2016) is shown in **Figure 5**.

The Cumberland Ecology (2016) study provided an understanding of the flora and fauna values, including vegetation communities, fauna habitat and threatened species, of the north western portion of the Southern Lease. This study provided information on the following:

- Distribution and descriptions of vegetation communities;
- Flora and fauna diversity;
- Fauna habitats present;
- Occurrence of threatened species, including Masked Owl (northern) (*Tyto novaehollandiae kimberli*) and Northern Quoll (*Dasyurus hallucatus*); and
- Occurrence of introduced and invasive species.

3.2.2. Cumberland Ecology (2019a)

Cumberland Ecology undertook a small mammal research project within the Southern Lease and surrounds in 2017 and 2018. The small mammal research project was undertaken to address the requirements of the *GEMCO Southern Lease Exploration Area Threatened Mammal Risk Assessment Plan* (Gillespie and Heiniger 2017). The small mammal research project was designed to obtain additional information on two threatened species, the Northern Hopping-mouse (*Notomys aquilo*) and the Brush-tailed Rabbit-rat (*Conilurus penicillatus*) to provide a more detailed understanding of the occurrence and habitat preferences of these species within the Southern Lease exploration tenement and surrounds. The design of the study also enabled collection of information on habitat types and a suite of other fauna species.

The small mammal research project included field surveys undertaken at 152 sampling sites, the locations of which were determined based on stratification units. Stratification units were determined by habitat types and

time since fire. Habitat types were nominated by DEPWS (then the Department of Environment and Natural Resources) based on an initial draft island-wide vegetation map that was prepared by DEPWS in 2017. Time since fire was determined from data downloaded from the North Australia and Rangelands Fire Information website in July 2017 (Darwin Centre for Bushfire Research 2017).

Seventy-six (76) sites were surveyed between August and November 2017 and the remaining 76 sites were surveyed between May and August 2018. Field surveys included the following at each of the 152 sampling sites:

- Four motion-sensor cameras and bait stations, including two unfenced cameras and bait stations, and two fenced (drift fence) cameras and bait stations, with cameras left to record for a minimum of four weeks (28 days);
- A 50 x 50 m habitat assessment quadrat centred at the sampling site, which included the collection of the following data:
 - Representative site photographs;
 - General vegetation description;
 - Evidence of fire prior to site establishment;
 - Circumferences of trees;
 - Length and circumferences of logs;
 - Ground cover, grass layer, shrub/woody vegetation and mid-storey vegetation; and
 - Soil information at each camera.
- Four 20 x 20 m Northern Hopping-mouse burrow search quadrats located adjacent to each camera, which included collection of the following data where spoil heaps were recorded:
 - Measurement of maximum spoil heap width was recorded, a Global Positioning System (GPS) unit reading taken, and the spoil heap photographed;
 - Where spoil heaps had a maximum width greater than 50 cm, searches were undertaken within 5 m of the spoil heap for the presence of pop holes; and
 - Where pop holes were detected, a measurement of the width of the hole was recorded, a GPS reading taken, and the hole photographed.

The location of the study area utilised by Cumberland Ecology (2019a) is shown in **Figure 5**.

The research project represented a rigorous assessment that was supported by a robust data set. An extensive amount of data analysis was undertaken following field surveys, including review of camera images and collation of field survey data. Over 1.58 million images were captured on cameras during the research project, of which approximately 12% of the total images were associated with fauna. Seventy fauna species were

identified to species level on images captured on cameras during the research project, including 42 birds, 15 mammals and 13 reptiles. As the Northern Hopping-mouse (*Notomys aquilo*) and the Brush-tailed Rabbit-rat (*Conilurus penicillatus*) were not recorded within the study area utilised by the small mammal research project, no occupancy modelling was undertaken for these threatened species. The lack of records therefore suggested that the two target species are absent from the areas surveyed. Records of the Northern Hopping-mouse (*Notomys aquilo*) were obtained at the Cave Paintings, an area outside of the area studied (11 km to the north of the Southern Lease boundary as shown on **Figure 2**) and known to support a population of the species.

Cumberland Ecology (2019a) provided information on the following:

- Habitat types;
- Fauna diversity;
- Occurrence of threatened species within the Southern Lease and surrounds, including Masked Owl (northern) (*Tyto novaehollandiae kimberli*) and Northern Quoll (*Dasyurus hallucatus*);
- Occurrence of introduced and invasive fauna species; and
- Fire history.

3.2.3. Cumberland Ecology (2021)

Cumberland Ecology undertook a baseline vegetation survey within GEMCO's existing mine and surrounding areas on Groote Eylandt between 2018 and 2019 (including an area in the north-west of the Southern Lease). The location of the study area utilised by Cumberland Ecology (2021) is shown in **Figure 5**.

The aim of the study was to undertake a baseline vegetation survey and confirm (based on ground-truthing) the presence of Vegetation Map Units (VMUs) within the study area. Draft versions of island-wide mapping prepared by DEPWS (then the Department of Environment and Natural Resources) were supplied to GEMCO and utilised as a base for the survey.

The baseline vegetation survey was undertaken over six survey periods spanning from April 2018 to October 2019. Initial ground-truthing surveys in April and May 2018 comprised driving and walking traverses within the study area and collecting data at Road Note points (as described in Blocklehurst et al. (2007)) to assess VMU distribution and extent. Surveys in October 2018, April 2019 and August-October 2019 comprised the collection of data at Rapid Data Points (RDPs) and limited Road Note points to assess VMU distribution and extent. The inclusion of RDPs in the methodology for the second suite of surveys was determined in consultation with DEPWS. A total of 61 Road Note points and 717 RDPs were surveyed.

Where VMU boundaries were found to differ from the DEPWS vegetation mapping, records were made of proposed new boundaries using a GPS unit and mark-up of aerial imagery. In some cases where it was not possible to detect boundaries of VMUs on aerial imagery, sections of the boundary were walked in order to verify boundaries. Following extensive data analysis, a revised VMU map of the study area and a description of VMUs was prepared.

The Cumberland Ecology (2021) provided an understanding of the vegetation across GEMCO's existing mine and adjoining areas. This study provided information on the following for the portion of the surveys that occurred within the Southern Lease:

- Information on the distribution of VMUs;
- Association between VMUs and sensitive or significant vegetation; and
- Flora diversity.

3.2.4. Cumberland Ecology (2023)

Cumberland Ecology undertook a camera fauna monitoring program on Groote Eylandt in 2021. The aim of the camera fauna monitoring program was to provide quantitative data to assist in understanding the impacts of vegetation disturbance associated with exploration activities on the density of feral cats and the occurrence of the Northern Quoll (*Dasyurus hallucatus*). The camera fauna monitoring program was recommended by DEPWS who assisted in the scoping of the program. The program built upon similar research undertaken by Heiniger et al. (2020).

The camera fauna monitoring program included the establishment of two camera monitoring grids, one within an area of the Southern Lease disturbed by exploration activities, and the other within an area in the northern portion of Groote Eylandt that has not been disturbed by exploration. The location of the portion of the study area that occurs within the Southern Lease is shown in **Figure 5**.

Each survey grid consisted of 75 grid points, in rows of five, spaced approximately 500 m apart. A total of 150 sites were surveyed between April and September 2021. At each site, a motion-sensor camera was deployed and left to record for approximately 15-17 weeks. Baits and lures were used to attract predators and mammals to the camera sites. Baits were alternated between sites, consisting of either soiled cat litter or standard mammal baits. Due to an uneven number of sites on each grid, each grid contained 38 sites with soiled cat litter and 37 sites with standard mammal baits.

The monitoring program represented a rigorous assessment that was supported by a robust data set. Data analysis was undertaken following field surveys, including review of camera images and comparison to the findings of similar research undertaken by DEPWS, as reported in Heiniger et al. (2020). Over 1.61 million images were captured on cameras during the monitoring program, of which approximately 16% of the total images were associated with fauna. Fifty-three (53) fauna species were identified to species level on images captured on cameras during the monitoring program, including 34 birds, 13 mammals and six reptiles. The two target species of the study, the Northern Quoll (*Dasyurus hallucatus*) and feral cat (*Felis catus*) were recorded in both monitoring grids. The Northern Quoll (*Dasyurus hallucatus*) was recorded at 74 sites within the southern grid within the Southern Lease, and 71 sites in the northern grid. Feral cats (*Felis catus*) were recorded at two locations each in the southern and northern grids. The Brush-tailed Rabbit-rat (*Conilurus penicillatus*) was only recorded in the northern monitoring grid at 54 sites.

Cumberland Ecology (2023) provided information on the following:

- Fauna diversity.

- Occurrence of threatened fauna species, including the Northern Quoll (*Dasyurus hallucatus*);
- Occurrence of feral cats.

Based on the findings of the monitoring program, the following was concluded:

- Exploration activities within the Southern Lease have not resulted in an increase in the naïve occupancy of feral cats.
- Exploration activities within the Southern Lease have not resulted in a decrease in the naïve occupancy of the Northern Quoll.

3.2.5. Cumberland Ecology (Current)

GEMCO is currently undertaking a Pre-Feasibility Study for a potential future mining project in the Southern Lease. As part of this, Cumberland Ecology has recently undertaken additional flora and fauna surveys within the Southern Lease between 2021 and 2022 that have contributed to both the Pre-Feasibility Study and to this assessment. Further details of these flora and fauna surveys are provided in the subsections below.

3.2.5.1. Ground-truthing Vegetation Surveys

Cumberland Ecology has ground-truthed the extent of VMU boundaries mapped by DEPWS (as issued to GEMCO in 2018), focussing on VMUs identified as being potentially sensitive or significant in the *Land Clearing Guidelines* (DEPWS 2021a), and VMUs along watercourses and adjoining areas. GEMCO required information on the boundaries of the sensitive and/or significant VMUs to enable exploration and potential future mining activities to be sited and designed to avoid clearing of this vegetation as far as possible.

Cumberland Ecology undertook the ground-truthing vegetation surveys between 2021 and 2022. Prior to the ground-truthing surveys, a desktop assessment of the vegetation mapping issued by DEPWS in 2018 was undertaken to identify VMUs that comprise wet monsoon rainforest, monsoon vine forest, riparian vegetation, wetlands, and mangroves, given that these are considered sensitive or significant under the *Land Clearing Guidelines* (DEPWS 2021a). Ground-truthing surveys were subsequently designed to focus on these VMUs, within two broad survey areas (see **Figure 6**). The first survey was undertaken between 30-31 October, and 3-8 November 2021 and the second survey was undertaken between 18-26 May 2022.

The first survey included collection of data at 112 RDPs and two mapping notes, and the second survey included collection of data at 158 RDP. At each RDP, the following information was recorded:

- Height and cover estimates for each stratum;
- Identification and recording of three to four dominant species in all strata/sub strata;
- Coordinates using a hand-held Global Positioning System (GPS) unit;
- Sample photograph of the assessed VMU;
- Identified VMU; and
- A short description of outcropping geology, topography, land form, soil type, and drainage.

Mapping notes were recorded where time/weather constraints did not allow for the collection of an RDP. The mapping notes recorded the VMU at that location.

The locations of RDPs and mapping notes are shown on **Figure 6**.

Where VMU boundaries were found to differ from the DEPWS mapping, records were made of proposed new boundaries through mark-up of aerial photographs. Where boundaries could not be clearly detected from aerial imagery the area was traversed on foot with GPS tracks to determine the boundaries of VMUs.

In some cases, split polygons were mapped where vegetation contained floristic or structural elements of more than one VMU or was located on the soils and landform associated with another similar VMU. Examples of this include areas with one or more landform (such as a mix of lateritic and sand plains), or where a eucalypt canopy occurred above a *Melaleuca* dominated subcanopy and did not fit the description of any individual VMU defined by DEPWS.

Within the two broad survey areas of the 2021/2022 surveys, VMUs not associated with sensitive or significant vegetation were not subject to ground-truthing surveys.

The mapping of VMUs developed for this assessment incorporates the findings of the current 2021/2022 ground truthing surveys, the 2018/2019 ground truthing surveys (see **Section 3.2.3**), and the DEPWS mapping issued to GEMCO in 2018 (see **Section 3.1.4**) for the non-sensitive or significant vegetation and areas outside the ground-truthing surveys by Cumberland Ecology.

3.2.5.2. Incidental Weed Observations

During ground-truthing surveys, any weeds encountered were recorded. The following data was collected:

- GPS location;
- Weed species;
- A photograph of the infestation; and
- Notes on weed abundance, disturbance and location.

3.2.5.3. Threatened Species Observations

Cumberland Ecology is currently undertaking several targeted fauna studies within the Southern Lease. Although these studies are not being undertaken for the purpose of this assessment, any threatened species observations made to date have been incorporated into this report.

3.2.6. Summary of Recent Survey Effort

A substantial amount of field surveys targeted to the terrestrial biodiversity values within the Southern Lease have been undertaken by Cumberland Ecology between 2016 and 2022. A summary of the flora and fauna survey effort by Cumberland Ecology between 2016 and 2022, as outlined in **Section 3.2.1 - Section 3.2.5**, is provided in **Table 1**. This table includes flora and fauna effort for the entirety of each study, the survey effort within the Southern Lease, and the survey effort within the disturbance footprint (and a 500m buffer).

Table 1 Summary of survey effort of recent field surveys

Survey	Method	Total Field Survey Effort	Total Effort within Southern Lease	Total Effort within 500m of Disturbance Footprint ¹
Cumberland Ecology (2016)	Flora			
	Primary Plot	21 (20 m x 20 m) plots	21 (20 m x 20 m) plots	12 (20 m x 20 m) plots
	Meander Transect Points and Track Notes	766 data points	641 data points	298 data points
	Threatened Flora Searches	Throughout survey period	Throughout survey period	Throughout survey period
	Fauna			
	Elliot Trapping	240 trap nights (4 sites)	240 trap nights (4 sites)	240 trap nights (4 sites)
	Cage Trapping	48 trap nights (4 sites)	48 trap nights (4 sites)	48 trap nights (4 sites)
	Pitfall Trapping	48 trap nights (4 sites)	48 trap nights (4 sites)	48 trap nights (4 sites)
	Funnel Trapping	48 trap nights (4 sites)	48 trap nights (4 sites)	48 trap nights (4 sites)
	Bird Census (diurnal)	32 surveys (8 for each of 4 sites)	32 surveys (8 for each of 4 sites)	32 surveys (8 for each of 4 sites)
	Bird Census (nocturnal):	10 surveys (2 for each of 4 sites and 1 for each of 2 sites)	10 surveys (2 for each of 4 sites and 1 for each of 2 sites)	8 surveys (2 for each of 4 sites)
	Active Searches (diurnal)	12 surveys (3 for each of 4 sites)	12 surveys (3 for each of 4 sites)	12 surveys (3 for each of 4 sites)
	Active Searches (nocturnal)	8 surveys (2 for each of 4 sites)	8 surveys (2 for each of 4 sites)	8 surveys (2 for each of 4 sites)
	Ultrasonic Call Detection	13 trap nights (1 for 1 site, 2 for each of 3 sites and 3 for each of 2 sites)	13 trap nights (1 for 1 site, 2 for each of 3 sites and 3 for each of 2 sites)	3 trap nights (3 nights for 1 site)
	Harp Trapping	7 trap nights (3 nights for 1 site and 2 nights for each of 2 sites)	7 trap nights (3 nights for 1 site and 2 nights for each of 2 sites)	2 trap nights (2 nights for 1 site)
	Additional Spotlighting	25 km of track	25 km of track	16 km of track
	IR Camera Detection (Short-term Cameras)	20 trap nights (4 sites)	20 trap nights (4 sites)	6 trap nights (1 site)

Survey	Method	Total Field Survey Effort	Total Effort within Southern Lease	Total Effort within 500m of Disturbance Footprint ¹
	IR Camera Detection (Long-term Cameras)	672 trap nights (10 sites)	672 trap nights (10 sites)	468 trap nights (7 sites)
	Incidental Observations	Throughout survey period	Throughout survey period	Throughout survey period
	Habitat Assessment	4 sites	4 sites	4 sites
Cumberland Ecology (2019a)	Fauna			
	Sampling Site, including:			
	Camera Detection	152 sites (27,463 capture nights ²)	98 sites (17,828 capture nights ²)	10 sites (1,923 capture nights ²)
	Habitat Assessment	152 sites	98 sites	10 sites
	Northern Hopping-mouse Burrow Search	152 sites	98 sites	10 sites
Cumberland Ecology (2021)	Flora			
	Road Note Point	61 sites	-	-
	Rapid Data Point	717 sites	17 sites	10 sites
Cumberland Ecology (2023)	Fauna			
	Camera Detection	150 sites (16,136 capture nights ²)	75 sites (8,002 capture nights ²)	39 sites (4,204 capture nights ²)
Cumberland Ecology (Current)	Flora			
	Rapid Data Point	270 sites	226 sites	65 sites
	Mapping Note	2 sites	2 sites	1 site
	Fauna			
	Incidental Observations	Throughout survey period	Throughout survey period	Throughout survey period

1. Excluding areas outside the Southern Lease.

2. A capture night represents a single night that an individual camera was deployed and working (e.g. one camera left for seven nights represents seven capture nights).

3.3. Likelihood of Occurrence Assessment

As described in **Section 3.1.1**, database searches were undertaken to identify threatened species that are known to, or that have the potential to occur within the locality (i.e. within a 20 km radius of the centre of the Southern Lease). The likelihood of occurrence of such species was assessed separately for the Southern Lease and disturbance footprint and the likelihood was classified using the criteria presented in **Table 2**. The assessment (see **Appendix D**) was based on the species known ranges, number and age of records, and habitat preferences which were evaluated in conjunction with the site characteristics observed during the field surveys. The assessment included consideration of information contained within the DCCEEW Species Profile and Threats Database, recovery plans and other literature.

Table 2 Criteria to assess potential for threatened species to occur

Likelihood to Occur	Definition
Present	The species was recorded within the Southern Lease or disturbance footprint during recent (2016-2022) terrestrial field surveys undertaken by Cumberland Ecology (see Section 3.2), during previous studies (see Section 3.1.2) or based on NR Maps records (see Section 3.1.1).
Potential	The species was not recorded within the Southern Lease or disturbance footprint during recent (2016-2022) terrestrial field surveys undertaken by Cumberland Ecology (see Section 3.2), during previous studies (see Section 3.1.2) or based on NR Maps records (see Section 3.1.1), but is known to occur within the surrounding area. Habitat of a similar and suitable quality is known to exist within the Southern Lease or disturbance footprint and it is deemed the species has potential to occur, despite it not being recorded to date.
Unlikely	The species was not recorded within the Southern Lease or disturbance footprint during recent (2016-2022) terrestrial field surveys undertaken by Cumberland Ecology, or during other studies. The species is unlikely to occur due to a lack of, or limited, habitat within the Southern Lease or disturbance footprint, or extremely poor quality habitat within the Southern Lease or disturbance footprint, or no or very few recent records of the species occurring in the wider region. A lack of records in the Southern Lease and wider region is a valid consideration in determining the likelihood of occurrence of a species, given that the Southern Lease and wider region is well surveyed.

In the case of the Northern Hopping-Mouse and Brush-tailed Rabbit-rat, the potential for these species to occur was based on the results of Cumberland Ecology (2019a), given that this study addressed the specific issue of occurrence of these species in the Southern Lease. Assessment of the Northern Hopping-mouse also considered the results of Anindilyakwa Land & Sea Rangers (2019), given that this study also targeted this species.

3.4. Fauna Habitat Mapping

The fauna habitat types identified within the Southern Lease have been developed over a number of assessments, initially using broad land cover types across Groote Eylandt by Crase and Hempel (2005), then

refined by Cumberland Ecology (2016) and further amended by Cumberland Ecology (2019b). The fauna habitat types were amended based on increasing knowledge of the habitat resources and fauna species assemblage of the Southern Lease.

Mapping of each identified fauna habitat type was developed based on the following:

- Vegetation mapping of the Southern Lease as prepared for this assessment (see **Section 3.2.5.1**);
- Observations made during recent (2016-2022) terrestrial surveys of the Southern Lease (see **Section 3.2**); and
- Review of aerial imagery, LiDAR data (1 m contour data) and mapping of white rock (see **Section 3.1.3**).

The vegetation mapping prepared for this assessment provided a good starting point to develop the mapping of fauna habitat within the Southern Lease. The VMUs identified within the Southern Lease were initially reviewed to determine potential alignment to the habitat types. For areas that were mapped as comprising combined VMUs, only the dominant VMU was reviewed. As some VMUs (and combination VMUs) comprised multiple habitat types, each individual polygon of mapped vegetation was assessed against recent available aerial imagery (September 2020), 1 m contour data, geological mapping and mapping of white rock. Where polygons appeared to contain more than one habitat type, it was assigned to the dominant habitat type.

The fauna habitat mapping prepared for this assessment delineates the major types of habitats within the Southern Lease, many of which are relevant to the threatened species known to occur or potentially occurring within the Southern Lease. The results of fauna habitat mapping are discussed in **Chapter 6**.

3.5. Data Suitability and Limitations

A substantial amount of field surveys targeted to the terrestrial biodiversity values within the Southern Lease have been undertaken by Cumberland Ecology between 2016 and 2022. No significant limitations to recent terrestrial surveys and habitat mapping were identified. As noted above, this assessment utilises information collected during recent (2016-2022) terrestrial field surveys of the Southern Lease by Cumberland Ecology (see **Section 3.2**), as well as relevant findings of numerous surveys conducted over several years and in all seasons in nearby areas with the same or very similar habitats. The assessment of likelihood of occurrence of threatened species also included consideration of information contained within the DCCEEW Species Profile and Threats Database, recovery plans and other literature.

As the biodiversity values of the Southern Lease and surrounding areas have been extensively studied, there is a high degree of confidence in the mapping of vegetation communities and broad fauna habitats, and the assessment of occurrence of threatened species.

3.5.1. Flora

The vegetation mapping presented within this report incorporates data collected by both Cumberland Ecology and DEPWS. In relation to vegetation mapping undertaken by Cumberland Ecology, the following limitations are relevant:

- Ground-truthing was largely limited to VMUs identified as being potentially sensitive or significant in the *Land Clearing Guidelines* (DEPWS 2021a). Limited RDPs were collected for some eucalypt dominated forests and woodlands in order to verify that the VMU was not sensitive or significant. However, for other adjacent eucalypt dominated open forests and woodlands, no RDPs were surveyed and the boundaries of adjacent VMU polygons were extended to join the boundaries of the polygons mapped; and
- Some VMUs were only surveyed from the boundary of the VMU due to safety concerns relating to the potential presence of crocodiles in permanent pools and estuarine areas.

In relation to the vegetation mapping by DEPWS (issued to GEMCO in 2018), the following limitations are relevant:

- The scale of DEPWS's island-wide mapping (1:50,000) may not pick-up narrow ecotonal areas or small patches of vegetation communities;
- Differences in vegetation composition may not be picked-up on aerial imagery for map units that are structurally similar. This is particularly the case for different *Melaleuca* dominated VMUs that differ slightly based on the relative dominance of grasses, sedges or ferns in the ground layer; and
- Some VMUs forming a mosaic of several communities cannot readily be mapped separately (combination VMUs). An example of this is on coastal sand dunes where grasslands, shrublands and monsoon open woodlands can form a mosaic depending on the degree of coastal exposure (i.e. micro-topography including protected dune swales, exposed dunes and dune crests).

Notwithstanding these limitations, the vegetation mapping of the Southern Lease produced for this assessment is considered the most accurate mapping available for the Southern Lease.

Detailed floristic surveys undertaken by Cumberland Ecology during recent (2016-2022) surveys were restricted to the western portion of the Southern Lease (see **Figure 5**). Some floristic information was also collected by Cumberland Ecology (2019a), which was limited to characteristic species and trees. Given the size of the Southern Lease and extensive range of vegetation communities present, not all flora species present would have been recorded during the surveys. Despite this, it is considered that sufficient information has been collected to assess issues including conservation significance of the flora.

3.5.2. Fauna

Recent (2016-2022) terrestrial fauna surveys by Cumberland Ecology were successful in detecting a wide range of vertebrate fauna, particularly birds, bats and non-flying mammals. The most recent surveys undertaken in 2022 as part of a Pre-Feasibility Study for a potential future mining project in the Southern Lease provided threatened species observations. Prior to these surveys, Cumberland Ecology (2023) included collection of survey data in 2021, which was targeted towards feral cats and the Northern Quoll (*Dasyurus hallucatus*), whilst also collecting information on other terrestrial fauna species. Cumberland Ecology (2019a) also collected extensive survey data across the Southern Lease and surrounds between 2017 and 2018, with survey locations targeted towards a spatial and temporal distribution within a range of habitats. The other recent terrestrial surveys by Cumberland Ecology (2016) were situated in the north western portion of the Southern Lease

(**Figure 5**) at locations where a number of representative habitat types co-occur and are therefore areas of high species diversity.

The majority of data obtained from the fauna surveys are generally considered a “snapshot” in time and illustrate the fauna that were active during the time of the surveys. However, as the two most recent terrestrial surveys by Cumberland Ecology (2019a, 2023) included the use of motion-sensor cameras for extended periods (minimum 15 weeks in 2022 and minimum 4 weeks in 2017 and 2018) this data is considered to represent more than a “snapshot” of terrestrial fauna species. The data produced by the surveys is intended to be indicative of the types of species that could occur and are not an absolute census of all vertebrate fauna species occurring within the Southern Lease. Due to the design of the Cumberland Ecology (2019a, 2023) surveys which targeted terrestrial mammals, the assemblage of terrestrial mammals within the Southern Lease is considered to be well known. Cumberland Ecology (2019a) also utilised methods to target reptiles, in particular large reptiles such as goannas.

Given the size of the Southern Lease and diversity of habitat types and resources, not all fauna species present would have been recorded during the surveys. It is likely that if additional field sampling was undertaken within the Southern Lease, more species may be identified, in particular frogs, small reptiles, birds and bats. For this reason, this assessment has also taken into account the results of previous surveys undertaken within, or in close proximity to the Southern Lease such as those undertaken for the Eastern Leases Project (Cumberland Ecology 2015).

As well as providing an overall census of the vertebrate fauna recorded within the Southern Lease, previous terrestrial fauna surveys by Cumberland Ecology between 2016 and 2022 also targeted several of the threatened species predicted to occur.

3.5.3. Habitat Mapping

The threatened or migratory species for which habitat was mapped have habitat requirements that are either broad, or specific. Some species, such as the Northern Quoll (*Dasyurus hallucatus*) are reliably predicted from mapped habitat types. Others such as Mertens’ Water Monitor (*Varanus mertensi*) have specific habitat features (e.g. watercourses) which are required within suitable habitat types. The vegetation mapping prepared for this assessment, in conjunction with field observations, and desktop review, is considered suitable to provide a basis for the habitat types within the Southern Lease. Where appropriate, additional descriptions of species habitat features are also noted to supplement the habitat mapping.

4. Results: Overview of Environmental Values

This chapter provides an overview of the environmental values of the Southern Lease and surrounds, including information on landform, geology, soils, land systems, hydrology, vegetation and land uses.

4.1. Geology

Groote Eylandt was formed on a stable basement of Proterozoic quartzite. This basement quartzite forms extensive elevated outcrops in the centre of the island. The Proterozoic basement was eroded and redeposited during the early Cretaceous period, forming a sandstone unit comprising reworked quartzite and sandstone.

A blanket of Cretaceous marine sediments was subsequently deposited over the paleosurface of basement and reworked basement materials in the west of the island. The distribution of the Cretaceous marine sediments is generally confined to the western plains and valleys of the island. The upper Cretaceous sediments host the manganese mineralisation as discrete layers of manganese oxides precipitated during an anoxic ocean event. Much of the Cretaceous sediment profile (including some of the manganese deposit) has been extensively modified by a long period of tropical weathering (or laterisation) during the Tertiary period. This has resulted in the development of thick laterite profiles up to 25 m thick, and supergene upgrading of the manganese.

The surface geology of the Southern Lease, based on mapping prepared by NT Department of Mines and Energy (2010), is shown in **Figure 8**, and includes Quaternary sediments, Tertiary laterite/lateritic clay, Cretaceous sediments and Proterozoic sediment (which represents the geological basement in this area). The surface geology strongly influences vegetation composition across the Southern Lease, as the geological surface erodes to provide sandy, relatively infertile soils, typically suitable only for native vegetation types, such as Eucalypts, Melaleucas and Cypress.

4.2. Soils

Broad scale soils mapping for the Southern Lease from the National Resource Information Centre Digital Atlas of Australian Soils (Bureau of Rural Sciences 2016) is shown in **Figure 9**. Three soil mapping units occur within the Southern Lease, including:

- Unit AC15: Plains with some incised streams and some flat valleys and spillways subject to local flooding: chief soils are yellow earthy sands with sandy yellow earths, both may contain some ironstone gravels;
- Unit BA10: Dissected sandstone plateau of high, stony, often steep-sided hills; large areas of bare rock outcrop: chief soils are shallow gritty and stony sands; and
- Unit B34: Coastal dune systems generally consolidated but with many mobile areas; sometimes with a central core of limestone or ancient coral: chief soils are siliceous sands.

The soil mapping indicates that the Southern Lease is predominately plains of sandy yellow earths with some gravels. A sandstone plateau with large areas of bare rock outcropping and sandy soils is located toward the central and eastern portions of the Southern Lease. Coastal soils are located near the western and southern boundaries of the Southern Lease in proximity to the coastline.

4.3. Land Systems

Land systems within the NT have been mapped and described by the NT Department of Land Resource Management (Lynch et al. 2012). Ten land systems are recognised in the Southern Lease as detailed in **Table 3** and the extent of the land systems is shown in **Figure 10**. The land systems support different types of vegetation, and provide important habitat for a broad range of plant and animal species.

Table 3 Land systems within the Southern Lease (Lynch et al. 2012)

Landform	Indicated Soil Types	Vegetation
Coastal parabolic dunefields Land System: Bartalumba	Siliceous sands	Tall open shrubland of <i>Acacia torulosa</i> , <i>Calytrix exstipulata</i> , <i>Bossiaea bossiaeoides</i> over <i>Triodia microstachya</i> , <i>Chrysopogon elongatus</i> and <i>Sorghum</i> spp
Beach ridge plains and chenier plains Land System: Blue Mud	Deep siliceous sands and shelly lithosols	Mid high open woodland (<i>Acacia auriculiformis</i> , <i>Acacia hemignosta</i> , <i>Melaleuca nervosa</i> and <i>Casuarina equisetifolia</i>)
Sandy colluvial footslopes below elevated quartz sandstone plateaux Land System: Bundah	Siliceous sands and shallow sandy skeletal soils	Tall open woodland of <i>E. tetradonta</i> , <i>E. miniata</i> , <i>Callitris intratropica</i> , <i>C. polycarpa</i> over tropical tall grass (<i>Heteropogon triticeus</i> , <i>Chrysopogon fallax</i> , <i>Sorghum</i> spp)
Gently undulating sand plains in coastal areas Land System: Dalumbu	Siliceous sands	Low open woodland of <i>Melaleuca nervosa</i> , <i>C. polycarpa</i> , <i>Acacia auriculiformis</i> , <i>Grevillea pteridifolia</i> over a mid-dense grass cover (<i>Triodia microtheca</i> , <i>Sorghum</i> spp, <i>Germania grandifolia</i>)
Level to gently undulating alluvial floodplains of dominantly sandy alluvium Land System: Effington	Uniform gradational and texture contrast sandy soils	Mid-high woodland of <i>Melaleuca viridiflora</i> , <i>C. polycarpa</i> , <i>Melaleuca nervosa</i> , <i>E. bigalerita</i> , <i>C. latifolia</i> over <i>Chrysopogon fallax</i> , <i>Pseudopogonatherum spinescens</i> , <i>Eriachne trisetia</i>
Rugged dissected plateaux on quartz sandstone Land System: Groote	Bare rock and shallow lithosols	Mid-high open woodland of <i>E. tetradonta</i> , <i>C. ferruginea</i> , <i>E. miniata</i> , <i>C. bleeseri</i> , <i>E. tectifera</i> over a sparse to mid-dense grass cover (<i>Heteropogon triticeus</i> , <i>Chrysopogon fallax</i> , <i>Sorghum</i> spp)
Level tidal flats with channels and estuaries and minor dunes Land System: Littoral 1	Saline muds and grey cracking clays	Samphire, sedgeland, or mangrove low closed forest
Gently undulating sandplains Land System: Queue	Deep red earthy sands	Mid-high woodland of <i>E. tetradonta</i> , <i>E. miniata</i> , <i>C. bleeseri</i> , <i>Callitris intratropica</i> over tall tropical grass (<i>Heteropogon triticeus</i> , <i>Chrysopogon fallax</i> , <i>Sorghum</i> spp)

Landform	Indicated Soil Types	Vegetation
Gently undulating coastal sand plains with parabolic dunes Land System: Umbakumba	Siliceous sands	Tall open shrubland to low open woodland of <i>Acacia torulosa</i>
Level to gently undulating plains Land System: Yarrawirrie	Red earths and red siliceous sands	Low open woodland of dwarfed <i>E. tetradonta</i> over <i>Chrysopogon fallax</i> , <i>Setaria apiculata</i> , <i>Schizachyrium fragile</i>

4.4. Hydrology

The Southern Lease is traversed by Arnduwamurrumanja Creek (a tributary of the Emerald River), Salt Creek, and Second Creek, as well as the Yenbakwa, Amagula, Innokumanja and Amiyelkuwa Rivers. The watercourses in the Southern Lease are shown in **Figure 11**.

Watercourses in the vicinity of the disturbance footprint are Arnduwamurrumanja Creek, Salt Creek, Second Creek, and Yenbakwa River (**Figure 11**). These watercourses are intermittent, flowing for several months during and after rainfall events, although waterholes may persist into the dry season or all year round in some locations.

4.5. Vegetation

The vegetation across the entire Southern Lease comprises remnant vegetation, and there has been little clearing of vegetation. Overall the vegetation is in very good condition and it is characterised by a high species and structural diversity, although the structure of the understorey and the condition of the ground layer has been modified by a frequent fire regime. Very few weeds occur within the Southern Lease.

Due to the remnant vegetation status of the entire Southern Lease, and the absence of broad scale vegetation clearing, habitat connectivity in the landscape is excellent and unbroken throughout. The Southern Lease provides linkages with remnant vegetation on all sides that can be utilised by fauna species to connect to adjacent areas of habitat. The Southern Lease provides a range of habitats for fauna species, including watercourses and wetlands, rocky outcrops and extensive areas of woodland.

The Southern Lease is regularly burnt by the Traditional Owners, which has resulted in a reduction in the amount of woody debris, and is also likely to have affected the species composition and structure of the vegetation. Some species are highly sensitive to changes in fire regime, and it is likely that this may have influenced the suite of species that are present within the Southern Lease.

4.6. Land Uses

The land within and surrounding the Southern Lease comprises natural bushland. No farming or agriculture activities are undertaken in the vicinity of the Southern Lease; however, the vegetation is regularly burnt by the Traditional Owners. There are few existing forms of anthropogenic disturbance within the Southern Lease, with the exception of access roads/tracks, outstations, and previous exploration.

Exploration was first undertaken in the Southern Lease in the late 1960s and 1970s, followed by a program of ground mapping in 2014, and further exploration drilling between 2016 and 2017 (involving the drilling of approximately 300 exploration holes).

More recently, the proponent has undertaken two larger exploration programs as follows:

- Between 2019 and 2020, approximately 500 exploration holes were drilled using Reverse Circulation (RC), aircore and diamond drilling methods, and associated access tracks were developed. The full extent of this disturbance has been rehabilitated.
- In late 2020, the proponent commenced a further drilling program, which is scheduled to be completed in 2022. It includes further infill drilling (i.e. RC drilling) of approximately 830 infill drill holes, and the drilling of approximately 75 diamond drill holes. It also includes associated development of access tracks. The majority of this disturbance has been rehabilitated.

Both exploration programs were referred to the NT EPA under the NT *Environmental Assessment Act 1982* and *Environmental Assessment Administrative Procedures*. A Notice of Intent was prepared for each program, describing the baseline environment, potential impacts and avoidance and mitigation measures. In both cases, the NT EPA concluded that potential environmental impacts and risks arising from the planned activities could be adequately managed and were not significant. Approval for the activities was obtained under the *Mining Management Act 2001*.

5. Results: Flora

This chapter provides an overview of the flora of the Southern Lease and surrounds, including information on vegetation communities, general flora species and threatened flora species.

5.1. Vegetation Communities

The vegetation community patterns within the Southern Lease strongly reflect the geology, soils, topography, and the impacts of frequent fires. Rocky sandstone hills are often sparsely vegetated by woodlands (depending on the depth of soil formed on the sandstone), but also include open forests, shrublands and grasslands. Gently undulating, well-drained sand plains are typically forested. On flatter, low relief areas, forests give way to woodlands, swamps and sedgeland (depending on drainage). *Callitris intratropica* (Northern Cypress Pine) forms thickets in places and are prevalent where the sand plains meet the rocky hillsides. Riparian forests and woodland occur along permanent and seasonal streams and adjacent floodplains including seasonal wetlands. Rainforests and vine thickets occur in areas protected from fires and as such are generally found adjacent to streams, soaks and springs, in protected rocky sites, and in the lee of sand dunes. Coastal vegetation varies in structure depending on the degree of coastal exposure and occurs near the western and southern boundaries of the Southern Lease in proximity to the coastline, including tidal flats near the western boundary.

The most extensive vegetation communities within the Southern Lease comprise open woodlands to open forests dominated by *Eucalyptus tetradonta* (Darwin Stringybark), which occur on both gently undulating sandy and lateritic soils, as well as within rocky sandstone areas. Within sandy and lateritic areas, *Eucalyptus miniata* (Darwin Woollybutt) is locally common in some areas and more rarely *Corymbia polycarpa* (Long-fruited Bloodwood). Alluvial woodlands also include *Corymbia bella* (Ghost Gum), *Corymbia polycarpa* (Long-fruited Bloodwood) and *Eucalyptus bigalerita* (Northern Salmon Gum). *Eucalyptus miniata* (Darwin Woollybutt) also occurs within rocky sandstone areas, along with *Callitris intratropica* (Northern Cypress Pine), *Corymbia polycarpa* (Long-fruited Bloodwood) and *Corymbia kombolgiensis* (Scarp Gum). *Melaleuca*-dominated vegetation occurs within the riparian zones and wetlands within the Southern Lease and is often dominated by *Melaleuca viridiflora* (Broad-leaved Paperbark) and/or *Melaleuca cajuputi* (Swamp Tea Tree), with *Pandanus spiralis* (Common Screwpine) being common in the midstorey. Coastal areas within the Southern Lease comprise a mix of mangroves, shrublands, grasslands, sedgeland, monsoon forest and *Melaleuca*-dominated dune swales. Monsoon forests also occur inland in sheltered riparian or seepage locations.

The mapping of VMUs developed for this assessment incorporates the findings of the 2021/2022 ground truthing surveys (see **Section 3.2.5**), the 2018/2019 ground truthing surveys (see **Section 3.2.3**) and the DEPWS mapping issued to GEMCO in 2018 for the non-sensitive or significant vegetation and areas outside the ground-truthing surveys by Cumberland Ecology. This vegetation mapping includes over 100 individual VMUs or combination VMUs within the Southern Lease. Combination VMUs are represented by areas where two VMUs are intermingled and therefore are unable to readily split into discrete areas. The first VMU listed in a combination VMU represents the dominant VMU. A detailed list of the individual VMUs or combination VMUs occurring within the Southern Lease is provided in **Appendix C**.

Due to the complexity of vegetation mapping developed for this assessment, which has resulted in a high number of VMUs and combination VMUs, the units have been grouped together to form broad vegetation types based on previous consultation and endorsement from DEPWS. For combination VMUs, the assigned

broad vegetation type is representative of the dominant VMU. **Table 4** summarises the broad vegetation types within the Southern Lease. The broad vegetation types for the Southern Lease are shown in **Figure 12**.

Table 4 Broad vegetation types within the Southern Lease

Broad Vegetation Types	Corresponding VMUs	Southern Lease		Disturbance Footprint	
		Area (ha)	%	Area (ha)	%
1: Mangrove	1	148.2	0.6	-	-
2: Spring closed forest (rainforest)	4, 6, 49	134.3	0.5	-	-
3: Dry closed forests or thickets (rainforest) on sand or sandstone	2, 62	93.9	0.4	-	-
4: Riparian and gully closed forests with mixed canopies (rainforest and Melaleuca spp.)	5, 18	81.9	0.3	-	-
5: Eucalypt open forests of lowlands and deeper sandy soils derived from sandstone or deeply weathered parent rocks (lateritic)	10, 10a, 12, 31	4,922.8	18.9	4.1	6.5
6: Eucalypt open forests on Quaternary sands	31a	416.4	1.6	-	-
7: Eucalypt open forests and woodlands of sandstone uplands	10b, 11	4,656.2	17.9	37.0	59.0
8: Callitris open forest	15	80.6	0.3	0.2	0.3
9: Melaleuca open forests on alluvial plains and drainage systems	17, 19	946.1	3.6	-	-
10: Melaleuca swamps	22, 23	112.9	0.4	-	-
11: Eucalypt woodlands and open woodlands of lowlands with sandy soils	40, 40a, 59	2,566.1	9.8	14.6	23.3
12: Eucalypt woodland and open woodlands on shallow soils associated with basement geologies	13, 29b, 40b, 48, 53	3,668.9	14.1	-	-
13: Eucalypt woodlands on alluvial soils	42, 45, 51, 51a, 51c	1,885.9	7.2	2.5	4.0
14: Eucalypt woodland on quaternary sands	50	43.1	0.2	-	-
15: Callitris woodland and open woodland	41	742.2	2.8	0.2	0.3
16: Melaleuca woodlands on alluvial soils (wet)	26, 28, 44, 52, 54, 55, 55a, 55b	990.9	3.8	-	-
17: Melaleuca woodlands on sandy soils (dry)	27a, 27b	297.5	1.1	0.04	0.1

Broad Vegetation Types	Corresponding VMUs	Southern Lease		Disturbance Footprint	
		Area (ha)	%	Area (ha)	%
18: Melaleuca open woodlands on alluvial soils (wet)	43, 61	793.2	3.0	-	-
19: Melaleuca open woodlands on sandy soils (dry)	60	73.9	0.3	-	-
20: Eucalypt low open woodland	46, 47	203.8	0.8	4.1	6.5
21: Shrublands on quaternary sand	72, 73	188.0	0.7	-	-
22: Sandstone shrublands	70	257.8	1.0	-	-
23: Acacia thickets etc. on sand or sandstone	32, 57	180.3	0.7	-	-
24: Tussock grasslands on alluvial soils or relict marine plains	81, 81a	7.4	<0.0	-	-
25: Tussock grasslands on Quaternary sand	82a	8.1	<0.0	-	-
26: Sedge wetlands	80, 81b, 84, 88	59.7	0.2	-	-
28: Hummock grassland on sandstone (or minor basalt)	86	35.5	0.1	-	-
29: Saline tidal flats and shrublands	75, 100	123.6	0.5	-	-
33: Cleared/disturbed/regrowth	202	1.8	<0.0	-	-
34: Water/ocean	500	0.9	<0.0	-	-
36: Eucalypt and/or Melaleuca open forest/vine thicket complex	20, 21, 30	2,331.7	8.9	-	-
Unmapped ¹	-	9.3	<0.0	-	-
Total²		26,063	100	63	100

1. A few sections of watercourses have been unmapped by DEPWS along the southern boundary of the Southern Lease.

2. In some cases totals may not equal the appropriate total number due to rounding.

5.2. Threatened Ecological Communities

The EPBC Act PMST did not record any TECs as occurring or potentially occurring within a 20 km radius of the centre of the Southern Lease (see **Appendix A**). The map of EPBC Act listed TECs in the NT (DSEWPac 2013) does not show the occurrence of any TECs within the Southern Lease, or Groote Eylandt.

Only one ecological community that occurs in the NT is listed as Endangered under the Commonwealth EPBC Act. This is the *Arnhem Plateau Sandstone Shrubland Complex*, however this TEC does not occur on Groote Eylandt.

Considering the above, it is concluded that no TECs occur in the Southern Lease. TECs are therefore not considered or assessed further in this report.

There is currently no mechanism for listing TECs under NT legislation. Therefore, the TPWC Act does not contain listings for TECs and are therefore not assessed further in this report.

5.3. Flora Species: Overview

5.3.1. Native Species

Over 250 native plant species have been recorded within the western portion of the Southern Lease by Cumberland Ecology during recent (2016-2022) surveys undertaken for this assessment. The data indicates that the floristic assemblage is well represented by Poaceae (grasses), Fabaceae (acacias and peas), Cyperaceae (sedges) and Myrtaceae (*Eucalyptus spp.* and *Melaleuca spp.*). A list of flora species that have been recorded within the Southern Lease by Cumberland Ecology is presented in **Appendix E**.

5.3.2. Weeds

The NR Maps database (DEPWS 2022) only holds records of one weed species, *Distimake dissectus* (Merremia), within the Southern Lease, at two locations. This species is not a declared weed under the WM Act.

The following weeds were recorded within the Southern Lease during field surveys undertaken for this assessment (see **Section 3.2.5.2**):

- *Hyptis suaveolens* (Hyptis);
- *Passiflora foetida* (Stinking Passionflower);
- *Sida cordifolia* (Flannel Weed);
- *Sida humilis*;
- *Spermacoce remota* (Spermacoce);
- *Stachytarpheta cayennensis* (Snakeweed);
- *Stylosanthes hamata* (Stylosanthes, Verano Stylo); and
- *Stylosanthes scabra* (Stylosanthes, Shrubby Stylo).

Hyptis suaveolens (Hyptis), *Sida cordifolia* (Flannel Weed) and *Stachytarpheta cayennensis* (Snakeweed) are all Class B declared weeds under the WM Act.

Weed occurrences are generally associated with disturbed areas, including public roads and access tracks and in the vicinity of outstations, as well as along waterways.

5.4. Flora Species: Threatened Species

No threatened flora species were recorded within the Southern Lease during the recent (2016-2022) terrestrial surveys by Cumberland Ecology.

An analysis of ecological databases was conducted for the Southern Lease and its surrounds, including interrogation of the DCCEEW EPBC PMST (DCCEEW 2022f), and NR Maps search facility (DEPWS 2022) for

threatened flora records. The results of the PMST search is presented in **Appendix A**, and the records held within the NR Maps database across Groote Eylandt are shown on **Figure 13**.

The DCCEEW EPBC PMST (DCCEEW 2022f) did not identify any threatened flora species or species habitat as 'known to occur', 'likely to occur' or 'may occur' within the locality. The NR Maps search facility (DEPWS 2022) identified the presence of one threatened flora within the locality of the Southern Lease, namely *Utricularia singeriana*. *Utricularia singeriana* is listed as Vulnerable under the TPWC Act.

A likelihood of occurrence assessment was undertaken for *Utricularia singeriana* to determine if it has the potential to occur within the disturbance footprint. The likelihood of this species occurring was classified using the criteria presented in **Table 2**. The assessment was based on the species known range, number and age of records, and habitat preferences which were evaluated in conjunction with the site characteristics observed during the field surveys. The assessment included consideration of information contained within the DCCEEW Species Profile and Threats Database, recovery plans and other literature. The full results of this likelihood of occurrence assessment are presented in **Appendix D**. A summary of *Utricularia singeriana* species and its occurrence within the Southern Lease is provided below.

Utricularia singeriana

Listing Status

EPBC Act Status: Not listed

TPWC Act Status: Vulnerable

Species Overview

Utricularia singeriana is a medium to large sized annual, terrestrial herb (Baleeiro and Jobson 2022). It is known to flower from mid-March to late May (Crowie 2010). It was recently redescribed by Baleeiro and Jobson (2022), separating the species from a newly described species of *Utricularia* occurring in Western Australia.

Distribution

Utricularia singeriana occurs in the vicinity of Darwin, Jabiru, Finnis River and Edith River areas of the Northern Territory (Baleeiro and Jobson 2022). The species has recently been collected from Groote Eylandt, and Baleeiro and Jobson (2022) indicates that this additional record suggests that the distribution may be wider across Arnhem Land and nearby islands. This record on Groote Eylandt is held within the NR Maps database on Groote Eylandt (see **Figure 13**).

Habitat

Utricularia singeriana is known to occur in seasonally inundated grassland and low open woodland; near granite outcrops, often in shallow water to 2 cm deep, and on moist sandy or sandy loam soils (Holmes et al. 2005). It has also been described by Crowie (2010) as occurring along the seasonally waterlogged margins of drainage flats amongst a relatively sparse grass layer.

Presence and Habitat within the Southern Lease and Disturbance Footprint

There is one record of *Utricularia singeriana* within the Southern Lease, outside of the disturbance footprint (see **Figure 13**). This record is located within an area mapped as VMU28 (Melaleuca spp. (*M. viridiflora*/*M. cajaputi*/*M. ferruginea*) woodland to low woodland on alluvial plains with sedge understorey). This VMU commonly occurs on alluvial plains associated with major streams but can also form wetlands. As shown in **Table 4**, this VMU corresponds to the broad vegetation type 16: Melaleuca woodlands on alluvial soils (wet) (see **Figure 12**).

Based on the previously described habitats for *Utricularia singeriana* and its known occurrence within the Southern Lease, there is potential habitat for the species in VMU 28 and other similar VMUs, in particular VMUs 43, 27a/b and 17 and possibly VMUs 22 and 26/17. These VMUs are widespread within the Southern Lease. It is likely that areas mapped as wetlands and riparian vegetation would capture potential habitat for this species within the Southern Lease.

This species is considered unlikely to occur in the disturbance footprint due to the absence of wetlands and riparian habitat.

6. Results: Fauna

This chapter provides an overview of the fauna of the Southern Lease and surrounds, including information on fauna habitats, general fauna species and threatened fauna species.

6.1. Fauna Habitats

The Southern Lease contains extensive areas of remnant vegetation which provide a range of habitats for fauna species. The matrix of fauna habitats within the Southern Lease occur within the various vegetation communities, topographical formations and water resources (permanent and ephemeral). The habitat features are numerous and provide potential foraging, shelter and breeding opportunities for a suite of fauna species. Key habitat types identified within the Southern Lease include:

- Closed forest (rainforest) habitats;
- Laterite woodland and forest habitats;
- Sandstone woodland and forest habitats;
- Coastal dune/swale complex habitats;
- Riparian/wetland habitats; and
- Estuarine complex habitats.

The extent of these habitats within the Southern Lease and disturbance footprint is summarised in **Table 5** and shown in **Figure 14**. Each of these habitats is discussed below.

Table 5 Fauna habitats within the Southern Lease and disturbance footprint

Habitat Type	VMUs ¹	Southern Lease		Disturbance Footprint	
		Area (ha)	%	Area (ha)	%
Closed forest (rainforest) habitats	2, 4, 5, 6	234.7	0.9	-	-
Laterite woodland and forest habitats	10 (part), 10a (part), 10b (part), 11 (part), 12 (part), 13 (part), 15 (part), 27a (part), 28 (part), 29b (part), 30 (part), 31, 31a (part), 40 (part), 40a, 41 (part), 42 (part), 45 (part), 46, 48 (part), 51 (part), 51a (part), 51c (part), 53, 59	13,914.9	53.4	62.6	99.9
Sandstone woodland and forest habitats	10 (part), 10a (part), 10b (part), 11 (part), 12 (part), 13 (part), 15 (part), 29b (part), 40 (part), 40b (part), 41 (part), 42 (part), 45 (part), 48 (part), 49, 51c (part), 70, 86	6,791.6	26.1	0.04	0.1
Coastal dune/swale complex habitats	27b, 28 (part), 30 (part), 31a (part), 32, 40b (part), 48 (part), 50, 55a	989.6	3.8	-	-

Habitat Type	VMUs ¹	Southern Lease		Disturbance Footprint	
		Area (ha)	%	Area (ha)	%
	(part), 57, 60, 61 (part), 62, 72, 73, 82a				
Riparian/wetland habitats	12 (part), 17, 18, 19, 20, 21, 22, 23, 26, 27a (part), 28 (part), 42 (part), 43, 44, 45 (part), 47, 51 (part), 51a (part), 51c (part), 52 (part), 54 (part), 55, 55a (part), 55b, 61 (part), 84, 500, water	3,792.4	14.6	-	-
Estuarine complex habitats	1, 52 (part), 54 (part), 75, 80, 81, 81a, 81b, 88, 100	328.6	1.3	-	-
Cleared	202, cleared	1.8	<0.0	-	-
Unmapped²		9.3	<0.0	-	-
Total³		26,063	100	63	100

1. VMUs comprising more than one habitat type are labelled as '(part)'.

2. A few sections of watercourses have been unmapped by DEPWS along the southern boundary of the Southern Lease.

3. In some cases totals may not equal the total number due to rounding.

6.1.1. Closed Forest (Rainforest) Habitats

True closed forest (rainforest) habitats cover less than 1% of the Southern Lease (**Table 5**). This habitat type is present at a number of scattered locations within the Southern Lease, including within coastal and inland areas (**Figure 14**). No areas of closed forest are mapped within the disturbance footprint.

Closed forest (rainforest) habitats occur in restricted unburnt areas, at the coastal fringe and along some inland riparian areas. Some other areas of vegetation within the Southern Lease contain elements of rainforest in the understorey, however these have not been included in the closed forest (rainforest) habitat type as they do not form closed forests. At coastal locations, closed forest (rainforest) habitats occur in sheltered areas just beyond the coastal dune/swale complex habitats. At inland locations, closed forest (rainforest) habitats occur at sheltered locations in proximity to the larger watercourses where the stream flow is perennial, in spring-fed areas associated with sandstone plateaus, and in areas fed by seepage from adjacent wetlands.

Closed forest includes canopy of *Pouteria sericea* (Wild Prune), *Diospyros maritima* (Sea Ebony), *Aglaia brownii* (Coastal Boodyarra), *Drypetes deplanchei* (Yellow Tulipwood), *Celtis philippensis* (Celtis), *Alstonia actinophylla* (Milkwood), *Canarium australianum* (Mango Bark) and *Melaleuca leucadendra* (Cajeput Tree), some of which form large hollows. As closed forest is associated with moderate to high moisture (or mesic) conditions and reliable water, it is likely to support a different assemblage of fauna to other habitats in the Southern Lease.

Fauna species recorded during recent terrestrial surveys by Cumberland Ecology (2016, 2019a) within this habitat type included the Northern Brown Bandicoot (*Isodon macrourus*), Grassland Melomys (*Melomys*

burtoni), Agile Wallaby (*Macropus agilis*), Water Rat (*Hydromys chrysogaster*), Orange-footed Scrubfowl (*Megapodius reinwardt*), Emerald Dove (*Chalcophaps indica*), Sand Goanna (*Varanus gouldii*) and Short-beaked Echidna (*Tachyglossus aculeatus*).

Features of this habitat type are summarised in **Table 6**, and a photograph of the closed forest (rainforest) habitat within the Southern Lease is shown in **Photograph 1**.

Table 6 Features of close forest (rainforest) habitats within the Southern Lease

Feature	Comment
Close forest (rainforest) area	Less than 1% of Southern Lease Does not occur within the disturbance footprint
Physiographic location	Small pockets protected from fires, coastal areas, riparian areas, spring-fed areas, seepage areas
Soils	High proportion of surface rocks and gravel, with organic material and debris on the rock surface
Water	Associated with permanent water, shallow groundwater, spring-fed locations, seepage areas
Fire	Unburnt
Tree hollows and fallen logs	Large trees with hollows typically present
Key microhabitats	Forest canopy, supporting a diversity of tree and liana types (i.e. long-stemmed woody vines that are rooted in the soil at ground level, and which utilise the trees in order to climb up to the canopy)
Values for wildlife	Sheltered, constant microclimate, diversity of plant food resources, hollow-bearing trees

Photograph 1 Closed forest (rainforest) habitat within the Southern Lease (May 2019)



6.1.2. Laterite Woodland and Forest Habitats

Laterite woodland and forest habitats cover approximately 53% of the Southern Lease (**Table 5**). This habitat type dominates the western half of the Southern Lease and also occurs extensively within the eastern half (**Figure 14**). This habitat type covers approximately 99.9% of the disturbance footprint.

This habitat type is associated with the undulating laterite plains within the Southern Lease. This habitat type varies structurally between open woodland and open forest. At some locations, which are likely in areas where the water table is close to the surface, the canopy stratum is expressed as a shrub layer of stunted trees. Laterite woodland and forest habitats are typically dominated by a canopy of *Eucalyptus tetradonta*, with *Eucalyptus miniata* being locally common at some locations. *Eucalyptus polycarpa* and *Eucalyptus tectifica* also occur within this habitat type. Areas of this habitat type are frequently burnt by the Traditional Owners.

The extensive areas of laterite woodland and forest habitats provide numerous important habitat features that would be suitable for a suite of fauna species, including a number of the threatened fauna known or predicted to occur within the disturbance footprint (see **Section 6.3**). Habitat features within this habitat type include a diversity of grasses for seed-eating species, a shrubby understorey for birds and taller eucalypt trees. Hollow bearing trees of varying sizes are present in these areas, however these features are largely absent from low open woodlands. The tree hollows and stags within the Southern Lease provide shelter, roosting and nesting habitat for a number of arboreal fauna species, including microbats and gliders, diurnal birds, owls and some reptiles. Terrestrial features such as fallen logs, debris and leaf litter provide shelter for many of the small to

medium sized terrestrial fauna species known to occur within the Southern Lease (see **Section 6.2**). However, there is also a paucity of coarse woody debris on the ground due to the frequency of fire.

Fauna species recorded within this habitat type during recent terrestrial surveys by Cumberland Ecology (2016, 2019a, 2023) included the Northern Quoll (*Dasyurus hallucatus*), Northern Brown Bandicoot (*Isodon macrourus*), Delicate Mouse (*Pseudomys delicatulus*), Sand Goanna (*Varanus gouldii*), Gilbert's Dragon (*Lophognathus gilberti*), Frilled Lizard (*Chlamydosaurus kingii*), Torresian Crow (*Corvus orru*) and Australian Owlet-nightjar (*Aegotheles cristatus*). Feral cats (*Felis catus*) were also recorded within this habitat type.

Features of this habitat type are summarised in **Table 7**. An example of laterite woodland and forest habitat within the Southern Lease is shown in **Photograph 2**.

Table 7 Features of laterite woodland and forest habitats within the Southern Lease

Feature	Comment
Laterite woodland and forest area	Covers approximately 53% of Southern Lease Covers approximately 99.9% of disturbance footprint
Physiographic location	Gently undulating lateritic plains
Soils	Dark brown to reddish brown loamy sands (open forests) and brownish black loamy sands to whitish/red sands (open woodland). Some areas with gravel present
Water	Well drained, relatively dry habitats. Some areas of low open woodland may be associated with shallow groundwater or seasonal flooding
Fire	Frequently and extensively burnt (annually or biennially)
Tree hollows and fallen logs	Large trees with hollows and fallen logs typically present
Key microhabitats	Woodland or forest canopy, subcanopy, shrub layer and grassy ground stratum well developed
Values for wildlife	- Diverse array of plant food resources, hollow-bearing trees, fallen logs, termite mounds - Some woodland has well developed grass and sedge areas

Photograph 2 Laterite woodland and forest habitat within the Southern Lease (May 2018)



6.1.3. Sandstone Woodland and Forest Habitats

Sandstone woodland and forest habitats cover approximately 26% of the Southern Lease (**Table 5**). This habitat type dominates the north eastern half of the Southern Lease (**Figure 14**). This habitat type occupies approximately 0.1% of the disturbance footprint, at the northern extent.

This habitat type is associated with the sandstone plateaus and rocky outcropping within the Southern Lease and is characterised by the presence of numerous rocky outcrops with extensive areas of bare rock. This habitat type is predominantly a woodland and forest structure, with some small areas of shrubland and grassland also present. Sandstone woodland and forest habitats have a mixed canopy and include *Eucalyptus tetradonta*, *Corymbia kombolgiensis*, *Callitris intratropica* and *Corymbia polycarpa*. *Cycas arnhemica* is also common within this habitat type.

These areas provide high quality habitat for mammals and reptiles (shelter habitat in the form of rocky outcrops, rock slabs, cracks, crevices, and caves). Sandstone woodland and rock outcrops are considered to provide high quality habitat for the Northern Quoll (*Dasyurus hallucatus*), in particular for shelter and breeding.

Fauna species recorded within this habitat type during recent terrestrial surveys by Cumberland Ecology (2016, 2019a, 2023) included the Northern Quoll (*Dasyurus hallucatus*), Northern Brown Bandicoot (*Isodon macrourus*), Delicate Mouse (*Pseudomys delicatulus*), Short-eared Rock-wallaby (*Petrogale brachyotis*), Common Rock-rat (*Zyomys argurus*), Common Sheath-tail-bat (*Taphozous georgianus*), Olive Python (*Liasis*

olivaceus) Short-beaked Echidna (*Tachyglossus aculeatus*), Black-headed Monitor (*Varanus tristis*) and Australian Owlet-nightjar (*Aegotheles cristatus*). Feral cats (*Felis catus*) were also recorded within this habitat type.

Features of this habitat type are summarised in **Table 8**. An example of the sandstone woodland and forest habitat in the Southern Lease is shown in **Photograph 3**. An example of this habitat type in the disturbance footprint is shown in **Photograph 4**.

Table 8 Features of sandstone woodland and forest habitats within the Southern Lease

Feature	Comment
Sandstone woodland and forest area	Covers approximately 26% of Southern Lease Covers approximately 0.1% of disturbance footprint
Physiographic location	Sandstone hills, plateaus and rocky outcropping
Soils	Shallow, if non-existent, gravelly and often rocky clayey sand over quartz sandstone with minor Leptic Rudosols
Water	Water is scarce - though may be present amid deeper rock outcrops
Fire	Relatively unburnt
Tree hollows and fallen logs	Few trees with hollows typically present
Key microhabitats	Various shelters amid rocks including crevices, caves and boulder piles
Values for wildlife	Rocky shelters providing refugia from heat and fire, diversity of plant food resources

Photograph 3 Sandstone woodland and forest habitat within the Southern Lease (May 2016)



Photograph 4 Sandstone woodland and forest habitat within the disturbance footprint (October 2021)



6.1.4. Coastal Dune/Swale Complex Habitats

Coastal dune/swale complex habitats cover approximately 4% of the Southern Lease (**Table 5**). This habitat type occurs along the southern and south-western boundaries of the Southern Lease (**Figure 14**). This habitat type is absent from the disturbance footprint.

This habitat type is associated with the coastal sand plains and is characterised by a dune and swale complex. Whilst this habitat type is associated with the coastline, it extends inland in some areas up to 3.5 km from the coast. This habitat type is variable in structure, with dunes often comprising grassland and shrubland with bare sand, and swales often comprising *Melaleuca* dominated woodland and forest. Grasslands and shrublands included both hummock and perennial grassland, and a shrub layer of *Acacias*, *Melaleucas*, *Grevillea heliosperma* (Rock Grevillea) and *Terminalia carpentariae* (Wild Peach). Woodlands and forests included a mixed canopy of *Melaleuca dealbata* (Blue-leaved Paperbark), *Melaleuca ferruginea* (Paperbark) and *Melaleuca cajuputi* (Cajuput Tree). These habitats provide limited terrestrial features such as trees with hollows and hollow logs. Some areas contained significant dieback of trees and shrubs. Ground cover is generally sparse, with bare ground common throughout the habitat type.

Fauna species recorded within this habitat type during recent terrestrial surveys by Cumberland Ecology (2019a) included the Delicate Mouse (*Pseudomys delicatulus*), Northern Quoll (*Dasyurus hallucatus*), Northern Brown Bandicoot (*Isodon macrourus*), Gilbert's Dragon (*Lophognathus gilberti*), Short-beaked Echidna (*Tachyglossus aculeatus*), Torresian Crow (*Corvus orru*) and Pheasant Coucal (*Centropus phasianinus*). Feral cats (*Felis catus*) were also recorded within this habitat type.

Features of this habitat type are summarised in **Table 9**. An example of the woodland form and shrubland form of the coastal dune/swale complex within the Southern Lease are shown in **Photograph 5** and **Photograph 6**, respectively.

Table 9 Features of coastal dune/swale complex habitats within the Southern Lease

Feature	Comment
Coastal dune / swale complex area	Covers approximately 4% of Southern Lease Does not occur within the disturbance footprint
Physiographic location	Gently undulating coastal sand plains with dunes and swales
Soils	Siliceous sands
Water	Water is generally scarce, although during the wet season will be held in swales
Fire	Relatively unburnt
Tree hollows and fallen logs	Few trees with hollows typically present
Key microhabitats	- Sheltered areas within woodland and forest - Open areas for foraging
Values for wildlife	Array of plant food resources

Photograph 5 Coastal dune/swale complex habitat (woodland) within the Southern Lease (August 2017)



Photograph 6 Coastal dune/swale complex habitat (shrubland) within the Southern Lease (May 2018)



6.1.5. Riparian/Wetland Habitats

Riparian/wetlands habitats cover approximately 15% of the Southern Lease (**Table 5**). This habitat type is interspersed throughout the Southern Lease (**Figure 14**). This habitat type is absent from the disturbance footprint.

This habitat type is associated with watercourses within the Southern Lease, including Arnduwamurrumanja Creek (a tributary of the Emerald River), Salt Creek, and Second Creek, as well as the Yenbakwa, Amagula, Innokumanja and Amiyelkuwa Rivers. The majority of the riparian habitat within the Southern Lease is represented by ephemeral watercourses that only flow when sufficient rain has fallen. These flow during the wet season, however all but the deepest pools dry out during the dry season. This habitat type also includes seasonal wetlands within the Southern Lease, which form in the wet season and dry out over the course of the dry season. Riparian/wetland habitats are typically dominated by *Melaleuca viridiflora* (Broad-leaved Paperbark) and/or *Melaleuca cajuputi* (Cajuput Tree), and often include a dense shrub layer, with sedges also common in the ground layer. Areas of this habitat type are occasionally burnt by the Traditional Owners, with wetter areas being less easily burnt.

The riparian/wetland areas provide numerous habitat features that would be suitable for a suite of fauna species. Habitat features within this habitat type include a diversity of grasses for seed-eating species, a shrubby understorey for birds and taller eucalypt trees. Hollow bearing trees of varying sizes are present in the structurally diverse riparian areas. The tree hollows provide shelter, roosting and nesting habitat for a number of fauna species. The riparian areas contain woody debris, standing trees, macrophytes and fringing vegetation such as reeds and rushes. They are likely to provide suitable habitat for a range of amphibians and waterbirds, including migratory wetland birds. Any freshwater habitats occurring within the Southern Lease would be restricted mainly to remnant pools isolated by dry river or stream beds. These temporary pools of water would provide a valuable drinking source in hot and dry months. The seasonal wetlands form short-lived seasonal swamps supporting sedges, rushes and grasses.

Fauna species recorded within this habitat type during recent terrestrial surveys by Cumberland Ecology (2016, 2019a, 2023) included the Northern Brown Bandicoot (*Isodon macrourus*), Agile Wallaby (*Macropus agilis*), Grassland Melomys (*Melomys burtoni*), Gilbert's Dragon, Sand Goanna (*Varanus gouldii*), Torresian Crow (*Corvus orru*), Peaceful Dove (*Geopelia striata*) and Buff-banded Rail (*Gallirallus philippensis*).

Features of this habitat type are summarised in **Table 10**. An example of riparian habitat and a seasonal wetland within the Southern Lease is shown in **Photograph 7** and **Photograph 8**, respectively.

Table 10 Features of riparian/wetland habitats within the Southern Lease

Feature	Comment
Area	Covers approximately 15% of Southern Lease Does not occur within the disturbance footprint
Physiographic location	Along watercourses and low-lying depressions

Feature	Comment
Soils	Brownish black to dark black sandy clay loams to silty loams
Water	Associated with permanent or seasonally flowing watercourses, and seasonally wet depressions
Fire	Larger, perennial sections of watercourses provide protection against fires, but most smaller seasonal watercourses support riparian vegetation that is regularly burnt
Tree hollows and fallen logs	Large trees with hollows present along larger watercourses
Key microhabitats	- Watercourses/water - Forest canopy, supporting a diversity of tree and shrub types - Riparian and aquatic plants present
Values for wildlife	Water resources plus a diversity of plant food resources

Photograph 7 Riparian habitat within the Southern Lease (May 2016)



Photograph 8 Wetland habitat within the Southern Lease (May 2016)



6.1.6. Estuarine Complex Habitats

Estuarine complex habitat covers approximately 1% of the Southern Lease (**Table 5**). This habitat type is located near the south-western boundaries of the Southern Lease (**Figure 14**). No areas of estuarine complex habitat are mapped within the disturbance footprint.

This habitat type is associated with tidal flats with channels and estuaries. It is variable in structure and includes mangroves, tidal flats, grassland, shrubland and sedgeland. Most of this habitat type is subject to tidal influences. Mangroves within the Southern Lease form low closed forests, whilst the other vegetation forms within this habitat type are sparsely vegetated. These include samphire/chenopod shrublands, closed tussock grassland, and sedgelands of *Eleocharis* and *Cyperus*. The tidal flats within the Southern Lease contain extensive areas of bare ground interspersed with saltmarsh, with occasional emergent trees or chenopod shrubs.

Features of this habitat type are summarised in **Table 11**, and a photograph of the coastal habitats within the Southern Lease is shown in **Photograph 9**.

Table 11 Features of estuarine complex habitats within the Southern Lease

Feature	Comment
Estuarine complex area	Covers approximately 1% of Southern Lease Does not occur within the disturbance footprint
Physiographic location	Along the coastal strand, up to high tide levels
Soils	Marine and estuarine sediments and soils
Water	Influenced by tidal movements and associated with the mouth of Natasha Creek
Fire	Grassland vegetation likely to be frequently burnt (annually or biennially)
Tree hollows and fallen logs	Limited trees and fallen logs
Key microhabitats	- Dense understorey in mangrove areas - Well developed ground layer in grassland areas - Open areas for foraging (saltmarsh, clay pans)
Values for wildlife	Array of plant food resources

Photograph 9 Estuarine complex habitat within the Southern Lease (May 2016)



6.2. Fauna Species: Overview

In total, 98 fauna species have been recorded within the Southern Lease during the recent (2016-2022) terrestrial surveys by Cumberland Ecology, including 56 birds, 20 mammals and 22 reptiles. A discussion of the faunal diversity recorded within the Southern Lease is presented below. A complete list of all the fauna species that have been recorded within the Southern Lease is presented in **Appendix F**. A suite of other fauna species have been recorded in the vicinity of the Southern Lease by Heiniger et al. (2020), Heiniger and Gillespie (2017), Cumberland Ecology (2015), URS Australia Pty Ltd (2012) and Webb (1992), the results of which are also presented in **Appendix F**.

6.2.1. Amphibians

No amphibians were recorded within the Southern Lease during recent (2016-2022) terrestrial surveys, which is considered to be related to limited targeted surveys.

No threatened amphibians listed under the EPBC Act and/or the TPWC Act have been recorded within the Southern Lease or from database searches and none are considered likely to occur.

6.2.2. Birds

A range of habitat features suitable for birds occur throughout the Southern Lease. A total of 56 bird species were recorded within the Southern Lease during the recent terrestrial surveys. Due to the broad range of habitats present within the Southern Lease, it is anticipated that bird diversity is much higher than recorded. Targeted bird surveys were restricted to the north-western portion of the Southern Lease within laterite woodland and open forest. Species within other habitats were subsequently detected during camera surveys.

The vast majority of bird species were common and widespread, and typical of woodland environments. Dominant families within the Southern Lease include Meliphagidae (honeyeaters and friarbirds), Columbidae (pigeons and doves), Accipitridae (raptors) and Rhipiduridae (fantails). Commonly recorded species include Torresian Crow (*Corvus orru*), Australian Owlet-nightjar (*Aegotheles cristatus*), Peaceful Dove (*Geopelia striata*), Bar-shouldered Dove (*Geopelia humeralis*), Brown Honeyeater (*Lichmera indistincta*), Rufous Whistler (*Pachycephala rufiventris*), Striated Pardalote (*Pardalotus striatus*), Silver-crowned Friarbird (*Philemon argenticeps*), White-throated Honeyeater (*Melithreptus albogularis*), Pied Butcherbird (*Cracticus nigrogularis*), Rainbow Lorikeet (*Trichoglossus haematodus*) and Northern Fantail (*Rhipidura rufiventris*).

One threatened bird was recorded within the Southern Lease during recent (2016-2022) terrestrial surveys, namely the Masked Owl (northern) (*Tyto novaehollandiae kimberli*). This includes one record by Cumberland Ecology (2016) and four records during 2022 surveys undertaken by Cumberland Ecology. Further discussion of this species is provided in **Section 6.3**.

6.2.3. Mammals

A total of 21 mammal species were recorded during the recent (2016-2022) terrestrial field surveys, including 13 terrestrial species, two non-flying arboreal species, four microbats and one megabat. Of the mammals species recorded, two are exotic species (dingo/dog and cat) (see **Section 6.2.5**).

The most common and widespread terrestrial mammals observed within the Southern Lease included the Northern Brown Bandicoot (*Isodon macrourus*), Delicate Mouse (*Pseudomys delicatulus*), Northern Quoll (*Dasyurus hallucatus*), Agile Wallaby (*Macropus agilis*), Grassland Melomys (*Melomys burtoni*) and Short-beaked Echidna (*Tachyglossus aculeatus*).

The non-flying arboreal mammals recorded within the Southern Lease during surveys included the Sugar Glider (*Petaurus breviceps*) and Rock Ringtail Possum (*Petropseudes dahli*). Four microbats were recorded including the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Common Sheathtail-bat (*Taphozous georgianus*), Northern Cave Bat (*Vespadelus caurinus*) and Finlayson's Cave Bat (*Vespadelus finlaysoni*). Ultrasonic call detection results indicated the potential for a further three species of microbats; however, these calls could not be positively identified.

Two threatened mammals were recorded during recent (2016-2022) terrestrial surveys within the Southern Lease, namely the Northern Quoll (*Dasyurus hallucatus*) and Ghost Bat (*Macroderma gigas*). Detections of the Northern Quoll (*Dasyurus hallucatus*) include three records by Cumberland Ecology (2016), 86 records by Cumberland Ecology (2019a) and 74 records by Cumberland Ecology (2023). The Ghost Bat (*Macroderma gigas*) was detected at one location during 2022 surveys undertaken by Cumberland Ecology. Further discussion of these species is provided in **Section 6.3**.

6.2.4. Reptiles

A range of habitat features suitable for reptiles occur throughout the Southern Lease. A total of 22 reptile species were recorded within the Southern Lease during the recent (2016-2022) terrestrial surveys. Due to the broad range of habitats present within the Southern Lease, it is anticipated that reptile diversity is much higher than recorded.

The dominant family within the Southern Lease was Scincidae (skinks), with other families present including Varanidae (monitors), Agamidae (dragons) and Elapidae (snakes). Commonly recorded reptiles include Gilbert's Dragon (*Lophognathus gilberti*), Sand Goanna (*Varanus gouldii*), Frilled Lizard (*Chlamydosaurus kingii*), Two-lined Dragon (*Diporiphora bilineata*), Northern Blue-tongue Lizard (*Tiliqua scincoides intermedia*) and Bar-shouldered Ctenotus (*Ctenotus inornatus*).

One threatened reptile was recorded during recent (2016-2022) terrestrial surveys within the Southern Lease, namely the Mertens' Water Monitor (*Varanus mertensi*). This includes one record during 2022 surveys undertaken by Cumberland Ecology. Further discussion of this species is provided in **Section 6.3**.

6.2.5. Exotic / Feral Species

Groote Eylandt represents a unique faunal refuge in that exotic and feral species such as feral cattle, horses, donkeys, pigs, goats, Water Buffalo, the Cane Toad and Rusa Deer are not established on the island.

Domestic dogs (*Canis familiaris*) and dingoes (*Canis lupus*) were frequently recorded within the Southern Lease. A very small number of feral cats (*Felis catus*) were recorded during field surveys. This is consistent with Cumberland Ecology (2023) and Heiniger et al. (2020) which both recorded low densities of feral cats in two areas of Groote Eylandt, including one within the Southern Lease. One House Gecko (*Hemidactylus frenatus*) was recorded during spotlighting surveys on sandstone outcropping.

6.3. Fauna Species: Threatened Species

6.3.1. Overview

An analysis of ecological databases was conducted for the Southern Lease and its surrounds, including interrogation of the DCCEEW EPBC PMST (DCCEEW 2022f) and NR Maps search facility (DEPWS 2022) for threatened fauna records. Database records identified the presence or potential presence of a number of threatened fauna species within the locality of the Southern Lease (defined in this report as a 20 km radius from the centre of the Southern Lease). The DCCEEW EPBC PMST (DCCEEW 2022f) identifies threatened fauna species or species habitat as 'known to occur', 'likely to occur' or 'may occur' within the locality search area. The NR Maps search facility (DEPWS 2022) generated records of threatened fauna species listed under the TPWC Act and/or EPBC Act within the locality search area. Results of the database searches within the locality of the Southern Lease for terrestrial threatened fauna species listed under the EPBC Act and/or the TPWC Act are summarised in **Table 12**.

As the locality includes some ocean areas, the search yielded numerous marine species including fish, turtles and marine mammals. These are not relevant to an assessment of terrestrial ecology within the Southern Lease and are not considered further in this report. The full results of the PMST search is presented in **Appendix A**. The threatened fauna records held within the NR Maps database across Groote Eylandt, including the locality, are shown on **Figure 15**.

A number of threatened fauna species have also been recorded within the Southern Lease during recent studies and their locations are shown on **Figure 16**. In some instances, there were multiple sightings of a particular species at a single location, however only one of these records is shown on the figure.

Table 12 Threatened fauna species database records within the locality

Common Name	Scientific Name	Conservation Status ¹		Database Results	
		EPBC Act ²	TPWC Act	PMST	NR Maps
Birds					
Red Knot	<i>Calidris canutus</i>	E, M(w)	V	X	X
Curlew Sandpiper	<i>Calidris ferruginea</i>	CE, M(w)	V	X	X
Great Knot	<i>Calidris tenuirostris</i>	CE, M(w)	V		X
Greater Sand Plover	<i>Charadrius leschenaultii</i>	V, M(w)	V	X	X
Lesser Sand Plover	<i>Charadrius mongolus</i>	E, M(w)	V		X
Red Goshawk	<i>Erythroriorchis radiatus</i>	V	V	X	
Gouldian Finch	<i>Erythrura gouldiae</i>	E	V	X	
Partridge Pigeon	<i>Geophaps smithii</i>	V ³	V		X
Bar-tailed Godwit	<i>Limosa lapponica</i>	V/CE ⁴ , M(w)	V	X	X
Eastern Curlew	<i>Numenius madagascariensis</i>	CE, M(w)	V	X	X
Australian Painted Snipe	<i>Rostratula australis</i>	E	V	X	

Common Name	Scientific Name	Conservation Status ¹		Database Results	
		EPBC Act ²	TPWC Act	PMST	NR Maps
Masked Owl (northern)	<i>Tyto novaehollandiae kimberli</i>	V	V		X
Mammals					
Brush-tailed Rabbit-rat	<i>Conilurus penicillatus</i>	V	E	X	X
Northern Quoll	<i>Dasyurus hallucatus</i>	E	CE	X	X
Ghost Bat	<i>Macroderma gigas</i>	V		X	X
Northern Hopping-mouse	<i>Notomys aquilo</i>	E	V	X	X
Bare-rumped Sheathtail Bat	<i>Saccolaimus saccolaimus nudicluniatus</i>	V		X	
Northern Brushtail Possum	<i>Trichosurus vulpecula arnhemensis</i>	V		X	X
Water Mouse	<i>Xeromys myoides</i>	V		X	
Reptiles					
Plains Death Adder	<i>Acanthophis hawkei</i>	V	V	X	
Mertens' Water Monitor	<i>Varanus mertensi</i>		V		X
Yellow-spotted Monitor	<i>Varanus panoptes</i>		V		X
Species Restricted to Marine Environment					
Blue Whale	<i>Balaenoptera musculus</i>	E, M(m)		X	
Loggerhead Turtle	<i>Caretta caretta</i>	E, M(m)	V	X	
Green Turtle	<i>Chelonia mydas</i>	V, M(m)		X	X
Leatherback Turtle	<i>Dermochelys coriacea</i>	E, M(m)	CE	X	
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V, M(m)	V	X	X
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	E, M(m)	V	X	X
Flatback Turtle	<i>Natator depressus</i>	V, M(m)		X	X
Great White Shark	<i>Carcharodon carcharias</i>	V, M(m)		X	
Speartooth Shark	<i>Glyphis glyphis</i>	CE	V	X	
Dwarf Sawfish	<i>Pristis clavata</i>	V, M(m)		X	
Large-tooth Sawfish	<i>Pristis pristis</i>	V, M(m)		X	
Green Sawfish	<i>Pristis zijsron</i>	V, M(m)		X	
Whale Shark	<i>Rhincodon typus</i>	V, M(m)		X	

1. Conservation Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Subcategories for EPBC Act listing of migratory species follow those within the PMST report

3. Two subspecies of *Geophaps smithii* are listed under the EPBC Act as Vulnerable (*Geophaps smithii blaauwi* and *Geophaps smithii smithii*).

4. Subspecies of *Limosa lapponica* have different listings under the EPBC Act. *Limosa lapponica baueri* is listed as Vulnerable and *Limosa lapponica menzbieri* is listed as Critically Endangered.

A likelihood of occurrence assessment was undertaken for the threatened species listed in **Table 12** (excluding the species restricted to the marine environment) to determine if they have the potential to occur within the Southern Lease, and more specifically within the disturbance footprint. The likelihood of these species occurring was classified using the criteria presented in **Table 1**. The assessment was based on the species known ranges, number and age of records, and habitat preferences which were evaluated in conjunction with the site characteristics observed during the field surveys. The assessment included consideration of information contained within the DCCEEW Species Profile and Threats Database, recovery plans and other literature. The full results of this likelihood of occurrence assessment are presented in **Appendix D**. A summary of the threatened species considered and the assessment of likelihood of occurrence is provided in **Table 13**.

Table 13 Summary of the likelihood of occurrence of threatened fauna species

Common Name	Scientific Name	Conservation Status ¹		Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	Southern Lease	Disturbance Footprint
Birds					
Red Knot	<i>Calidris canutus</i>	E, M(w)	V	Unlikely	Unlikely
Curlew Sandpiper	<i>Calidris ferruginea</i>	CE, M(w)	V	Unlikely	Unlikely
Great Knot	<i>Calidris tenuirostris</i>	CE, M(w)	V	Unlikely	Unlikely
Greater Sand Plover	<i>Charadrius leschenaultii</i>	V, M(w)	V	Unlikely	Unlikely
Lesser Sand Plover	<i>Charadrius mongolus</i>	E, M(w)	V	Unlikely	Unlikely
Red Goshawk	<i>Erythrotriorchis radiatus</i>	V	V	Unlikely	Unlikely
Gouldian Finch	<i>Erythrura gouldiae</i>	E	V	Unlikely	Unlikely
Partridge Pigeon	<i>Geophaps smithii</i>	V ³	V	Unlikely	Unlikely
Bar-tailed Godwit	<i>Limosa lapponica</i>	V/CE ⁴ , M(w)	V	Unlikely	Unlikely
Eastern Curlew	<i>Numenius madagascariensis</i>	CE, M(w)	V	Unlikely	Unlikely
Australian Painted Snipe	<i>Rostratula australis</i>	E	V	Unlikely	Unlikely
Masked Owl (northern)	<i>Tyto novaehollandiae kimberli</i>	V	V	Present	Present
Mammals					
Brush-tailed Rabbit-rat	<i>Conilurus penicillatus</i>	V	E	Unlikely	Unlikely
Northern Quoll	<i>Dasyurus hallucatus</i>	E	CE	Present	Present
Ghost Bat	<i>Macroderma gigas</i>	V		Present	Potential
Northern Hopping-mouse	<i>Notomys aquilo</i>	E	V	Unlikely ⁵	Unlikely

Common Name	Scientific Name	Conservation Status ¹		Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	Southern Lease	Disturbance Footprint
Bare-rumped Sheathtail Bat	<i>Saccolaimus saccolaimus nudicluniatus</i>	V		Unlikely	Unlikely
Northern Brushtail Possum	<i>Trichosurus vulpecula arnhemensis</i>	V		Unlikely	Unlikely
Water Mouse	<i>Xeromys myoides</i>	V		Unlikely	Unlikely
Reptiles					
Plains Death Adder	<i>Acanthophis hawkei</i>	V	V	Unlikely	Unlikely
Mertens' Water Monitor	<i>Varanus mertensi</i>		V	Present	Unlikely
Yellow-spotted Monitor	<i>Varanus panoptes</i>		V	Unlikely	Unlikely

1. EPBC Act Status / TPWC Act Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Subcategories for EPBC Act listing of migratory species follow those within the PMST report

3. Two subspecies of *Geophaps smithii* are listed under the EPBC Act as Vulnerable (*Geophaps smithii blaauwi* and *Geophaps smithii smithii*).

4. Subspecies of *Limosa lapponica* have different listings under the EPBC Act. *Limosa lapponica baueri* is listed as Vulnerable and *Limosa lapponica menzbieri* is listed as Critically Endangered.

5. Five records of the species from the NR Maps database exist within the Southern Lease; however these records are associated with the presence of spoil heaps, which are not a reliable determinate for the presence of the Northern Hopping-mouse (Coffey Environments 2010, Diete et al. 2015a). The likelihood of occurrence has been determined based on the findings of the small mammal research project undertaken within the Southern Lease and surrounds by Cumberland Ecology (2019a) (see Section 3.3.2).

The following sections provide details of the threatened fauna species that have been recorded within the Southern Lease during recent surveys, or which are considered to have the potential to occur within the Southern Lease.

6.3.2. EPBC Act Species (Threatened)

Three threatened fauna species listed under the EPBC Act, namely the Masked Owl (northern) (*Tyto novaehollandiae kimberli*), Northern Quoll (*Dasyurus hallucatus*) and Ghost Bat (*Macroderma gigas*) are known to occur within the Southern Lease. Details on these species, their occurrence, and habitat preferences within the Southern Lease and disturbance footprint are provided below.

An additional two EPBC Act listed threatened fauna species, namely the Brush-tailed Rabbit-rat (*Conilurus penicillatus*) and Northern Hopping-mouse (*Notomys aquilo*) are considered further despite being assessed as unlikely to occur. Recent surveys within the Southern Lease by Cumberland Ecology (2019a) targeted these two species and neither species were recorded despite the presence of suitable habitat. Due to the significance of these species on Groote Eylandt, details of these species and the results of the targeted surveys have been included.

A number of other threatened bird species records appear on NR Maps (likely to be inaccurate¹) or have suitable habitat within the estuarine complex habitat located near the south-western boundaries of the Southern Lease, or on isolated permanent wetland areas on the southern boundary of the Southern Lease (see **Figure 14**). As the habitats for these species represent a small proportion of the habitat within the Southern Lease, and do not occur within the disturbance footprint, these species have been assessed as unlikely to occur and have not been described in detail below. Summary descriptions of these species are, however, provided in **Appendix D**.

6.3.2.1. Masked Owl (northern)

Listing Status

EPBC Act Status: Vulnerable

TPWC Act Status: Vulnerable

Species Overview

The Masked Owl (northern) is a large owl, reaching lengths of up to 41cm and 50cm, with wing spans of up to 110 cm and 128 cm (Threatened Species Scientific Committee 2015). It has a prominent heart-shaped facial disc and plumage that is highly patterned by speckling and is generally darker on the back and paler below (Woinarski 2004b). The species is territorial, and is usually seen singly but occasionally in pairs or family groups (DEWHA 2010). A photograph of a Masked Owl (northern) recorded north of the Southern Lease, within the Eastern Leases, is shown in **Photograph 10**.

The Masked Owl (northern) likely breeds between March and October, however the breeding season is poorly known (DEWHA 2010). The species (*Tyto novaehollandiae*) is known to lay two or three eggs (Higgins 1999). The species has a fledging period of approximately 10-12 weeks, and the young are dependent on the parents for one to three months after fledging (DCCEEW 2022k). Although there is no detailed information for this subspecies, masked owls of other subspecies occupy large exclusive home ranges, estimated at 5-10 km² (Woinarski and Ward 2012a).

EPBC Act Plans

Conservation Advice

Approved Conservation Advice for the Masked Owl (northern) has been prepared, which identifies conservation and management actions, survey and monitoring priorities and information and research priorities. Identified threats to the Masked Owl (northern) include broad-scale changes to the environment caused by altered fire

¹ There is a location within the NR Maps database that represents a total of 18 threatened and migratory species records. It appears that a single coordinate was utilised for these species that doesn't reflect the actual location of the detected individuals. It is therefore considered that the records of these species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) not aligning with the coordinates. As such, these records have not been counted towards a species being present within the Southern Lease.

regimes, grazing by livestock and feral animals, and the invasion of native woodlands by exotic plants (Threatened Species Scientific Committee 2015).

Recovery Plan

There is no current Recovery Plan for the Masked Owl (northern); however, the DCCEEW Species Profile and Threats Database acknowledge that a recovery plan is required. A National Multi-species Recovery Plan had previously been in place for several bird species, including the Masked Owl (Northern) (Woinarski 2004b); however the DCCEEW Species Profile and Threats Database indicated that this plan has ceased to be in effect from 1 October 2015.

Threat Abatement Plan

The *Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (DEWPaC 2012) lists the Masked Owl (northern) as a threatened species that is under immediate threat from five listed grasses. This plan is applicable to the species on Groote Eylandt as *Andropogon gayanus* (Gamba Grass), *Urochloa mutica* (Para Grass), *Cenchrus polystachios* (Perennial Mission Grass) and *Cenchrus pedicellatus* (Annual Mission Grass) have been recorded on Groote Eylandt.

Referral Guideline

There is no Referral Guideline for the Masked Owl (northern).

Groote Archipelago Threatened Species Management Plan

The Groote Archipelago Threatened Species Management Plan (TSMP) has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes the Masked Owl (northern). The goal for the Masked Owl (northern) is to acquire a baseline for the population and evaluate its status within two years. Very high and high risk threats identified for the species includes major habitat loss/alteration, weed invasion and inappropriate fire regimes.

Distribution

The distribution of the Masked Owl (northern) is imperfectly known, with remarkably few records across its broad range (Woinarski 2004b). In the Top End of the NT, the species occurs from the Cobourg Peninsula down to Katherine and Jasper Gorge (Victoria River area), and to the east at McArthur River (DCCEEW 2022k).

Habitat

The Masked Owl (northern) has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields (DCCEEW 2022k). The species occurs mainly in tall eucalypt open forests (especially those dominated by *Eucalyptus miniata* (Darwin Woollybutt) and *E. tetradonta* (Darwin Stringybark) and also forages in more open vegetation types, including grasslands (Woinarski and Ward 2012a). Roosting habitat occurs in dense foliage, including within monsoon rainforests, however it more typically roosts and nests in tree hollows (Woinarski and Ward 2012a). The Masked Owl (northern) usually nests in tree hollows within patches of closed forest (DCCEEW 2022k). Habitat critical

to the survival of this species is not defined due to a lack of records, however this species is considered to be dependent on tree hollows (Woinarski 2004b). Mammals that are up to the size of possums form the primary component of the diet of this species (Higgins 1999).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Present

Records

The NR Maps database holds 140 records of the Masked Owl (northern) on Groote Eylandt between 2012 and 2018. Of these records 54 occur within the locality of the Southern Lease (see **Figure 15**). Twelve of these records occur within the Southern Lease.

The Masked Owl (northern) was recorded from four locations within the Southern Lease during surveys undertaken by Cumberland Ecology in 2022 using call playback and spotlighting. The species was also recorded from one location within the Southern Lease by Cumberland Ecology (2016), using call playback and spotlighting. This species has also been recorded at numerous locations in the Eastern Leases, which is to the north of the Southern Lease, by Cumberland Ecology (2015) and EMS (2013), and at one location to the west of the Southern Lease by Cumberland Ecology (2019a).

Some of the records from recent (2016-2022) surveys by Cumberland Ecology within the Southern Lease occur within the immediate vicinity of the disturbance footprint and therefore the species has been assessed as present.

A summary of the records within the Southern Lease is provided in **Table 14**. This includes records from recent (2016-2022) terrestrial surveys and records from the NR Maps database. It is noted that a number of the NR Maps database records are duplicates and have been noted as such within this table.

Table 14 Summary of Masked Owl (northern) records within the Southern Lease

Record ¹	Date	Source	Location	Comments ²
1	12/05/2016	Cumberland Ecology (2016)	Track to Leske Pools. Recorded within an area mapped as VMU 46 laterite woodland and forest habitat.	One individual sighted. Detected in response to call playback.
2, 3	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as VMU 40 and laterite woodland and forest habitat.	Database provides a count of 1 individual.
4, 5	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as	Database provides a count of 1 individual.

Record ¹	Date	Source	Location	Comments ²
			VMU 26/17 and riparian/wetland habitat.	
6, 7	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as VMU 40 and laterite woodland and forest habitat.	Database provides a count of 1 individual.
8, 9	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as VMU 10b and laterite woodland and forest habitat.	Database provides a count of 1 individual.
10, 11	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as VMU 11 and laterite woodland and forest habitat.	Database provides a count of 1 individual.
12, 13	25/08/2014	NR Maps	Yenbakwa Road. Recorded within an area mapped as VMU 10a and laterite woodland and forest habitat.	Database provides a count of 1 individual.
14	15/10/2022	Cumberland Ecology (Current)	Track to Southern Eastern Lease. Recorded within an area mapped as VMU 10a and laterite woodland and forest habitat.	One individual sighted and heard and one individual heard. Both detected in response to call playback.
15	15/10/2022	Cumberland Ecology (Current)	West of Yenbakwa Road. Recorded within an area mapped as VMU 11 and laterite woodland and forest habitat.	One individual sighted and heard. Detected in response to call playback.
16	21/10/2022	Cumberland Ecology (Current)	Track to Leske Pools. Recorded within an area mapped as VMU 10b and laterite woodland and forest habitat.	One individual sighted and heard. Detected in response to call playback.
17	21/10/2022	Cumberland Ecology (Current)	Track to Leske Pools. Recorded within an area mapped as VMU 10 and laterite woodland and forest habitat.	One individual heard. Detected in response to call playback.

1. Duplicate records have been grouped together.

2. For NR Maps database records comments are limited to count of individuals, as no details on method of detection are provided.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat resources for this species:

- Closed forest (rainforest) habitats;
- Laterite woodland and forest habitats;
- Sandstone woodland and forest habitats;
- Coastal dune/swale complex habitats; and
- Riparian/wetland habitats.

This species is not likely to forage, roost or breed in parts of the Southern Lease which contain estuarine complex habitats, due to the lack of dense canopy or large hollow-bearing trees.

A discussion of the foraging habitat, and roosting and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

Key foraging habitat resources are present within the Southern Lease and consist of a high density of potential prey species such as small- to medium-sized ground-dwelling mammals, including the Delicate Mouse (*Pseudomys delicatulus*), Northern Brown Bandicoot (*Isodon macrourus*) and Northern Quoll (*Dasyurus hallucatus*), as well as habitats containing the Sugar Glider (*Petaurus breviceps*). The species is known to forage across a range of habitat types, and the habitat types listed above are considered to form suitable foraging habitat for the species. Such foraging habitats are widespread in the Southern Lease. Based on the habitat types identified above, foraging habitat occupies approximately 25,723 ha of the Southern Lease. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which comprise foraging habitat for this species. Similar assemblages of prey species listed above would also occur within the disturbance footprint. Based on the habitat types identified above, foraging habitat occupies approximately 63 ha of the disturbance footprint.

Roosting and Breeding Habitat

Roosting and breeding habitat in the Southern Lease would occur predominantly in areas that comprise denser vegetation and areas containing hollow-bearing trees with large-sized hollows. Denser vegetation would occur within closed forest (rainforest) habitats and riparian/wetland habitat, and areas containing large hollow-bearing trees would occur within all the habitat types listed above. Pre-clearance surveys undertaken by Cumberland Ecology within the Southern Lease between 2016 and 2022 recorded suitable hollows for the Masked Owl (northern) at a number of locations, most commonly within *Eucalyptus tetradonta* (Darwin

Stringybark), however these surveys were predominately undertaken within laterite woodland and forest habitats.

Based on the habitat types identified above, roosting and breeding habitat occupies approximately 25,723 ha of the Southern Lease. However, within these habitat types, it is expected that the species would particularly favour riparian/wetland habitats where they contain both a dense canopy and large hollow-bearing trees. Based on the presence of the species and suitable roosting and breeding habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which comprise roosting and breeding habitat for this species where there are hollow-bearing trees with large-sized hollows. Based on the habitat types identified above, roosting and breeding habitat occupies approximately 63 ha of the disturbance footprint. However, as noted above, the species is likely to particularly favour riparian/wetland habitats which contain both a dense canopy and large hollow-bearing trees. These habitats do not occur within the disturbance footprint.

Photograph 10 Masked Owl photographed in open forest in the Eastern Leases



6.3.2.2. Northern Quoll

Listing Status

EPBC Act Status: Endangered

TPWC Act Status: Critically Endangered

Species Overview

The Northern Quoll is a carnivorous marsupial that is the size of a small cat (300-1,100 g) (Woinarski and Hill 2012b). Its fur is brown with white spots on its back, rump and head, and has a creamy white belly (Oakwood 2008). The tail is brown at the base with occasional white spots, and with a dark brown/black tip with no spots (Oakwood 2008). A photograph of a Northern Quoll is shown in **Photograph 11**.

Northern Quolls breed once each year, with females bearing on average seven young, weaning two or three (DCCEEW 2022e). Northern Quolls have short life spans, with males living for approximately one year and the oldest recorded female in the wild being three years of age (DCCEEW 2022e). In rocky habitats both sexes have longer life spans, with animals of both sexes often living to two years and occasionally three (DCCEEW 2022e).

During the non-breeding season, home ranges are about 35 ha, but this increases to about 100 ha for males in the breeding season (Woinarski and Ward 2012a).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Northern Quoll.

Recovery Plan

A National Recovery Plan for the Northern Quoll has been prepared (Hill and Ward 2010). The plan lists a series of objectives and actions to manage existing populations of the species, including the protection of quoll populations on offshore islands from invasion and establishment of Cane Toads, feral cats and other potential predators.

Threat Abatement Plan

The *Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (DEWPaC 2012) lists the Northern Quoll as a threatened species that is under immediate threat from five listed grasses. This plan is applicable to the species on Groote Eylandt as *Andropogon gayanus* (Gamba Grass), *Urochloa mutica* (Para Grass), *Cenchrus polystachios* (Perennial Mission Grass) and *Cenchrus pedicellatus* (Annual Mission Grass), have been recorded on Groote Eylandt.

The Threat abatement plan for predation by feral cats (DotE 2015d) listed the Northern Quoll as a threatened species that is under immediate threat from feral cats. This plan is applicable to the species as feral cats are present on Groote Eylandt.

A Threat Abatement Plan for the threat of Cane Toads is also in place and of relevance to this species. However, it is noted that Groote Eylandt is currently free of Cane Toads.

Referral Guideline

A Referral Guideline exists for the Northern Quoll which outlines likely habitats critical to the survival of the Northern Quoll and populations important for its long term survival (DotE 2016).

Groote Archipelago Threatened Species Management Plan

The TSMP has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes the Northern Quoll. The goal for the Northern Quoll is to maintain a stable population at 2017 densities or occupancies across the current range. Very high and high risk threats identified for the species includes poisoning by Cane Toads, weed invasion and inappropriate fire regimes.

Distribution

The current distribution is discontinuous across northern Australia, with core populations in rocky and/or high rainfall areas (Hill and Ward 2010), however there has been a decline across much of this range (Woinarski and Ward 2012a). It is known from a number of offshore islands, including Groote Eylandt (Hill and Ward 2010).

Habitat

The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (DAWE 2020a). Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats with high structural diversity used for foraging and dispersal (DAWE 2020a). Rocky areas are considered as prime habitat for the Northern Quoll (Hill and Ward 2010). Den sites include rocky outcrops and crevices, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (Hill and Ward 2010, DAWE 2020a). They are opportunistic omnivores that feed on a broad range of items, including beetles, grasshoppers, spiders, scorpions, centipedes, fruit and nectar, switching dietary resources according to season and availability (Hill and Ward 2010, DAWE 2020a).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Present

Records

The NR Maps database holds 4,507 records of the Northern Quoll on Groote Eylandt between 1922 and 2018. Of these records 1,520 occur within the locality of the Southern Lease, and 1,158 of these occur within the

Southern Lease (see **Figure 15**). Smith (2009b) noted that the Northern Quoll appears to be widely distributed across Groote Eylandt.

In addition to the extensive number of records of the Northern Quoll in the Southern Lease held in the NR Maps database (see **Figure 15**), the Northern Quoll has also been recorded within the Southern Lease during recent surveys, including:

- Cumberland Ecology (2016) recorded the species at three locations during trapping surveys and nine locations during camera surveys;
- Cumberland Ecology (2019a) recorded the species at 86 locations during camera surveys;
- Heiniger et al. (2020) recorded the species at 37 locations during camera surveys; and
- Cumberland Ecology (2023) recorded the species at 74 locations during camera surveys.

Cumberland Ecology also recorded the Northern Quoll incidentally at one location immediately to the north of the Southern Lease during surveys in 2022. The locations of these records are shown on **Figure 16**. A number of these records occur within the disturbance footprint. The Northern Quoll has also been recorded within mine rehabilitation areas of the existing GEMCO mine (Cumberland Ecology 2015). The Northern Quoll has been recorded numerous times within and in close proximity to the Eastern Leases (Webb 1992, Ward 2006b, Firth 2008, Smith 2009b, URS Australia Pty Ltd 2012, Cumberland Ecology 2015).

Due to the quantum of records of the Northern Quoll in the Southern Lease (see **Figure 16**), a summary of all records has not been provided.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat resources for this species:

- Closed forest (rainforest) habitats;
- Laterite woodland and forest habitats;
- Sandstone woodland and forest habitats;
- Coastal dune/swale complex habitats; and
- Riparian/wetland habitats.

This species is not likely to forage, roost or breed in parts of the Southern Lease which contain estuarine complex habitats, due to the absence of vegetation with high structural diversity.

A discussion of the foraging habitat, and shelter and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

The species is known to forage across a range of habitat types for invertebrates, fruit and nectar. All the habitat types listed above are considered to form suitable foraging habitat for the species. Such foraging habitats are widespread in the Southern Lease. Based on the habitat types identified above, foraging habitat occupies approximately 25,723 ha of the Southern Lease. Based on the presence of the species and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which comprise foraging habitat for this species. Food resources, such as invertebrates, fruit and nectar would also occur within the disturbance footprint. Based on the habitat types identified above, foraging habitat occupies approximately 63 ha of the disturbance footprint.

Shelter and Breeding Habitat

Key areas of shelter and breeding habitat within the Southern Lease are located in proximity to rocky habitats in vegetation with high structural diversity, especially sandstone woodland and forest habitat. All other habitat types listed above also provide shelter and breeding habitat in the form of tree hollows, hollow logs and termite mounds.

Based on the habitat types identified above, shelter and breeding habitat occurs across approximately 25,723 ha of the Southern Lease. However, within these habitat types, it is expected that the species would particularly favour sandstone woodland and forest habitat. Based on the presence of the species and suitable shelter and breeding habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which contain shelter and breeding habitat for this species. Based on the habitat types identified above, shelter and breeding habitat occupies approximately 63 ha of the disturbance footprint.

Photograph 11 Northern Quoll captured during camera surveys within the Southern Lease (July 2018)



6.3.2.3. Ghost Bat

Listing Status

EPBC Act Status: Vulnerable

TPWC Act Status: Not listed

Species Overview

The Ghost Bat is the largest echolocating bat in Australia and has a mean weight of approximately 105g (Churchill 2009). Its fur is pale grey or light brown, with a lighter belly. Wing membranes are pale cream to brown, and whilst no tail is present, a full tail membrane is retained (Churchill 2009). Facial features include very large ears joined above the head, a large forked tragus, large eyes, and a long simple-shaped nose-leaf extending along the top of the muzzle (Churchill 2009). A photograph of a Ghost Bat is shown in **Photograph 12**.

Females give birth to a single young in a season, and most females breed by two years of age (Hoyle et al. 2001). Studies in the Pilbara have indicated pregnancy occurs in August and September, followed by births in October and November (Armstrong and Anstee 2000). During recent consultation, DEPWS indicated that in the NT, the species give birth in July-August. Generation time is estimated at eight years (Woinarski et al. 2014).

EPBC Act Plans

Conservation Advice

Approved Conservation Advice for the Ghost Bat has been prepared, which identifies threats and conservation actions for the species. Conservation actions include management actions, survey and monitoring priorities and information and research priorities. The key threat to the Ghost Bat is habitat loss and degradation due to mining activities (Threatened Species Scientific Committee 2016c).

Recovery Plan

There is no Recovery Plan available for the Ghost Bat; however, the DCCEE Species Profile and Threats Database and Approved Conservation Advice recommends that a recovery plan is prepared.

Threat Abatement Plan

A Threat Abatement Plan is in place for the Ghost Bat for the threat of the European Red Fox. This plan is not applicable to the species on Groote Eylandt as the European Fox is not present.

Referral Guideline

There is no Referral Guideline for the Ghost Bat.

Groote Archipelago Threatened Species Management Plan

The TSMP has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes the Ghost Bat. The goal for the Ghost Bat is to improve viability of populations on Groote Eylandt in five years. One very high risk threat identified for the species includes poisoning by Cane Toads. A number of other threats have been identified, including predation by feral cats.

Distribution

The current distribution is discontinuous, with geographically disjunct colonies occurring in the Pilbara, Kimberley, northern portion of the NT (including Groote Eylandt), the Gulf of Carpentaria, coastal and near coastal eastern Queensland from Cape York to near Rockhampton, and western Queensland (Threatened Species Scientific Committee 2016c).

Habitat

The Ghost Bat occupies habitats ranging from the arid habitats to tropical savanna woodlands and rainforests (Threatened Species Scientific Committee 2016c). During the daytime they roost in caves, rock crevices and old mines (Threatened Species Scientific Committee 2016c). Roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°–28°C and a moderate to high relative humidity of 50–100 percent (Threatened Species Scientific Committee 2016c). Colonies can disperse up to 150 km from permanent roosting sites during the non-breeding season in the cooler months, with caves, rock shelters, overhangs, vertical cracks and mines providing day roost habitat (Hourigan 2011). Radio-tracking of the Ghost Bat has indicated that foraging areas were centred, on average, 1.9 km from the day roost (Tidemann et al., 1985). Threatened Species Scientific Committee (2016c) noted foraging habitat occurs typically less than 5km from the diurnal roost site. During recent consultation, DEPWS indicated that a recent unpublished study of Ghost Bats found that they can forage at greater distances than previously reported. The Ghost Bat perches in vegetation to ambush passing prey (either on the ground or in the air), and it also gleans surfaces such as the ground while in flight (Threatened Species Scientific Committee 2016c). It feeds on small mammals including other bats, birds, reptiles, frogs and large insects (Threatened Species Scientific Committee 2016c). Most breeding sites appear to require multiple entranced caves (Threatened Species Scientific Committee 2016c). Individuals aggregate in maternity roosts during spring and summer (Hourigan 2011).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Potential

Records

The NR Maps database holds 48 records of the Ghost Bat on Groote Eylandt between 2006 and 2017. Of these records 10 occur within the locality of the Southern Lease. None of these records occur within the Southern Lease.

A single Ghost Bat was recorded within the Southern Lease during recent surveys by Cumberland Ecology in 2022 (see **Figure 16**). This record is located within VMU 13 and in sandstone woodland and forest habitat. It is located approximately 700m from the disturbance footprint. The Ghost Bat has been previously recorded within dry eucalypt forest within the existing GEMCO mine (URS Australia Pty Ltd 2012), within open woodland in proximity to the existing GEMCO mine (Diete et al. 2015b) and in coastal grass and shrub habitat in the south west peninsular of the island (Diete et al. 2015b). The NR Maps database has records of this species in the central and northern parts of the island as shown in **Figure 15**.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat resources for this species:

- Closed forest (rainforest) habitats;
- Laterite woodland and forest habitats;
- Sandstone woodland and forest habitats;
- Coastal dune/swale complex habitats;
- Riparian/wetland habitat; and
- Estuarine complex habitats.

A discussion of the foraging habitat and roosting and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

Key foraging habitat resources are present within the Southern Lease and consist of a high density of potential prey species such as small mammals, including other bats, birds, reptiles, frogs and large insects. The species is known to forage across a range of habitat types, and the habitat types listed above are considered to form suitable foraging habitat for the species. Such foraging habitats are widespread in the Southern Lease. Based on the habitat types identified above, foraging habitat occupies approximately 26,052 ha of the Southern Lease. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which comprise foraging habitat for this species. Similar assemblages

of prey species listed above would also occur within the disturbance footprint. Based on the habitat types identified above, foraging habitat occupies approximately 63 ha of the disturbance footprint.

Roosting and Breeding Habitat

Roosting and breeding habitat would occur in the Southern Lease in areas of sandstone woodland and forest habitat, where rocky outcropping and caves are present. Roosting habitat would occur in caves and rock crevices, and breeding habitat would potentially occur in caves that contain multiple entrances. It is currently unknown as to whether the Southern Lease contains suitable breeding habitat for this species.

Roosting habitat and potential breeding habitat, in the form of crevices and caves within sandstone woodland and forest habitat occupies approximately 6,792 ha of the Southern Lease. Within this habitat type, it is expected that the Southern Lease would only contain breeding habitat where caves are present. Based on the presence of the species and suitable roosting habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, with only the latter having the potential to support roosting or breeding habitat. Due to the rocky outcropping in the sandstone woodland and forest habitats being limited to low lying rubble (see **Photograph 4**), it is not considered to contain suitable features, such as crevices and caves, that would support roosting habitat for this species. No breeding habitat is present within the disturbance footprint due to the absence of caves. Therefore, no roosting or breeding habitat is present within the disturbance footprint.

Photograph 12 Ghost Bat (Source: EMS in URS Australia Pty Ltd, 2012)



6.3.2.4. Brush-tailed Rabbit-rat

Listing Status

EPBC Act Status: Vulnerable

TPWC Act Status: Endangered

Species Overview

The Brush-tailed Rabbit-rat is a moderately large (144-163 g) rodent, with a head and body length of 135-227 mm and tail length of 102-235 mm (Kemper and Firth 2008). It is a partly arboreal rat, and is characterised by a long brush-tipped tail, with the distal third either black or white, and long ears (Woinarski and Hill 2012a). The fur colour of the Brush-tailed Rabbit-rat is grey to golden brown on the back and white to cream on the belly (Kemper and Firth 2008). A photograph of a Brush-tailed Rabbit-rat is shown in **Photograph 14**.

The Brush-tailed Rabbit-rat has a long breeding season from March to October (Threatened Species Scientific Committee 2016b). Females give birth to at least two sets of young and have an average litter size of two to three (Threatened Species Scientific Committee 2016b). In the wild, the species' life expectancy is at least two years and the generation length is 1 – 2 years (Threatened Species Scientific Committee 2016b).

EPBC Act Plans

Conservation Advice

Approved Conservation Advice for the Brush-tailed Rabbit-rat has been prepared, which identifies research and action priorities to manage and monitor the species. Identified threats to the Brush-tailed Rabbit-rat include habitat alteration due to inappropriate fire regimes, habitat loss and fragmentation resulting from forestry and mining operations, predation by feral cats, competition with introduced rodents, invasive weeds, and grazing by introduced herbivores (Threatened Species Scientific Committee 2016b).

Recovery Plan

There is no Recovery Plan for the Brush-tailed Rabbit-rat; however, the DCCEEW Species Profile and Threats Database acknowledges that a recovery plan is required.

Threat Abatement Plan

The *Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (DEWPaC 2012) lists the Brush-tailed Rabbit-rat as a threatened species that is under immediate threat from five listed grasses. This plan is applicable to the species on Groote Eylandt as *Andropogon gayanus* (Gamba Grass), *Urochloa mutica* (Para Grass), *Cenchrus polystachios* (Perennial Mission Grass) and *Cenchrus pedicellatus* (Annual Mission Grass), have been recorded on Groote Eylandt.

The Threat abatement plan for predation by feral cats (DotE 2015d) listed the Brush-tailed Rabbit-rat as a threatened species that is under immediate threat from feral cats. This plan is applicable to the species as feral cats are present on Groote Eylandt.

Referral Guideline

There is no Referral Guideline for the Brush-tailed Rabbit-rat.

Groote Archipelago Threatened Species Management Plan

The TSMP has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes the Brush-tailed Rabbit-rat. The goal for the Brush-tailed Rabbit-rat is to improve viability of populations on Groote Eylandt in five years. Very high and high risk threats identified for the species includes predation by feral cats, weed invasion, inappropriate fire regimes, feral herbivores (deer/buffalo) and major habitat loss/alteration.

Distribution

The Brush-tailed Rabbit-rat is found in monsoonal northern Australia, adjacent islands and southern New Guinea (Threatened Species Scientific Committee 2008). Within the NT this species is known to persist only on the Cobourg Peninsula, Bathurst, Melville and Inglis Islands, and Groote Eylandt (Woinarski and Hill 2012a).

Habitat

The Brush-tailed Rabbit-rat appears to have quite specific habitat requirements and is largely restricted to mixed eucalypt open forest and woodland, or on dunes with Casuarina (Threatened Species Scientific Committee 2008). Preference appears to be given to habitats that are not burnt annually, that have an understorey of predominantly perennial grasses and a sparse-to-moderate middle storey (Threatened Species Scientific Committee 2008). It shelters in tree hollows, hollow logs and, less frequently, in the crowns of pandanus or sand-palms (Woinarski and Hill 2012a). Most foraging is on the ground, but it is also partly arboreal (Woinarski and Hill 2012a). Their mean home range size is approximately 1 ha and males typically have larger home ranges than females (Firth 2007). The diet of the Brush-tailed Rabbit-rat consists primarily of seed, particularly from perennial grasses (Firth 2007) with some fruits, invertebrates and leaves (Woinarski and Hill 2012a).

Presence within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Unlikely

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 347 records of the Brush-tailed Rabbit-rat on Groote Eylandt between 1921 and 2016. Of these records 27 occur within the locality of the Southern Lease (see **Figure 15**). None of these records occur within the Southern Lease. The Brush-tailed Rabbit-rat was not recorded within the Southern Lease during recent (2016-2022) fauna surveys.

Beyond the Southern Lease, the species has been recorded during the following recent surveys:

- Heiniger and Gillespie (2017) captured records at 19 locations on Groote Eylandt, with the majority of records occurring approximately 35 km north of the Southern Lease, two locations within the Eastern Leases and two locations to the east of the Southern Lease;
- Heiniger et al. (2020) captured records at 10 locations at the northern end of Groote Eylandt; and
- Cumberland Ecology (2023) captured records at 54 locations at the northern end of Groote Eylandt.

The Brush-tailed Rabbit-rat was also recorded at one location in 2014 during surveys of the nearby Eastern Leases (Cumberland Ecology 2015). The Brush-tailed Rabbit-rat was also previously recorded within the Eastern Leases by Ward (2007a) and EMS (2013). None of the records of the Brush-tailed Rabbit-rat are located within the Southern Lease.

Despite the presence of vegetation communities and habitat resources that would seemingly be suitable for the Brush-tailed Rabbit-rat, it was not recorded during recent terrestrial surveys by Cumberland Ecology (2019a), which were specifically designed to target the species, or in other camera surveys by Cumberland Ecology (2023), Heiniger et al. (2020) and Heiniger and Gillespie (2017). Survey effort using camera surveys within the Southern Lease has been substantial, and included 98 sites (17,828 capture nights) by Cumberland Ecology (2019c) and 75 sites (8,002 capture nights) by Cumberland Ecology (2022). Survey effort of these studies within 500m of the disturbance footprint included 10 camera sites (1,923 capture nights) and 39 sites (4,204 nights of data), respectively.

Heiniger et al. (2020) noted that the Brush-tailed Rabbit-rat was absent from a large proportion of studied sites despite being positioned within seemingly suitable habitat. A positive association between occurrence and shrub density was reported, however it was noted that further research is required to ascertain what factors may be limiting the distribution of this species on Groote Eylandt.

The Brush-tailed Rabbit-rat was recorded extensively north of the Southern Lease using a very similar survey methodology by Cumberland Ecology (2023), Heiniger et al. (2020) and Heiniger and Gillespie (2017), giving rise to a high detection probability. Therefore, there is a high degree of confidence that if the species was present within the studied portions of the Southern Lease, it would have been recorded. As such, the absence of records by Cumberland Ecology (2023), Heiniger et al. (2020), Cumberland Ecology (2019a) and Heiniger and Gillespie (2017) is likely related to the absence of the species in the surveyed portions of the Southern Lease. However, it is noted that there is still some potential for it to be present in low numbers in suitable habitat found in parts of the Southern Lease that were not specifically sampled, such as to the north east of the Amagula River and east of the Innokumanja River. These unsurveyed portions are located outside of the disturbance footprint (see **Figure 7**) and are separated from the disturbance footprint by rivers.

Photograph 13 Brush-tailed Rabbit-rat (Source: K. Brennan in Woinarski and Hill, 2012a)



6.3.2.5. Northern Hopping-mouse

Listing Status

EPBC Act Status: Endangered

TPWC Act Status: Vulnerable

Species Overview

The Northern Hopping-mouse is a small (35-44 g) rodent, with a head and body length of 91-112 mm and tail length of 15-173 mm (Woinarski and Flannery 2008). It is characterised by an extremely long tail (around 140-150 per cent head-body length) tipped with a tuft of longer dark hairs, large ears and eyes, and very long (35-40 mm) narrow hind-feet (Woinarski and Ward 2012b). The fur colour of the Northern Hopping-mouse is sandy brown above and white below (Woinarski and Ward 2012b). A photograph of a Northern Hopping-mouse is shown in **Photograph 15**.

Breeding of the Northern Hopping-mouse has been found not to be seasonal with breeding adults and juveniles captured throughout the year (Threatened Species Scientific Committee 2021a). A higher influx of juveniles into the population has been recorded in the dry season with more juveniles captured in June and July (Threatened Species Scientific Committee 2021a). Females can give birth to up to five young (Threatened Species Scientific Committee 2021a).

The species has been recorded as having a home range between 0.39 ha (lactating female) and 23.95 ha (scrotal male) (Diete et al. 2016).

EPBC Act Plans

Conservation Advice

Approved Conservation Advice for the Northern Hopping-mouse has been prepared, which identifies threats and conservation actions for the species. Conservation actions include management actions, survey and monitoring priorities and information and research priorities. Key threats to the Northern Hopping-mouse include predation by feral cats, major habitat loss/alteration, inappropriate fire regimes, grazing and trampling by introduced herbivores, invasive weeds, and minor habitat loss/disturbance (Threatened Species Scientific Committee 2021a).

Recovery Plan

There is no current Recovery Plan for the Northern Hopping-mouse; however, the DCCEEW Species Profile and Threats Database acknowledges that a recovery plan is required. A National Multi-species Recovery Plan has previously been in place for several small mammal species, including the Northern Hopping-mouse (Woinarski 2004a); however DCCEEW has advised that this plan has ceased to be in effect from 1 October 2015 (DAWE 2020b).

Threat Abatement Plan

The *Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses* (DEWPaC 2012) lists the Northern Hopping-mouse as a threatened species that is under immediate threat from five listed grasses. This plan is applicable to the species on Groote Eylandt as *Andropogon gayanus* (Gamba Grass), *Urochloa mutica* (Para Grass), *Cenchrus polystachios* (Perennial Mission Grass) and *Cenchrus pedicellatus* (Annual Mission Grass), have been recorded on Groote Eylandt.

The Threat abatement plan for predation by feral cats (DotE 2015d) listed the Brush-tailed Rabbit-rat as a threatened species that is under immediate threat from feral cats. This plan is applicable to the species as feral cats are present on Groote Eylandt.

Referral Guideline

There is no Referral Guideline for the Northern Hopping-mouse.

Groote Archipelago Threatened Species Management Plan

The TSMP has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes the Northern Hopping-mouse. The goal for the Northern Hopping-mouse is to improve viability of populations on Groote Eylandt in five years. Very high and high risk threats identified for the species includes predation by feral cats, major habitat loss/alteration, weed invasion, inappropriate fire regimes and feral herbivores (deer/buffalo).

Distribution

The Northern Hopping-mouse is restricted to the monsoonal tropics of northern Australia, including Groote Eylandt (DotE 2013). Records on Groote Eylandt are sparsely scattered across woodland, coast heathland and shrubland habitats (Woinarski et al. 2014).

Habitat

The Northern Hopping-mouse is most often found in areas with sandy substrates and seems to favour coastal sand dunes and sand sheets with a cover of tussock grass or heath (DotE 2013). It is also found in shrubland, eucalypt open forest, and the margins of coastal rainforest thickets (DotE 2013). It constructs elaborate communally-used burrow systems, whose vertical entrances may be obscured by a thin layer of sand (Woinarski and Ward 2012b, Diete et al. 2014). Burrows are unmarked by entrances or tracks (Ward 2014). The Northern Hopping-mouse is active at night and it forages entirely on the ground (Woinarski and Ward 2012b).

Presence within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Unlikely

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 52 records of the Northern Hopping-mouse on Groote Eylandt between 2005 and 2015. Previous surveys have recorded the apparent presence of the Northern Hopping-mouse based upon the presence of spoil heaps (e.g. Firth (2008) and Smith (2009a)) and a number of the records held in the NR Maps database appear to correlate to these spoil heaps. It has since been determined that the presence of spoil heaps on their own are not a reliable determinate for the presence of the Northern Hopping-mouse as spoil heaps are also created by the Delicate Mouse (*Pseudomys delicatulus*) (Coffey Environments 2010, Diete et al. 2015a), which is prevalent on Groote Eylandt, and was also recorded within the nearby Eastern Leases.

A review of the NR Maps database records has determined that 21 of the records held in the database are attributed to trapping, spotlighting, and burrow excavation (+ capture) and have been assessed as confirmed records. None of these records occur within the Southern Lease (see **Figure 15**). The Northern Hopping-mouse was not recorded within the Southern Lease during recent fauna surveys (2016-2022).

Beyond the Southern Lease, the species has been recorded during the following recent surveys:

- At the Cave Paintings (see **Figure 2**) by Heiniger and Gillespie (2017) and Cumberland Ecology (2019a); a culturally significant area located to the east of the existing GEMCO mine, as shown in **Photograph 15**;
- North of the Cave Paintings (approximately 10 km) by Heiniger and Gillespie (2017); and
- Records in the same broad location along the access corridor to the Eastern Leases by Cumberland Ecology (2015) and Anindilyakwa Land & Sea Rangers (2019).

Despite the presence of vegetation communities and habitat resources that would seemingly be suitable for the Northern Hopping-mouse, it was not recorded during recent terrestrial surveys by Cumberland Ecology (2019a), which were specifically designed to target the species, or in other camera surveys by Cumberland Ecology (2023), Heiniger et al. (2020) and Heiniger and Gillespie (2017). Survey effort using camera surveys within the Southern Lease has been substantial, and included 98 sites (17,828 capture nights) by Cumberland Ecology (2019c) and 75 sites (8,002 capture nights) by Cumberland Ecology (2022). Survey effort of these studies within 500m of the disturbance footprint included 10 camera sites (1,923 capture nights) and 39 sites (4,204 nights of data), respectively.

Heiniger et al. (2020) noted that the distribution of the Northern Hopping-mouse on Groote Eylandt is highly restricted despite the availability of seemingly suitable habitat.

As part of the Cumberland Ecology (2019a) survey, the Northern Hopping-mouse was recorded at survey at the Cave Paintings using a very similar survey methodology to Heiniger and Gillespie (2017), providing evidence and certainty that the camera trapping method utilised within the Southern Lease could detect the Northern Hopping-mouse. The lack of records within the Southern Lease (using a method known to detect the species) suggests that the species is therefore not present in the areas sampled. Given the high survey intensity and sample sites in the full range of suitable habitats and fire types, it is concluded that there is a low probability of occurrence for the species in the Southern Lease.

Despite the absence of records of the Northern Hopping-mouse within the Southern Lease (within the area studied by Cumberland Ecology (2023), Heiniger et al. (2020), Cumberland Ecology (2019a) and Heiniger and Gillespie (2017)), it is possible the species may occur in low numbers in suitable habitat within the unsurveyed portions of the Southern Lease, such as to the north east of the Amagula River and east of the Innokumanja River which were not able to be safely accessed. These unsurveyed portions are located outside of the disturbance footprint (see **Figure 7**) and are separated from the disturbance footprint by rivers.

Photograph 14 Northern Hopping-mouse captured during camera trapping near the Cave Paintings (east of existing GEMCO mine) (April 2018)



6.3.3. TPWC Act Species

Three threatened fauna species listed under the TPWC Act were recorded within the Southern Lease during the recent terrestrial surveys, namely the Masked Owl (northern), Northern Quoll and Mertens' Water Monitor. The Masked Owl (northern) and Northern Quoll are also listed under the EPBC Act and have been discussed in **Section 6.3.2**. Details on the occurrence and habitat of the Mertens' Water Monitor within the Southern Lease are provided below. No other TPWC Act listed threatened fauna species are considered to have potential to occur within the Southern Lease and as such are not assessed further within this report.

6.3.3.1. Mertens' Water Monitor

Listing Status

EPBC Act Status: Not listed

TPWC Act Status: Vulnerable

Species Overview

Mertens' Water Monitor is a medium to large sized semi-aquatic monitor lizard up to 1 m in size (DAWE 2021). It is dark brown to black on the back with numerous small dark-edged cream or yellow spots (DAWE 2021). A

photograph of a Mertens' Water Monitor recorded on camera to the north of the Southern Lease, within the Eastern Leases, is shown in **Photograph 16**.

Egg laying typically occurs in the early dry season (Ward et al. 2006). The species generation length is not known with certainty, but it is thought likely that animals reach sexual maturity at 3-4 years and live for 10-12 years (DAWE 2021).

Groote Archipelago Threatened Species Management Plan

The TSMP has been developed with support from the NT Government and the Australian Government (DENR and ALC 2019). The plan identifies key actions to reduce threats and support conditions for threatened species recovery, and it includes Mertens' Water Monitor. The goal for Mertens' Water Monitor is to improve viability of populations on Groote Eylandt in five years. One very high risk threat identified for the species includes poisoning by Cane Toads.

Distribution

Mertens' Water Monitor has a broad geographic range, occupying coastal and inland waters across the far north of Australia from the Kimberley to the west side of Cape York Peninsula (Ward et al. 2006). In the NT, Mertens' Water Monitor has been recorded on Marchinbar, Guluwuru and Jigari Islands, Melville and Bathurst Islands in the Tiwi islands, Groote Eylandt and Vanderlin and Winchelsea Islands (DAWE 2021).

Habitat

Mertens' Water Monitor is semi-aquatic and is seldom seen far from water (Ward et al. 2006). It is often observed climbing on rocks or trees near water, often basking on branches overhanging the water or on rocks mid-stream (Ward et al. 2006). The species also inhabits human-made water bodies such as dams and irrigation channels (DAWE 2021). It lays eggs in a burrow constructed in the ground, with egg-laying usually occurring in the early dry season (Ward et al. 2006). It feeds mostly on fish, frogs and carrion, and is also known to eat insects and small terrestrial vertebrates (Ward et al. 2006).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 29 records of Mertens' Water Monitor on Groote Eylandt between 1947 and 2018. Of these records 15 occur within the locality of the Southern Lease (see **Figure 15**). Two of these records occur within the Southern Lease.

Mertens' Water Monitor was recorded from one location within the Southern Lease incidentally in Arnduwarumarrumanja Creek during surveys undertaken by Cumberland Ecology in 2022 (see **Figure 16**). C&R

(Unpublished) also recorded the species at two locations along the Amagula River during aquatic surveys conducted within the Southern Lease (see **Figure 16**). Cumberland Ecology (2015) also recorded the species within the Southern Lease (see **Figure 16**).

None of the records within the Southern Lease occur within the disturbance footprint.

Cumberland Ecology (2015) recorded the species at numerous locations within the Eastern Leases, including within laterite woodland and forest habitat, and riparian/wetland habitats directly adjacent to watercourses (within 15m) using cage traps and incidental observations. It was also recorded at two locations within the Southern Lease in the NR Maps database (see **Figure 15**), however these locations are identical and overlap with the record by Cumberland Ecology (2015). URS Australia Pty Ltd (2012) and Webb (1992) also recorded this species within their respective studies to the north of the Southern Lease.

A summary of the records within the Southern Lease is provided in **Table 16**. This includes records from recent (2016-2022) terrestrial surveys and records from the NR Maps database. It is noted that two of the NR Maps database records are duplicates and have been noted as such within this table.

Table 15 Summary of Mertens' Water Monitor records within the Southern Lease

Record	Date	Source	Location	Comments
1,2	6/10/2014	NR Maps Cumberland Ecology (2015)	/ Amagula River. Recorded within an area mapped as VMU 5 and closed rainforest habitat.	Database provides a count of 1 individual. Corresponds with a detection by Cumberland Ecology (2015), which is noted as an incidental observation.
3	28/10/2021	C&R (Unpublished)	Amagula River. Recorded within an area mapped as VMU 26 and riparian/wetland habitat.	One individual detected through direct observation.
4	7/06/2022	C&R (Unpublished)	Amagula River. Recorded within an area mapped as VMU 20 and riparian/wetland habitat.	One individual detected through direct observation.
5	11/10/2022	Cumberland Ecology (Current)	Arnduwamurrumanja Creek. Recorded within an area mapped as VMU 26/17 and comprising riparian/wetland habitat.	One individual detected through direct observation.

Habitat Types

Riparian/wetland habitats form the primary habitat type for this species in the Southern Lease. However, it may also occur on occasion within other habitat types located close to waterways.

A discussion of the foraging habitat and shelter and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

Key foraging habitat resources are present within the Southern Lease and consist of frogs and small fish. The watercourses of the Emerald, Yenbakwa, Amagula, Innokumanja and Amiyelkuwa Rivers, Salt Creek and Second Creek provide suitable foraging habitat and food resources for this species in the form of riparian/wetland habitat; however, the availability of such habitat is reliant on seasonal conditions. Suitable foraging habitat for Mertens' Water Monitor is likely to be more restricted within the dry season when there is less water within the waterways. Habitat types in which this species would forage within the Southern Lease predominantly comprises riparian/wetland habitats. Some other habitat types may be used on occasions where they occur in close proximity to waterways. This species is expected to utilise many of the perennial waterways within the Southern Lease.

Based on the presence of riparian/wetland habitats, foraging habitat occupies approximately 3,792 ha of the Southern Lease. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any riparian/wetland habitat or watercourses. Therefore, no foraging habitat is present within the disturbance footprint.

Shelter and Breeding Habitat

Key areas of shelter and breeding habitat within the Southern Lease are located in riparian and wetland habitat along watercourses where nesting burrows can be constructed. Based on the presence of riparian/wetland habitats, shelter and breeding habitat occurs across approximately 3,792 ha of the Southern Lease. Based on the presence of the species and suitable shelter and breeding habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise shelter or breeding habitat for this species. The disturbance footprint does not contain any riparian/wetland habitat or watercourses. Therefore, no shelter and breeding habitat is present within the disturbance footprint.

Photograph 15 Mertens' Water Monitor detected by a camera within the Eastern Leases



6.4. Fauna Species: Migratory Species

6.4.1. Overview

An analysis of ecological databases was conducted for the Southern Lease and its surrounds, including interrogation of the DCCEEW EPBC PMST (DCCEEW 2022f) and NR Maps search facility (DEPWS 2022) for migratory fauna records. Database records identified the presence of a number of migratory species or habitat within the locality of the Southern Lease (defined in this report as a 20 km radius from the centre of the Southern Lease). Results of the database searches within the locality of the Southern Lease for migratory fauna species listed under the EPBC Act are summarised in **Table 17**. The TPWC Act does not include a separate migratory status.

As the locality includes some ocean areas, the search yielded numerous marine and aquatic species including fish, turtles and marine mammals. These are not relevant to an assessment of terrestrial ecology within the Southern Lease and are not considered further in this report.

The full results of the PMST search is presented in **Appendix A**. The migratory fauna records held within the NR Maps database across Groote Eylandt, including the locality, are shown on **Figure 17**.

One migratory fauna species, namely the Salt-water Crocodile (*Crocodylus porosus*), has been recorded within the Southern Lease during recent (2016-2022) surveys by Cumberland Ecology and studies by C&R (2019, Unpublished). The locations of this species within the Southern Lease are shown on **Figure 16**.

Table 16 Migratory fauna species database records within the locality

Common Name	Scientific Name	Conservation Status ¹		Database Results	
		EPBC Act ²	TPWC Act	PMST	NR Maps
Birds					
Red Knot	<i>Calidris canutus</i>	E, M(w)	V	X	X
Curlew Sandpiper	<i>Calidris ferruginea</i>	CE, M(w)	V	X	X
Great Knot	<i>Calidris tenuirostris</i>	CE, M(w)	V		X
Greater Sand Plover	<i>Charadrius leschenaultii</i>	V, M(w)	V	X	X
Lesser Sand Plover	<i>Charadrius mongolus</i>	E, M(w)	V		X
Bar-tailed Godwit	<i>Limosa lapponica</i>	V/CE ³ , M(w)	V	X	X
Eastern Curlew	<i>Numenius madagascariensis</i>	CE, M(w)	V	X	X
Oriental Reed-warbler	<i>Acrocephalus orientalis</i>	M(w)		X	
Common Sandpiper	<i>Actitis hypoleucos</i>	M(w)		X	X
Common Noddy	<i>Anous stolidus</i>	M(m)		X	
Fork-tailed Swift	<i>Apus pacificus</i>	M(m)		X	X
Ruddy Turnstone	<i>Arenaria interpres</i>	M(w)			X
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	M(w)		X	X
Pectoral Sandpiper	<i>Calidris melanotos</i>	M(w)		X	
Red-necked Stint	<i>Calidris ruficollis</i>	M(w)			X
Streaked Shearwater	<i>Calonectris leucomelas</i>	M(m)		X	
Red-rumped Swallow	<i>Cecropis daurica</i>	M(t)		X	
Oriental Plover	<i>Charadrius veredus</i>	M(w)		X	X
White-winged Black Tern	<i>Chlidonias leucopterus</i>	M(m)			X
Oriental Cuckoo	<i>Cuculus optatus</i>	M(t)		X	
Lesser Frigatebird	<i>Fregata ariel</i>	M(m)		X	X
Great Frigatebird	<i>Fregata minor</i>	M(m)		X	
Oriental Pratincole	<i>Glareola maldivarum</i>	M(w)		X	X
Barn Swallow	<i>Hirundo rustica</i>	M(t)		X	
Caspian Tern	<i>Hydroprogne caspia</i>	M(m)			X
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	M(w)		X	X
Black-tailed Godwit	<i>Limosa limosa</i>	M(w)			X
Grey Wagtail	<i>Motacilla cinerea</i>	M(t)		X	
Yellow Wagtail	<i>Motacilla flava</i>	M(t)		X	
Whimbrel	<i>Numenius phaeopus</i>	M(w)			X
Eastern Osprey	<i>Pandion cristatus</i> ⁶	M(w)		X	X

Common Name	Scientific Name	Conservation Status ¹		Database Results	
		EPBC Act ²	TPWC Act	PMST	NR Maps
White-tailed Tropicbird	<i>Phaethon lepturus</i>	M(m)		X	
Glossy Ibis	<i>Plegadis falcinellus</i>	M(w)			X
Pacific Golden Plover	<i>Pluvialis fulva</i>	M(w)			X
Grey Plover	<i>Pluvialis squatarola</i>	M(w)			X
Rufous Fantail	<i>Rhipidura rufifrons</i>	M(t)		X	
Roseate Tern	<i>Sterna dougallii</i>	M(m)		X	X
Common Tern	<i>Sterna hirundo</i>	M(m)			X
Black-naped Tern	<i>Sterna sumatrana</i>	M(m)			X
Little Tern	<i>Sternula albifrons</i>	M(m)			X
Brown Booby	<i>Sula leucogaster</i>	M(m)			X
Lesser Crested Tern	<i>Thalasseus bengalensis</i>	M(m)			X
Crested Tern	<i>Thalasseus bergii</i>	M(w)		X	
Grey-tailed Tattler	<i>Tringa brevipes</i>	M(w)			X
Common Greenshank	<i>Tringa nebularia</i>	M(w)		X	X
Marsh Sandpiper	<i>Tringa stagnatilis</i>	M(w)			X
Terek Sandpiper	<i>Xenus cinereus</i>	M(w)			X
Reptiles					
Salt-water Crocodile	<i>Crocodylus porosus</i>	M(m)		X	X
Species Restricted to Marine Environment					
Blue Whale	<i>Balaenoptera musculus</i>	E, M(m)		X	
Bryde's Whale	<i>Balaenoptera edeni</i>	M(m)		X	
Killer Whale	<i>Orcinus orca</i>	M(m)		X	
Dugong	<i>Dugong dugong</i>	M(m)		X	X
Loggerhead Turtle	<i>Caretta caretta</i>	E, M(m)	V	X	
Green Turtle	<i>Chelonia mydas</i>	V, M(m)		X	X
Leatherback Turtle	<i>Dermochelys coriacea</i>	E, M(m)	CE	X	
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V, M(m)	V	X	X
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	E, M(m)	V	X	X
Flatback Turtle	<i>Natator depressus</i>	V, M(m)		X	X
Reef Manta Ray	<i>Manta alfredi</i>	M(m)		X	
Giant Manta Ray	<i>Manta birostris</i>	M(m)		X	
Australian Snubfin Dolphin	<i>Orcaella heinsohni</i>	M(m)		X	X

Common Name	Scientific Name	Conservation Status ¹		Database Results	
		EPBC Act ²	TPWC Act	PMST	NR Maps
Australian Humpback Dolphin	<i>Sousa sahalensis</i>	M(m)		X	
Narrow Sawfish	<i>Anoxypristis cuspidata</i>	M(m)		X	
Great White Shark	<i>Carcharodon carcharias</i>	V, M(m)		X	
Dwarf Sawfish	<i>Pristis clavata</i>	V, M(m)		X	
Large-tooth Sawfish	<i>Pristis pristis</i>	V, M(m)		X	
Green Sawfish	<i>Pristis zijsron</i>	V, M(m)		X	
Whale Shark	<i>Rhincodon typus</i>	V, M(m)		X	

1. Conservation Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Subcategories for EPBC Act listing of migratory species follow those within the PMST report

3. Subspecies of *Limosa lapponica* have different listings under the EPBC Act. *Limosa lapponica baueri* is listed as Vulnerable and *Limosa lapponica menzbieri* is listed as Critically Endangered.

A likelihood of occurrence assessment was undertaken for the migratory species listed in **Table 17** (excluding species restricted to the marine environment) to determine if they have the potential to occur within the Southern Lease, and more specifically to occur within the disturbance footprint. The likelihood of these species occurring was classified using the criteria presented in **Table 1**. The assessment was based on the species known ranges, number and age of records, and habitat preferences which were evaluated in conjunction with the site characteristics observed during the field surveys. The assessment included consideration of information contained within the DCCEW Species Profile and Threats Database, recovery plans and other literature. The full results of this likelihood of occurrence assessment are presented in **Appendix D**. A summary of the species and their likelihood of occurrence is provided in **Table 18**. Details of the species with potential to occur and their occurrence within the Southern Lease are provided below.

Table 17 Summary of the likelihood of occurrence of migratory fauna species

Common Name	Scientific Name	Conservation Status ¹		Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	Southern Lease	Disturbance Footprint
Red Knot	<i>Calidris canutus</i>	E, M(w)	V	Unlikely	Unlikely
Curlew Sandpiper	<i>Calidris ferruginea</i>	CE, M(w)	V	Unlikely	Unlikely
Great Knot	<i>Calidris tenuirostris</i>	CE, M(w)	V	Unlikely	Unlikely
Greater Sand Plover	<i>Charadrius leschenaultii</i>	V, M(w)	V	Unlikely	Unlikely
Lesser Sand Plover	<i>Charadrius mongolus</i>	E, M(w)	V	Unlikely	Unlikely
Bar-tailed Godwit	<i>Limosa lapponica</i>	V/CE ⁴ , M(w)	V	Unlikely	Unlikely
Eastern Curlew	<i>Numenius madagascariensis</i>	CE, M(w)	V	Unlikely	Unlikely

Common Name	Scientific Name	Conservation Status ¹		Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	Southern Lease	Disturbance Footprint
Oriental Reed-warbler	<i>Acrocephalus orientalis</i>	M(w)		Unlikely	Unlikely
Common Sandpiper	<i>Actitis hypoleucos</i>	M(w)		Potential ⁶	Unlikely
Common Noddy	<i>Anous stolidus</i>	M(m)		Unlikely	Unlikely
Fork-tailed Swift	<i>Apus pacificus</i>	M(m)		Potential	Potential
Ruddy Turnstone	<i>Arenaria interpres</i>	M(w)		Unlikely	Unlikely
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	M(w)		Potential	Unlikely
Pectoral Sandpiper	<i>Calidris melanotos</i>	M(w)		Unlikely	Unlikely
Red-necked Stint	<i>Calidris ruficollis</i>	M(w)		Unlikely	Unlikely
Streaked Shearwater	<i>Calonectris leucomelas</i>	M(m)		Unlikely	Unlikely
Red-rumped Swallow	<i>Cecropis daurica</i>	M(t)		Unlikely	Unlikely
Oriental Plover	<i>Charadrius veredus</i>	M(w)		Unlikely	Unlikely
White-winged Black Tern	<i>Chlidonias leucopterus</i>	M(m)		Unlikely	Unlikely
Oriental Cuckoo	<i>Cuculus optatus</i>	M(t)		Unlikely	Unlikely
Lesser Frigatebird	<i>Fregata ariel</i>	M(m)		Unlikely	Unlikely
Great Frigatebird	<i>Fregata minor</i>	M(m)		Unlikely	Unlikely
Oriental Pratincole	<i>Glareola maldivarum</i>	M(w)		Unlikely	Unlikely
Barn Swallow	<i>Hirundo rustica</i>	M(t)		Unlikely	Unlikely
Caspian Tern	<i>Hydroprogne caspia</i>	M(m)		Unlikely	Unlikely
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	M(w)		Unlikely	Unlikely
Black-tailed Godwit	<i>Limosa limosa</i>	M(w)		Unlikely	Unlikely
Grey Wagtail	<i>Motacilla cinerea</i>	M(t)		Unlikely	Unlikely
Yellow Wagtail	<i>Motacilla flava</i>	M(t)		Unlikely	Unlikely
Whimbrel	<i>Numenius phaeopus</i>	M(w)		Unlikely	Unlikely
Eastern Osprey	<i>Pandion cristatus</i> ⁵	M(w)		Present	Unlikely
White-tailed Tropicbird	<i>Phaethon lepturus</i>	M(m)		Unlikely	Unlikely
Glossy Ibis	<i>Plegadis falcinellus</i>	M(w)		Unlikely	Unlikely
Pacific Golden Plover	<i>Pluvialis fulva</i>	M(w)		Unlikely	Unlikely
Grey Plover	<i>Pluvialis squatarola</i>	M(w)		Unlikely	Unlikely
Rufous Fantail	<i>Rhipidura rufifrons</i>	M(t)		Unlikely	Unlikely
Roseate Tern	<i>Sterna dougallii</i>	M(m)		Unlikely	Unlikely
Common Tern	<i>Sterna hirundo</i>	M(m)		Unlikely	Unlikely
Black-naped Tern	<i>Sterna sumatrana</i>	M(m)		Unlikely	Unlikely

Common Name	Scientific Name	Conservation Status ¹		Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	Southern Lease	Disturbance Footprint
Little Tern	<i>Sternula albifrons</i>	M(m)		Unlikely	Unlikely
Brown Booby	<i>Sula leucogaster</i>	M(m)		Unlikely	Unlikely
Lesser Crested Tern	<i>Thalasseus bengalensis</i>	M(m)		Unlikely	Unlikely
Crested Tern	<i>Thalasseus bergii</i>	M(w)		Unlikely	Unlikely
Grey-tailed Tattler	<i>Tringa brevipes</i>	M(w)		Unlikely	Unlikely
Common Greenshank	<i>Tringa nebularia</i>	M(w)		Potential ⁶	Unlikely
Marsh Sandpiper	<i>Tringa stagnatilis</i>	M(w)		Potential	Unlikely
Terek Sandpiper	<i>Xenus cinereus</i>	M(w)		Unlikely	Unlikely
Salt-water Crocodile	<i>Crocodylus porosus</i>	M(m)		Present	Unlikely

1. Conservation Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Subcategories for EPBC Act listing of migratory species follow those within the PMST report

3. Includes record held within the NR Maps Database and recent surveys.

4. Subspecies of *Limosa lapponica* have different listings under the EPBC Act. *Limosa lapponica baueri* is listed as Vulnerable and *Limosa lapponica menzbieri* is listed as Critically Endangered.

5. Species listed as *Pandion haliaetus* in the Protected Matters Search report. *Pandion haliaetus cristatus* was previously recognised as a subspecies for Australasia and New Caledonia, however it is currently recognised as a species in its own right.

6. There is a location within the NR Maps database that represents a total of 18 threatened and migratory species records. It appears that a single coordinate was utilised for these species that doesn't reflect the actual location of the detected individuals. It is therefore considered that the records of these species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) not aligning with the coordinates. As such, these records have not been counted towards a species being present within the Southern Lease.

The following section provides details of the migratory fauna species that have been recorded within the Southern Lease, or which are considered to have the potential to occur within the Southern Lease.

6.4.2. EPBC Act Species (Migratory)

Several migratory fauna species listed under the EPBC Act, including the Salt-water Crocodile (*Crocodylus porosus*) and Eastern Osprey (*Pandion cristatus*), have been recorded within the Southern Lease during recent surveys or appear on NR Maps. Several species listed as migratory under the EPBC Act are also considered to have potential to occur within the Southern Lease, including the Common Sandpiper (*Actitis hypoleucos*) and Common Greenshank (*Tringa nebularia*) Fork-tailed Swift (*Apus pacificus*), Sharp-tailed Sandpiper (*Calidris acuminata*), and Marsh Sandpiper (*Tringa stagnatilis*) (refer to **Table 17**). Details on these species and their occurrence and habitat within the Southern Lease are provided below.

A number of other migratory bird species records appear on NR Maps (likely to be inaccurate²) or have suitable habitat within the estuarine complex habitat located near the south-western boundaries of the Southern Lease. As the habitats for these species represent a small proportion of the habitat within the Southern Lease, and do not occur within the disturbance footprint, these species have been assessed as being unlikely to occur. Summary descriptions of these species are, however, provided in **Appendix D**.

6.4.2.1. Salt-water Crocodile

Listing Status

EPBC Act Status: Migratory (marine)

Species Overview

The Salt-water Crocodile is the largest living reptile in the world, with males averaging 5m in length and up to 450kg in weight, and females averaging 3m length and up to 150kg in weight (DCCEEW 2022d). The upper body is grey, brown or almost black, with irregular darker mottling, and are whitish on the underside (Cogger 2018). The snout of an adult is broad and granular (Cogger 2018). A photograph of a Salt-water Crocodile recorded on camera north of the Southern Lease, within the Eastern Leases, is shown in **Photograph 17**.

The Salt-water Crocodile breeds in the wet season, between November and May (DCCEEW 2022d), and lays approximately 60 eggs (Cogger 2018). The Salt-water Crocodile is estimated to live beyond 70 years of age (DCCEEW 2022d).

Brien et al. (2008) found that individual crocodiles occupied larger home ranges during the late dry/mid-wet season (11 ha) than in the dry season (3 ha), and males occupied larger home ranges (24 ha) than females (6 ha) during the late dry/mid-wet season.

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Salt-water Crocodile.

Recovery Plan

There is no Recovery Plan for the Salt-water Crocodile.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Salt-water Crocodile.

² There is a location within the NR Maps database that represents a total of 18 threatened and migratory species records. It appears that a single coordinate was utilised for these species that doesn't reflect the actual location of the detected individuals. It is therefore considered that the records of these species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) not aligning with the coordinates. As such, these records have not been counted towards a species being present within the Southern Lease.

Referral Guideline

There is no Referral Guideline for the Salt-water Crocodile.

Distribution

The distribution of the Salt-water Crocodile ranges from Rockhampton in Queensland, throughout coastal NT to King Sound (near Broome) in Western Australia (DCCEEW 2022d). In the NT the Salt-water Crocodile has been found in numerous river systems, including but not limited to the following rivers: Mary, Adelaide, Daly, Moyle, Victoria/Baines, Finniss, Wildman, West Alligator, East Alligator, South Alligator, Liverpool, Blyth, Glyde, Habgood, Baralminar/Gobalpa, Goromuru, Cato and Peter John Rivers (DCCEEW 2022d).

Habitat

The Salt-water Crocodile typically occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast (DCCEEW 2022d). Preferred nesting habitat of the Salt-water Crocodile includes elevated, isolated freshwater swamps that are not influenced by tidal movements (DCCEEW 2022d). Floating rafts of vegetation also provide important nesting habitat (DCCEEW 2022d). The primary food sources of the Salt-water Crocodile include crustaceans, insects and mammals; however, only larger individuals eat mammals (DCCEEW 2022d).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 14 records of the Salt-water Crocodile on Groote Eylandt between 1984 and 2018. Of these records nine occur within the locality of the Southern Lease (see **Figure 17**). These records are located along waterways or off the coast. None of the NR Maps database records occur within the Southern Lease.

The Salt-water Crocodile was recorded incidentally within the Southern Lease at Leske Pools by Cumberland Ecology (2016), at two locations during aquatic surveys conducted by C&R (2019, Unpublished), and at four locations by C&R (Unpublished) when they were undertaking surface water monitoring and/or aquatic ecology surveys (see **Figure 16**). A summary of the records within the Southern Lease is provided in **Table 19**. None of the records within the Southern Lease occur within the disturbance footprint.

Table 18 Summary of Salt-water Crocodile records within the Southern Lease

Record	Date	Source	Location	Comments
1	12/05/2016	Cumberland Ecology (2016)	Amagula River. Recorded within an area mapped as	One individual detected through direct observation.

Record	Date	Source	Location	Comments
			VMU 26 and comprising riparian/wetland habitat.	
2	24/07/2018	C&R (2019)	Amagula River. Recorded within an area mapped as VMU 26 and comprising riparian/wetland habitat.	One individual detected through direct observation.
3	2019	C&R (2019)	Amagula River. Recorded within an area mapped as VMU 19 and comprising riparian/wetland habitat.	One individual detected through direct observation.
4	2019	C&R (2019)	Innokumanja River. Recorded within an area mapped as VMU 17/26 and comprising riparian/wetland habitat.	One individual trapped during aquatic surveys
5	29/10/2021	C&R (Unpublished)	Amagula River. Recorded within an area mapped as VMU 26 and comprising riparian/wetland habitat.	One individual detected through direct observation. Same location as record 2.
6	9/06/2022	C&R (Unpublished)	Yenbakwa River. Recorded within an area mapped as VMU 44 and comprising riparian/wetland habitat.	One individual detected through direct observation.
7	12/06/2022	C&R (Unpublished)	Salt Creek. Recorded within an area mapped as VMU 44 and comprising riparian/wetland habitat.	One individual detected through direct observation.
8	12/06/2022	C&R (Unpublished)	Second Creek. Recorded within an area mapped as VMU 88 and comprising estuarine complex habitat.	One individual detected through direct observation.

Habitat Types

Riparian/wetland habitats form the primary habitat type for this species in the Southern Lease. However, it may also occur on occasion within other habitat types located close to waterways.

A discussion of the foraging habitat and shelter and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

Key foraging habitat resources are present within the Southern Lease and consist of crustaceans, insects and mammals. Suitable prey for this species recorded in the Southern Lease included the Agile Wallaby (*Macropus agilis*), Northern Brown Bandicoot (*Isodon macrourus*), and the Northern Quoll (*Dasyurus hallucatus*). Aquatic species such as small fish, macroinvertebrates and riparian reptiles such as water monitors would also be suitable prey for this species. The well-developed watercourses of the Emerald, Yenbakwa, Amagula, Innokumanja and Amiyelkuwa Rivers, and Salt Creek and Second Creek provide suitable habitat for the Salt-water Crocodile in the form of riparian/wetland habitats; however, the availability of such habitat is reliant on seasonal conditions. Suitable habitat for this species is likely to be more restricted within the dry season when there is less water within the waterways. Habitat types identified within the Southern Lease in which the species occurs include riparian/wetland habitats along watercourses. This species is expected to utilise many of the perennial waterways within the Southern Lease.

Based on the presence of riparian/wetland habitats, foraging habitat occupies approximately 3,792 ha of the Southern Lease. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any watercourses. Therefore, no foraging habitat is present within the disturbance footprint.

Shelter and Breeding Habitat

The species utilises elevated, isolated freshwater swamps that are not influenced by tidal movements and floating vegetation for shelter and nesting. Key areas of shelter and breeding habitat within the Southern Lease that contain these features are located in riparian and wetland habitat along watercourses. Based on the presence of riparian/wetland habitats, shelter and breeding habitat occurs across approximately 3,792 ha of the Southern Lease. Based on the presence of the species and suitable shelter and breeding habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise shelter or breeding habitat for this species. The disturbance footprint does not contain any watercourses. Therefore, no shelter and breeding habitat is present within the disturbance footprint.

Photograph 16 Salt-water Crocodile detected by a motion-sensor camera within the Eastern Leases



6.4.2.2. Eastern Osprey

Listing Status

EPBC Act Status: Migratory (wetland)

Species Overview

The Eastern Osprey is a medium-sized raptor, approximately 50–65 cm in length and with a wingspan of 145–170 (DCCEEW 2022g). Adults are mainly dark-brown to blackish-brown above and white below with a white head and neck, with various patterns in the plumage (DCCEEW 2022g). A photograph of an Eastern Osprey is shown in **Photograph 18**.

The Eastern Osprey breed as monogamous pairs (DCCEEW 2022g) between April and February, with breeding season influenced by latitude (Commonwealth of Australia 2020). The young fledged approximately seven to eleven weeks after hatching and continue to return to the nest for some time thereafter, possibly one to two months in duration, to be fed (DCCEEW 2022g). Pairs usually rear one brood but are capable of rearing two broods per season, however pairs tend not to breed each year with breeding attempts separated by periods of up to three years (DCCEEW 2022g). The southern forms of the Eastern Osprey have been recorded to live to at least 22 years of age (DCCEEW 2022g).

The home range of the Eastern Osprey has not been quantified (DCCEEW 2022g).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Eastern Osprey.

Recovery Plan

There is no Recovery Plan for the Eastern Osprey.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Eastern Osprey.

Referral Guideline

There is no finalised Referral Guideline for the Eastern Osprey.

Distribution

The Eastern Osprey occurs in tropical and temperate Australia and offshore islands (Commonwealth of Australia 2020).

Habitat

The Eastern Osprey occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DCCEEW 2022g). They are mostly found in coastal areas but occasionally travel inland along major rivers (DCCEEW 2022g). The Eastern Osprey requires extensive areas of open fresh, brackish or saline water for foraging (DCCEEW 2022g). This species constructs stick nests in a variety of natural and artificial sites including in dead or partly dead trees or bushes; on cliffs, rocks, rock stacks or islets; on the ground on rocky headlands, coral cays, deserted beaches, sandhills or saltmarshes; and on artificial nest platforms, pylons, jetties, lighthouses, navigation towers, cranes, exposed shipwrecks and offshore drilling rigs (DCCEEW 2022g).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Present

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 370 records of the Eastern Osprey on Groote Eylandt between 1921 and 2019. Of these records 37 occur within the locality of the Southern Lease (see **Figure 17**). The majority of these records are located along waterways or off the coast. Two of the NR Maps database records occur within the Southern Lease (see **Figure 16**).

The Eastern Osprey was not recorded within the Southern Lease during recent (2016-2022) fauna surveys.

A single undated record occurs within the Southern Lease within an area of white rock to the west of Yenbakwa Road. One further record occurs at a single location that is the same as 17 other species records, which is considered unlikely to reflect the actual location of the species. The Eastern Osprey was not recorded within the Southern Lease during recent fauna surveys (2016-2022). A summary of the records within the Southern Lease is provided in **Table 20**. None of the records within the Southern Lease occur within the disturbance footprint.

Table 19 Summary of Eastern Osprey records within the Southern Lease

Record	Date	Source	Location	Comments ¹
1	Undated	NR Maps	West of Yenbakwa Road. Recorded within an area mapped as VMU 70/48 and comprising sandstone woodland and forest habitat.	Database provides a count of 0 individuals. Record considered to be a fly-over record due to the distance from waterways
2	3/01/2019	NR Maps	South of Second Creek. Recorded within an area mapped as VMU 60/81b and comprising riparian/wetland habitat.	Database provides a count of 1 individual. Location considered to be inaccurate, as it is the same location as 17 other species records (see Section 6.4.2).

1. For NR Maps database records comments are limited to count of individuals, as no details on method of detection are provided.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat resources for this species:

- Coastal dune/swale complex habitats;
- Riparian/wetland habitats;
- Estuarine complex habitats.

A discussion of the foraging habitat and shelter and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

Suitable prey for this species within the Southern Lease would include fish. The coastal areas, watercourses and estuarine areas of the Southern Lease provide suitable foraging habitat for this species. Habitat types in which this species would occur within the Southern Lease comprises coastal dune/swale complex habitats, riparian/wetland habitats and estuarine complex habitats. Within the riparian/wetland habitat, foraging habitat is likely confined to riparian areas along watercourses. This species may also fly over other areas as it moves between areas of suitable foraging habitat within the Southern Lease.

Based on the habitat types identified above, foraging habitat occupies approximately 5,111 ha of the Southern Lease. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any coastal areas, watercourses, or estuarine areas. Therefore, no foraging habitat is present within the disturbance footprint.

Roosting and Breeding Habitat

Key areas of roosting and breeding habitat within the Southern Lease are located in coastal areas, watercourses and estuarine areas, where large trees are present. This includes areas of coastal dune/swale complex habitats, riparian/wetland habitats and estuarine complex habitats. Based on these habitat, roosting and breeding habitat occurs across approximately 5,111 ha of the Southern Lease. However, within these habitat types, it is expected that the species would be restricted to areas containing large trees adjacent to watercourses. Based on the presence of the species and suitable roosting and breeding habitat features, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise roosting or breeding habitat for this species. The disturbance footprint does not contain any coastal areas, watercourses, or estuarine areas. Therefore, no roosting and breeding habitat is present within the disturbance footprint.

Photograph 17 Eastern Osprey (Source: P. Harris in BirdLife International, 2016)



6.4.2.3. Common Sandpiper

Listing Status

EPBC Act Status: Migratory (wetland)

Species Overview

The Common Sandpiper is a small sandpiper of 19–21 cm in length with a wingspan of 32–35 cm (DCCEEW 2022a). Breeding plumage of the Common Sandpiper is dark brown above, with a greenish gloss to feathers of cap, hindneck and mantle (DCCEEW 2022a). Non-breeding plumage of the species is duller and more uniform in colouration (DCCEEW 2022a). A photograph of a Common Sandpiper is shown in **Photograph 19**.

Flocks are formed for migration and the species has been known to roost with other waders (DCCEEW 2022a). The species does not breed in Australia (DCCEEW 2022a). The species has been recorded as surviving up to 12 years (DCCEEW 2022a).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Common Sandpiper. However, this species is included under the *Wildlife Conservation Plan for Migratory Shorebirds* (Commonwealth of Australia 2015). This conservation plan addresses topics relevant to the conservation of migratory shorebirds, including the Common Sandpiper, and includes a summary of Australia's commitments under international conventions and agreements, and identification of important habitat.

Recovery Plan

There is no Recovery Plan for the Common Sandpiper.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Common Sandpiper.

Referral Guideline

There is no Referral Guideline for the Common Sandpiper.

Distribution

The Common Sandpiper is found along all coastlines of Australia and in many inland areas (DCCEEW 2022a). When in Australia, the population is concentrated in northern and western Australia (DCCEEW 2022a).

Habitat

This species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats (DCCEEW 2022a). The

species feeds for extensive periods in grasslands consuming terrestrial prey, though riverine areas are also utilised (DCCEEW 2022a). Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves (DCCEEW 2022a).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Potential

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 104 records of the Common Sandpiper on Groote Eylandt between 1922 and 2019. Of these records 14 occur within the locality of the Southern Lease (see **Figure 17**). One of the NR Maps database records occur within the Southern Lease (see **Figure 16**). This record occurs at a location that is the same as 17 other species records, which is considered unlikely to reflect the actual location of the species.

The Common Sandpiper was not recorded within the Southern Lease during recent fauna surveys (2016-2022).

A summary of the records within the Southern Lease is provided in **Table 21**. None of the records within the Southern Lease occur within the disturbance footprint.

Table 20 Summary of Common Sandpiper records within the Southern Lease

Record	Date	Source	Location	Comments ¹
1	3/01/2019	NR Maps	South of Second Creek. Recorded within an area mapped as VMU 60/81b and comprising riparian/wetland habitat.	Database provides a count of 1 individual. Location considered to be inaccurate location, as it is the same location as 17 other species records (see Section 6.4.2).

1. For NR Maps database records comments are limited to count of individuals, as no details on method of detection are provided.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat

- Riparian/wetland habitats (limited to wetland areas only); and
- Estuarine complex habitats.

A discussion of the foraging and roosting habitat and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging and Roosting Habitat

Key foraging resources are present within the Southern Lease and consist of molluscs, crustaceans and crabs. Within the Southern Lease, this species would utilise rocks, roots and branches of vegetation for roosting and particularly favour mangroves. The estuarine complex habitats and wetland areas of the riparian/wetland habitats of the Southern Lease provide suitable foraging and roosting habitat features for this species.

The extent of suitable inland wetlands as foraging and roosting habitat is unknown as not all of the riparian/wetland habitat type comprises suitable habitat. It is estimated that approximately 580 ha of this habitat type comprises some form of wetland. Therefore based on this estimate, and the extent of estuarine complex habitats, foraging habitat occupies approximately 908 ha of the Southern Lease. Of this extent, approximately 118 ha comprises mangroves, which is a favoured roosting habitat feature. Based on the presence of the species, suitable prey items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any estuarine areas or wetland areas. Therefore, no foraging habitat is present within the disturbance footprint.

Breeding Habitat

No breeding habitat is present within the Southern Lease, or disturbance footprint, as breeding occurs outside of Australia.

Photograph 18 Common Sandpiper (Source: P. Harris in BirdLife International, 2016)



6.4.2.4. Fork-tailed Swift

Listing Status

EPBC Act Status: Migratory (marine)

Species Overview

The Fork-tailed Swift is a medium sized swift that is 18-21 cm in length and has a wingspan of 40-42 cm (DCCEEW 2022b). It is mainly blackish with a white band across the rump and is characterised by a long and deeply forked tail (DCCEEW 2022b). A photograph of a Fork-tailed Swift is shown in **Photograph 20**.

The species does not breed in Australia (DCCEEW 2022a).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Fork-tailed Swift.

Recovery Plan

There is no Recovery Plan in place for the Fork-tailed Swift.

Threat Abatement Plan

A Threat Abatement Plan is in place for the Fork-tailed Swift for the threat of feral cats. This plan is applicable to the species on Groote Eylandt as feral cats are present.

Referral Guideline

There is no finalised Referral Guideline for the Fork-tailed Swift.

Distribution

The Fork-tailed Swift is known to migrate to Australia during its non-breeding season (August to March) (DCCEEW 2022b). In the NT, there are widespread but scattered records in the north, including on some offshore islands (DCCEEW 2022b),

Habitat

The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher, mostly over inland plains but sometimes above foothills or in coastal areas (DCCEEW 2022b). Foraging occurs anywhere from 1 m to 300 m above the ground, with the known diet comprising small bees, wasps, termites and moths (DCCEEW 2022b). The species is likely to roost aerially, but are occasionally observed to land (DCCEEW 2022b).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Potential

Disturbance Footprint: Potential

Records

The NR Maps database holds 20 records of the Fork-tailed Swift on Groote Eylandt between 1978 and 2019. Of these records two occur within the locality of the Southern Lease (see **Figure 17**). None of the NR Maps database records occur within the Southern Lease.

The Fork-tailed Swift was not recorded within the Southern Lease during the recent fauna surveys (2016-2022). URS Australia Pty Ltd (2012) recorded this species in an area to the north of the Southern Lease.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat resources for this species:

- Closed forest (rainforest) habitats;
- Laterite woodland and forest habitats;
- Sandstone woodland and forest habitats;
- Coastal dune/swale complex habitats; and
- Riparian/wetland habitats.

A discussion of the foraging habitat and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging Habitat

This species is known to forage across a range of habitat types for small bees, wasps, termites and moths. All the habitat types listed above are considered to form suitable foraging habitat for the species. The species is expected to forage aerially about these areas on occasion. These foraging habitats are widespread in the Southern Lease. Based on the habitat types identified above, foraging habitat occupies approximately 26,052 ha of the Southern Lease. Based on the presence suitable habitat types, the habitat within the Southern Lease is considered to contain good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, both of which comprise foraging habitat for this species. Based on the habitat types identified above, foraging habitat occupies approximately 63 ha of the disturbance footprint.

Breeding Habitat

No breeding habitat is present within the Southern Lease, or disturbance footprint, as breeding occurs outside of Australia.

Photograph 19 Fork-tailed Swift (Source: K. Nicolson in Atlas of Living Australia, 2018)



6.4.2.5. Sharp-tailed Sandpiper

Listing Status

EPBC Act Status: Migratory (wetland)

Species Overview

The Sharp-tailed Sandpiper is a small-medium wader that is 17–22 cm in length and has a wingspan of 36–43 cm (DCCEEW 2022c). A photograph of a Sharp-tailed Sandpiper is shown in **Photograph 21**.

The species does not breed in Australia (DCCEEW 2022c).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Sharp-tailed Sandpiper. However, this species is included under the *Wildlife Conservation Plan for Migratory Shorebirds* (Commonwealth of Australia 2015). This conservation plan addresses topics relevant to the conservation of migratory shorebirds, including the Sharp-

tailed Sandpiper, and includes a summary of Australia's commitments under international conventions and agreements, and identification of important habitat.

Recovery Plan

There is no Recovery Plan for the Sharp-tailed Sandpiper.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Sharp-tailed Sandpiper.

Referral Guideline

There is no Referral Guideline for the Sharp-tailed Sandpiper.

Distribution

The Sharp-tailed Sandpiper spends the non-breeding season across Australia (DCCEEW 2022c). In the NT they mostly occur in the north coastal regions, generally east to Groote Eylandt and the Gove Peninsula, but also around McArthur River and east of Borroloola (DCCEEW 2022c).

Habitat

The Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW 2022c). They forage at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water (DCCEEW 2022c). The species forages in the wave-wash zone and amongst rotting seaweed (DCCEEW 2022c). The species roosts on or behind bare sand high on the beach, clumps of washed-up kelp, coastal dunes, and rocky reefs and ledges (DCCEEW 2022c).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Potential

Disturbance Footprint: Unlikely

The NR Maps database holds 51 records of the Sharp-tailed Sandpiper on Groote Eylandt between 1978 and 2019. Of these records eight occur within the locality of the Southern Lease (see **Figure 17**). None of the NR Maps database records occur within the Southern Lease.

The Sharp-tailed Sandpiper was not recorded within the Southern Lease during recent fauna surveys (2016-2022). This species has been recorded in a previous survey by Webb (1992) to the north of the Southern Lease.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat:

- Riparian/wetland habitats (limited to wetland areas only); and

- Estuarine complex habitats.

A discussion of the foraging and roosting habitat and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging and Roosting Habitat

Key foraging resources are present within the Southern Lease and consist of seeds, worms, molluscs, crustaceans and insects. The estuarine complex habitats and wetland areas of the riparian/wetland habitats of the Southern Lease provide suitable foraging habitat for this species.

However, the extent of suitable inland wetlands as foraging habitat is unknown as not all of the riparian/wetland habitat type comprises suitable habitat. It is estimated that approximately 580 ha of this habitat type comprises some form of wetland. Therefore based on this estimate, and the extent of estuarine complex habitats, foraging habitat occupies approximately 908 ha of the Southern Lease. Based on the presence of the species, suitable food items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any estuarine areas or wetland areas. Therefore, no foraging habitat is present within the disturbance footprint.

Very limited areas of roosting habitat occur within the Southern Lease in the form of bare areas of sand and coastal dunes, and none of these features occur within the disturbance footprint. Therefore, no roosting habitat occurs within the disturbance footprint.

Breeding Habitat

No breeding habitat is present within the Southern Lease, or disturbance footprint, as breeding occurs outside of Australia.

Photograph 20 Sharp-tailed Sandpiper (Source: K. Jones in DES, 2019)



6.4.2.6. Common Greenshank

Listing Status

EPBC Act Status: Migratory (wetland)

Species Overview

The Common Greenshank is a heavily built wader that is 30-35 cm in length and has a wingspan of 55-65cm (DCCEEW 2022i). In flight, all plumages show uniformly dark upperwing and contrasting white rump extending in a white wedge up the back, whitish tail and tips of toes projecting slightly beyond the tip of the tail (DCCEEW 2022i). The species is seen singly or in small to large flocks (sometimes hundreds) (DCCEEW 2022i). A photograph of a Common Greenshank is shown in **Photograph 22**.

The species does not breed in Australia (DCCEEW 2022i). The species has been recorded as surviving up to 15 years (DCCEEW 2022i).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Common Greenshank. However, this species is included under the *Wildlife Conservation Plan for Migratory Shorebirds* (Commonwealth of Australia 2015). This conservation plan addresses topics relevant to the conservation of migratory shorebirds, including the Common Greenshank, and includes a summary of Australia's commitments under international conventions and agreements, and identification of important habitat.

Recovery Plan

There is no Recovery Plan for the Common Greenshank.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Common Greenshank.

Referral Guideline

There is no Referral Guideline for the Common Greenshank.

Distribution

The species is sparsely scattered through most of the NT, including occasional records in the Tanami Desert and records from Birrindudu Waterhole in the north-east to Lake Woods, Lake Sylvester and the Barkly Tableland in central NT (DCCEEW 2022i).

Habitat

The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (DCCEEW 2022i). It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass (DCCEEW 2022i). The species is known to forage at the edge of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW 2022i). It will occasionally feed on exposed seagrass beds (DCCEEW 2022i). The Common Greenshank roosts and loafs around wetlands, in shallow pools and puddles, or slightly elevated on rocks, sandbanks or small muddy islets (DCCEEW 2022i). Occasionally the species will perch and roost on stakes (DCCEEW 2022i).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Potential

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 116 records of the Common Greenshank on Groote Eylandt between 1978 and 2019. Of these records 36 occur within the locality of the Southern Lease (see **Figure 17**). Two of the NR Maps database records occur within the Southern Lease (see **Figure 16**). Both records occur at a location that is the same as 17 other species records, which is considered unlikely to reflect the actual location of the species.

The Common Greenshank was not recorded within the Southern Lease during the recent fauna surveys (2016-2022).

A summary of the records within the Southern Lease is provided in **Table 22**. None of the records within the Southern Lease occur within the disturbance footprint.

Table 21 Summary of Common Greenshank records within the Southern Lease

Record	Date	Source	Location	Comments ¹
1	27/12/2018	NR Maps	South of Second Creek. Recorded within an area mapped as VMU 60/81b and comprising riparian/wetland habitat.	Database provides a count of 1 individual. Location considered to be inaccurate location, as it is the same location as 17 other species records (see Section 6.4.2).
1	3/01/2019	NR Maps	South of Second Creek. Recorded within an area mapped as VMU 60/81b and comprising riparian/wetland habitat.	Database provides a count of 1 individual. Location considered to be inaccurate location, as it is the same location as 17 other species records (see Section 6.4.2).

1. For NR Maps database records comments are limited to count of individuals, as no details on method of detection are provided.

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat

- Riparian/wetland habitats (limited to wetland areas only); and
- Estuarine complex habitats.

A discussion of the foraging and roosting habitat and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging and Roosting Habitat

Key foraging resources are present within the Southern Lease and consist of molluscs, crustaceans, insects, fish and frogs. Within the Southern Lease, this species would utilise wetlands and muddy islets for roosting. The

estuarine complex habitats and wetland areas of the riparian/wetland habitats of the Southern Lease provide suitable foraging and roosting habitat for this species.

The extent of suitable inland wetlands as foraging and roosting habitat is unknown as not all of the riparian/wetland habitat type comprises suitable habitat. It is estimated that approximately 580 ha of this habitat type comprises some form of wetland. Therefore based on this estimate, and the extent of estuarine complex habitats, foraging habitat occupies approximately 908 ha of the Southern Lease. Based on the presence of the species, suitable food items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any estuarine areas or wetland areas. Therefore, no foraging habitat is present within the disturbance footprint.

Breeding Habitat

No breeding habitat is present within the Southern Lease, or disturbance footprint, as breeding occurs outside of Australia.

Photograph 21 Common Greenshank (Source: J. Bartoš in BirdLife International, 2016)



6.4.2.7. Marsh Sandpiper

Listing Status

EPBC Act Status: Migratory (wetland)

Species Overview

The Marsh Sandpiper is a medium sized wader with a length of 22-26 cm and a wingspan of 40-45 cm (DCCEEW 2022j). In all plumages the species shows a contrasting outerwing, a very pale whitish tail and a bold white wedge up the back (DCCEEW 2022j). A photograph of a Marsh Sandpiper is shown in **Photograph 23**.

The Marsh Sandpiper does not breed in Australia (DCCEEW 2022j). The species occur singly or in small to large flocks and often associate with other waders (DCCEEW 2022j).

EPBC Act Plans

Conservation Advice

There is no Approved Conservation Advice for the Marsh Sandpiper. However, this species is included under the *Wildlife Conservation Plan for Migratory Shorebirds* (Commonwealth of Australia 2015). This conservation plan addresses topics relevant to the conservation of migratory shorebirds, including the Marsh Sandpiper, and includes a summary of Australia's commitments under international conventions and agreements, and identification of important habitat.

Recovery Plan

There is no Recovery Plan for the Marsh Sandpiper.

Threat Abatement Plan

There are no Threat Abatement Plans in place for the Marsh Sandpiper.

Referral Guideline

There is no Referral Guideline for the Marsh Sandpiper.

Distribution

The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia (DCCEEW 2022j). There are scattered occurrences of the species in the NT (DCCEEW 2022j).

Habitat

The species lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DAWE 2020c). The species usually forages in shallow water at the edge of wetlands (DAWE 2020c). The species has been recorded roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps (DAWE 2020c).

Presence and Habitat within the Southern Lease and Disturbance Footprint

Likelihood of Occurrence

Southern Lease: Potential

Disturbance Footprint: Unlikely

Records

The NR Maps database holds 33 records of the Marsh Sandpiper on Groote Eylandt between 1997 and 2019. Of these records three occur within the locality of the Southern Lease (see **Figure 17**). None of the NR Maps database records occur within the Southern Lease.

The Marsh Sandpiper was not recorded within the Southern Lease during the recent fauna surveys (2016-2022).

Habitat Types

The following fauna habitat types occurring in the Southern Lease have the potential to provide habitat

- Riparian/wetland habitats (limited to wetland areas only); and
- Estuarine complex habitats.

A discussion of the foraging and roosting habitat and breeding habitat within the Southern Lease and disturbance footprint is provided below.

Foraging and Roosting Habitat

Key foraging resources are present within the Southern Lease and consist of insects and molluscs. Within the Southern Lease, this species would utilise tidal mudflats and inland swamps for roosting. The estuarine complex habitats and wetland areas of the riparian/wetland habitats of the Southern Lease provide suitable foraging and roosting habitat for this species.

The extent of suitable inland wetlands as foraging and roosting habitat is unknown as not all of the riparian/wetland habitat type comprises suitable habitat. It is estimated that approximately 580 ha of this habitat type comprises some form of wetland. Therefore based on this estimate, and the extent of estuarine complex habitats, foraging habitat occupies approximately 908 ha of the Southern Lease. Based on the presence of the species, suitable food items and suitable habitat types, the habitat within the Southern Lease is considered to comprise good quality habitat.

The disturbance footprint comprises two habitat types, laterite woodland and forest habitats, and sandstone woodland and forest habitats, neither of which comprise foraging habitat for this species. The disturbance footprint does not contain any estuarine areas or wetland areas. Therefore, no foraging habitat is present within the disturbance footprint.

Breeding Habitat

No breeding habitat is present within the Southern Lease, or disturbance footprint, as breeding occurs outside of Australia.

Photograph 22 Marsh Sandpiper (Source: O. Prosický in BirdLife International, 2016)



7. References

- Anindilyakwa Land & Sea Rangers. 2019. Northern Hopping Mouse Surveys: Final Report to Territory NRM July 2019. Anindilyakwa Land & Sea Rangers.
- Armstrong, K. N., and S. D. Anstee. 2000. The ghost bat in the Pilbara: 100 years on. *Mammalogy* **22**:93-101.
- Atlas of Living Australia. 2014. *Varanus panoptes*.
- Baleeiro, P. C., and R. W. Jobson. 2022. Redescription of *Utricularia singeriana* and a new species *Utricularia baliboongarnang* Baleeiro & R.W.Jobson for north-eastern Western Australia. *Telopea Journal of Plant Systematics* **25**:63-73.
- BirdLife International. 2022a. *Fregata ariel*. The IUCN Red List of Threatened Species 2022. BirdLife International.
- BirdLife International. 2022b. *Fregata minor*. The IUCN Red List of Threatened Species 2022. BirdLife International.
- BirdLife International. 2022c. *Thalasseus bergii*. The IUCN Red List of Threatened Species 2022. BirdLife International.
- Brien, M. L., M. A. Read, H. I. McCallum, and G. C. Grigg. 2008. Home range and movements of radio-tracked estuarine crocodiles (*Crocodylus porosus*) within a non-tidal waterhole. *Wildlife Research* **35**:140-149.
- Brocklehurst, P., and I. Cowie. 1992. Flora Survey of the GEMCO Mining Lease on the Western Side of Groote Eylandt, Northern Territory. Land Conservation Unit. Conservation Commission of the Northern Territory, Palmerston.
- Brocklehurst, P., D. Lewis, D. Napier, and D. Lynch. 2007. Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping. Technical Report No. 02/2007D. Department of Natural Resources, Environment and the Arts, Palmerston.
- Bureau of Rural Sciences. 2016. NRIC Digital Atlas of Australian Soils.
- Churchill, S. 2009. Australian Bats. Second Edition. Allen & Unwin, Crows Nest.
- CMS. 2015. Convention on the Conservation of Migratory Species of Wild Animals. United Nations Environment Program, Germany.
- Coffey Environments. 2010. Eastern Leases Pre-clearance Survey for Groote Eylandt Mining Company, August 2010. Coffey Environments Pty Ltd.
- Coffey Environments Pty Ltd. 2010. Eastern Leases Pre-clearance Survey for Groote Eylandt Mining Company, August 2010.
- Cogger, H. G. 2018. Reptiles & Amphibians of Australia. Updated Seventh Edition. CSIRO Publishing, Clayton South.
- Commonwealth of Australia. 2015. Wildlife Conservation Plan for Migratory Shorebirds. Department of the Environment.
- Commonwealth of Australia. 2020. Wildlife Conservation Plan for Seabirds. Department of Agriculture, Water and the Environment, Canberra.
- Crane, B., and C. Hempel. 2005. Object Based Land Cover Mapping for Groote Eylandt: a Tool for Reconnaissance and Land Based Surveys. Biodiversity Conservation, Conservation and Natural Resources, Department of Infrastructure, Planning and Environment, Palmerston.
- Crowie, I. D. 2010. Notes on the identity, distribution and conservation status of the threatened plant species *Utricularia singeriana* F. Muell. (Lentibulariaceae). *The Beagle, Records of the Museums and Art Galleries of the Northern Territory* **26**:119-121.
- Cumberland Ecology. 2015. Eastern Leases Project. Terrestrial Ecology Assessment Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2016. Southern Lease Project. Baseline Terrestrial Ecology Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2019a. GEMCO/South32 Southern Lease Small Mammal Research Project. Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2019b. Southern Lease Project. Baseline Terrestrial Ecology Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2020. Southern Lease - Stage 2 Exploration Program. Baseline Terrestrial Ecology Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2021. GEMCO Western Leases and Surrounds. Vegetation Mapping Report. Cumberland Ecology Pty Ltd, Carlingford Court.
- Cumberland Ecology. 2023. 2021 Camera Fauna Monitoring Program. Cumberland Ecology Pty Ltd, Carlingford Court.
- Darwin Centre for Bushfire Research. 2017. North Australia and Rangelands Fire Information.
- Davies, M., and M. J. Tyler. 1986. The frog fauna of Groote Eylandt, Northern Territory, Australia. *Zoological Journal of the Linnean Society* **88**:91-101.
- DAWE. 2020a. *Dasyurus hallucatus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2020b. *Notomys aquilo* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2020c. *Tringa stagnatilis* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2020d. Wildlife Conservation Plan for Seabirds. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2021. Consultation Document on Listing Eligibility and Conservation Actions *Tiliqua scincoides intermedia* (Northern Blue-tongue Lizard). Canberra.
- DAWE. 2022a. *Anous stolidus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022b. *Arenaria interpres* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022c. *Calidris melanotos* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022d. *Calidris ruficollis* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022e. *Calidris tenuirostris* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022f. *Charadrius leschenaultii* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.

- DAWE. 2022g. *Charadrius mongolus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022h. *Charadrius veredus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022i. *Chlidonias leucopterus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022j. *Erythrorhynchus radiatus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022k. *Erythrura gouldiae* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022l. *Geophaps smithii smithii* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022m. *Glareola maldivarum* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022n. *Hirundo rustica* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022o. *Hydroprogne caspia* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022p. *Limnodromus semipalmatus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022q. *Limosa lapponica* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022r. *Limosa limosa* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022s. *Notomys aquilo* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022t. *Numenius phaeopus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022u. *Plegadis falcinellus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022v. *Pluvialis fulva* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022w. *Pluvialis squatarola* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022x. *Rostratula australis* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022y. *Saccolaimus saccolaimus nudiclunatus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022z. *Sterna dougallii* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022aa. *Sterna hirundo* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ab. *Sterna sumatrana* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ac. *Sternula albifrons* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ad. *Sula leucogaster* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ae. *Tringa brevipes* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022af. *Tringa nebularia* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ag. *Tringa stagnatilis* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ah. *Tyto novaehollandiae kimberli* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022ai. *Xenus cinereus* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DAWE. 2022aj. *Xeromys myoides* in Species Profile and Threats Database. Department of Agriculture, Water and the Environment, Canberra.
- DCCEEW. 2022a. *Actitis hypoleucos* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022b. *Apus pacificus* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022c. *Calidris acuminata* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022d. *Crocodylus porosus* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022e. *Dasyurus hallucatus* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022f. EPBC Protected Matters Search Tool. Department of Climate Change, Energy, the Environment and Water, Canberra.

- DCCEEW. 2022g. *Pandion haliaetus* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022h. *Rhipidura rufifrons* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022i. *Tringa nebularia* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022j. *Tringa stagnatilis* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DCCEEW. 2022k. *Tyto novaehollandiae kimberli* in Species Profile and Threats Database. Department of Climate Change, Energy, the Environment and Water, Canberra.
- DENR and ALC. 2019. Groote Archipelago Threatened Species Management Plan 2019-2028. Department of the Environment and Natural Resources, Darwin.
- Department of Mines and Energy. 2010. Northern Territory Geological Survey
- DEPWS. 2021a. Land clearing guidelines. Department of Environment, Parks and Water Security, Darwin.
- DEPWS. 2021b. Vegetation Survey of Groote Eylandt, 2018. Department of Environment, Parks and Water Security, Darwin.
- DEPWS. 2022. NR Maps. Northern Territory Department of Environment, Parks and Water Security.
- DEWHA. 2008. Arnhem Coast Bioregion. Department of Environment, Water, Heritage and the Arts, Canberra.
- DEWHA. 2010. Survey guidelines for Australia's threatened birds. Commonwealth Department of the Environment, Water, Heritage and the Arts, Canberra.
- Diete, R. L., S. M. Adamczyk, P. D. Meek, C. R. Dickman, and L. K.-P. Leung. 2015a. Burrowing behaviour of the delicate mouse (*Pseudomys delicatulus*) and the management implications for a threatened sympatric rodent (*Notomys aquilo*). *Australian Mammalogy* **37**.
- Diete, R. L., K. M. Dixon, and P. A. Barden. 2015b. Predation of pitfall-trapped rodents by the ghost bat (*Macroderma gigas*). *Australian Mammalogy* **32**:249-252.
- Diete, R. L., P. D. Meek, C. R. Dickman, and L. K.-P. Leung. 2014. Burrowing behaviour of the northern hopping-mouse (*Notomys aquilo*): field observations. *Australian Mammalogy* **36**:242-246.
- Diete, R. L., P. D. Meek, C. R. Dickman, and L. K.-P. Leung. 2016. Ecological and conservation of the northern hopping-mouse (*Notomys aquilo*). *Australian Journal of Zoology* **64**:21-31.
- DLRM. 2014. Arnhem Coast - Bioregional Description. Department of Land and Resource Management.
- DotE. 2013. *Notomys aquilo* in Species Profile and Threats Database Department of the Environment, Canberra.
- DotE. 2014. Bilateral Migratory Bird Agreements. Commonwealth Department of the Environment, Canberra.
- DotE. 2015a. Conservation Advice *Calidris ferruginea* curlew sandpiper. Department of the Environment, Canberra.
- DotE. 2015b. Conservation Advice *Numenius madagascariensis* eastern curlew. Department of the Environment, Canberra.
- DotE. 2015c. Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act. Department of the Environment, Canberra.
- DotE. 2015d. Threat abatement plan for predation by feral cats. Commonwealth of Australia, Canberra.
- DotE. 2016. EPBC Act referral guideline for the endangered northern quoll *Dasyurus hallucatus* EPBC Act Policy Statement. Department of the Environment, Canberra.
- DotEE. 2019a. *Chlidonias leucopterus* in Species Profile and Threats Database. Department of the Environment, Canberra.
- DotEE. 2019b. Indigenous Protected Areas. Department of the Environment and Energy.
- DotEE. 2019c. *Saccolaimus saccolaimus nudiclunatus* in Species Profile and Threats Database. Department of the Environment and Energy, Canberra.
- DSEWPac. 2012. Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- DSEWPac. 2013. Map of EPBC-listed Ecological Communities occurring in the Northern Territory. Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- EHG. 2022. Great Knot - profile. Environment and Heritage, Hurstville.
- EMS. 2013. Eastern Leases ELR28161/ELR28162 Exploration Drilling Program Northern Masked Owl/Northern Hopping Mouse Habitat Assessment June – July 2013. Ecological Management Services Pty Ltd, Coolum Beach.
- Firth, R. 2008. Surveys for the Threatened Northern Hopping-mouse, Northern Quoll & Brush-tailed Rabbit-rat on GEMCO Eastern Exploration Leases (Groote Eylandt). EWL Sciences Pty Ltd.
- Firth, R. S. C. 2007. Ecology and conservation status of the brush-tailed rabbit-rat *Conilurus penicillatus*, PhD thesis. Charles Darwin University, Darwin.
- Gillespie, G., and J. Heiniger. 2017. GEMCO Southern Lease Exploration Area Threatened Mammal Risk Assessment Plan. Unpublished report. Flora and Fauna Division, Department of Environment and Natural Resources, Berrimah.
- Heiniger, J., H. F. Davies, and G. R. Gillespie. 2020. Status of mammals on Groote Eylandt: Safe haven or slow burn? *Austral Ecology* **47**:224-238.
- Heiniger, J., and G. Gillespie. 2017. Survey of Threatened Mammal and Feral Cat Surveys on Groote Eylandt. Unpublished Report to the Anindilyakwa Land Council. Flora and Fauna Division, Department of Environment and Natural Resources, Darwin.
- Higgins, P. J. 1999. Handbook of Australian, New Zealand and Antarctic Birds Volume 4. Oxford University Press, Melbourne.
- Hill, B., and S. Ward. 2010. National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*. Department of Natural Resources, Environment, the Arts and Sport, Darwin.

- Holmes, J., D. Bisa, A. Hills, and B. Crase. 2005. A Guide to Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory. WWF-Australia, Sydney.
- Hourigan, C. 2011. Ghost bat, *Macroderma gigas*. Targeted species survey guidelines. Queensland Herbarium, Department of Science, Information Technology and Innovation, Brisbane.
- Hoyle, S. D., A. R. Pople, and G. K. Tpp[2001. Mark-recapture may reveal more about ecology than about population trends: demography of a threatened ghost bat (*Macroderma gigas*) population. *Austral Ecology* **26**:80-92.
- Kemper, C. M., and R. S. C. Firth. 2008. Brush-tailed Rabbit-rat *Conilurus penicillatus*. Pages 579-580 in S. Van Dyck and R. Strahan, editors. *The Mammals of Australia*. Third edition. Reed New Holland, Sydney.
- Langkamp, P. J., D. H. Ashton, and M. J. Dalling. 1981. Ecological gradients in forest communities on Groote Eylandt, Northern Territory, Australia. *Vegetatio* **48**:27-46.
- Lynch, B., N. Cuff, and C. Green. 2012. Summary of the Origin and Derivation of the 1:250,000 Land System Descriptions for the Northern Part of the Northern Territory, DRAFT. Land Resource Assessment Unit, Department of Land Resource Management, Palmerston.
- Northern Territory Government. 2006. Threatened Species of the Northern Territory - Mertens Water Monitor. Department of Natural Resources, Environment and the Arts, Darwin.
- Northern Territory Government. 2012a. Threatened Species of the Northern Territory - Plains Death Adder. Department of Land Resource Management, Darwin.
- Northern Territory Government. 2012b. Threatened Species of the Northern Territory - Yellow-Spotted Monitor. Department of Land Resource Management, Darwin.
- Noske, R., and G. Brennan. 2002. The Birds of Groote Eylandt. NTUniprint, Darwin.
- NRETAS. 2009. Groote Eylandt group Sites of Conservation Significance. in Department of Natural Resources Environment the Arts and Sport, editor. Northern Territory Government, Darwin.
- Oakwood, M. 2008. Northern Quoll *Dasyurus hallucatus*. Pages 57-58 in S. Van Dyck and R. Strahan, editors. *The Mammals of Australia*. Third edition. Reed New Holland, Sydney.
- Pizzey, G., and F. Knight. 1997. Field Guide to the Birds of Australia. Angus and Robertson.
- Rankmore, B. 2011. Survey for Signs of Northern Hopping-mice on the GEMCO Eastern Leases. Aminjarrinja Enterprises Aboriginal Corporation. .
- Smith, J. 2009a. Seasonal detectability of Northern Hopping Mouse spoil heaps on Groote Eylandt.
- Smith, J. 2009b. Surveys for Northern Hopping-mouse, Northern Quoll and Brush-tailed Rabbit-rat across Groote Eylandt. EWL Sciences Pty Ltd.
- Takahashi, A., D. Ochi, Y. Watanuki, T. Deguchi, N. Oka, V. Afanasyev, J. W. Fox, and P. N. Trathan. 2008a. Post-breeding movement and activities of two Streaked Shearwaters in the north-western Pacific
- Ornithol Sci* **7**:29-35.
- Takahashi, A., D. Ochi, Y. Watanuki, T. Deguchi, N. Oka, V. Afanasyev, J. W. Fox, and P. N. Trathan. 2008b. Post-breeding movement and activities of two Streaked Shearwaters in the north-western Pacific. *Ornithol Sci* **7**:29-35.
- Threatened Species Scientific Committee. 2008. Commonwealth Listing Advice for *Conilurus penicillatus* (Brush-tailed Rabbit-rat). Department of the Environment, Water, Heritage and the Arts, Canberra.
- Threatened Species Scientific Committee. 2012. Commonwealth Listing Advice on *Acanthophs hawkei* (Plains Death Adder). Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- Threatened Species Scientific Committee. 2015. Approved Conservation Advice for *Tyto novaehollandiae kimberli* (masked owl (northern)). Department of the Environment, Canberra.
- Threatened Species Scientific Committee. 2016a. Conservation Advice *Calidris canutus* Red knot. Department of the Environment, Canberra.
- Threatened Species Scientific Committee. 2016b. Conservation Advice *Conilurus penicillatus* brush-tailed rabbit-rat. Department of the Environment, Canberra.
- Threatened Species Scientific Committee. 2016c. Conservation Advice *Macroderma gigas* ghost bat. Department of the Environment, Canberra.
- Threatened Species Scientific Committee. 2021a. Conservation Advice *Notomys aquilo* Northern Hopping-mouse. Department of Agriculture, Water and the Environment, Canberra.
- Threatened Species Scientific Committee. 2021b. Conservation Advice *Trichosurus vulpecula arnhemensis* Northern Brushtail Possum. Canberra.
- URS Australia Pty Ltd. 2012. Flora and Fauna Surveys of Western Groote Eylandt. Prepared for BHP Billiton GEMCO.
- Ward, S. 2006a. Northern Hopping Mouse *Notomys aquilo* - ALC Ranger Report April 2006.
- Ward, S. 2006b. Northern Hopping Mouse *Notomys aquilo* - ALC Ranger Report November 2006.
- Ward, S. 2007a. Northern Hopping Mouse *Notomys aquilo* - ALC Ranger Report April-May 2007.
- Ward, S. 2007b. Northern Hopping Mouse *Notomys aquilo* - ALC Ranger Report September 2007.
- Ward, S., J. Woinarski, and L. McKay. 2006. Threatened Species of the Northern Territory MERTENS WATER MONITOR *Varanus mertensi* in Department of Natural Resources Environment and the Arts, editor., Darwin.
- Ward, S. J. 2014. Structure of a burrow of the northern hopping-mouse, *Notomys aquilo*, and its surface signs on Groote Eylandt. *Australian Mammalogy* **36**:55-59.
- Webb, G. 1992. Flora and Fauna Surveys on the Western Side of Groote Eylandt, N.T. (1991-92). G. Webb Pty Limited, Darwin.

- Woinarski, J., A. Burbidge, and P. Harrison. 2014. The Action Plan for Australian Mammals. CSIRO Publishing, Collingwood.
- Woinarski, J., and B. Hill. 2012a. Threatened Species of the Northern Territory BRUSH-TAILED RABBIT-RAT *Conilurus penicillatus* in Department of Land Resource Management, editor., Darwin.
- Woinarski, J., and B. Hill. 2012b. Threatened Species of the Northern Territory NORTHERN QUOLL *Dasyurus hallucatus*. Department of Land Resource Management, Darwin.
- Woinarski, J., and S. Ward. 2012a. Threatened Species of the Northern Territory MASKED OWL (north Australian mainland subspecies) *Tyto novaehollandiae kimberli* in Department of Land Resource Management, editor., Darwin.
- Woinarski, J., and S. Ward. 2012b. Threatened Species of the Northern Territory NORTHERN HOPPING-MOUSE *Notomys aquilo*. in Department of Land Resource Management, editor., Darwin.
- Woinarski, J. C. Z. 2004a. National Multi-species Recovery Plan for the Carpentarian Antechinus *Pseudantechinus mimulus*, Butler's Dunnart *Sminthopsis butleri* and Northern Hopping-mouse *Notomys aquilo*, 2004 - 2009. Northern Territory Department of Infrastructure Planning and Environment, Darwin.
- Woinarski, J. C. Z. 2004b. National Multi-species Recovery Plan for the Partridge Pigeon [eastern subspecies] *Geophaps smithii smithii*; Crested Shrike-tit [northern (sub)species] *Falcunculus (frontatus) whitei*; Masked Owl [north Australian mainland subspecies] *Tyto novaehollandiae kimberli*; and Masked Owl [Tiwi Islands subspecies] *Tyto novaehollandiae melvillensis*, 2004-2009. Northern Territory Department of Infrastructure Planning and Environment, Darwin.
- Woinarski, J. C. Z., and T. F. Flannery. 2008. Northern Hopping-mouse *Notomys aquilo*. Pages 599-600 in S. Van Dyck and R. Strahan, editors. The Mammals of Australia. Third edition. Reed New Holland, Sydney.

APPENDIX A :

EPBC Act Protected Matters Search Tool Results



Australian Government

Department of Climate Change, Energy,
the Environment and Water

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. Please see the caveat for interpretation of information provided here.

Report created: 08-Nov-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment 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 (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	30
Listed Migratory Species:	49

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 <https://www.dcceew.gov.au/parks-heritage/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 Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	78
Whales and Other Cetaceans:	10
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	3

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	1
Biologically Important Areas:	6
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In buffer area only

Listed Threatened Species

[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Conilurus penicillatus Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma [132]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area	In feature area
Notomys aquilo Northern Hopping-mouse, Woorrentinta [123]	Endangered	Species or species habitat known to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat may occur within area	In feature area
Trichosurus vulpecula arnhemensis Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat known to occur within area	In feature area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
REPTILE			
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Glyphis glyphis Speartooth Shark [82453]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In buffer area only
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sousa sahalensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area	In buffer area only
Migratory Terrestrial Species			
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area	In feature area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area	In feature area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limnodromus semipalmatus Asian Dowitcher [843]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding likely to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]		
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area overfly marine area	In feature area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In buffer area only
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding likely to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area	In buffer area only
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In buffer area only
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In buffer area only
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In buffer area only
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In buffer area only
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In buffer area only
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In buffer area only
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area	In buffer area only
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In buffer area only
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In buffer area only
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In buffer area only
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In buffer area only
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area	In buffer area only
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In buffer area only
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In buffer area only
Mammal			
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Reptile			
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area	In buffer area only
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area	In buffer area only
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area	In buffer area only
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Chitulia inornata as Hydrophis inornatus Plain Seasnake [87379]		Species or species habitat may occur within area	In buffer area only
Chitulia ornata as Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [87377]		Species or species habitat may occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area	In buffer area only
Enhydrina schistosa Beaked Seasnake [1126]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In buffer area only
Hydrophis atriceps Black-headed Seasnake [1101]		Species or species habitat may occur within area	In buffer area only
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowelli as Hydrophis mcdowelli Small-headed Seasnake [75601]		Species or species habitat may occur within area	In buffer area only
Lapemis curtus as Lapemis hardwickii Spine-bellied Seasnake [83554]		Species or species habitat may occur within area	In buffer area only
Leioselasma pacifica as Hydrophis pacificus Large-headed Seasnake, Pacific Seasnake [87378]		Species or species habitat may occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
Parahydrophis mertoni Northern Mangrove Seasnake [1090]		Species or species habitat may occur within area	In buffer area only
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Orcaella heinsohni as Orcaella brevirostris Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Sousa sahalensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Habitat Critical to the Survival of Marine Turtles			
Scientific Name	Behaviour	Presence	Buffer Status
Aug - Sep			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In buffer area only
Dec - Jan			

Scientific Name	Behaviour	Presence	Buffer Status
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur	In buffer area only
Nov - May			
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Anindilyakwa	Indigenous Protected Area	NT	In feature area
Anindilyakwa	Indigenous Protected Area	NT	In buffer area only

EPBC Act Referrals			[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Eastern Leases Project, Groote Eylandt, Northern Territory	2014/7228	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Eastern Leases 2010 Exploration Drilling Program	2010/5455	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Acoustic and Resistivity Sub-Bottom Profiling Survey	2011/6116	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Eastern Leases 2013 Exploration Drilling Program, Groote Eylandt, NT	2013/6848	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Eastern Leases Manganese Exploration Drilling	2008/4563	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Groote Eylandt Offshore Marine Surveys	2010/5643	Referral Decision	Completed	In feature area

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Gulf of Carpentaria coastal zone	North	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Marine Turtles			

Chelonia mydas			
Green Turtle [1765]	Internesting	Likely to occur	In buffer area only

Eretmochelys imbricata			
Hawksbill Turtle [1766]	Internesting	Likely to occur	In buffer area only

Natator depressus			
Flatback Turtle [59257]	Internesting	Likely to occur	In buffer area only

Seabirds

Onychoprion anaethetus			
Bridled Tern [82845]	Breeding	Known to occur	In buffer area only

Sterna dougallii			
Roseate Tern [817]	Breeding (high numbers)	Known to occur	In buffer area only

Thalasseus bergii			
Crested Tern [83000]	Breeding	Known to occur	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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.

[© Commonwealth of Australia](#)

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

Canberra ACT 2601 Australia

+61 2 6274 1111

APPENDIX B :

Summary of Previous Survey Reports

Table 22 Summary of previous survey reports utilised within this assessment

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
Ecological gradients in forest communities on Groote Eylandt, Northern Territory, Australia.	Langkamp, P. J., Ashton, D. H. and Dalling, M. J.	1981	Botanical examination of the natural patterns and ecology of forest and woodland on Western Groote Eylandt, particularly in areas where manganese deposits are located on Western Groote Eylandt.	Existing GEMCO Mine and Eastern Leases (see Figure 5).	The document explains the patterns of forest and woodland floristic and structural variation in relation to soils, topography and drainage.
Flora Survey of the GEMCO Mining Lease on the Western Side of Groote Eylandt, Northern Territory.	Brocklehurst, P. and Cowie, I.	1992	Provide baseline data on the flora and fauna within the GEMCO mineral leases and adjoining areas.	Existing GEMCO Mine and Eastern Leases (see Figure 5).	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present.
Flora and Fauna Surveys on the Western Side of Groote Eylandt, N.T. (1991-92).	G. Webb Pty Limited.	1992	Provide baseline data on the flora and fauna within the GEMCO mineral leases and adjoining areas.	Existing GEMCO Mine and Eastern Leases (see Figure 5).	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present. - Occurrence of threatened fauna species (although no maps of occurrence were provided in the Webb report).
Object based land cover mapping for Groote Eylandt: a tool for reconnaissance and land based surveys.	Cruse, B. and Hempel, C.	2005	Provide a land cover map by spatial analysis, which integrates remotely sensed imagery with Geographic Information Systems. Intended to be a useful tool for selection of sites for vegetation investigation.	Entire Groote Eylandt.	The document provided a map of broad land cover types.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
Ecological gradients in forest communities on Groote Eylandt, Northern Territory, Australia.	Langkamp, P. J., Ashton, D. H. and Dalling, M. J.	1981	Botanical examination of the natural patterns and ecology of forest and woodland on Western Groote Eylandt, particularly in areas where manganese deposits are located on Western Groote Eylandt.	Existing GEMCO Mine and Eastern Leases (see Figure 5).	The document explains the patterns of forest and woodland floristic and structural variation in relation to soils, topography and drainage.
Northern Hopping Mouse Notomys aquilo - ALC Ranger Report April 2006.	Ward, S.	2006	To examine ways to monitor the Northern Hopping-mouse.	Eningkirra and Yenbakwa.	The document provided background information on: - Small terrestrial mammals occurring on Groote Eylandt. - Survey techniques for the Northern Hopping-mouse. This document provided locations of records of potential Northern Hopping-mouse spoils.
Northern Hopping Mouse Notomys aquilo - ALC Ranger Report November 2006.	Ward, S.	2006	To examine ways to monitor the Northern Hopping-mouse.	Enungwadena (Kings Crossing) and the road to Dalumba Bay and Yingakwumanja.	The document provided background information on: - Small terrestrial mammals occurring on Groote Eylandt. - Survey techniques for the Northern Hopping-mouse. This document provided locations of records of: - Northern Hopping-mouse. - Potential Northern Hopping-mouse spoils. - Brush-tailed Rabbit-rat.
Northern Hopping Mouse Notomys aquilo - ALC Ranger	Ward, S.	2007	To examine ways to monitor the Northern Hopping-mouse.	Amalyikba Creek, Enungwadena (Kings Crossing) and the road to Dalumba Bay,	The document provided background information on: - Small terrestrial mammals occurring on Groote Eylandt.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
Report April-May 2007.				Hempel Bay and tracks joining Umbakumba, Mamalingmanja Point (Picnic Beach) and Banyan Tree.	- Survey techniques for the Northern Hopping-mouse. This document provided locations of records of: - Northern Hopping-mouse. - Potential Northern Hopping-mouse spoils. - Brush-tailed Rabbit-rat.
Northern Hopping Mouse Notomys aquilo - ALC Ranger Report September 2007.	Ward, S.	2007	To examine ways to monitor the Northern Hopping-mouse.	Tracks joining Umbakumba, Mamalingmanja Point (Picnic Beach) and Banyan Tree, north east of Umbakumba and Enungwadena (Kings Crossing) and the road to Dalumba Bay.	The document provided background information on survey techniques for the Northern Hopping-mouse. This document provided locations of records of potential Northern Hopping-mouse spoils.
Surveys for the Threatened Northern Hopping-mouse, Northern Quoll & Brush-tailed Rabbit-rat on GEMCO Eastern Exploration Leases (Groote Eylandt).	Firth, R.	2008	Undertake targeted surveys for the Northern Hopping-mouse, Northern Quoll and Brush-tailed Rabbit-rat.	Eastern Leases (see Figure 5).	This document provided locations of records of: - Potential Northern Hopping-mouse spoils. - Brush-tailed Rabbit-rat.
Seasonal detectability of Northern Hopping Mouse spoil heaps on Groote Eylandt.	Smith, D. J.	2009	Collect additional information about the seasonal visibility of Northern Hopping- mouse spoil heaps.	Eastern Leases (see Figure 5).	This document provided locations of records of potential Northern Hopping-mouse spoils.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
Surveys for Northern Hopping-mouse, Northern Quoll and Brush-tailed Rabbit-rat across Groote Eylandt.	Smith, D. J.	2009	Undertake targeted surveys for the Northern Hopping-mouse, Northern Quoll and Brush-tailed Rabbit-rat.	Various locations across Groote Eylandt.	The document provided background information on small terrestrial mammals occurring on Groote Eylandt. This document provided locations of records of: - Potential Northern Hopping-mouse spoils. - Northern Quoll. - Brush-tailed Rabbit-rat.
Eastern Leases Pre-clearance Survey for Groote Eylandt Mining Company.	Coffey Environments Pty Ltd.	2010	Pre-clearance surveys for Northern Hopping-mouse and collection of population characteristics through the excavation of spoil heaps, and targeted surveys for the Northern Hopping-mouse.	Eastern Leases (pre-clearing) and Quarries F3, G and D (targeted surveys) (see Figure 5).	The document provided background information on the suitability of using spoils to record the presence of the Northern Hopping-mouse. This document provided locations of records of: - Northern Hopping-mouse. - Potential Northern Hopping-mouse spoils.
Survey for Signs of Northern Hopping-mice on the GEMCO Eastern Leases.	Rankmore, D. B.	2011	Targeted survey for signs of the Northern Hopping-mouse.	Eastern Leases (see Figure 5).	The document provided background information on surveys for the Northern Hopping-mouse.
Flora and Fauna Surveys of Western Groote Eylandt.	URS Australia Pty Ltd.	2012	Provide a comprehensive flora and fauna assessment across the GEMCO mineral leases.	Existing GEMCO Mine Figure 5 shows the study area for URS (2012).	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present. - Occurrence of threatened fauna species mentioned but not mapped by URS.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
					- Faunal assemblages within mine rehabilitation areas.
Assessment of Northern Hopping Mouse (<i>Notomys aquilo</i>) Habitat Issues, A-South Expansion Area.	Ecological Management Services Pty Ltd.	2012	Provide a preliminary assessment of the potential for a proposed expansion area to support populations of the Northern Hopping-mouse.	West of the A South Quarry (see Figure 5).	The document provided information on mammal species known within the GEMCO mineral leases. This document provided locations of records of potential Northern Hopping-mouse spoils.
Eastern Leases ELR28161/ELR28162 Exploration Drilling Program: Northern Masked Owl/Northern Hopping Mouse Habitat Assessment June – July 2013.	Ecological Management Services Pty Ltd.	2013	Conduct surveys within the footprint of the proposed exploration drilling lines and pads within the Eastern Leases, targeting Masked Owl (northern) individuals and habitat and Northern Hopping-mouse burrows.	Eastern Leases (see Figure 5).	The document provided background information on nesting/roosting habitat features available for use by the Masked Owl (northern). This document provided locations of records of: - Potential Northern Hopping-mouse spoils. - Brush-tailed Rabbit-rat. - Masked Owl (northern).
Eastern Leases ELR28161/ELR28162 Exploration Drilling Program: Northern Masked Owl/ Northern Hopping Mouse Habitat Assessment. August 2014.	Ecological Management Services Pty Ltd.	2014	Re-survey uncleared exploration drilling lines and pads in the Eastern Leases and identify Masked Owl (northern) roost/nest trees and Northern Hopping-mouse spoils.	Eastern Leases (see Figure 5).	The document provided background information on nesting/roosting habitat features available for use by the Masked Owl (northern). This document provided locations of records of potential Northern Hopping-mouse spoils.
Eastern Leases Project – Terrestrial Ecology Assessment Report	Cumberland Ecology Pty Ltd.	2015	To document the findings of a terrestrial ecological assessment of the Eastern Leases Project, to	Eastern Leases (see Figure 5).	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
			support an Environmental Impact Statement.		- Fauna habitats present. - Occurrence of threatened species. The document also provides information on faunal assemblages within mine rehabilitation areas of the existing GEMCO mine.
Southern Lease Project – Baseline Terrestrial Ecology Report	Cumberland Ecology Pty Ltd.	2016	To document the findings of a baseline terrestrial ecology assessment of the Ecological Survey Area, an area of land in the northern portion of the Southern Lease.	Southern Lease (see Figure 5).	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present. - Occurrence of threatened species. - Occurrence of introduced and invasive species.
Interim Report on Threatened Small Mammal and Feral Cat Surveys on Groote Eylandt	Heiniger, J. and Gillespie, G.	2017	To document the findings of an island wide survey in lowland eucalypt woodland which was undertaken to understand the current distribution and status of threatened mammal species and feral cats on Groote Eylandt to improve knowledge of their current status, and determine the environmental and landscape correlates of their distributions.	Various locations across Groote Eylandt.	The document provided information on: - Fauna diversity. - Occurrence of threatened fauna species. - Occurrence of introduced fauna species. This document provided locations of records of: - Brush-tailed Rabbit-rat. - Northern Quoll. - Northern Hopping-mouse.
GEMCO/South32 Southern Lease Small Mammal Research Project - Report	Cumberland Ecology Pty Ltd.	2019	To document the findings of a small mammal research project, targeting threatened species, within the Southern Lease and surrounds.	Southern Lease and surrounds (see Figure 5).	The document provided information on: - Habitat types. - Fauna diversity. - Occurrence of threatened species.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
					- Occurrence of introduced and invasive fauna species. - Fire history. This document provided locations of records of: - Masked Owl (northern). - Northern Quoll. - Northern Hopping-mouse.
Southern Lease. Baseline Terrestrial Ecology Report	Cumberland Ecology Pty Ltd	2019	To document the findings of a baseline terrestrial ecology assessment of the Southern Lease.	Southern Lease	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present. - Occurrence of threatened species. - Occurrence of introduced and invasive species.
Northern Hopping-mouse Surveys: Final Report to Territory NRM July 2019	Anindilyakwa Land & Sea Rangers	2019	To document the findings of targeted Northern Hopping-mouse surveys across Groote Eylandt.	Various locations across Groote Eylandt.	This document provided details of staged targeted surveys for the Northern Hopping-mouse. This document also provided locations of records of Northern Hopping-mouse spoils and individuals.
Status of mammals on Groote Eylandt: Safe haven or slow burn?	Heiniger, J., Davies, H. F. and G. R. Gillespie.	2020	To investigate the correlates of native mammal distribution and abundance across Groote Eylandt, and to obtain estimates of feral cat density in two survey grids.	Various locations across Groote Eylandt. One feral cat survey area located in the Southern Lease (see Figure 5).	The document provided information on: - Fauna diversity. - Occurrence of threatened fauna species. - Occurrence of introduced fauna species. This document provided locations of records of: - Brush-tailed Rabbit-rat.

Document Title	Author	Date	Purpose	Location	Information Utilised within this Report
					- Northern Quoll. - Northern Hopping-mouse. - Feral cats.
Southern Lease – Stage 2 Exploration Program. Baseline Terrestrial Ecology Report	Cumberland Ecology Pty Ltd	2020	To document the findings of a baseline terrestrial ecology assessment of the Southern Lease.	Southern Lease.	The document provided information on: - Distribution and descriptions of vegetation communities. - Flora and fauna diversity. - Fauna habitats present. - Occurrence of threatened species. - Occurrence of introduced and invasive species.
GEMCO Western Leases and Surrounds – Vegetation Mapping Report	Cumberland Ecology Pty Ltd.	2021	To undertake a baseline vegetation survey and confirm the presence of VMUs within GEMCO's existing mine and surrounds.	Existing GEMCO Mine and surrounds (see Figure 5).	The document provided information on: - Distribution and descriptions of VMUs. - Association between VMUs and sensitive or significant vegetation. - Flora diversity. - Occurrence of introduced flora species.
2021 Camera Fauna Monitoring Program – Summary Report	Cumberland Ecology Pty Ltd.	2023	To provide quantitative data to assist in understanding the impacts of vegetation disturbance associated with exploration on the density of feral cats and the occurrence of the Northern Quoll.	Two locations across Groote Eylandt. One survey area located in the Southern Lease (see Figure 5).	The document provided information on: - Fauna diversity. - Occurrence of threatened fauna species. - Occurrence of introduced fauna species. This document provided locations of records of: - Northern Quoll. - Feral cats.

APPENDIX C :

Vegetation Map Units



Table 23 Vegetation map units within the Southern Lease

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
Individual VMUs			
1	Mangrove low closed-forest/closed-forest	148.2	-
2	Dry coastal monsoon vine closed forests/low closed-forests	82.2	-
4	Spring monsoon vine-forests	95.7	-
5	Riparian monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i>	22.6	-
6	Seepage monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i> isolated emergents	3.5	-
10	<i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> open-forest to woodland with low shrub or tussock grass understorey	1,070.8	2.1
10a	<i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> open-forest with low shrub or tussock grass understorey on lowland plains and rises	3,712.4	2.0
10b	<i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> open-forest with low shrub and mixed tussock/hummock grass understorey on upland plateau surfaces, mostly associated with deeply weathered land surfaces	1,548.5	36.2
11	<i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> / <i>Callitris intratropica</i> open-forest with mixed shrub/tussock grass understorey	2,974.9	0.8
12	<i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> / <i>Callitris intratropica</i> open-forest with <i>Acacia</i> spp., <i>Grevillea pteridifolia</i> dense mid layer and sedge/tussock grass understorey. Drainage areas in sandstone.	121.9	-
13	<i>Eucalyptus tetrodonta</i> /C. <i>kombolgiensis</i> Woodland with shrubby or open hummock grassland understorey	831.2	-
15	<i>Callitris intratropica</i> open-forest; <i>Acacia</i> spp. tall shrubland complex on sandstone	80.6	0.2
17	<i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey	390.0	-
18	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca cajuputi</i> / <i>Dillenia alata</i> +/- <i>Melaleuca viridiflora</i> open forest with fern/sedge understorey (Swamp Forests - Emerald River) Gullies in sandstone	46.0	-
19	<i>Melaleuca cajuputi</i> or <i>Melaleuca ferruginea</i> / M. <i>leucadendra</i> open forest with fern/bracken understorey. <i>Corymbia bella</i> and/or <i>Eucalyptus bigalerita</i> woodland occurs on the fringes	83.7	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
20	<i>Melaleuca cajuputi</i> / <i>Corymbia bella</i> or <i>Eucalyptus bigalerita</i> open forest with shrubby understorey often including monsoon vine forest species	525.8	-
21	Mixed <i>Melaleuca</i> open forests/ monsoon vine-forests	79.8	-
22	<i>Melaleuca cajuputi</i> low closed-forest / <i>Dapsilanthus ramosus</i> sedgeland/closed sedgeland (permanent swamps/sedgelands)	23.2	-
23	<i>Melaleuca cajuputi</i> / <i>M. viridiflora</i> low open-forest with <i>Dapsilanthus elatior</i> sedgeland understorey	89.8	-
26	Riparian woodland to open-forest of <i>Melaleuca leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Eucalyptus tetrodonta</i> on ephemeral rivers/streams in drier sub-coastal lowlands	125.8	-
27a	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock grass/sedge ground layer on lateritic plains	21.1	<0.0
27b	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock and tussock grass/sedge ground layer on quaternary sandplains	83.1	-
28	<i>Melaleuca</i> spp. (<i>M. viridiflora</i> / <i>M. cajuputi</i> / <i>M. ferruginea</i>) woodland to low woodland on alluvial plains with sedge understorey	544.7	-
29b	<i>Eucalyptus tetrodonta</i> , <i>Corymbia ferruginea</i> +/- <i>Callitris intratropica</i> low woodland on low hills of sandstone in the north with mixed tussock grass, shrub and <i>Triodia bitextura</i> ground layer	37.2	-
30	<i>Eucalyptus tetrodonta</i> , <i>Corymbia kombolgiensis</i> , <i>Corymbia polycarpa</i> woodland with shrubby understorey of monsoon vine thicket woodland on deeply weathered lowlands and stabilised coastal sands in the east	1,649.1	-
31	<i>Eucalyptus tertodonta</i> , <i>Corymbia kombolgiensis</i> , <i>Melaleuca viridiflora/leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Corymbia foelscheana</i> open forest/woodland with shrubby understorey and tussock grasses on lowlands including stabilising sands in the east where transitional into VMU 30.	17.8	-
31a	<i>Eucalyptus tetrodonta</i> , <i>Corymbia kombolgiensis</i> , <i>Melaleuca viridiflora/leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Corymbia foelscheana</i> open forest/woodland with shrubby understorey and tussock grasses on lowlands including stabilising sands in the east where transitional into VMU 30.	416.4	-
40	<i>Eucalyptus tetrodonta</i> / <i>E. miniata</i> / <i>E. polycarpa</i> +/- <i>Callitris intratropica</i> woodland with low shrub or tussock/hummock grass understorey	823.0	5.6

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
40a	<i>Eucalyptus tetradonta</i> /E. <i>miniata</i> +/- E. <i>polycarpa</i> woodland with low shrub and tussock grass dominated understorey on lateritic plains and low rises (generally lowlands).	1,644.3	9.0
40b	<i>Eucalyptus tetradonta</i> +/- E. <i>miniata</i> +/- <i>Callitris intratropica</i> woodland to open woodland with low shrub/hummock/tussock grass understorey on shallow rocky soils usually derived from sandstone. Plateaus, hills and rises.	962.1	-
41	<i>Callitris intratropica</i> / <i>Eucalyptus tetradonta</i> / C. <i>kombolgiensis</i> open- woodland with hummock grassland understorey	742.2	0.2
42	<i>Eucalyptus polycarpa</i> /E. <i>tetradonta</i> /E. <i>miniata</i> woodland with sedge spp./ low shrub understorey	660.4	0.8
43	<i>Melaleuca viridiflora</i> / <i>Eucalyptus polycarpa</i> / <i>Grevillea pteridifolia</i> open woodland with <i>Asteromyrtus symphyocarpa</i> and <i>Vetiveria elongata</i> tussock grassland	675.0	-
44	<i>Melaleuca leucadendra</i> or <i>Melaleuca cajuputi</i> woodland with <i>Ischaemum</i> spp. understorey adjacent to the estuarine zone	27.1	-
45	<i>Eucalyptus polycarpa</i> open- woodland with sedges, short tussock grass understorey. Also areas of grassland	396.1	1.3
46	<i>Eucalyptus tetradonta</i> /E. <i>miniata</i> low woodland with tussock grass understorey	194.3	4.1
47	<i>Eucalyptus tetradonta</i> /E. <i>polycarpa</i> <i>Melaleuca viridiflora</i> low open woodland with <i>Asteromyrtus symphyocarpa</i> Shrubland	9.6	-
48	<i>Eucalyptus tetradonta</i> and/or <i>Corymbia kombolgiensis</i> +/- <i>Corymbia polycarpa</i> , <i>Corymbia ferruginea</i> open woodland to woodland with <i>Acacia</i> spp., <i>Grevillea</i> spp., <i>Terminalia carpentariae</i> and mixed hummock/tussock grasses on sandstone	572.6	-
49	Mixed Monsoon species (e.g. <i>Xanthostemon umbrosus</i> , <i>Pouteria sericea</i> , <i>Drypetes deplanchei</i> , <i>Terminalia carpentariae</i> etc.) +/- <i>Corymbia kombolgiensis</i> scattered trees to open-woodland on margins of Sandstone plateau surfaces	7.6	-
51	Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophleum chlorostachys</i>	183.9	-
51a	<i>E. bigalerita</i> woodland	159.1	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
51c	<i>E. tectifera</i> and <i>E. tetradonta</i> +/- <i>E. jensenii</i> low open woodland to woodland. May be associated with alluvial plains on sandy areas on sandstone plateaus	219.4	0.2
52	<i>Melaleuca viridiflora</i> and <i>Pandanus spiralis</i> +/- <i>Corymbia bella</i> and/or <i>Eucalyptus bigalerita</i> and/or <i>Corymbia polysciada</i> (in north) open-woodland adjacent to estuarine zone. <i>Chrysopogon elongatus</i> tussock grassland	57.5	-
53	<i>Eucalyptus jensenii</i> and/or <i>Eucalyptus bigalerita</i> , <i>Eucalyptus foelscheana</i> on basalt	2.3	-
54	<i>Melaleuca acacioides</i> low open woodland adjacent to estuarine zone	17.1	-
55	<i>Melaleuca viridiflora</i> or <i>M. dealbata</i> or <i>M. ferruginea</i> +/- <i>P. spiralis</i> and <i>G. pteridifolia</i> low woodland on quaternary/coastal sands or adjacent to floodplains with sedge understorey	38.7	-
55a	<i>Melaleuca viridiflora</i> or <i>M. dealbata</i> or <i>M. ferruginea</i> +/- <i>P. spiralis</i> and <i>G. pteridifolia</i> low woodland on quaternary/coastal sands with sedge understorey, <i>Dapsilanthus elatior</i> prominent	33.0	-
55b	<i>Melaleuca viridiflora</i> or <i>M. dealbata</i> or <i>M. ferruginea</i> +/- <i>P. spiralis</i> and <i>G. pteridifolia</i> low woodland adjacent to floodplains with sedge understorey	12.5	-
57	<i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>Melaleuca viridiflora</i> , <i>Melaleuca cajuputi</i> , <i>Asteromyrtus symphyocarpa</i> , <i>Banksia dentata</i> , <i>Grevillea pteridifolia</i> , <i>Corymbia polycarpa</i> , <i>Corymbia kombolgiensis</i> , <i>Eucalyptus tetradonta</i> low open woodland to tall shrubland with mixed tussock grass/sedge ground layer on quaternary sandplains	140.3	-
59	<i>Eucalyptus tetradonta</i> / <i>Erythrophleum chlorostichys</i> / <i>Corymbia polycarpa</i> woodland on lateritic lowland plains	98.7	-
60	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> +/- <i>Corymbia polycarpa</i> low open woodland/shrubland on quaternary/coastal sandplains with mixed hummock grass/sedge understorey	51.2	-
61	<i>Melaleuca ferruginea</i> / <i>Melaleuca viridiflora</i> / <i>Melaleuca cajuputi</i> +/- <i>Corymbia polycarpa</i> open woodland to low open woodland with <i>Pandanus spiralis</i> , <i>Grevillea pteridifolia</i> and 'wet' tussock grass ground layer (<i>Germania grandiflora</i> , <i>Ichaemum</i> spp.) and sedges (<i>Dapsilanthus</i> spp.) in wet dune swales and open drainage systems	23.7	-
62	Open-woodland to scattered trees of monsoon species on sand or cemented sand dunes (<i>Sterculia quadrifida</i> , <i>Diospyros humilis</i> , <i>Drypetes deplanchei</i> , <i>Santalum</i> , <i>Diospyros maratima</i> , <i>Pouteria sericea</i> , <i>Brachychiton paradoxus</i> , <i>Hakea arborescens</i>)	11.8	-
70	Dry Sandstone shrublands +/- emergent <i>Corymbia kombolgiensis</i>	193.7	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
72	<i>Acacia</i> spp. and/or mixed species shrublands (<i>Melaleuca</i> spp., <i>Terminalia carpentariae</i> , <i>Buchanania obovata</i> , <i>Grevillea</i> spp., <i>Banksia dentata</i> , <i>Verticordia cunninghamii</i>) on coastal sandplains and stabilising dunes with mixed sedge/tussock grass ground layer (<i>Triodia microstachya</i> , <i>Dapsilanthus spathaceus</i> , <i>Schoenus sparteus</i>)	180.7	-
73	<i>Acacia</i> spp., <i>Asteromyrtus symphyocarpa</i> , <i>Banksia dentata</i> , <i>Verticordia cunninghamii</i> wet shrublands on coastal dunes and plains. <i>Dapsilanthus spathaceus</i> dominant in ground layer	7.2	-
75	Samphire (Chenopod) Shublands on intertidal flats	22.1	-
80	<i>Eleocharis</i> , <i>Cyperus</i> sedgeland	2.5	-
81	Closed tussock grassland on margins of estuarine zone	2.4	-
81a	Closed tussock grassland on margins of estuarine zone (<i>Heteropogon triticeus</i> , <i>Chrysopogon elongatus</i> , <i>Triodia</i> spp. (Dry)	5.0	-
81b	<i>Pseudoraphis spinescens</i> , <i>Paspalum scrobiculatum</i> closed grassland in wet swales or plains on quaternary coastal sands with emergent <i>Pandanus spiralis</i> +/- <i>Melaleuca</i> spp.	36.4	-
82a	Tussock grassland on sandplains and stabilised dunes of <i>Sorghum plumosum</i> and <i>Chrysopogon elongatus</i>	8.1	-
84	<i>Lepironia</i> or <i>Dapsilanthus ramosus</i> and <i>Dapsilanthus elatior</i> sedgeland fringing permanent waterbodies	19.5	-
86	<i>Triodia</i> grassland to open shrubland on sandstone	24.5	-
88	Brackish water sedge swamp - <i>Schoenoplectus littoralis</i> , <i>Eleocharis</i> spp., <i>Cyperus</i> spp.	1.4	-
100	Saline Tidal Flats +/- emergent isolated trees and (chenopod) shrubs	97.7	-
202	Cleared	1.8	-
500	Lacustrine wetlands	0.4	-
Water		0.5	-
Combination VMUs			
4/21	Spring monsoon vine-forests / Mixed <i>Melaleuca</i> open forests/monsoon vine-forests	3.1	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
4/30	Spring monsoon vine-forests / <i>Eucalyptus tetradonta</i> , <i>Corymbia kombolgiensis</i> , <i>Corymbia polycarpa</i> woodland with shrubby understorey of monsoon vine thicket woodland on deeply weathered lowlands and stabilised coastal sands in the east	24.4	-
5/21	Riparian monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i> / Mixed <i>Melaleuca</i> open forests/monsoon vine-forests	3.4	-
10b/15	<i>Eucalyptus tetradonta</i> / <i>E. miniata</i> open-forest with low shrub and mixed tussock/hummock grass understorey on upland plateau surfaces, mostly associated with deeply weathered land surfaces / <i>Callitris intratropica</i> open-forest; <i>Acacia</i> spp. tall shrubland complex on sandstone	6.3	-
11/15	<i>Eucalyptus tetradonta</i> / <i>E. miniata</i> / <i>Callitris intratropica</i> open-forest with mixed shrub/tussock grass understorey / <i>Callitris intratropica</i> open-forest; <i>Acacia</i> spp. tall shrubland complex on sandstone	126.5	-
13/40b	<i>Eucalyptus tetradonta</i> / <i>C. kombolgiensis</i> open-forest/low open forest Woodland with shrubby or open hummock grassland understorey / <i>Eucalyptus tetradonta</i> +/- <i>E. miniata</i> +/- <i>Callitris intratropica</i> woodland to open woodland with low shrub/hummock/tussock grass understorey on shallow rocky soils usually derived from sandstone. Plateaus, hills and rises.	180.7	-
13/70	<i>Eucalyptus tetradonta</i> / <i>C. kombolgiensis</i> open-forest/low open forest Woodland with shrubby or open hummock grassland understorey / Dry Sandstone shrublands +/- emergent <i>Corymbia kombolgiensis</i>	79.8	-
17/5	<i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey / Riparian monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i>	55.4	-
17/26	<i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey / Riparian woodland to open-forest of <i>Melaleuca leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Eucalyptus tetradonta</i> on ephemeral rivers/streams in drier sub-coastal lowlands	417.1	-
17/28	<i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey / <i>Melaleuca</i> spp. (<i>M. viridiflora</i> / <i>M. cajuputi</i> / <i>M. ferruginea</i>) woodland to low woodland on alluvial plains with sedge understorey	<0.0	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
18/5	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca cajuputi</i> / <i>Dillenia alata</i> +/- <i>Melaleuca viridiflora</i> open-forest with fern/sedge understorey (Swamp Forests - Emerald River) Gullies in sandstone / Riparian monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i>	0.5	-
18/6	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca cajuputi</i> / <i>Dillenia alata</i> +/- <i>Melaleuca viridiflora</i> open-forest with fern/sedge understorey (Swamp Forests - Emerald River) Gullies in sandstone / Seepage monsoon vine-forests with <i>Melaleuca cajuputi</i> and/or <i>Melaleuca leucadendra</i> isolated emergents	2.9	-
18/500	<i>Melaleuca leucadendra</i> and/or <i>Melaleuca cajuputi</i> / <i>Dillenia alata</i> +/- <i>Melaleuca viridiflora</i> open forest with fern/sedge understorey (Swamp Forests - Emerald River) Gullies in sandstone / Lacustrine wetlands	6.5	-
20/51	<i>Melaleuca cajuputi</i> / <i>Corymbia bella</i> or <i>Eucalyptus bigalerita</i> open forest with shrubby understorey often including monsoon vine forest species / Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophloeum chlorostachys</i>	71.5	-
21/4	Mixed <i>Melaleuca</i> open forests/monsoon vine-forests / Spring monsoon vine-forests	5.5	-
26/17	Riparian woodland to open-forest of <i>Melaleuca leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Eucalyptus tetradonta</i> on ephemeral rivers/streams in drier sub-coastal lowlands / <i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey	80.6	-
27a/27b	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock grass/sedge ground layer on lateritic plains / <i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>Melaleuca viridiflora</i> , <i>Corymbia polycarpa</i> , <i>Asteromyrtus symphyocarpa</i> low woodland on quaternary sandplains	13.7	-
27b/32	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock and tussock grass/sedge ground layer on quaternary sandplains / <i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>Melaleuca viridiflora</i> , <i>Corymbia polycarpa</i> , <i>Asteromyrtus symphyocarpa</i> low woodland on quaternary sandplains	21.3	-
27b/55a	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock and tussock grass/sedge ground layer on quaternary sandplains / <i>Melaleuca viridiflora</i> or <i>M. dealbata</i> or <i>M. ferruginea</i> +/- <i>P. spiralis</i> and <i>G. pteridifolia</i> low woodland on quaternary/coastal sands with sedge understorey, <i>Dapsilanthus elatior</i> prominent	158.3	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
32/27b	<i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>Melaleuca viridiflora</i> , <i>Corymbia polycarpa</i> , <i>Asteromyrtus symphyocarpa</i> low woodland on quaternary sandplains / <i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock and tussock grass/sedge ground layer on quaternary sandplains	25.6	-
32/60	<i>Acacia</i> spp., <i>Melaleuca dealbata</i> , <i>Melaleuca viridiflora</i> , <i>Corymbia polycarpa</i> , <i>Asteromyrtus symphyocarpa</i> low woodland on quaternary sandplains / <i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> +/- <i>Corymbia polycarpa</i> low open woodland/shrubland on quaternary/coastal sandplains with mixed hummock grass/sedge understorey	14.4	-
40b/13	<i>Eucalyptus tetrodonta</i> +/- <i>E. miniata</i> +/- <i>Callitris intratropica</i> woodland to open woodland with low shrub/hummock/tussock grass understorey on shallow rocky soils usually derived from sandstone. Plateaus, hills and rises. / <i>Eucalyptus tetrodonta</i> /C. <i>kombolgiensis</i> open-forest/low open forest Woodland with shrubby or open hummock grassland understorey	577.2	-
40b/48	<i>Eucalyptus tetrodonta</i> +/- <i>E. miniata</i> +/- <i>Callitris intratropica</i> woodland to open woodland with low shrub/hummock/tussock grass understorey on shallow rocky soils usually derived from sandstone. Plateaus, hills and rises. / <i>Eucalyptus tetrodonta</i> and/or <i>Corymbia kombolgiensis</i> +/- <i>Corymbia polycarpa</i> , <i>Corymbia ferruginea</i> open woodland to woodland with <i>Acacia</i> spp., <i>Grevillea</i> spp., <i>Terminalia carpentariae</i> and mixed hummock/tussock grasses on sandstone	137.9	-
42/12	<i>Eucalyptus polycarpa</i> / <i>E. tetrodonta</i> / <i>E. miniata</i> woodland with sedge spp./ low shrub understorey / <i>Eucalyptus tetrodonta</i> /E. <i>miniata</i> /Callitris <i>intratropica</i> open forest with <i>Acacia</i> spp., <i>Grevillea pteridifolia</i> dense mid layer and sedge/tussock grass understorey. Drainage areas in sandstone	1.8	-
42/51	<i>Eucalyptus polycarpa</i> / <i>E. tetrodonta</i> / <i>E. miniata</i> woodland with sedge spp./ low shrub understorey / <i>Eucalyptus polycarpa</i> open-woodland with sedges, short tussock grass understorey. Also areas of grassland	14.3	-
42/51a	<i>Eucalyptus polycarpa</i> / <i>E. tetrodonta</i> / <i>E. miniata</i> woodland with sedge spp./ low shrub understorey / <i>E. bigalerita</i> woodland	30.2	-
43/45	<i>Melaleuca viridiflora</i> / <i>Eucalyptus polycarpa</i> / <i>Grevillea pteridifolia</i> open woodland with <i>Asteromyrtus symphyocarpa</i> and <i>Vetiveria elongata</i> tussock grassland / <i>Eucalyptus polycarpa</i> open-woodland with sedges, short tussock grass understorey. Also areas of grassland	14.3	-
43/51	<i>Melaleuca viridiflora</i> / <i>Eucalyptus polycarpa</i> / <i>Grevillea pteridifolia</i> open woodland with <i>Asteromyrtus symphyocarpa</i> and <i>Vetiveria elongata</i> tussock grassland / Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia</i>	80.3	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
	<i>polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophleum chlorostachys</i>		
44/17	<i>Melaleuca leucadendra</i> or <i>Melaleuca cajuputi</i> woodland with <i>Ischaemum</i> spp. understorey adjacent to the estuarine zone / <i>Melaleuca viridiflora</i> or <i>Melaleuca cajuputi</i> or <i>Melaleuca leucadendra</i> or <i>Melaleuca ferruginea</i> / <i>Eucalyptus polycarpa</i> / <i>Eucalyptus bigalerita</i> open-forest with <i>Pandanus spiralis</i> and Mixed tussock grassland understorey	18.3	-
44/54	<i>Melaleuca leucadendra</i> or <i>Melaleuca cajuputi</i> woodland with <i>Ischaemum</i> spp. understorey adjacent to the estuarine zone / <i>Melaleuca acacioides</i> low open woodland adjacent to estuarine zone	6.9	-
45/46	<i>Eucalyptus polycarpa</i> open- woodland with sedges, short tussock grass understorey. Also areas of grassland / <i>Eucalyptus tetradonta</i> / <i>E. miniata</i> low woodland with tussock grass understorey	19.9	0.3
48/70	<i>Eucalyptus tetradonta</i> and/or <i>Corymbia kombolgiensis</i> +/- <i>Corymbia polycarpa</i> , <i>Corymbia ferruginea</i> open woodland to woodland with <i>Acacia</i> spp., <i>Grevillea</i> spp., <i>Terminalia carpentariae</i> and mixed hummock/tussock grasses on sandstone / Dry Sandstone shrublands +/- emergent <i>Corymbia kombolgiensis</i>	287.9	-
50/60	Quaternary sandplain or stabilized dune <i>Eucalyptus tetradonta</i> open woodland to woodland with mixed <i>Triodia bitextura</i> and tussock grass understorey / <i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> +/- <i>Corymbia polycarpa</i> low open woodland/shrubland on quaternary/coastal sandplains with mixed hummock grass/sedge understorey	43.1	-
51/20	Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophleum chlorostachys</i> / <i>Melaleuca cajuputi</i> / <i>Corymbia bella</i> or <i>Eucalyptus bigalerita</i> open forest with shrubby understorey often including monsoon vine forest species	125.1	-
51/27a	Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophleum chlorostachys</i> / <i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> low woodland on plains with shrubby or mixed hummock grass/sedge ground layer on lateritic plains	3.1	-
51/43	Alluvial woodland to open-woodland with <i>Corymbia bella</i> , <i>Corymbia polycarpa</i> and <i>Eucalyptus bigalerita</i> +/- <i>Corymbia grandifolia</i> , <i>Corymbia foelscheana</i> , <i>Corymbia confertiflora</i> , <i>Eucalyptus tetradonta</i> , <i>Eucalyptus tectifera</i> , <i>Erythrophleum chlorostachys</i> / <i>Melaleuca viridiflora</i> / <i>Eucalyptus polycarpa</i> / <i>Grevillea pteridifolia</i> open woodland with <i>Asteromytrus symphyocarpa</i> and <i>Vetiveria elongata</i> tussock grassland	56.0	-

VMU	Name	Southern Lease (ha)	Disturbance Footprint (ha) ²
51a/28	<i>E. bigalerita</i> woodland / <i>Melaleuca</i> spp. (<i>M. viridiflora</i> / <i>M. cajaputi</i> / <i>M. ferruginea</i>) woodland to low woodland on alluvial plains with sedge understorey	16.5	-
52/100	<i>Melaleuca viridiflora</i> and <i>Pandanus spiralis</i> +/- <i>Corymbia bella</i> and/or <i>Eucalyptus bigalerita</i> and/or <i>Corymbia polysciada</i> (in north) open-woodland adjacent to estuarine zone. <i>Chrysopogon elongatus</i> tussock grassland / Saline Tidal Flats +/- emergent isolated trees and (chenopod) shrubs	9.8	-
54/52	<i>Melaleuca acacioides</i> low open woodland adjacent to estuarine zone / <i>Melaleuca viridiflora</i> and <i>Pandanus spiralis</i> +/- <i>Corymbia bella</i> and/or <i>Eucalyptus bigalerita</i> and/or <i>Corymbia polysciada</i> (in north) open-woodland adjacent to estuarine zone. <i>Chrysopogon elongatus</i> tussock grassland	18.9	-
60/81b	<i>Melaleuca viridiflora</i> or <i>Melaleuca ferruginea</i> +/- <i>Corymbia polycarpa</i> low open woodland/shrubland on quaternary/coastal sandplains with mixed hummock grass/sedge understorey / <i>Pseudoraphis spinescens</i> , <i>Paspalum scrobiculatum</i> closed grassland in wet swales or plains on quaternary coastal sands with emergent <i>Pandanus spiralis</i> +/- <i>Melaleuca</i> spp.	22.7	-
70/48	Dry Sandstone shrublands +/- emergent <i>Corymbia kombolgiensis</i> / <i>Eucalyptus tetradonta</i> and/or <i>Corymbia kombolgiensis</i> +/- <i>Corymbia polycarpa</i> , <i>Corymbia ferruginea</i> open woodland to woodland with <i>Acacia</i> spp., <i>Grevillea</i> spp., <i>Terminalia carpentariae</i> and mixed hummock/tussock grasses on sandstone	64.1	-
75/88	Samphire (Chenopod) Shrublands on intertidal flats / Brackish water sedge swamp - <i>Schoenoplectus littoralis</i> , <i>Eleocharis</i> spp., <i>Cyperus</i> spp.	3.8	-
86/70	<i>Triodia</i> grassland to open shrubland on sandstone / Dry Sandstone shrublands +/- emergent <i>Corymbia kombolgiensis</i>	11.0	-
Unmapped ¹		9.3	-
Total (nearest hectare)²		26,063	63

1. A few sections of watercourses have been unmapped by DEPWS along the southern boundary of the Southern Lease.

2. In some cases totals may not equal the total number due to rounding.

APPENDIX D :

Likelihood of Occurrence Assessment



Table 24 Likelihood of occurrence assessment

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
PLANTS									
Utricularia, Bladderwort	<i>Utricularia singeriana</i>		V		X	General habitat requirements/preferences: <i>Utricularia singeriana</i> is known to occur in seasonally inundated grassland and low open woodland; also recorded growing near granite outcrops, often in shallow water to 2 cm deep; on moist sandy or sandy loam soils (Holmes et al. 2005). It has also been described by Crowie (2010) as occurring along the seasonally waterlogged margins of drainage flats amongst a relatively sparse grass layer.	This species was not recorded during recent flora studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies one record of the species from 2021 within the Southern Lease. This record is located along Second Creek. The species has not been recorded in the Southern Lease or adjacent areas in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992).	Present. NR Maps contains one recent record of the species within the Southern Lease. Suitable habitat is present throughout the Southern Lease, within wetland areas and near waterways.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain wetland areas and is not located near waterways.
BIRDS									
Red Knot	<i>Calidris canutus</i>	E, M(w)	V	X	X	General habitat requirements/preferences: The Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts and sometimes on sandy ocean beaches or shallow pools on exposed rock platforms (Threatened Species Scientific Committee 2016a). They have also been recorded on terrestrial saline wetlands near the	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies two occurrences of the species in the locality, with the latest record from 1978. No records exist within the Southern Lease.	Unlikely to occur. The Red Knot is a coastal species. A small area of potential habitat for this species occurs in the south-western portion of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						coast (Threatened Species Scientific Committee 2016a). Foraging requirements/preferences: The species is known to forage near the edge of water on intertidal mudflats and sand flats, as well as sewage ponds, and nearby lakes (Threatened Species Scientific Committee 2016a). Roosting requirements/preferences: The species roosts on sandy beaches, spits and islets, and mudflats (Threatened Species Scientific Committee 2016a). The species prefer to roost in open areas far away from potential cover for predators, but close to feeding grounds (Threatened Species Scientific Committee 2016a). Breeding requirements/preferences: The species does not breed in Australia, (Threatened Species Scientific Committee 2016a).	The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	unlikely to occur, given the lack of records in recent years and limited extent of habitat within the Southern Lease.	
Curlew Sandpiper	<i>Calidris ferruginea</i>	CE, M(w)	V	X	X	General habitat requirements/preferences: The Curlew Sandpiper mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies 16 occurrences of the species in the	Unlikely to occur⁶. The Curlew Sandpiper is a coastal species. A small area of potential habitat for this species occurs in the south-western portion of the	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						near the coast, and ponds in saltworks and sewage farms (DotE 2015a). Foraging requirements/preferences: Main requirements for feeding habitats are the presence of mudflats or shallow water up to 60 mm. The Curlew Sandpiper may also forage in low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated saltflats (DotE 2015a). Roosting requirements/preferences: Roosting occurs in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (DotE 2015a). Breeding requirements/preferences: The species does not breed in Australia (DotE 2015a).	locality, with the latest record from 2019. One record exists within the Southern Lease from 2019. This record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The species has been recorded previously on the island by Webb (1992), however the exact location is unknown. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	estuarine complex habitat.
Great Knot	<i>Calidris tenuirostris</i>	CE, M(w)	V		X	General habitat requirements/preferences: The Great Knot inhabits sheltered coastal habitats, including inlets, harbours and estuaries. The species prefers habitats with large intertidal mudflats or sand flats. It has also	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies 20 occurrences of the species within the	Unlikely to occur⁶. The Great Knot is a coastal species. A small area of potential habitat for this species occurs in the south-western portion of the Southern	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						been recorded on rock platforms, ponds in salt works, swamps near the coast, and salt lakes (DAWE 2022e) Foraging requirements/preferences: The species is known to forage in areas of mud for invertebrates (EHG 2022) Roosting requirements/preferences: Roosting habitat for the Great Knot is mainly shallow water in close proximity to feeding grounds (DAWE 2022e) Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022e).	locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992).	Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	estuarine complex habitat.
Greater Sand Plover	<i>Charadrius leschenaultii</i>	V, M(w)	V	X	X	General habitat requirements/preferences: The Greater Sand Plover inhabits coastal littoral and estuarine environments, and is mainly found on sandy or muddy beaches with intertidal mudflats or sandbanks, rock platforms, inshore reefs or sand cays on coral reefs (DAWE 2022f). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has been recorded previously on the island by URS (2012), however the exact location is unknown.	Unlikely to occur⁶. The Greater Sand Plover is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14).	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species forages visually over the surface of the substrate or just below the surface. It prefers to forage in areas that have low densities of other foraging shorebirds (DAWE 2022f). Roosting requirements/preferences: The Greater Sand Plover usually roosts on banks, sand-spits, beaches, or in tidal lagoons. They are also known to roost on rocky points and in salt marshes (DAWE 2022f). Breeding requirements/preferences: This species does not breed in Australia (DAWE 2022f).	The NR Maps database identifies 25 occurrences of the species in the locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Lesser Sand Plover	<i>Charadrius mongolus</i>	E, M(w)	V		X	General habitat requirements/preferences: The Lesser Sand Plover is found in coastal littoral and estuarine environment, with preferred habitats including large intertidal sand flats or mudflats in sheltered bays, harbours and estuaries, and sometimes also sandy ocean beaches, coral reefs, and rock platforms (DAWE 2022g).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has been recorded previously on the island by URS (2012) in coastal and estuarine environments.	Unlikely to occur⁶. The Lesser Sand Plover is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14).	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Foraging requirements/preferences: Preferred foraging habitat consists of vast, freshly-exposed intertidal sand flats and mudflats in beaches, estuaries and ponds in salt works. They are also known to feed on coral reef, river margins, and muddy areas around lakes (DAWE 2022g). Roosting requirements/preferences: Roosting habitat is usually near foraging areas, but it is known to roost inland on sandbanks in swamp, grassy margins of ephemeral pools, and inland claypan (DAWE 2022g). Breeding requirements/preferences: The Lesser Sand Plover is a migratory bird which breeds in Mongolia and Siberia, and typically overwinters in Australia. It is not known to breed in Australia (DAWE 2022g).	The NR Maps database identifies 24 occurrences of the species in the locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat.	Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Red Goshawk	<i>Erythrotriorchis radiatus</i>	V	V	X		General habitat requirements/preferences: The Red Goshawk prefers woodlands and forests with a mosaic of vegetation types that are open enough for fast manoeuvring flight. These favoured areas contain permanent water and have large	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). There are no records of this raptor on Groote Eylandt within the NR Maps database and it has not been recorded during previous surveys by	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022) surveys. Given the species is a large raptor that readily identifiable during surveys, and	Unlikely to occur. The species has not been recorded within the disturbance footprint during previous or recent (2016-2022) surveys. Given the species is readily identifiable

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						populations of birds of other species (DAWE 2022j). Foraging requirements/preferences: The Red Goshawk generally avoids very dense or very open habitats, preferring to hunt along their ecotones (DAWE 2022j). Roosting requirements/preferences: The species nests in tall trees in open forest and woodland near permanent water bodies. Their nest is usually placed on a horizontal branch against a vertical branch (DAWE 2022j). Breeding requirements/preferences: Breeding generally occurs from August to November and nesting territories are reused by breeding pairs year after year (DAWE 2022j).	Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat is likely to occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	Groote Eylandt is well surveyed, this species is assessed as unlikely to occur. Furthermore, the EPBC PMST does not identify the species as known within the locality.	during surveys, and Groote Eylandt is well surveyed, this species is assessed as unlikely to occur.
Gouldian Finch	<i>Erythrura gouldiae</i>	E	V	X		General habitat requirements/preferences: The main habitat requirements for the Gouldian Finch are the presence of grasses (especially Sorghum), close proximity to permanent water, and open woodlands dominated by Eucalypts (DAWE 2022k) Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database contains a single record of occurrence of this species on Groote Eylandt (although the record is not from within the Southern Lease or locality). The record is from the year 1924, and	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022) surveys. Given the species is readily identifiable during surveys, and Groote Eylandt is well surveyed,	Unlikely to occur. The species has not been recorded within the disturbance footprint during previous or recent (2016-2022) surveys. Given the species is readily identifiable during surveys, and

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species feeds almost exclusively on seeds taken from grasses such as Sorghum, although they also take seeds from grasses in other genera including <i>Alloteropsis</i>, <i>Aristida</i>, <i>Chrysopogon</i>, <i>Digitaria</i>, <i>Echinochloa</i>, <i>Eriachne</i>, <i>Heteropogon</i>, <i>Panicum</i>, <i>Schizachyrium</i>, <i>Sehima</i>, <i>Themeda</i>, <i>Triodia</i> and <i>Xerochloa</i>. The species has also been recorded foraging in areas burnt by fire (DAWE 2022k). Roosting requirements/preferences: The Gouldian Finch usually nests in Eucalyptus tree hollows, but is also known to nest in shrubs among grass and in termite mound hollows (DAWE 2022k). Breeding requirements/preferences: Breeding habitat usually occurs on ridges and rocky foothills. A critical habitat requirement for breeding is the presence of unburnt hollow-bearing Eucalyptus trees (DAWE 2022k).	there have been no further records of this species since then, despite numerous fauna surveys on the island. In particular, this species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	this species is assessed as unlikely to occur.	Groote Eylandt is well surveyed, this species is assessed as unlikely to occur.
Partridge Pigeon	<i>Geophaps smithii smithii</i>	V ³	V		X	General habitat requirements/preferences: The Partridge Pigeon inhabits <i>Eucalyptus tetradonta</i> and <i>E. miniata</i> dominated open forest and woodland (DAWE 2022l).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). Three records of this species on Groote Eylandt are held within the NR Maps database, and date from	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022) surveys. Given the species is readily	Unlikely to occur. The species has not been recorded within the disturbance footprint during previous or recent (2016-2022) surveys.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Foraging requirements/preferences: Main foraging habitat requirements include areas with an open ground layer, or locations which have recently been burnt. It relies on perennial grass species which set seed relatively early (e.g. <i>Chrysopogon fallax</i> and <i>Alloteropsis semialata</i>) (DAWE 2022l) Roosting requirements/preferences: The species roosts and nests on the ground, in areas with dense vegetation cover (DAWE 2022l) Breeding requirements/preferences: Little is known about the breeding of the species, but it is known to lay eggs throughout the year. Nests are usually constructed in a shallow depression and lined with leaves or grass (DAWE 2022l)	1910 (all in the locality). This species has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). It is a relatively conspicuous species and has not been found in any previous surveys of the existing GEMCO mine or the Eastern Leases, despite surveys having been undertaken in these areas within the past 25 years.	identifiable during surveys, and Groote Eylandt is well surveyed, this species is assessed as unlikely to occur.	Given the species is readily identifiable during surveys, and Groote Eylandt is well surveyed, this species is assessed as unlikely to occur.
Bar-tailed Godwit	<i>Limosa lapponica</i>	V/CE ⁴ M(w)	V	X	X	General habitat requirements/preferences: The Bar-tailed Godwit is mainly a coastal species, and inhabits intertidal sand flats, mudflats, estuaries, harbours and coastal lagoons. The species has been recorded in coastal sewage farms and salt lakes and brackish wetlands, sandy ocean beaches, rock	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies 22 occurrences of the species in the locality, with the latest record from 2019. One record exists in the Southern Lease from 2019. This	Unlikely to occur ⁶ . The Bar-tailed Godwit is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14).	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						platforms, and around beds of seagrass (DAWE 2022q). Foraging requirements/preferences: Preferred feeding habitats include shallow water or the edge of water in tidal estuaries, harbours, or soft mud with seagrass beds (DAWE 2022q). Roosting requirements/preferences: Main habitat requirements for roosting include sandy beaches and near-coastal salt marshes (DAWE 2022q). Breeding requirements/preferences: The Bar-tailed Godwit does not breed in Australia (DAWE 2022q).	record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Eastern Curlew	<i>Numenius madagascariensis</i>	CE, M(w)	V	X	X	General habitat requirements/preferences: During the non-breeding season in Australia, the Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (DotE 2015b). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 52 occurrences of the species in the	Unlikely to occur ⁶ . The Eastern Curlew is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species mainly forages during the non-breeding season on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline (DotE 2015b). Roosting requirements/preferences: The species roosts during high tide periods on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves (DotE 2015b). Breeding requirements/preferences: The Eastern Curlew does not breed in Australia (DotE 2015b).	locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST identifies that the species or species habitat is known to occur within the 20 km search radius.	inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Australian Painted Snipe	<i>Rostratula australis</i>	E	V	X		General habitat requirements/preferences: Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DAWE 2022x). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). There are no records of this species on Groote Eylandt within the NR Maps database and it has not been recorded during previous surveys by	Unlikely to occur. The Australian Painted Snipe is a coastal / wetland species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat, and	Unlikely to occur. The species is not predicted to occur in the disturbance footprint given the absence of suitable habitat (estuarine complex habitats). In addition, there are no recent records of this

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Generally remain in dense cover when feeding, although may forage over nearby mudflats and other open areas such as ploughed land or grassland (DAWE 2022x). Breeding requirements/preferences: Breeds in shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby (DAWE 2022x).	Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	grassland areas adjacent to wetlands which are rare. Nevertheless, the species is assessed as being unlikely to occur, given the lack of records on Groote Eylandt.	species on Groote Eylandt.
Masked Owl (northern)	<i>Tyto novaehollandiae kimberli</i>	V	V		X	General habitat requirements/preferences: The northern species of the Masked Owl is known to occur in riparian forest, eucalypt tall open forest, monsoon rainforest, and Melaleuca swamps and the margins of sugar cane fields (DAWE 2022ah). Foraging requirements/preferences: The species forages in open woodland on small to medium-sized terrestrial mammals (DAWE 2022ah). Roosting requirements/preferences: The species requires large tree hollows for nesting and usually nests in areas of closed forest (DAWE 2022ah). Breeding requirements/preferences:	This species was recorded within the Southern Lease at five locations during previous recent field surveys (see Figure 16). The species was recorded in lateritic woodland and forest habitats in response to call playback. The species has also been recorded immediately adjacent to the Southern Lease (Cumberland Ecology 2019a). The Masked Owl (northern) was previously recorded within the nearby Eastern Leases at four locations by Cumberland Ecology (2015) and at 10 locations by EMS (2013). URS (2012) recorded this species at four locations in <i>E. tetradonta</i> open forest and on the margins of Melaleuca and Eucalyptus-dominated forest types.	Present. Suitable habitat is present throughout the Southern Lease as in the form of closed forest (rainforest) habitats, laterite woodland and forest habitats, sandstone woodland and forest habitats, coastal dune/swale complex habitats, and riparian/wetland habitats. These habitat types all form foraging habitat for the species. Roosting and breeding habitat also occurs within these habitat types, however roosting and breeding would predominantly occur in areas that comprise	Present. Suitable habitat is present throughout the disturbance footprint in the form of laterite woodland and forest habitats, and sandstone woodland and forest habitats. These habitat types form foraging habitat for the species. Roosting and breeding habitat also occurs within these habitat types in areas containing hollow-bearing trees with large-sized hollows.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Little is known about the life cycle of the species but it is believed to breed between March-October (DAWE 2022ah).	The NR Maps database identifies 54 occurrences of the species in the locality, with the latest record from 2018. Furthermore, 12 records are located within the Southern Lease from six locations, with the latest record from 2014.	denser vegetation such as areas containing hollow-bearing trees with large-sized hollows.	
Oriental Reed-warbler	<i>Acrocephalus orientalis</i>	M(w)		X		General habitat requirements/preferences: Found in aquatic vegetation along waterways and waterbodies. It has been recorded using Typha sp., in sugar cane plantations, and in mangroves (DotE 2015c). Foraging requirements/preferences: Little information on the foraging requirements of this species in Australia is currently known. Roosting requirements/preferences: Little information on the roosting requirements of this species in Australia is currently known. Breeding requirements/preferences: This species does not breed in Australia (DotE 2015c).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). There are no records of this species from Groote Eylandt on the NR Maps database. It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022) surveys. Given the species is readily identifiable during surveys, and Groote Eylandt is well surveyed, this species is assessed as unlikely to occur. Furthermore, the EPBC PMST does not identify the species as known within the locality.	Unlikely to occur. The species is not predicted to occur in the disturbance footprint given the absence of suitable habitat (areas of Typha sp. and mangroves). In addition, there are no recent records of this species on Groote Eylandt.
Common Sandpiper	<i>Actitis hypoleucos</i>	M(w)		X	X	General habitat requirements/preferences: This species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Potential ⁶ . The Common Sandpiper is a coastal / wetland species. A small area of potential habitat for this	Unlikely to occur. No suitable habitat for this species occurs in the disturbance

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats (DCCEEW 2022a). Foraging requirements/preferences: The species feeds for extensive periods in grasslands consuming terrestrial prey, though riverine areas are also utilised (DCCEEW 2022a) Roosting requirements/preferences: Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves (DCCEEW 2022a). Breeding requirements/preferences: The species does not breed in Australia (DCCEEW 2022a).	This species has been recorded in a previous survey by URS (2012) in monsoon/mangrove forest and coastal strand habitats, and Webb (1992) in sewage ponds. The exact location of these records is unknown. The NR Maps database identifies 14 occurrences of the species in the locality, with the latest record from 2019. One record exists within the Southern Lease from 2018. The record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST identifies that the species or species habitat is known to occur within the 20 km search radius.	species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Some limited areas of suitable wetlands also occur. This species is considered to have the potential to occur within this area of estuarine complex habitat and wetlands. However, the remainder of the Southern Lease does not contain suitable habitat.	footprint, as it does not contain estuarine complex habitat or wetland habitat.
Common Noddy	<i>Anous stolidus</i>	M(m)			X	General habitat requirements/preferences: The species occurs on or near islands, on rocky islets and stacks	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur. The Common Noddy is a coastal / marine species. A small area of potential	Unlikely to occur. The species is not predicted to occur in the disturbance

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						with precipitous cliffs, or on shoals or cays of coral or sand (DAWE 2022a). Foraging requirements/preferences: The species feeds mainly on fish, although they are known to also take squid, pelagic molluscs, medusae, aquatic insects and even Pandanus fruit (DAWE 2022a). Roosting requirements/preferences: During the non-breeding period, the species occurs in groups throughout the pelagic zone (DAWE 2022a). Breeding requirements/preferences: The species breeds in colonies, and only one breeding location is known within the Northern Territory (DAWE 2022a).	It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database has no records of this species in the Southern Lease or locality. The latest record from Groote Eylandt is from 1980. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the lack of records in recent years and the limited extent of habitat within the Southern Lease.	footprint given the absence of suitable habitat (estuarine complex habitat). In addition, there are no recent records of this species on Groote Eylandt.
Fork-tailed Swift	<i>Apus pacificus</i>	M(m)		X	X	General habitat requirements/preferences: The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher, mostly over inland plains but sometimes above foothills or in coastal areas (DCCEEW 2022b). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has been recorded in previous surveys by URS (2012), however the exact location is unknown. The NR Maps database identifies two occurrences of the species in the	Potential to occur. Potential overfly habitat is present in the Southern Lease. Suitable habitat within the Southern Lease comprises foraging habitat above closed forest (rainforest) habitats, laterite woodland and forest habitats, sandstone	Potential to occur. Potential overfly habitat is present in the disturbance footprint. Suitable habitat comprises foraging habitat above laterite woodland and forest habitats, and sandstone

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Foraging occurs anywhere from 1 m to 300 m above the ground, with the known diet comprising small bees, wasps, termites and moths (DCCEEW 2022b). Roosting requirements/preferences: The species is likely to roost aerially, but are occasionally observed to land (DCCEEW 2022b). Breeding requirements/preferences: The species does not breed in Australia (DCCEEW 2022a).	locality, with the latest record from 2019. No records exist within the Southern Lease. The EPBC PMST identifies the species or species habitat as being likely to occur within the 20 km search radius.	woodland and forest habitats, coastal dune/swale complex habitats, and riparian/wetland habitats.	woodland and forest habitats.
Ruddy Turnstone	<i>Arenaria interpres</i>	M(w)			X	General habitat requirements/preferences: The species is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches (DAWE 2022b). Foraging requirements/preferences: Mainly forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone (DAWE 2022b). Roosting requirements/preferences: Roosting occurs on beaches, above the tideline, among rocks, shells,	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 14 occurrences of the species in the locality, with the latest record from 2019. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. The Ruddy Turnstone is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						beachcast seaweed or other debris (DAWE 2022b). Breeding requirements/preferences: The Ruddy Turnstone does not breed in Australia (DAWE 2022b).			
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	M(w)		X	X	General habitat requirements/preferences: This species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW 2022c). Foraging requirements/preferences: They forage at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water (DCCEEW 2022c). Roosting requirements/preferences: Roosting occurs on or behind bare sand high on the beach, clumps of washed-up kelp, coastal dunes, and rocky reefs and ledges (DCCEEW 2022c). Breeding requirements/preferences: The Sharp-tailed Sandpiper does not breed in Australia (DCCEEW 2022c).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has been recorded in previous surveys by Webb (1992), however the exact location is unknown. The NR Maps database identifies eight occurrences of the species in the locality, with the latest record from 2018. No records exist within the Southern Lease. The EPBC PMST identifies the species or species habitat as known to occur within the 20 km search radius.	Potential to occur. The Sharp-tailed Sandpiper is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Some limited areas of suitable wetlands also occur. This species is considered to have potential to occur within this area of estuarine complex habitat and wetlands. However, the remainder of the Southern Lease does not contain suitable habitat for this species.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat or wetland habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
Pectoral Sandpiper	<i>Calidris melanotos</i>	M(w)		X		General habitat requirements/preferences: The species prefers shallow fresh to saline wetlands (DAWE 2022c). The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DAWE 2022c). Foraging requirements/preferences: The species forages in shallow water or soft mud at the edge of wetlands (DAWE 2022c). Roosting requirements/preferences: Roosting habitat occurs in proximity to foraging habitat. Breeding requirements/preferences: The Pectoral Sandpiper does not breed in Australia (DAWE 2022c).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify any occurrences of the species in the locality, although does identify one record within the existing mine to the north from 2014. The EPBC PMST identifies that the species or species habitat is likely to occur within the 20 km search radius.	Unlikely to occur. The Pectoral Sandpiper is a coastal / wetland species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Some limited areas of wetlands also occur. Nevertheless, the species is assessed as being unlikely to occur, given the scarcity of records.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.
Red-necked Stint	<i>Calidris ruficollis</i>	M(w)			X	General habitat requirements/preferences: The species is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DAWE 2022d). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 40 occurrences of the species in the	Unlikely to occur⁶. The Red-necked Stint is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14).	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water (DAWE 2022d). Roosting requirements/preferences: The species roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation (DAWE 2022d). Breeding requirements/preferences: The Red-necked Stint does not breed in Australia (DAWE 2022d).	locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Streaked Shearwater	<i>Calonectris leucomelas</i>	M(m)			X	General habitat requirements/preferences: The species has been observed over open ocean and on islands (Takahashi et al. 2008a). Foraging requirements/preferences: Areas near the continental shelf that have high primary productivity may be suitable foraging habitat (Takahashi et al. 2008b).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992).	Unlikely to occur. No suitable habitat for this species occurs in the Southern Lease, which is located outside of marine areas.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, which is located outside of marine areas.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Roosting requirements/preferences: The species is known to nest in burrows (Takahashi et al. 2008b). Breeding requirements/preferences: This species does not breed in Australia (Takahashi et al. 2008b).	The NR Maps database does not identify any records of the species within Groote Eylandt. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. However, this result should be viewed in light of the fact that the PMST radius includes coastal areas, not predominantly representative of the Southern Lease.		
Red-rumped Swallow	<i>Cecropis daurica</i>	M(t)			X	General habitat requirements/preferences: The species is found at locations with wetlands and open areas, such as golf courses (DotE 2015c). Foraging requirements/preferences: Predominately forages over wetlands, for example swamps, rivers, dams, or open areas such as golf course or cane fields, where insects are taken on the wing (DotE 2015c). Roosting requirements/preferences: As with most swallows and martins, Red-rumped Swallows often perch on bare branches or wires (DotE 2015c). Breeding requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). It has not been recorded on Groote Eylandt during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify any records of the species within the locality. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	Unlikely to occur. This species has been assessed as having a low potential to occur, given no suitable habitat for this species occurs in the Southern Lease, and given it has not been recorded on Groote Eylandt in recent years, despite numerous fauna surveys.	Unlikely to occur. The species is not predicted to occur in the disturbance footprint given the absence of suitable habitat (wetland and open areas). In addition, there are no recent records of this species on Groote Eylandt.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						This species does not breed in Australia (DotE 2015c).			
Oriental Plover	<i>Charadrius veredus</i>	M(w)		X	X	General habitat requirements/preferences: The Oriental Plover is known to spend several weeks in coastal areas when first arriving in northern Australia, and then eventually moves further inland. The species prefers flat, open, grasslands with areas of bare ground or areas recently burnt, including dry paddocks or clay pans. The species has also been sighted near terrestrial wetlands and in salt marshes (DAWE 2022h). Foraging requirements/preferences: The species is usually found foraging in short grass or on stony bare ground. It is also known to feed on mudflats and on beaches with beach cast seaweed (DAWE 2022h). Roosting requirements/preferences: Oriental Plovers roost on wet mud, near the shallow water of beaches, and in salt marshes or paddocks (DAWE 2022h). Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022h).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies one occurrence of the species in the locality, with the record undated. No records exist within the Southern Lease. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	Unlikely to occur. The Oriental Plover is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
White-winged Black Tern	<i>Chlidonias leucopterus</i>	M(m)			X	General habitat requirements/preferences: The species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands (DAWE 2022i). They rarely occur on inland wetlands in Australia (DAWE 2022i). Foraging requirements/preferences: The species mainly forages aerially, over water or over muddy or sandy edges of wetlands; and also forages over land adjacent to wetlands, especially if inundated, including rice paddies and dry paddocks and grassland (DAWE 2022i). Roosting requirements/preferences: The species often roosts or loafs on ground at the edges of wetlands, including sandflats, mudflats, beaches, spits, banks, islets and rocks (DAWE 2022i). Breeding requirements/preferences: The species does not breed in Australia (DotEE 2019a).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies four occurrences of the species in the locality, with the latest record from 2016. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. The White-winged Black Tern is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.
Oriental Cuckoo	<i>Cuculus optatus</i>	M(t)			X	General habitat requirements/preferences: The species is found in coastal regions across northern and eastern Australia as well as offshore islands (DotE 2015c). The species uses a	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022)	Unlikely to occur. The species has not been recorded within the disturbance footprint during

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (DotE 2015c). Foraging requirements/preferences: This species feeds arboreally, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes (DotE 2015c). It will also forage from the ground (DotE 2015c). Roosting requirements/preferences: The species requires shrubs or trees from which it sallies and returns to consume prey items (DotE 2015c). Breeding requirements/preferences: This species does not breed in Australia (DotE 2015c).	It has not been recorded on Groote Eylandt during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify any occurrences of the species in the locality. The NR Maps database has five records from Groote Eylandt, near the township of Angurugu and the Cave Paintings. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius.	surveys, despite being readily identifiable by plumage and call. Therefore, this species is assessed as unlikely to occur.	previous or recent (2016-2022) surveys. Given the species is readily identifiable during surveys, and Groote Eylandt is well surveyed, this species is assessed as unlikely to occur.
Lesser Frigatebird	<i>Fregata ariel</i>	M(m)		X	X	General habitat requirements/preferences: This species occurs in pelagic habitat (BirdLife International 2022a). Foraging requirements/preferences: It feeds mainly on fish (especially flying-fish) and squid, but also on seabird eggs and chicks, carrion and	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed	Unlikely to occur. The Lesser Frigatebird is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						fish scraps (BirdLife International 2022a). Roosting requirements/preferences: This species occurs in pelagic habitat (BirdLife International 2022a). Breeding requirements/preferences: breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground (BirdLife International 2022a).	by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies four occurrences of the species in the locality, with the latest record from 2016. No records exist within the Southern Lease. The EPBC PMST identifies that the species or species habitat is likely to occur within the 20 km search radius.	estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Great Frigatebird	<i>Fregata minor</i>	M(m)			X	General habitat requirements/preferences: This species occurs in pelagic habitat (BirdLife International 2022b). Foraging requirements/preferences: The species feed on fish, squid and chicks of other bird species (BirdLife International 2022b). Roosting requirements/preferences: This species occurs in pelagic habitat (BirdLife International 2022b). Breeding requirements/preferences: The species breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes and occasionally on bare ground (BirdLife International 2022b).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify any records of the species within Groote Eylandt. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. However, this result should be viewed in light of the fact that the PMST radius includes coastal areas,	Unlikely to occur. No suitable habitat for this species occurs in the Southern Lease, which is located outside of marine areas, and given it has not been recorded on Groote Eylandt, despite numerous fauna surveys.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, which is located outside of marine areas.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
							not predominantly representative of the Southern Lease.		
Oriental Pratincole	<i>Glareola maldivarum</i>	M(w)		X	X	General habitat requirements/preferences: The Oriental Pratincole is found in short grassland or on floodplains in close proximity to wetlands and lakes, as well as on beaches and mudflats along the coast. It prefers habitats with extensive bare areas (DAWE 2022m). Foraging requirements/preferences: The species usually forages aerially in large flocks, from just above the ground to 300 m. They are seen near cyclonic storms or fires to catch prey. They are also seen foraging on the ground (DAWE 2022m). Roosting requirements/preferences: The Oriental Pratincole usually roosts in bare areas that have low vegetation, such as salt marshes, airfields or clay pans (DAWE 2022m). Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022m).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies two occurrences of the species in the locality, with the latest record from 2018. No records exist within the Southern Lease. The EPBC PMST identifies the species or species habitat may occur within the 20 km search radius.	Unlikely to occur. The Oriental Pratincole is a coastal / wetland species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14), and grassland areas adjacent to wetlands which are rare. Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat or grassland areas adjacent to wetlands.
Barn Swallow	<i>Hirundo rustica</i>	M(t)		X		General habitat requirements/preferences: The Barn Swallow occurs above open vegetated areas including farmland,	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur. The species has not been recorded within the Southern Lease	Unlikely to occur. No suitable habitat for this species occurs in the

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						sports grounds, native grasslands and airstrips as well as over open water such as billabongs, lagoons, creeks and sewage treatment plants. (DotE 2015c). Foraging requirements/preferences: The species prefers to feed on insects by aerial pursuit or by skimming plants or water surface. It is occasionally seen feeding on roads, paths and beaches (DAWE 2022n). Roosting requirements/preferences: The Barn Swallow nests on small vertical surfaces, such as window-ledge of buildings, typically, two to five metres from the ground (DAWE 2022n). Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022n).	It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). There are no records of this species from Groote Eylandt on the NR Maps database. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	during previous or recent (2016-2022) surveys. Very limited areas of grassland (in estuarine complex habitats) and open water (in riparian/wetland habitats) have been recorded within the Southern Lease. The species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease. Furthermore, the EPBC PMST does not identify the species as known within the locality.	disturbance footprint, as it does not contain areas of grassland (in estuarine complex habitats) and open water (in riparian/wetland habitats).
Caspian Tern	<i>Hydroprogne caspia</i>	M(m)			X	General habitat requirements/preferences: The species is mostly found in sheltered coastal embayments and those with sandy or muddy margins are preferred (DAWE 2022o). Foraging requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992).	Unlikely to occur⁶. The Caspian Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as	Unlikely to occur. No suitable habitat for this species occurs in disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species usually forages in open wetlands, including lakes and rivers (DAWE 2022o). Roosting requirements/preferences: Generally roosting occurs on bare exposed sand or shell spits, banks or shores of coasts, lakes, estuaries, coastal lagoons and inlets (DAWE 2022o). Breeding requirements/preferences: The species breeds on variable types of sites including low islands, cays, spits, banks, ridges, beaches of sand or shell, terrestrial wetlands and stony or rocky islets or banks (DAWE 2022o).	The NR Maps database identifies 21 occurrences of the species in the locality, with the latest record from 2019. One record exists within the Southern Lease from 2019. This record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	M(w)		X	X	General habitat requirements/preferences: The species occurs in sheltered coastal environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats (DAWE 2022p). Foraging requirements/preferences: The species feeds on inter-tidal mudflats and is known to eat	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies two occurrences of the species in the locality, with the latest record from	Unlikely to occur. The Asian Dowitcher is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						polychaete worms and larvae, also insect larvae and molluscs (DAWE 2022p). Roosting requirements/preferences: The species roosts during the non-breeding season in sheltered coastal environments, primarily estuarine and intertidal mudflats, lagoons, creeks and saltworks (DAWE 2022p). Breeding requirements/preferences: The Asian Dowitcher does not breed in Australia (DAWE 2022p).	2019. No records exist within the Southern Lease. The EPBC PMST identifies the species or species habitat may occur within the 20 km search radius.	unlikely to occur, given the limited extent of habitat within the Southern Lease.	
Black-tailed Godwit	<i>Limosa limosa</i>	M(w)			X	General habitat requirements/preferences: The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit (DAWE 2022r). Foraging requirements/preferences: The species forages on wide intertidal mudflats or sandflats, in soft mud or shallow water and occasionally in shallow estuaries (DAWE 2022r). Roosting requirements/preferences: The claypan may be an important roost site for this species at least	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies two occurrences of the species in the locality, with the latest record from 2015. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. The Black-tailed Godwit is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the lack of records in recent years and the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						during the non-breeding season (DAWE 2022r). Breeding requirements/preferences: The Black-tailed Godwit does not breed in Australia (DAWE 2022r).			
Grey Wagtail	<i>Motacilla cinerea</i>	M(t)		X		General habitat requirements/preferences: All confirmed Australian records are associated with water; especially creeks, rivers and waterfalls (DotE 2015c). Foraging requirements/preferences: The diet of the Grey Wagtail reflects its habitat with it feeding on a variety of insects as well as other small prey items such as molluscs, crustaceans and occasionally small fish and tadpoles (DotE 2015c). Roosting requirements/preferences: Little information on the roosting requirements of this species in Australia is currently known. Breeding requirements/preferences: This species does not breed in Australia (DotE 2015c).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). There are no records of this species from Groote Eylandt on the NR Maps database. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	Unlikely to occur. The species has not been recorded within the Southern Lease during previous or recent (2016-2022) surveys. It has also not been previously recorded on Groote Eylandt, despite numerous fauna surveys. Given the lack of records despite numerous surveys, this species has been assessed as being unlikely to occur.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain waterways.
Yellow Wagtail	<i>Motacilla flava</i>	M(t)		X		General habitat requirements/preferences:	This species was not recorded during recent fauna studies within the	Unlikely to occur. Some potential habitat for the Yellow Wagtail	Unlikely to occur. The species is not predicted to occur

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Habitat requirements for the Yellow Wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, and the species sometimes utilises tidal mudflats and edges of mangroves (DotE 2015c). Foraging requirements/preferences: Little information on the foraging requirements of this species in Australia is currently known. Roosting requirements/preferences: This species roosts in mangroves and other dense vegetation (DotE 2015c). Breeding requirements/preferences: This species does not breed in Australia (DotE 2015c).	Southern Lease by Cumberland Ecology (2016-2022). It has not been recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). There are no records of this species from Groote Eylandt on the NR Maps database. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	exists in the Southern Lease in the form of estuarine complex habitats, (refer Figure 14), and grassland areas adjacent to wetlands which are rare. Although the vegetation on the Southern Lease has some potential to provide habitat for the Yellow Wagtail, this species has been assessed as having a low potential to occur, given that the species has never been recorded on Groote Eylandt, despite numerous fauna surveys. There is also only a limited extent of habitat within the Southern Lease.	in the disturbance footprint given the absence of suitable habitat (estuarine complex habitats and grassland areas adjacent to wetlands). In addition, there are no recent records of this species on Groote Eylandt.
Whimbrel	<i>Numenius phaeopus</i>	M(w)			X	General habitat requirements/preferences: The species is often found on the intertidal mudflats of sheltered coasts (DAWE 2022t).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur⁶. The Whimbrel is a coastal species. A small area of potential habitat for this species occurs in the south-western	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Foraging requirements/preferences: The species generally forages on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves (DAWE 2022t). Roosting requirements/preferences: The species often roosts in the branches of mangroves around mudflats and in estuaries and occasionally in tall coastal trees (DAWE 2022t). Breeding requirements/preferences: The Whimbrel does not breed in Australia (DAWE 2022t).	This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 39 occurrences of the species in the locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	not contain estuarine complex habitat.
Eastern Osprey	<i>Pandion cristatus</i> ⁶	M(w)		X	X	General habitat requirements/preferences: The Eastern Osprey occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DCCEEW 2022g). They are mostly	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Present. NR Maps hold two records of the species in the Southern Lease. Suitable foraging, roosting and breeding habitat in the Southern	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain coastal

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						found in coastal areas but occasionally travel inland along major rivers (DCCEE 2022g). Foraging requirements/preferences: They require extensive areas of open fresh, brackish or saline water for foraging (DCCEE 2022g). Roosting requirements/preferences: This species constructs stick nests in a variety of natural and artificial sites including in dead or partly dead trees or bushes; on cliffs, rocks, rock stacks or islets; on the ground on rocky headlands, coral cays, deserted beaches, sandhills or saltmarshes; and on artificial nest platforms, pylons, jetties, lighthouses, navigation towers, cranes, exposed shipwrecks and offshore drilling rigs (DCCEE 2022g). Breeding requirements/preferences: The Eastern Osprey breed as monogamous pairs (DCCEE 2022g) between April and February, with breeding season influenced by latitude (Commonwealth of Australia 2020).	This species has been recorded in a previous survey by URS (2012) within coastal strand vegetation. The NR Maps database identifies 37 occurrences of the species in the locality, with the latest record from 2019. Two records exist within the Southern Lease from 2019. One is a single record within an area of white rock to the west of Yenbakwa Road and it is considered likely that this is a flyover record due to the distance from waterways. The second record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST identifies the species as having potential to occur within the 20 km search radius.	Lease occurs in coastal dune/swale complex habitats, riparian/wetland habitats and estuarine complex areas (refer Figure 14), predominantly in riparian areas along watercourses.	dune/swale complex habitats, riparian/wetland habitats or estuarine complex habitat, or any watercourses.
White-tailed Tropicbird	<i>Phaethon lepturus</i>	M(m)			X	General habitat requirements/preferences: Species is primarily oceanic in tropical waters, rarely inshore, and	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur. No suitable habitat for this species occurs in the Southern Lease, which is	Unlikely to occur. No suitable habitat for this species occurs in the

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						only is near land when breeding (DAWE 2020d). Foraging requirements/preferences: The species feeds mainly on fish and cephalopods, captured by deep plunge diving (DAWE 2020d). Roosting requirements/preferences: The species is primarily oceanic (DAWE 2020d). Breeding requirements/preferences: Nests are located on islands and atolls utilising a variety of habitats from closed canopy rainforest to bare sandy ground and rugged rocky terrain (DAWE 2020d).	The species has not been recorded in areas adjacent to the Southern Lease in previous surveys performed by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify any records of the species within Groote Eylandt. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. However, this result should be viewed in light of the fact that the PMST radius includes coastal areas, not predominantly representative of the Southern Lease.	located outside of marine areas.	disturbance footprint, which is located outside of marine areas.
Glossy Ibis	<i>Plegadis falcinellus</i>	M(w)			X	General habitat requirements/preferences: Within Australia, the largest contiguous areas of prime habitat is inland and northern floodplains (DAWE 2022u). Foraging requirements/preferences: The preferred habitat for foraging is freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies one occurrence of the species in the locality from 2017. No records exist within the Southern Lease.	Unlikely to occur. Although the estuarine complex habitats (refer Figure 14) within the Southern Lease have some potential to provide habitat for the Glossy Ibis, this species has been assessed as having a low potential to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						and cultivated areas under irrigation (DAWE 2022u). Roosting requirements/preferences: The species roost in trees or shrubs usually near, but sometimes far, from water bodies (DAWE 2022u). Breeding requirements/preferences: The preferred habitat for breeding is fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (DAWE 2022u).	The EPBC PMST does not identify habitat for this species within the 20 km search radius.		
Pacific Golden Plover	<i>Pluvialis fulva</i>	M(w)			X	General habitat requirements/preferences: In Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands (DAWE 2022v). Foraging requirements/preferences: This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs (DAWE 2022v). Roosting requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species has been recorded in a previous survey by Webb (1992) within tailings/water storage dams at the existing mine. The NR Maps database identifies eight occurrences of the species in the locality, with the latest record from 2019. One record exists within the Southern Lease from 2019. This record is from the same location as 17 other species. It appears that a	Unlikely to occur⁶. The Pacific Golden Plover is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed (DAWE 2022v). Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022v).	single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	the limited extent of habitat within the Southern Lease.	
Grey Plover	<i>Pluvialis squatarola</i>	M(w)			X	General habitat requirements/preferences: The species occurs almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons (DAWE 2022w). Foraging requirements/preferences: The species usually forages on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons (DAWE 2022w). Roosting requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 22 occurrences of the species in the locality, with the latest record from 2019. One record exists within the Southern Lease from 2019. This record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore	Unlikely to occur⁶. The Lesser Sand Plover is a coastal species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in the area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species usually roosts in sandy areas, such as on unvegetated sandbanks or sand-spits on sheltered beaches or other sheltered environments such as estuaries or lagoons (DAWE 2022w). Breeding requirements/preferences: This species does not breed in Australia (DAWE 2022w).	considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	habitat within the Southern Lease.	
Rufous Fantail	<i>Rhipidura rufifrons</i>	M(t)		X		General habitat requirements/preferences: In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (<i>Melaleuca</i> spp.) (DCCEEW 2022h). Foraging requirements/preferences: The species forages mainly in the low to middle strata of forests, sometimes in or below the canopy or on the ground; in northern Australia they also forage in mangroves (DCCEEW 2022h). Roosting requirements/preferences: Roosting occurs in nests made from grass, roots, bark, wood, moss and spider web (DCCEEW 2022h).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has been recorded during a previous survey by Webb (1992) in monsoon vine forest on the western side of Groote Eylandt. There are no records of this species from Groote Eylandt on the NR Maps database, however there are a number of records of the Arafura Fantail. The Arafura Fantail has previously been considered a subspecies of the Rufous Fantail, but it has been split taxonomically and now accepted as a species. The Arafura Fantail is not listed under the EPBC Act or TPWC Act. The Arafura Fantail occurs	Unlikely to occur. Due to taxonomic changes the species occurring on Groote Eylandt is the Arafura Fantail and not the Rufous Fantail, which has a different distribution in Australia.	Unlikely to occur. Due to taxonomic changes the species occurring on Groote Eylandt is the Arafura Fantail and not the Rufous Fantail, which has a different distribution in Australia.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Breeding requirements/preferences: The species breeds from about September to February, and eggs are laid in a small cup-shaped nest which is usually made from grass, roots, fine strips of bark, plant-fibre, decayed wood, moss and spider web (DCCEEW 2022h) .	across much of northern Australia, from coastal west Cape York Peninsula and the Gulf Country, through Northern Territory, mostly north of 14°S, and west to coastal areas of the Kimberley region, Western Australia. The Webb (1992) record occurred prior to the taxonomic change, and is therefore considered to represent the Arafura Fantail.		
Roseate Tern	<i>Sterna dougallii</i>	M(m)		X	X	General habitat requirements/preferences: The species occurs in coastal and marine areas in subtropical and tropical seas (DAWE 2022z). The species inhabits rocky and sandy beaches, coral reefs, sand cays and offshore islands (DAWE 2022z). Foraging requirements/preferences: The species forages mainly on fish, but also on some crustaceans (DAWE 2022z). Roosting requirements/preferences: The species usually roosts or loafs in the intertidal zone on islands, including on the upper sections of beaches, above the high-water mark on banks, spits and bars, usually of coral or sand (DAWE 2022z).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies four occurrences of the species in the locality, with the latest record from 2019. No records exist within the Southern Lease. The EPBC PMST identifies the species as having potential to occur within the 20 km search radius.	Unlikely to occur. The Roseate Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Breeding requirements/preferences: Breeding mainly occurs off the coasts of Western Australia, the Northern Territory and Queensland (DAWE 2022z). In the Northern Territory, some colonies nest between April and June/July, but the majority nest between September and January/February (DAWE 2022z).			
Common Tern	<i>Sterna hirundo</i>	M(m)			X	General habitat requirements/preferences: The species is marine, pelagic and coastal (DAWE 2022aa). Foraging requirements/preferences: The species forages in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea (DAWE 2022aa). Roosting requirements/preferences: The species roosts on unvegetated, intertidal sandy ocean beaches, sandy islands, shores of estuaries or lagoons, and sandbars, as well as on rocky shores, rock platforms or rocks protruding above the surface of the water (DAWE 2022aa). Breeding requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 10 occurrences of the species in the locality, with the latest record from 2015. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. The Common Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						This species does not breed in Australia (DAWE 2022aa).			
Black-naped Tern	<i>Sterna sumatrana</i>	M(m)			X	General habitat requirements/preferences: The species is mainly associated with small, offshore sand and coral cays, coral reefs and lagoons, and sandy and rocky islands and islets, and in the surrounding seas (DAWE 2022ab). Foraging requirements/preferences: The species forages on and around coral reefs, over lagoons, reef-flats, reef-crests and reef-edges as well as rock pools and the open sea beyond the surf-zone along outer reefs (DAWE 2022ab). Roosting requirements/preferences: The species usually roost near the edge of the water, on sandy beaches or spits and occasionally on rubble banks or rocks (DAWE 2022ab). Breeding requirements/preferences: The species breeds on islands, which are very occasionally close to or attached to the mainland at low tides, and forage in seas surrounding colonies (DAWE 2022ab).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies eight occurrences of the species in the locality, with the latest record from 2019. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. The Black-naped Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.
Little Tern	<i>Sternula albifrons</i>	M(m)			X	General habitat requirements/preferences:	This species was not recorded during recent fauna studies within the	Unlikely to occur⁶.	Unlikely to occur.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species inhabits sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches (DAWE 2022ac). Foraging requirements/preferences: The species forages in shallow waters of estuaries, coastal lagoons and lakes, frequently over channels next to spits and banks or entrances, and often close to breeding colonies (DAWE 2022ac). Roosting requirements/preferences: The species roosts on sand-spits, banks and bars within sheltered estuarine or coastal environments, or on the sandy shores of lakes and ocean beaches (DAWE 2022ac). Breeding requirements/preferences: The species nest on sand-spits, banks, ridges or islets in sheltered coastal environments, such as coastal lakes, estuaries and inlets, and also on wide and flat or gently sloping sandy ocean beaches, and also, occasionally, in sand-dunes (DAWE 2022ac).	Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 27 occurrences of the species in the locality, with the latest record from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	The Little Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
Brown Booby	<i>Sula leucogaster</i>	M(m)			X	General habitat requirements/preferences: The species uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands (DAWE 2022ad). Foraging requirements/preferences: The species forages in tropical waters of all major oceans, often staying close to breeding islands (DAWE 2022ad). Roosting requirements/preferences: The species cords on the ground in a variety of sites, from rugged rocky terrain (cliffs, steep slopes) on larger islands, to beaches, sand bards, coral rubble and guano flats on cays, as well as artificial structures (DAWE 2022ad). Breeding requirements/preferences: The species utilises tropical islands, continental islands, sand cays and atolls for breeding (DAWE 2022ad).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies two occurrences of the species in the locality from 2019. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Unlikely to occur. No suitable habitat for this species occurs in the Southern Lease, which is located outside of marine areas.	Unlikely to occur. No suitable habitat for this species occurs in disturbance footprint, which is located outside of marine areas.
Lesser Crested Tern	<i>Thalasseus bengalensis</i>	M(m)			X	General habitat requirements/preferences: The Lesser Crested Tern occurs in coastal bays and inlets, lakes and large rivers. It frequents coastal seas	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur⁶. The Lesser Crested Tern is a coastal / marine species. A small area of potential habitat for this	Unlikely to occur. No suitable habitat for this species occurs in the disturbance

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						using shores of sandy beaches, coral cays, exposed reefs, and islands. On parts of the coast it uses mudflats of estuaries, and creek channels (Pizzey and Knight 1997). Foraging requirements/preferences: Feed primarily in marine environments, diving for fish (Pizzey and Knight 1997). Roosting requirements/preferences: The species roosts in closely packed colonies on small offshore islands. Nests are shallow, unlined scrape in the sand (Pizzey and Knight 1997). Breeding requirements/preferences: Breeds in closely packed colonies on low sand and coral cays of reefs, offshore islands or sandbars (Pizzey and Knight 1997).	This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies nine occurrences of the species in the locality, with the latest record from 2019. One record exists within the Southern Lease, from 2018. This record is from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	footprint, as it does not contain estuarine complex habitat.
Crested Tern	<i>Thalasseus bergii</i>	M(w)			X	General habitat requirements/preferences: The species inhabits tropical and subtropical coastlines, foraging in the shallow waters of lagoons, coral reefs, estuaries, bays, harbours and inlets, along sandy, rocky, coral or muddy shores, on rocky outcrops in open sea, in mangrove swamps and	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). There are no records of this species from Groote Eylandt on the NR Maps database.	Unlikely to occur. The Crested Tern is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as	Unlikely to occur. The species is not predicted to occur in the disturbance footprint given the absence of suitable habitat (estuarine complex habitats). In addition, there

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						also far out to sea on open water (BirdLife International 2022c). Foraging requirements/preferences: It feeds predominantly on pelagic fish, an opportunistically on cephalopods, crustaceans, prawns, insects and hatchling turtles (BirdLife International 2022c). Breeding requirements/preferences: The species nest comprises a shallow scrape in bare sand, rock or coral in flat open sites. The species nests in dense colonies (BirdLife International 2022c)	The EPBC PMST identifies the species as having potential to occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	estuarine complex habitat (refer Figure 14). Nevertheless, the species is assessed as being unlikely to occur, given the lack of records and the limited extent of habitat within the Southern Lease.	are no recent records of this species on Groote Eylandt.
Grey-tailed Tattler	<i>Tringa brevipes</i>	M(w)			X	General habitat requirements/preferences: The species is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats (DAWE 2022ae). Foraging requirements/preferences: The species usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge (DAWE 2022ae). Roosting requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 25 occurrences of the species in the locality, with the latest from 2018. One record exists within the Southern Lease from 2018. This record is from the same location as 17 other species. It appears that a single coordinate was utilised for this	Unlikely to occur⁶. The Grey-tailed Tattler is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species usually roosts in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood (DAWE 2022ae). Breeding requirements/preferences: This species does not breed in Australia (DAWE 2022ae).	species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	the limited extent of habitat within the Southern Lease.	
Common Greenshank	<i>Tringa nebularia</i>	M(w)		X	X	General habitat requirements/preferences: Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (DAWE 2022af). It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass (DAWE 2022af). Foraging requirements/preferences: The species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DAWE 2022af). It will occasionally feed on	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species has been recorded in a previous survey by Webb (1992) at the Angurugu township sewerage ponds. The NR Maps database identifies 36 occurrences of the species in the locality, with the latest from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the	Potential⁶. The Common Greenshank is a coastal / wetland species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Some limited areas of wetlands also occur. This species is considered to have potential to occur within this area of estuarine complex habitat and wetlands. However, the remainder of the Southern Lease does not	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat or wetland habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						exposed seagrass beds (DAWE 2022af). Roosting requirements/preferences: Roosts and loafs around wetlands, in shallow pools and puddles, or slightly elevated on rocks, sandbanks or small muddy islets (DAWE 2022af). Occasionally the species will perch and roost on stakes (DAWE 2022af). Breeding requirements/preferences: The species does not breed in Australia (DAWE 2022af).	actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) and limited available habitat. The EPBC PMST identifies the species as likely to occur within the 20 km search radius.	contain suitable habitat for this species.	
Marsh Sandpiper	<i>Tringa stagnatilis</i>	M(w)			X	General habitat requirements/preferences: The species lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DAWE 2022ag). Foraging requirements/preferences: The species usually forages in shallow water at the edge of wetlands (DAWE 2022ag). Roosting requirements/preferences:	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species has been recorded in a previous survey by URS (2012) within mine rehabilitation. The NR Maps database identifies three occurrences of the species in the locality, with the latest from 2018. No records exist within the Southern Lease. The EPBC PMST does not identify habitat for this species within the 20 km search radius.	Potential to occur. The Marsh Sandpiper is a coastal / wetland species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Some limited areas of suitable wetlands also occur. This species is considered to have potential to occur within this area of estuarine complex habitat and wetlands. However, the	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat or wetland habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The species has been recorded roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps (DAWE 2022ag). Breeding requirements/preferences: The Marsh Sandpiper does not breed in Australia (DAWE 2022ag).		remainder of the Southern Lease does not contain suitable habitat for this species.	
Terek Sandpiper	<i>Xenus cinereus</i>	M(w)			X	General habitat requirements/preferences: The species occurs on mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (DAWE 2022ai). Foraging requirements/preferences: This species mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons (DAWE 2022ai). Roosting requirements/preferences: The species prefers to roost in or among mangroves (DAWE 2022ai). Breeding requirements/preferences: This species does not breed in Australia (DAWE 2022ai).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). This species was not recorded during surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies 13 occurrences of the species in the locality, with the latest from 2019. Two records exist within the Southern Lease, with the latest record from 2019. Both records (one each from 2018 and 2019) are from the same location as 17 other species. It appears that a single coordinate was utilised for this species, that doesn't reflect the actual location of the detected individuals. It is therefore considered that the record of this species within the Southern Lease is not accurate due to the general location description (noted as being	Unlikely to occur⁶. The Terek Sandpiper is a coastal / marine species. A small area of potential habitat for this species occurs in the south-western corner of the Southern Lease, in an area mapped as estuarine complex habitat (refer Figure 14). Despite the presence of the NR Map record (which is considered to be an inaccurate location), the species is assessed as being unlikely to occur, given the limited extent of habitat within the Southern Lease.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain estuarine complex habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
							at Salt Creek and associated road) and limited available habitat. The EPBC PMST does not identify habitat for this species within the 20 km search radius.		
MAMMALS									
Brush-tailed Rabbit-rat	<i>Conilurus penicillatus</i>	V	E	X	X	General habitat requirements/preferences: The Brush-tailed Rabbit-rat appears to have quite specific habitat requirements and is largely restricted to mixed eucalypt open forest and woodland, or on dunes with Casuarina (Threatened Species Scientific Committee 2008). Preference appears to be given to habitats that are not burnt annually, that have an understorey of predominantly perennial grasses and a sparse-to-moderate middle storey (Threatened Species Scientific Committee 2008). Foraging requirements/preferences: Most foraging is on the ground, but it is also partly arboreal (Woinarski and Hill 2012a). The diet of the Brush-tailed Rabbit-rat consists primarily of seed, particularly from perennial grasses (Firth 2007) with some fruits, invertebrates and leaves (Woinarski and Hill 2012a).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). Cumberland Ecology (2023) recorded the species at 54 locations in the north of the island, none of which were in the locality. Heiniger and Gillespie (2017) detected the species at 19 locations, of which four were located within the locality, however none were within the Southern Lease. It was also recorded in the nearby Eastern Leases in 2014 (Cumberland Ecology 2015). This species was recorded on a motion-sensor camera within <i>E. tetradonta</i> / <i>E. miniata</i> open forest (Cumberland Ecology 2015). The Brush-tailed Rabbit-rat has also been recorded previously within the Eastern Leases by Ward (2007a) and EMS (2013). The NR Maps database identifies 27 occurrences of the species in the	Unlikely to occur. Extensive camera surveys undertaken by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) did not detect the species, despite utilising survey methods suitable for the detection of the species. The lack of records suggests that the species is not present in the areas sampled. Given high survey intensity and sampling across a range of suitable habitats, it is concluded that there is a low probability of occurrence for the species in the Southern Lease. Although the potential for occurrence is assessed as unlikely, it is	Unlikely to occur. The species was not detected during recent surveys by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) despite utilising survey methods suitable for the detection of the species. Survey effort within 500m of the disturbance footprint by Cumberland Ecology (2019c) included 10 camera sites (1,923 capture nights), and by Cumberland Ecology (2022) included 39 sites (4,204 capture nights). Heiniger

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Requirements/preferences for shelter sites: Brush-tailed rabbit-rats shelters in tree hollows, hollow logs and, less frequently, in the crowns of pandanus or sand-palms (Woinarski and Hill 2012a). Breeding requirements/preferences: Breeding season occurs from March to October with a litter size of two or three (Threatened Species Scientific Committee 2016b).	locality, with the latest from 2016. No records exist within the Southern Lease. The EPBC PMST identifies that the species or species habitat may occur within the 20 km search radius. A further discussion of the species is provided in Section 6.3.2.4 .	noted that there is still some potential for it to be present in low numbers in parts of the Southern Lease that have not been subject to extensive fauna survey (e.g. such as to the north east of the Amagula River and east of the Innokumanja River). These unsurveyed portions are located outside of the disturbance footprint (see Figure 7) and are separated from the disturbance footprint by rivers.	and Gillespie (2017) and Heiniger et al. (2020) also undertook surveys within 500m of the disturbance footprint.
Northern Quoll	<i>Dasyurus hallucatus</i>	E	CE	X	X	General habitat requirements/preferences: The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (DAWE 2020a). Foraging requirements/preferences: They are opportunistic omnivores that feed on a broad range of items, including beetles, grasshoppers, spiders, scorpions, centipedes, fruit	This species was recorded at 172 locations within the Southern Lease during recent (2016-2022) field surveys by Cumberland Ecology (see Figure 16). This species was recorded within a range of habitats. Cumberland Ecology (2023) recorded the species at 74 locations within the Southern Lease. Heiniger and Gillespie (2017) and Heiniger et al. (2020) also recently recorded the species at numerous locations within the Southern Lease. Cumberland Ecology (2019a) recorded the	Present. Recorded extensively within the Southern Lease during previous and recent surveys by Cumberland Ecology and others. Suitable foraging, shelter and breeding habitat is present throughout the Southern Lease in closed forest (rainforest) habitats, laterite woodland and forest habitats, sandstone woodland and forest	Present. Recorded at numerous locations within the disturbance footprint. Suitable habitat is present throughout the disturbance footprint in laterite woodland and forest habitats, and sandstone woodland and forest habitats.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						and nectar, switching dietary resources according to season and availability (Hill and Ward 2010, DAWE 2020a) Requirements/preferences for shelter sites: Den sites include rocky outcrops and crevices, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (Hill and Ward 2010, DAWE 2020a). Breeding requirements/preferences: Breeding habitat for the Northern Quoll occurs within den sites. Northern Quolls breed once each year, with females bearing on average seven young, weaning two or three (DCCEEW 2022e).	species at a number of other locations to the south and west of the Southern Lease. Heiniger and Gillespie (2017) also detected the species extensively to the north of the Southern Lease. It has been recorded during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). This species is known to occur in areas of mine rehabilitation in the existing GEMCO mine (URS Australia Pty Ltd 2012, Cumberland Ecology 2015). The NR Maps database identifies 1,520 occurrences of the species in the locality, with the latest from 2018. Numerous records of the species exist within the Southern Lease. The EPBC PMST identifies the species or species habitat as being known to occur within the 20 km search radius.	habitats, coastal dune/swale complex habitats and riparian/wetland habitats.	
Ghost Bat	<i>Macroderma gigas</i>	V		X	X	General habitat requirements/preferences: This species occupies habitats ranging from the arid Pilbara to tropical savanna woodlands and	This species was recorded during recent (2022) fauna surveys by Cumberland Ecology. This species has been recorded on the existing GEMCO mine in a	Present. Suitable roosting and foraging habitat for this species occurs in the Southern Lease in the form of closed forest	Potential to occur. Suitable foraging habitat for this species occurs in the disturbance footprint in the form

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						rainforests (Threatened Species Scientific Committee 2016c). Foraging requirements/preferences: They are carnivores, with a broad diet comprising small mammals including other bats, birds, reptiles, frogs and large insects (Threatened Species Scientific Committee 2016c). It perches in vegetation to ambush passing prey (either on the ground or in the air), and it also gleans surfaces such as the ground while in flight (Threatened Species Scientific Committee 2016c). Roosting requirements/preferences: During the daytime they roost in caves, rock crevices and old mines (Threatened Species Scientific Committee 2016c). Roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°–28°C and a moderate to high relative humidity of 50–100 percent (Threatened Species Scientific Committee 2016c). Breeding requirements/preferences: Most breeding sites appear to require multiple entranced caves (Threatened Species Scientific Committee 2016c). Individuals	previous survey by URS (2012). Diete et al. (2015b) recorded the species within open woodland in proximity to the existing GEMCO mine and in coastal grass and shrub habitat in the south west peninsular of the island. The NR Maps database identifies 10 occurrences of the species in the locality, with the latest from 2017. No records occur within the Southern Lease. The EPBC PMST identifies that the species or species habitat is likely to occur within the 20 km search radius.	(rainforest) habitats, laterite woodland and forest habitats, sandstone woodland and forest habitats, coastal dune/swale complex habitats, riparian/wetland habitats and estuarine complex habitats.	of laterite woodland and forest habitat and sandstone woodland and forest habitat.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						aggregate in maternity roosts during spring and summer (Hourigan 2011).			
Northern Hopping-mouse	<i>Notomys aquilo</i>	V	V	X	X	General habitat requirements/preferences: The Northern Hopping-mouse inhabits coastal dune systems, shrubland, eucalypt woodland, and the margins of coastal rainforest areas. Main habitat requirements are areas with sandy substrates and relatively high rainfall (about 1000-1400 mm per year), preferring areas in close proximity to rocky areas (DAWE 2022s). Foraging requirements/preferences: The species feeds mainly on seeds from grasses, herbs and shrubs. It is also known to eat insects (DAWE 2022s). Requirements/preferences for shelter sites: The Northern Hopping-mouse constructs complex burrows that can be used for sheltering which consist of a spoil mound located 2 m from the burrow entrance. The entrance is a vertical shaft that is dug from below (DAWE 2022s). Breeding requirements/preferences: All breeding information is based on observations made in captivity. The	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). Cumberland Ecology (2019a) recorded the species at one location to the east of the existing GEMCO mine. Heiniger and Gillespie (2017) also detected the species at three locations north of the Southern Lease. It was also recorded in the nearby Eastern Leases in 2014 (Cumberland Ecology 2015). It was recorded within E. tetradonta/E. miniata open forest. This species was not recorded during surveys by URS (2012) and Webb (1992). The NR Maps database identifies 40 occurrences of the species in the locality, with the latest from 2014. Five records of the species exist within the Southern Lease; however these records are associated with the presence of spoil heaps. The presence of spoil heaps is not a reliable determinate for the presence of the Northern Hopping-mouse as spoil heaps are also created by the	Unlikely to occur⁵. Extensive camera surveys undertaken by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) did not detect the species, despite utilising survey methods suitable for the detection of the species. The lack of records suggests that the species is not present in the areas sampled. Given high survey intensity and sampling across a range of suitable habitats, it is concluded that there is a low probability of occurrence for the species in the Southern Lease. Although the potential for occurrence is assessed as unlikely, it is noted that there is still some potential for it to be present in low numbers in parts of the Southern Lease that have not been subject to	Unlikely to occur. The species was not detected during recent surveys by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) despite utilising survey methods suitable for the detection of the species. Survey effort within 500m of the disturbance footprint by Cumberland Ecology (2019c) included 10 camera sites (1,923 capture nights), and by Cumberland Ecology (2022) included 39 sites (4,204 capture nights). Heiniger and Gillespie (2017) and Heiniger et al. (2020) also undertook surveys within 500m of the

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						young are born hairless with one to five young being reared at a time (DAWE 2022s).	Delicate Mouse (<i>Pseudomys delicatulus</i>) (Coffey Environments Pty Ltd 2010, Diete et al. 2015a). The EPBC PMST identifies the species or species habitat may occur within the 20 km search radius. A further discussion of the species is provided in Section 6.3.2.5.	extensive fauna survey (e.g. such as to the north east of the Amagula River and east of the Innokumanja River). These unsurveyed portions are located outside of the disturbance footprint (see Figure 7) and are separated from the disturbance footprint by rivers.	disturbance footprint.
Bare-rumped Sheath-tail Bat	<i>Saccolaimus saccolaimus nudicluniatus</i>	V			X	General habitat requirements/preferences: Occurs mostly in lowland areas, typically in a range of woodland, forest and open environments (DAWE 2022y). Foraging requirements/preferences: The species has a fast, direct flight and is likely to forage primarily for aerial insects over the woodland/forest canopy but may fly lower when foraging over open situations (DAWE 2022y). Roosting requirements/preferences: No studies have been conducted on the roosting ecology of this species and all located roosts are from incidental records (such as, as a	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database does not identify occurrences of the species on Groote Eylandt. The EPBC PMST identifies the species as having potential to occur within the 20 km search radius. It should be noted that the PMST	Unlikely to occur. Suitable habitat for this species occurs in the Southern Lease, within lateritic woodland and forest and sandstone woodland and forest habitat (refer Figure 14). However, given the lack of records of this species on Groote Eylandt, it is assessed as being unlikely to occur.	Unlikely to occur. The species is not predicted to occur in the disturbance footprint given the lack of recent records on Groote Eylandt.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						result of land clearance) (DAWE 2022y). In Australia, all confirmed roosting records are from deep tree hollows in the Poplar Gum, Darwin Woollybutt and Darwin Stringybark (DAWE 2022y). Breeding requirements/preferences: There is no information available on the type of breeding system or breeding success in this species (DotEE 2019c). In Australia all breeding records have been obtained from trees that were felled during land-clearing operations (DotEE 2019c).	results are based on broad scale habitat modelling, rather than actual records of the species.		
Northern Brushtail Possum	<i>Trichosurus vulpecula arnhemensis</i>	V		X	X	General habitat requirements/preferences: The species occurs mainly in tall eucalypt open forests with large hollow-bearing trees, particularly where the understorey includes some shrubs that bear fleshy fruits (Threatened Species Scientific Committee 2021b). Foraging requirements/preferences: The species diet mostly comprises fruits, flowers and foliage (such as mistletoe species including <i>Lysiana spathulata</i>, <i>Amyema miquelii</i> and <i>A. bifurcate</i> as well as <i>Erythrophleum chlorostachys</i>) (Threatened Species Scientific Committee 2021b).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species has not been recorded in areas adjacent to the Southern Lease in previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database identifies two occurrences of the species within the locality, however none within the Southern Lease.	Unlikely to occur. Extensive camera surveys undertaken by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) did not detect the species, despite utilising survey methods suitable for the detection of the species. The lack of records suggests that the species is not present in the areas sampled. Given high survey intensity and sampling across a range of	Unlikely to occur. The species was not detected during recent surveys by Cumberland Ecology (2019a, 2023), Heiniger and Gillespie (2017) and Heiniger et al. (2020) despite utilising survey methods suitable for the detection of the species. Survey effort within 500m of the disturbance footprint by Cumberland

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						Requirements/preferences for shelter sites: The species shelters mostly in tree hollows and in some cases, human infrastructure (Threatened Species Scientific Committee 2021b). Breeding requirements/preferences: The species has no distinct breeding season (Threatened Species Scientific Committee 2021b).	The EPBC PMST identifies the species as having potential to occur within the 20 km search radius.	suitable habitats, it is concluded that there is a low probability of occurrence for the species in the Southern Lease. Although the potential for occurrence is assessed as unlikely, it is noted that there is still some potential for it to be present in low numbers in parts of the Southern Lease that have not been subject to extensive fauna survey (e.g. such as to the north east of the Amagula River and east of the Innokumanja River). These unsurveyed portions are located outside of the disturbance footprint (see Figure 7) and are separated from the disturbance footprint by rivers.	Ecology (2019c) included 10 camera sites (1,923 capture nights), and by Cumberland Ecology (2022) included 39 sites (4,204 capture nights). Heiniger and Gillespie (2017) and Heiniger et al. (2020) also undertook surveys within 500m of the disturbance footprint.
Water Mouse	<i>Xeromys myoides</i>	V		X		General habitat requirements/preferences: The broadly described habitats of the Water Mouse include sedgelands, heathlands, clay pans, mangroves and the associated salt	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022).	Unlikely to occur. Only small areas of coastal habitat occur in the south western portion of the Southern Lease in the estuarine	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint (estuarine

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						marsh, and freshwater wetlands (DAWE 2022aj). In the Northern Territory, the Water Mouse has been known to use both intertidal and freshwater habitats, including mangroves, sedgelands, clay pans, and freshwater melaleuca wetlands (DAWE 2022aj). Foraging requirements/preferences: In the Northern Territory, the species is known to feed on grapsid crabs (i.e. shore crabs), and plant foods are believed to comprise some of its diet (DAWE 2022aj). Requirements/preferences for shelter sites: The species is known to make five types of nests which provide refuge from predators at high tide. These are: free-standing, nests or mounds at the base of mangrove trees, mound nests on small elevated 'islands' within the tidal zone, mound nests or holes in supralittoral banks; nests inside hollow tree trunks, and nests in spoil heaps created as a result of human activity (DAWE 2022aj). Breeding requirements/preferences: Nests created by the species are important for breeding and it is	This species has not been recorded during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). No records of this species on Groote Eylandt are held within the NR Maps database. The EPBC PMST identifies the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	complex habitats (refer Figure 14). There are also some areas of melaleuca wetlands in the Southern Lease. However, this species has been assessed as having a low potential to occur, given it has not been recorded on Groote Eylandt, despite numerous fauna surveys.	complex habitat and riparian/wetland habitat). In addition, there are no records of this species on Groote Eylandt.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						capable of breeding year-round (DAWE 2022aj).			
REPTILES									
Plains Death Adder	<i>Acanthopis hawkei</i>	V	V	X		General habitat requirements/preferences: The Plains Death Adder inhabits flat treeless habitats on the cracking soils of riverine floodplains (Northern Territory Government 2012a). Foraging requirements/preferences: When young, the species feeds on frogs and lizards, and when they reach larger sizes the species feeds on mammals (Northern Territory Government 2012a). Requirements/preferences for shelter sites: During floods, the species floats on debris or emergent vegetation. During the Dry season, it often rests in deep cracks in the soil (Northern Territory Government 2012a). Breeding requirements/preferences: The species breeds from October to November and live young are produced between February and March (Threatened Species Scientific Committee 2012).	This species was not recorded during recent fauna studies within the Southern Lease by Cumberland Ecology (2016-2022). The species was not recorded in areas adjacent to the Southern Lease during previous surveys by Cumberland Ecology (2015), URS (2012) and Webb (1992). The NR Maps database results do not identify occurrences of the species on Groote Eylandt. The EPBC PMST identifies the species or species habitat may occur within the 20 km search radius. It should be noted that the PMST results are based on broad scale habitat modelling, rather than actual records of the species.	Unlikely to occur. This species has been assessed as having a low potential to occur, given no suitable habitat for this species, in the form of cracking soils of riverine floodplains, occurs in the Southern Lease, and given it has not been recently recorded on Groote Eylandt, despite numerous fauna surveys.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
Mertens' Water Monitor	<i>Varanus mertensi</i>		V		X	General habitat requirements/preferences: Mertens' Water Monitor is semi-aquatic and is seldom seen far from water (Ward et al. 2006). It is often observed climbing on rocks or trees near water, often basking on branches overhanging the water or on rocks mid-stream (Ward et al. 2006). Foraging requirements/preferences: It feeds mostly on fish, frogs and carrion, and is also known to eat insects and small terrestrial vertebrates (Ward et al. 2006). Requirements/preferences for shelter sites: The Mertens' Water Monitor is terrestrial and also has the ability to climb trees (Northern Territory Government 2006). Breeding requirements/preferences: The species digs burrows in the ground where it lays its eggs, usually during the early dry season (Northern Territory Government 2006).	This species was recorded during recent (2022) fauna surveys by Cumberland Ecology within the Southern Lease. It has also been recorded by C&R (Unpublished) during aquatic surveys. It was recorded in the Southern Lease and the nearby Eastern Leases in 2014 (Cumberland Ecology 2015). It was recorded within freshwater streams and in Melaleuca dominated communities, as well as laterite woodland and forests directly adjacent to watercourses (within 15m). This species has also been recorded during previous surveys by URS (2012) and Webb (1992) to the north of the Southern Lease. The NR Maps database identifies 15 occurrences of the species in the locality, with the latest record from 2014. Two records occur within the Southern Lease. Both records are at the same location as the Cumberland Ecology (2015) record (refer Figure 16).	Present. Recorded at one location within the Southern Lease during a 2022 field survey. Suitable habitat for this species occurs in the Southern Lease in the form of riparian/wetland habitats.	Unlikely to occur. No suitable habitat for this species occurs in the disturbance footprint, as it does not contain riparian/wetland habitat, including watercourses.
Yellow-spotted Monitor	<i>Varanus panoptes</i>		V		X	General habitat requirements/preferences:	This species was not recorded during recent fauna studies within the	Unlikely to occur. Recent genetic testing has concluded that this	Unlikely to occur. Recent genetic testing has

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The Yellow-spotted Monitor occurs in a variety of habitats including grasslands, woodlands, floodplains, and coastal beaches. Its distribution has been recorded across most of the Top End of the Northern Territory (Northern Territory Government 2012b). Foraging requirements/preferences: The species forages on primarily small terrestrial insects and vertebrates, including marine and freshwater turtle eggs (Northern Territory Government 2012b). Requirements/preferences for shelter sites: The species is known to dig large burrows and take over existing burrows (Atlas of Living Australia 2014). Recent research has indicated that these species make use of large communal burrows / warrens (Doody, et al., 2014). Breeding requirements/preferences: The Yellow-spotted Monitor lays its eggs in burrows in the ground, usually during the wet season (Northern Territory Government 2012b).	Southern Lease by Cumberland Ecology (2016-2022). The NR Maps database identifies eight occurrences of the species in the locality, with the latest record from 2014. No records exist within the Southern Lease. Whilst this species was previously reported to occur on Groote Eylandt, recent genetic testing by Paul Barden, Australian Museum and DEPWS has determined that all previous specimens from the island are from the non-threatened Sand Goanna (<i>Varanus gouldii</i>). It has subsequently been concluded that Yellow-spotted Monitor (<i>Varanus panoptes</i>) does not occur on Groote Eylandt.	species does not occur on Groote Eylandt.	concluded that this species does not occur on Groote Eylandt.
Salt-water Crocodile	<i>Crocodylus porosus</i>	M(m)		X	X	General habitat requirements/preferences:	This species was recorded incidentally during recent (2016-2022) field surveys within the	Present.	Unlikely to occur.

Common Name	Scientific Name	Conservation Status ¹		Database Records		Habitat Requirements	Occurrence Summary	Likelihood of Occurrence	
		EPBC Act ²	TPWC Act	PMST	NR Maps			Southern Lease	Disturbance footprint
						The Salt-water Crocodile typically occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast (DCCEEW 2022d). Foraging requirements/preferences: The primary food sources of the Salt-water Crocodile include crustaceans, insects and mammals; however, only larger individuals eat mammals (DCCEEW 2022d). Requirements/preferences for shelter sites: The species is often found exposed in the midday sun, but under cover and shaded during the morning and late evening (DCCEEW 2022d). Breeding requirements/preferences: Preferred nesting habitat of the Salt-water Crocodile includes elevated, isolated freshwater swamps that are not influenced by tidal movements (DCCEEW 2022d). Floating rafts of vegetation also provide important nesting habitat (DCCEEW 2022d)	Southern Lease. C&R (2019, Unpublished) also recently recorded the species within the Southern Lease during aquatic surveys. It was also recorded in the nearby Eastern Leases within the tributaries of the Amagula River (Cumberland Ecology 2015). This species has also been recorded during previous surveys by URS (2012) and Webb (1992), however the exact location is unknown. The NR Maps database identifies nine occurrences of the species in the locality, with the latest from 2014. No records exist within the Southern Lease. The EPBC PMST identifies the species or species habitat is likely to occur within the 20 km search radius.	Suitable habitat for this species occurs in the Southern Lease in riparian/wetland habitat, in the form of rivers, creeks and their tributaries.	No suitable habitat for this species occurs in the disturbance footprint, as it does not contain riparian/wetland habitat, including watercourses.

1. EPBC Act Status / TPWC Act Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Subcategories for EPBC Act listing of migratory species follow those within the PMST report

3. Two subspecies of *Geophaps smithii* are listed under the EPBC Act as Vulnerable (*Geophaps smithii blaaui* and *Geophaps smithii smithii*).

4. Subspecies of *Limosa lapponica* have different listings under the EPBC Act. *Limosa lapponica baueri* is listed as Vulnerable and *Limosa lapponica menzbieri* is listed as Critically Endangered.

5. Five records of the species from the NR Maps database exist within the Southern Lease; however these records are associated with the presence of spoil heaps, which are not a reliable

determinate for the presence of the Northern Hopping-mouse (Coffey Environments Pty Ltd 2010, Diete et al. 2015a). The likelihood of occurrence has been determined based on the findings of the small mammal research project undertaken within the Southern Lease and surrounds by Cumberland Ecology (2019a) (see Section 3.3.2).

6. There is a location within the NR Maps database that represents a total of 18 threatened and migratory species records. It appears that a single coordinate was utilised for these species that doesn't reflect the actual location of the detected individuals. It is therefore considered that the records of these species within the Southern Lease is not accurate due to the general location description (noted as being at Salt Creek and associated road) not aligning with the coordinates. As such, these records have not been counted towards a species being present within the Southern Lease.

APPENDIX E :

Flora Species List

Table 25 Flora species list

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Anacardiaceae	<i>Buchanania arborescens</i>	Buchanania	Native				X
Anacardiaceae	<i>Buchanania obovata</i>	Buchanania, Green Plum, Wild Mango	Native	X	X	X	X
Apocynaceae	<i>Alstonia actinophylla</i>	Alstonia, Milkwood, Northern Milkwood	Native				X
Apocynaceae	<i>Alyxia spicata</i>	Alyxia	Native	X		X	X
Apocynaceae	<i>Carissa lanceolata</i>	Carissa, Conkerberry, Conkle Berry, Currant Bush, Kungsberry Bush	Native			X	
Apocynaceae	<i>Gymnanthera oblonga</i>	Gymnanthera	Native	X			X
Apocynaceae	<i>Marsdenia sp.</i>		Native				X
Apocynaceae	<i>Marsdenia viridiflora</i>	Marsdenia, Bush Banana, Native Potato, Green Berry Creeper	Native	X			
Apocynaceae	<i>Tabernaemontana orientalis</i>	Tabernaemontana	Native				X
Apocynaceae	<i>Wrightia saligna</i>	Wrightia, Milk Bush, Coolaroo	Native			X	X
Araliaceae	<i>Trachymene microcephala</i>	Trachymene	Native	X			
Arecaceae	<i>Hydriastele wendlandiana</i>	Hydriastele, Hydriastele Palm	Native				X
Arecaceae	<i>Livistona inermis</i>	Livistona, Fan Palm	Native			X	
Asparagaceae	<i>Asparagus racemosus</i>	Protasparagus, Asparagus Fern, Asparagus Vine	Native			X	X
Asparagaceae	<i>Lomandra tropica</i>	Lomandra	Native	X	X	X	X
Asparagaceae	<i>Thysanotus banksii</i>	Thysanotus	Native				X
Bixaceae	<i>Cochlospermum gillivraei</i>	Cochlospermum, Kapok Bush, Cotton Tree, Kapok Tree	Native			X	X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Blechnaceae	<i>Blechnum orientale</i>	Blechnum	Native				X
Blechnaceae	<i>Stenochlaena palustris</i>	Stenochlaena, Climbing Fern, Branched Comb Fern	Native				X
Blechnaceae	<i>Telmatoblechnum indicum</i>	Blechnum, Swamp Water Fern	Native				X
Boraginaceae	<i>Heliotropium ventricosum</i>	Heliotropium	Native	X			
Burmanniaceae	<i>Burmannia coelestis</i>	Burmannia	Native				X
Burseraceae	<i>Canarium australianum</i>	Canarium	Native			X	X
Campanulaceae	<i>Lobelia douglasiana</i>	Lobelia	Native				X
Cannabaceae	<i>Celtis paniculata</i>	Celtis	Native				X
Cannabaceae	<i>Trema tomentosa</i>	Trema, Peach-leaved Poison Bush, Poison Peach, Native Peach	Native				X
Celastraceae	<i>Denhamia obscura</i>	Denhamia	Native			X	
Celastraceae	<i>Stackhousia intermedia</i>	Stackhousia, Wiry Stackhousia	Native	X			
Clusiaceae	<i>Calophyllum sil</i>	Calophyllum	Native				X
Combretaceae	<i>Terminalia canescens</i>	Terminalia, Bendee, Winged Nut Tree	Native	X		X	X
Combretaceae	<i>Terminalia carpentariae</i>	Terminalia, Billy Goat Plum, Wild Peach	Native	X	X	X	X
Combretaceae	<i>Terminalia microcarpa</i>	Terminalia	Native				X
Commelinaceae	<i>Cartonema spicatum</i>	Cartonema	Native	X			X
Commelinaceae	<i>Commelina ensifolia</i>	Commelina, Wandering Jew	Native	X			X
Convolvulaceae	<i>Bonamia media</i>	Bonamia, Common Bonamia	Native	X			
Convolvulaceae	<i>Evolvulus alsinoides</i>	Evolvulus, Blue Periwinkle, Tropical Speedwell	Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Convolvulaceae	<i>Merremia quinata</i>	Merremia	Native	X			X
Convolvulaceae	<i>Polymeria ambigua</i>	Polymeria, Creeping Polymeria	Native	X			
Convolvulaceae	<i>Xenostegia tridentata</i>	Xenostegia	Native	X			
Cupressaceae	<i>Callitris intratropica</i>	Callitris, Cypress Pine, Northern Cypress Pine, White Cypress Pine	Native	X	X	X	X
Cycadaceae	<i>Cycas arnhemica</i>		Native	X	X	X	X
Cyperaceae	<i>Baumea rubiginosa</i>	Baumea	Native			X	
Cyperaceae	<i>Cyperus haspan</i>	Cyperus, Nutgrass	Native				X
Cyperaceae	<i>Cyperus haspan subsp. juncooides</i>	Cyperus, Nutgrass	Native	X			
Cyperaceae	<i>Cyperus sp.</i>		Native	X		X	X
Cyperaceae	<i>Eleocharis sp.</i>		Native		X	X	X
Cyperaceae	<i>Fimbristylis cymosa</i>	Fimbristylis, Fringe-rush	Native	X			
Cyperaceae	<i>Fimbristylis depauperata</i>	Fimbristylis, Fringe-rush	Native	X			
Cyperaceae	<i>Fimbristylis dolera</i>	Fimbristylis, Fringe-rush	Native	X			
Cyperaceae	<i>Fimbristylis pauciflora</i>	Fimbristylis, Fringe-rush	Native	X			
Cyperaceae	<i>Fimbristylis sp.</i>		Native			X	X
Cyperaceae	<i>Fuirena ciliaris</i>	Fuirena, Small Club Rush	Native				X
Cyperaceae	<i>Fuirena sp.</i>		Native			X	
Cyperaceae	<i>Rhynchospora longisetis</i>	Rhynchospora	Native	X			
Cyperaceae	<i>Schoenus falcatus</i>	Schoenus	Native			X	X
Cyperaceae	<i>Schoenus sp.</i>		Native		X		X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Cyperaceae	<i>Schoenus sparteus</i>	Schoenus	Native	X		X	X
Cyperaceae	<i>Scleria brownii</i>	Scleria	Native	X			
Cyperaceae	<i>Scleria ciliaris</i>	Scleria	Native				X
Cyperaceae	<i>Scleria novae-hollandiae</i>	Scleria	Native	X			
Cyperaceae	<i>Scleria pygmaea</i>	Scleria	Native				X
Cyperaceae	<i>Tricostularia undulata</i>	Tricostularia	Native			X	X
Dilleniaceae	<i>Dillenia alata</i>	Dillenia	Native			X	X
Dilleniaceae	<i>Hibbertia complanata</i>	Pachynema	Native	X		X	X
Dilleniaceae	<i>Hibbertia dealbata</i>	Hibbertia	Native	X			
Dilleniaceae	<i>Hibbertia sericea</i>		Native	X			
Dioscoreaceae	<i>Dioscorea bulbifera</i>	Dioscorea, Round Yam, Cheeky Yam	Native				X
Dioscoreaceae	<i>Dioscorea sp.</i>		Native	X			
Dioscoreaceae	<i>Dioscorea transversa</i>	Dioscorea, Long Yam	Native				X
Droseraceae	<i>Drosera dilatato-petiolearis</i>	Drosera, Sundew	Native	X			
Droseraceae	<i>Drosera fulva</i>	Drosera, Sundew	Native	X			
Droseraceae	<i>Drosera sp.</i>		Native			X	
Ebenaceae	<i>Diospyros maritima</i>	Diospyros	Native				X
Elaeocarpaceae	<i>Elaeocarpus arnhemicus</i>	Elaeocarpus	Native			X	X
Eriocaulaceae	<i>Eriocaulon sp.</i>		Native			X	X
Erythroxylaceae	<i>Erythroxylum ellipticum</i>	Erythroxylum	Native	X		X	
Euphorbiaceae	<i>Euphorbia sp.</i>		Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Euphorbiaceae	<i>Macaranga tanarius</i>	Macaranga	Native				X
Euphorbiaceae	<i>Microstachys chamaelea</i>	Sebastiania	Native	X		X	X
Fabaceae	<i>Acacia alleniana</i>	Acacia, Wattle	Native	X			
Fabaceae	<i>Acacia difficilis</i>	Acacia, River Wattle, Wattle	Native	X		X	X
Fabaceae	<i>Acacia holosericea</i>	Acacia, Silver Wattle, Silver Leaf Wattle, Silver-leaved Wattle, Candelabra Wattle, Soap Bush, Wattle	Native	X			X
Fabaceae	<i>Acacia lamprocarpa</i>	Acacia, Wattle	Native	X	X	X	X
Fabaceae	<i>Acacia latescens</i>	Acacia, Wattle	Native	X	X	X	X
Fabaceae	<i>Acacia leptocarpa</i>	Acacia, Wattle	Native		X	X	X
Fabaceae	<i>Acacia multisiliqua</i>	Acacia, Wattle	Native	X			X
Fabaceae	<i>Acacia oncinocarpa</i>	Acacia, Wattle	Native	X		X	X
Fabaceae	<i>Acacia torulosa</i>	Acacia, Torulosa Wattle, Deep-gold Wattle, Wattle	Native		X	X	X
Fabaceae	<i>Acacia yirrkallensis</i>	Acacia, Wattle	Native	X		X	
Fabaceae	<i>Cajanus geminatus</i>	Cajanus	Native	X			
Fabaceae	<i>Crotalaria brevis</i>	Crotalaria, Rattlepod	Native				X
Fabaceae	<i>Erythrophleum chlorostachys</i>	Erythrophleum, Ironwood, Cooktown Ironwood, Camel Poison	Native	X	X	X	X
Fabaceae	<i>Flemingia parviflora</i>	Flemingia	Native	X		X	
Fabaceae	<i>Flemingia parviflora</i>	Flemingia	Native				X
Fabaceae	<i>Flemingia sp.</i>		Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Fabaceae	<i>Gompholobium subulatum</i>	Gompholobium	Native	X		X	X
Fabaceae	<i>Jacksonia dilatata</i>	Jacksonia	Native			X	X
Fabaceae	<i>Sesbania cannabina</i>	Sesbania, Yellow Pea-bush, Sesbania Pea, Yellow Bush Pea	Native				X
Fabaceae	<i>Stylosanthes hamata</i>	Caribbean Stylo	Exotic			X	X
Fabaceae	<i>Stylosanthes scabra</i>	Stylosanthes, Shrubby Stylo, Stylo	Exotic	X			X
Fabaceae	<i>Tephrosia juncea</i>	Tephrosia	Native	X			
Fabaceae	<i>Tephrosia leptoclada</i>	Tephrosia, Slender Tephrosia	Native	X			
Fabaceae	<i>Vigna lanceolata</i>	Vigna, Pencil Yam, Maloga Bean, Parsnip Bean	Native				X
Flagellariaceae	<i>Flagellaria indica</i>	Flagellaria, Bamboo Vine	Native				X
Gleicheniaceae	<i>Dicranopteris linearis</i>	Dicranopteris, Hay Rake Fern, Coral Fern, River Fern	Native				X
Goodeniaceae	<i>Goodenia pilosa</i>	Goodenia	Native	X		X	X
Goodeniaceae	<i>Goodenia purpurascens</i>	Goodenia	Native	X			X
Haloragaceae	<i>Gonocarpus chinensis</i>	Gonocarpus	Native				X
Haloragaceae	<i>Gonocarpus leptothecus</i>	Gonocarpus	Native			X	
Hanguanaceae	<i>Hanguana malayana</i>	Hanguana	Native				X
Hemerocallidaceae	<i>Dianella longifolia</i>	Dianella	Native	X		X	X
Lamiaceae	<i>Anisomeles malabarica</i>	Purple Bush Flower	Native	X			X
Lamiaceae	<i>Hyptis suaveolens</i>	Hyptis	Exotic			X	X
Lamiaceae	<i>Plectranthus scutellarioides</i>	Plectranthus	Native				X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Lamiaceae	<i>Premna serratifolia</i>	Premna	Native				X
Lamiaceae	<i>Vitex acuminata</i>	Vitex	Native				X
Lauraceae	<i>Cassytha filiformis</i>	Cassytha, Dodder Laurel, Dodder-laurel, Hairy Dodder-laurel, Love Vine, Devils Twine, Spaghetti Plant	Native	X		X	X
Lauraceae	<i>Cryptocarya cunninghamii</i>	Cryptocarya	Native				X
Lecythidaceae	<i>Planchonia careya</i>	Planchonia, Cocky Apple, Mangaloo	Native			X	X
Lindsaeaceae	<i>Lindsaea ensifolia</i>	Lindsaea, Freshwater Fern, Common Wedge Fern	Native				X
Loganiaceae	<i>Mitrasacme connata</i>	Mitrasacme	Native	X			
Lomariopsidaceae	<i>Nephrolepis acutifolia</i>	Nephrolepis	Native				X
Lygodiaceae	<i>Lygodium microphyllum</i>	Lygodium, Climbing Maidenhair Fern	Native				X
Malvaceae	<i>Brachychiton diversifolius</i>	Brachychiton, Kurrajong, Northern Kurrajong	Native			X	X
Malvaceae	<i>Brachychiton paradoxus</i>	Brachychiton, Red-flowered Kurrajong, Red-flowering Kurrajong	Native	X		X	X
Malvaceae	<i>Grewia retusifolia</i>		Native	X			X
Malvaceae	<i>Grewia savannicola</i>	Grewia, Dog's Balls, Emu Berry, Dysentery Bush	Native			X	
Malvaceae	<i>Helicteres cana</i>	Helicteres	Native	X			X
Malvaceae	<i>Hibiscus meraukensis</i>	Hibiscus, Glabrous Hibiscus, Ballerina Hibiscus, Merauke Hibiscus	Native	X			X
Malvaceae	<i>Sida cordifolia</i>	Flannel Weed	Exotic				X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Malvaceae	<i>Sida humilis</i>		Exotic			X	
Malvaceae	<i>Sterculia quadrifida</i>	Sterculia, Peanut Tree	Native				X
Malvaceae	<i>Waltheria indica</i>	Waltheria	Native	X			X
Melastomataceae	<i>Melastoma malabathricum</i>	Melastoma, Native Lasiandra	Native				X
Meliaceae	<i>Aglaia brownii</i>	Aglaia	Native				X
Meliaceae	<i>Owenia vernicosa</i>	Owenia, Emu Apple, Candlestick Tree	Native			X	X
Moraceae	<i>Ficus hispida</i>	Ficus, Hairy Fig	Native				X
Myristicaceae	<i>Horsfieldia australiana</i>	Horsfieldia	Native				X
Myristicaceae	<i>Myristica insipida</i>	Myristica, Native Nutmeg	Native				X
Myrtaceae	<i>Asteromyrtus symphyocarpa</i>	Asteromyrtus, Liniment Bush	Native	X	X	X	X
Myrtaceae	<i>Calytrix brownii</i>	Calytrix	Native			X	
Myrtaceae	<i>Corymbia bella</i>	Corymbia, Ghost Gum, White Gum, Carbeen, Paper-fruited Bloodwood	Native			X	X
Myrtaceae	<i>Corymbia confertiflora</i>	Corymbia, Broad-leaf Carbeen, Broad-leaved Carbeen, Rough-leaf Cabbage Gum, Rough-leaved Cabbage Gum, Paper-fruited Bloodwood	Native		X	X	X
Myrtaceae	<i>Corymbia ferruginea</i>	Corymbia, Rusty Bloodwood, Rusty-leaf Bloodwood, Bloodwood	Native		X	X	X
Myrtaceae	<i>Corymbia kombolgiensis</i>	Corymbia, Paper-fruited Bloodwood	Native			X	X
Myrtaceae	<i>Corymbia polycarpa</i>	Corymbia, Long-fruited Bloodwood, Small-flowered Bloodwood, Bloodwood	Native	X	X	X	X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Myrtaceae	<i>Eucalyptus bigalerita</i>	Eucalyptus, Northern Salmon Gum, Poplar Gum	Native				X
Myrtaceae	<i>Eucalyptus miniata</i>	Eucalyptus, Woollybutt, Woolly Butt, Darwin Woollybutt, Manawan	Native	X	X	X	X
Myrtaceae	<i>Eucalyptus tectifica</i>	Eucalyptus, Darwin Box, Grey Box	Native			X	X
Myrtaceae	<i>Eucalyptus tetradonta</i>	Eucalyptus, Darwin Stringybark, Stringybark, Messmate	Native	X	X	X	X
Myrtaceae	<i>Lithomyrtus retusa</i>	Lithomyrtus	Native			X	
Myrtaceae	<i>Lophostemon grandiflorus</i>	Northern Swamp Box	Native	X			
Myrtaceae	<i>Lophostemon lactifluus</i>	Lophostemon, Red Paperbark, Red Paper Bark	Native				X
Myrtaceae	<i>Melaleuca acacioides</i>	Melaleuca, Coastal Paperbark, Black Tea-tree, Paperbark	Native			X	X
Myrtaceae	<i>Melaleuca cajuputi</i>	Melaleuca, Cajuput, Cajuput Tree, Paperbark	Native	X	X	X	X
Myrtaceae	<i>Melaleuca dealbata</i>	Melaleuca, Paperbark	Native			X	
Myrtaceae	<i>Melaleuca ferruginea</i>		Native			X	X
Myrtaceae	<i>Melaleuca leucadendra</i>	Melaleuca, Weeping Paperbark, White Paperbark, Cajuput Tree, Cajuput, Weeping River Tea-tree, Paperbark	Native		X	X	X
Myrtaceae	<i>Melaleuca viridiflora</i>	Melaleuca, Broad-leaved Paperbark, Broad -leaf Paperbark, Green Paperbark, Large-leaved Paperbark, Paperbark	Native	X	X	X	X
Myrtaceae	<i>Syzygium angophoroides</i>	Syzygium	Native				X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Myrtaceae	<i>Syzygium nervosum</i>	Syzygium	Native				X
Myrtaceae	<i>Syzygium suborbiculare</i>	Syzygium, Red Bush Apple	Native			X	X
Myrtaceae	<i>Verticordia verticillata</i>	Verticordia, Featherflower	Native			X	
Nymphaeaceae	<i>Nymphaea violacea</i>	Nymphaea, Water Lily	Native			X	X
Oleaceae	<i>Jasminum molle</i>	Jasminum	Native	X		X	X
Onagraceae	<i>Ludwigia octovalvis</i>	Ludwigia, Willow Primrose	Native				X
Opiliaceae	<i>Opilia amentacea</i>	Opilia	Native	X			
Orchidaceae	<i>Geodorum densiflorum</i>	Geodorum, Pink Nodding Orchid	Native				X
Orobanchaceae	<i>Buchnera gracilis</i>	Buchnera	Native	X			
Orobanchaceae	<i>Buchnera linearis</i>	Buchnera, Dainty Bush Flower	Native	X			
Pandanaceae	<i>Pandanus spiralis</i>	Pandanus, Srew-palm, Pandanus Palm	Native	X	X	X	X
Passifloraceae	<i>Passiflora foetida</i>	Stinking Passion Flower	Exotic	X			X
Philydraceae	<i>Philydrum lanuginosum</i>	Philydrum, Frogsmouth, Woolly Waterlily	Native		X	X	X
Phyllanthaceae	<i>Antidesma ghesaembilla</i>	Antidesma	Native			X	X
Phyllanthaceae	<i>Breynia cernua</i>	Breynia	Native	X		X	X
Phyllanthaceae	<i>Flueggea virosa</i>	Flueggea, White Currant, White Grape, White Berry Bush, White Raisin	Native			X	X
Phyllanthaceae	<i>Phyllanthus carpentariae</i>	Phyllanthus	Native	X			
Phyllanthaceae	<i>Phyllanthus exilis</i>	Phyllanthus	Native	X			
Phyllanthaceae	<i>Phyllanthus minutiflorus</i>	Phyllanthus	Native	X			
Phyllanthaceae	<i>Phyllanthus sp.</i>		Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Phyllanthaceae	<i>Phyllanthus virgatus</i>	Phyllanthus	Native	X			X
Phyllanthaceae	<i>Sauropus stenocladus</i>		Native	X			X
Phyllanthaceae	<i>Sauropus stenocladus</i> subsp. <i>Stenocladus</i>		Native	X			
Picrodendraceae	<i>Petalostigma banksii</i>	Petalostigma, Smooth-leaved Quinine	Native		X	X	X
Picrodendraceae	<i>Petalostigma pubescens</i>	Petalostigma, Quinine Bush, Quinine Tree, Downy Cracker Bush	Native	X		X	X
Poaceae	<i>Alloteropsis semialata</i>	Alloteropsis, Cockatoo Grass	Native				X
Poaceae	<i>Aristida holathera</i>	Aristida, Erect Kerosene Grass, Erect Windgrass, White Grass, Arrow Grass, Three-awn, Wiregrass	Native			X	X
Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>	Aristida, Erect Kerosene Grass, Erect Windgrass, White Grass, Arrow Grass, Three-awn, Wiregrass	Native	X			
Poaceae	<i>Aristida</i> sp.		Native			X	X
Poaceae	<i>Chrysopogon elongatus</i>	Chrysopogon, Tall Tamil Grass	Native			X	X
Poaceae	<i>Chrysopogon oliganthus</i>	Chrysopogon	Native			X	X
Poaceae	<i>Cymbopogon refractus</i>	Cymbopogon, Barbed-wire Grass	Native			X	
Poaceae	<i>Ectrosia leporina</i>	Ectrosia, Hares-foot Grass. Hare's Foot Grass	Native	X		X	X
Poaceae	<i>Eragrostis</i> sp.		Native				X
Poaceae	<i>Eriachne avenacea</i>	Eriachne, Wanderrie Grass	Native	X			
Poaceae	<i>Eriachne melicacea</i>	Eriachne, Fire Grass, Wanderrie Grass	Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Poaceae	<i>Eriachne pallescens</i>	Eriachne, Wanderrie Grass	Native	X	X	X	X
Poaceae	<i>Eriachne schultziiana</i>	Eriachne, Wanderrie Grass	Native	X	X	X	X
Poaceae	<i>Eriachne sp.</i>		Native		X	X	X
Poaceae	<i>Eriachne stipacea</i>	Eriachne, Wanderrie Grass	Native	X			
Poaceae	<i>Eriachne trisetata</i>	Eriachne, Wanderrie Grass	Native	X		X	X
Poaceae	<i>Germainia grandiflora</i>	Germainia	Native			X	X
Poaceae	<i>Heteropogon contortus</i>	Heteropogon, Bunch Speargrass, Black Speargrass	Native			X	X
Poaceae	<i>Heteropogon triticeus</i>	Heteropogon	Native	X	X	X	X
Poaceae	<i>Imperata cylindrica</i>	Imperata, Blady Grass	Native		X	X	X
Poaceae	<i>Ischaemum australe</i>	Ischaemum, Large Bluegrass	Native				X
Poaceae	<i>Ischaemum australe var. villosum</i>	Ischaemum	Native	X			
Poaceae	<i>Ischaemum fragile</i>	Ischaemum	Native			X	
Poaceae	<i>Mnesithea formosa</i>	Mnesithea, Red Grass, Itchgrass, Silky-top Grass	Native	X			X
Poaceae	<i>Mnesithea rottboellioides</i>	Mnesithea, Blady grass, Northern Cane-grass	Native		X	X	X
Poaceae	<i>Mnesithea sp.</i>		Native	X			
Poaceae	<i>Panicum mindanaense</i>	Panicum	Native			X	X
Poaceae	<i>Panicum simile</i>	Panicum	Native				X
Poaceae	<i>Paspalidium distans</i>	Paspalidium	Native	X			
Poaceae	<i>Paspalum scrobiculatum</i>	Paspalum, Scrobic, Ditch Millet	Native				X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Poaceae	<i>Paspalum vaginatum</i>	Paspalum, Salt-water Couch, Water Couch	Native	X			
Poaceae	<i>Pseudopogonatherum contortum</i>	Pseudopogonatherum	Native				X
Poaceae	<i>Pseudoraphis spinescens</i>	Pseudoraphis, Swamp Grass, Spiny Mudgrass, Water Couch. Mudgrass	Native				X
Poaceae	<i>Sacciolepis indica</i>	Sacciolepis	Native				X
Poaceae	<i>Schizachyrium pachyarthron</i>	Schizachyrium	Native	X		X	X
Poaceae	<i>Setaria apiculata</i>	Setaria, Pigeon Grass	Native	X			
Poaceae	<i>Sorghum interjectum</i>	Sorghum	Native				X
Poaceae	<i>Sorghum intrans</i>	Sorghum	Native			X	X
Poaceae	<i>Sorghum timorens</i>	Sorghum, Downs Sorghum, Annual Sorghum, Black Soil Canegrass, Annual Canegrass	Native	X		X	X
Poaceae	<i>Thaumastochloa major</i>	Thaumastochloa	Native	X		X	X
Poaceae	<i>Thaumastochloa striata</i>	Thaumastochloa	Native				X
Poaceae	<i>Themeda arguens</i>	Themeda, Annual Kangaroo Grass	Native				X
Poaceae	<i>Triodia bitextura</i>	Triodia, Curly Spinifex, Soft Spinifex, Feathertop Spinifex, Spinifex	Native			X	
Poaceae	<i>Triodia procera</i>	Triodia, Spinifex	Native	X			
Poaceae	<i>Triodia sp.</i>		Native				X
Poaceae	<i>Urochloa polyphylla</i>	Urochloa	Native	X			
Polygalaceae	<i>Polygala sp.</i>		Native	X			

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Proteaceae	<i>Banksia dentata</i>	Banksia	Native	X	X	X	X
Proteaceae	<i>Grevillea heliosperma</i>	Grevillea, Rock Grevillea	Native	X		X	X
Proteaceae	<i>Grevillea pteridifolia</i>	Grevillea, Fern-leaved Grevillea, Silky Grevillea, Kimberley Christmas Tree, Golden Parrot Tree, Golden Toothbrush Grevillea	Native	X	X	X	X
Proteaceae	<i>Hakea arborescens</i>	Hakea, Yellow Hakea, Common Hakea, Tree Hakea	Native	X	X	X	X
Proteaceae	<i>Persoonia falcata</i>	Persoonia, Milky Plum, Wild Pear	Native		X	X	X
Pteridaceae	<i>Cheilanthes tenuifolia</i>	Cheilanthes	Native	X		X	
Pteridaceae	<i>Platyzoma microphyllum</i>	Platyzoma, Braid Fern	Native				X
Putranjivaceae	<i>Drypetes deplanchei</i>	Drypetes	Native	X		X	X
Restionaceae	<i>Dapsilanthus elatior</i>	Dapsilanthus	Native		X	X	X
Restionaceae	<i>Dapsilanthus ramosus</i>	Dapsilanthus	Native				X
Rhamnaceae	<i>Alphitonia excelsa</i>	Alphitonia, Soap Tree, Red Ash	Native	X	X	X	X
Rhamnaceae	<i>Alphitonia oblata</i>	Alphitonia, Red Ash	Native				X
Rhizophoraceae	<i>Carallia brachiata</i>	Carallia	Native			X	X
Rubiaceae	<i>Gardenia megasperma</i>	Gardenia, Native Gardenia, Wild Gardenia	Native			X	X
Rubiaceae	<i>Larsenaikia suffruticosa</i>	Kailarsenia	Native	X		X	X
Rubiaceae	<i>Spermacoce elaiosoma</i>	Spermacoce	Native	X			
Rubiaceae	<i>Spermacoce remota</i>	Woodland False Buttonweed	Exotic				X

Family	Scientific Name	Common Name	Native / Exotic	Cumberland Ecology (2016)	Cumberland Ecology (2019b)	October / November 2021	May 2022
Rubiaceae	<i>Spermacoce sp.</i>		Native	X	X	X	X
Rubiaceae	<i>Timonius timon</i>	Timonius	Native				X
Rutaceae	<i>Boronia lanuginosa</i>	Boronia	Native	X			
Rutaceae	<i>Correa planchonifolia</i>		Native	X			
Rutaceae	<i>Melicope elleryana</i>	Melicope, Euodia	Native				X
Rutaceae	<i>Micromelum minutum</i>	Micromelum	Native				X
Santalaceae	<i>Exocarpos acacioides</i>		Native	X			
Santalaceae	<i>Exocarpos latifolius</i>	Exocarpos, Native Cherry	Native		X	X	X
Sapotaceae	<i>Planchonella arnhemica</i>	Pouteria	Native	X		X	X
Smilacaceae	<i>Smilax australis</i>	Smilax	Native	X			X
Stylidiaceae	<i>Stylidium sp.</i>		Native				X
Thymelaeaceae	<i>Thecanthes concreta</i>	Thecanthes	Native	X			
Thymelaeaceae	<i>Thecanthes punicea</i>	Red Wax Plant	Native	X			
Verbenaceae	<i>Stachytarpheta cayennensis</i>	Cayenne Snakeweed	Exotic			X	X
Violaceae	<i>Hybanthus enneaspermus</i>	Hybanthus, Blue Spade Flower, Ladys Slipper	Native	X			
Vitaceae	<i>Ampelocissus acetosa</i>	Ampelocissus, Wild Grape	Native	X		X	X
Vitaceae	<i>Cayratia trifolia</i>	Cayratia	Native				X
Vitaceae	<i>Cissus reniformis</i>	Cissus	Native				X
Xyridaceae	<i>Xyris complanata</i>	Xyris, Hatpins, Yellow Iris	Native	X		X	X
Xyridaceae	<i>Xyris sp.</i>		Native		X	X	

APPENDIX F :

Fauna Species List

Table 26 Fauna species list

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)
						Survey Location														
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease
AMPHIBIANS																				
ANURA	HYLIDAE	<i>Litoria bicolor</i>	Northern Dwarf Tree Frog	-	-	X	X	X												
ANURA	HYLIDAE	<i>Litoria caerulea</i>	Green Tree Frog	-	-	X	X													
ANURA	HYLIDAE	<i>Litoria microbelos</i>	Javelin Frog	-	-		X													
ANURA	HYLIDAE	<i>Litoria nasuta</i>	Rocket Frog	-	-	X	X	X												
ANURA	HYLIDAE	<i>Litoria pallida</i>	Pale Frog	-	-			X												
ANURA	HYLIDAE	<i>Litoria rothii</i>	Roth's Tree Frog	-	-	X	X	X												
ANURA	HYLIDAE	<i>Litoria rubella</i>	Desert Tree Frog	-	-	X	X													
ANURA	HYLIDAE	<i>Litoria tornieri</i>	Tornier's Frog	-	-		X													
ANURA	HYLIDAE	<i>Litoria watjulumensis</i>	Wotjulum Frog	-	-		X													
ANURA	MYOBATRACHIDAE	<i>Crinia remota</i>	Remote Froglet	-	-	X	X	X												
ANURA	MYOBATRACHIDAE	<i>Limnodynastes</i>	Marbled Frog	-	-	X	X													
ANURA	MYOBATRACHIDAE	<i>Platyplectrum ornatum</i>	Ornate Burrowing Frog	-	-	X	X													
ANURA	MYOBATRACHIDAE	<i>Uperoleia inundata</i>	Floodplain Toadlet	-	-	X	X	X												
ANURA	MYOBATRACHIDAE	<i>Uperoleia lithomoda</i>	Stonemason Toadlet	-	-	X	X													
BIRDS																				
ANSERIFORMES	ANATIDAE	<i>Anas gracilis</i>	Grey Teal	-	-	X														
ANSERIFORMES	ANATIDAE	<i>Anas superciliosa</i>	Pacific Black Duck	-	-	X	X													
ANSERIFORMES	ANATIDAE	<i>Dendrocygna arcuata</i>	Wandering Whistling-duck	-	-															
ANSERIFORMES	ANATIDAE	<i>Tadorna tadornoides</i>	Australian Shelduck	-	-		X													
APODIFORMES	AEGOTHELIDAE	<i>Aegothales cristatus</i>	Australian Owlet-noddy	-	-	X	X	X		X		X	X	X	X		X	X	X	
APODIFORMES	APODIDAE	<i>Apus pacificus</i>	Fork-tailed Swift	M(m)	-		X													
CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	-	-	X	X							X						
CAPRIMULGIFORMES	CAPRIMULGIDAE	<i>Eurostopus argus</i>	Spotted Nightjar	-	-	X								X	X				X	
CAPRIMULGIFORMES	PODARGIDAE	<i>Podargus strigoides</i>	Tawny Frogmouth	-	-	X	X	X		X				X	X	X		X	X	
CHARADRIIFORMES	BURHINIDAE	<i>Burhinus grallarius</i>	Bush Stone-curlew	-	-	X	X	X		X				X	X	X	X	X	X	
CHARADRIIFORMES	BURHINIDAE	<i>Esacus magnirostris</i>	Beach Stone-curlew	-	-		X													
CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius leschenaultii</i>	Greater Sand Plover	V, M(w)	-		X													
CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius mongolus</i>	Lesser Sand Plover	E, M(w)	-		X													
CHARADRIIFORMES	CHARADRIIDAE	<i>Charadrius ruficapillus</i>	Red-capped Plover	-	-		X													
CHARADRIIFORMES	CHARADRIIDAE	<i>Pluvialis fulva</i>	Pacific Golden Plover	M(w)	-	X														
CHARADRIIFORMES	CHARADRIIDAE	<i>Vanellus miles</i>	Masked Lapwing	-	-	X	X			X										
CHARADRIIFORMES	JACANIDAE	<i>Irediparra gallinacea</i>	Comb-crested Jacana	-	-		X													
CHARADRIIFORMES	LARIDAE	<i>Chroicocephalus</i>	Silver Gull	-	-		X													
CHARADRIIFORMES	LARIDAE	<i>Gelochelidon nilotica</i>	Gull-billed Tern	-	-		X													
CHARADRIIFORMES	RECURVIROSTRIDAE	<i>Himantopus</i>	Black-winged Stilt	-	-	X														
CHARADRIIFORMES	SCOLOPACIDAE	<i>Actitis hypoleucos</i>	Common Sandpiper	M(w)	-	X	X													
CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M(w)	-	X														
CHARADRIIFORMES	SCOLOPACIDAE	<i>Calidris ferruginea</i>	Curlew Sandpiper	CE, M(w)	-	X														
CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa brevipes</i>	Grey-tailed Tattler	M(w)	-		X													
CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa nebularia</i>	Common Greenshank	M(w)	-	X														
CHARADRIIFORMES	SCOLOPACIDAE	<i>Tringa stagnatilis</i>	Marsh Sandpiper	M(w)	-		X													
CICONIIFORMES	ARDEIDAE	<i>Ardea intermedia</i>	Intermediate Egret	-	-		X													
CICONIIFORMES	ARDEIDAE	<i>Ardea modesta</i>	Eastern Great Egret	-	-		X													
CICONIIFORMES	ARDEIDAE	<i>Butorides striatus</i>	Striated Heron	-	-		X													
CICONIIFORMES	ARDEIDAE	<i>Egretta garzetta</i>	Little Egret	-	-		X													
CICONIIFORMES	ARDEIDAE	<i>Egretta novaehollandiae</i>	White-faced Heron	-	-		X	X												
CICONIIFORMES	ARDEIDAE	<i>Egretta sacra</i>	Eastern Reef Egret	-	-		X													
CICONIIFORMES	ARDEIDAE	<i>Nycticorax caledonicus</i>	Nankeen Night-heron	-	-		X	X		X										
CICONIIFORMES	CICONIIDAE	<i>Ephippiorhynchus</i>	Black-necked Stork	-	-		X													
COLUMBIFORMES	COLUMBIDAE	<i>Chalcophaps indica</i>	Emerald Dove	-	-	X	X	X			X		X	X	X			X		

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)	
						Survey Location															
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	
COLUMBIFORMES	COLUMBIDAE	<i>Ducula bicolor</i>	Pied Imperial-pigeon	-	-		X	X													
COLUMBIFORMES	COLUMBIDAE	<i>Ducula spilorrhoa</i>	Torresian Imperial Pigeon	-	-	X															
COLUMBIFORMES	COLUMBIDAE	<i>Geopelia humeralis</i>	Bar-shouldered Dove	-	-	X	X	X	X	X			X	X	X	X	X	X	X		
COLUMBIFORMES	COLUMBIDAE	<i>Geopelia striata</i>	Peaceful Dove	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X		
COLUMBIFORMES	COLUMBIDAE	<i>Phaps chalcoptera</i>	Common Bronzewing	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X		
COLUMBIFORMES	COLUMBIDAE	<i>Ptilinopus regina</i>	Rose-crowned Fruit-dove	-	-	X	X														
CORACIFORMES	ALCEDINIDAE	<i>Ceyx azureus</i>	Azure Kingfisher	-	-		X														
CORACIFORMES	ALCEDINIDAE	<i>Dacelo leachii</i>	Blue-winged Kingfisher	-	-	X	X	X		X		X	X	X	X		X	X	X		
CORACIFORMES	ALCEDINIDAE	<i>Todiramphus chloris</i>	Collared Kingfisher	-	-		X							X							
CORACIFORMES	ALCEDINIDAE	<i>Todiramphus macleayi</i>	Forest Kingfisher	-	-	X	X	X		X	X		X					X	X		
CORACIFORMES	ALCEDINIDAE	<i>Todiramphus sanctus</i>	Sacred Kingfisher	-	-		X								X						
CORACIFORMES	CORACIIDAE	<i>Eurystomus orientalis</i>	Dollarbird	-	-		X														
CORACIFORMES	MEROPIDAE	<i>Merops ornatus</i>	Rainbow Bee-eater	-	-	X	X	X		X				X		X		X			
CUCULIFORMES	CENTROPODIDAE	<i>Centropus phasianinus</i>	Pheasant Coucal	-	-		X	X		X			X	X	X	X	X	X	X		
CUCULIFORMES	CUCULIDAE	<i>Cacomantis variolosus</i>	Brush Cuckoo	-	-	x	X	X													
CUCULIFORMES	CUCULIDAE	<i>Chrysococcyx minutillus</i>	Little Bronze Cuckoo	-	-	X	X														
CUCULIFORMES	CUCULIDAE	<i>Eudynamys orientalis</i>	Eastern Koel	-	-	X		X													
CUCULIFORMES	CUCULIDAE	<i>Scythrops nouaehollandiae</i>	Channel-billed Cuckoo	-	-			X													
FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	-	-		X						X			X					
FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter fasciatus</i>	Brown Goshawk	-	-	X	X	X						X							
FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter sp.</i>		-	-														X		
FALCONIFORMES	ACCIPITRIDAE	<i>Aquila audax</i>	Wedge-tailed Eagle	-	-		X	X		X								X			
FALCONIFORMES	ACCIPITRIDAE	<i>Aviceda subcristata</i>	Pacific Baza	-	-	X															
FALCONIFORMES	ACCIPITRIDAE	<i>Circus assimilis</i>	Spotted Harrier	-	-		X														
FALCONIFORMES	ACCIPITRIDAE	<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	-	-		X			X				X							
FALCONIFORMES	ACCIPITRIDAE	<i>Haliastur indus</i>	Brahminy Kite	-	-		X														
FALCONIFORMES	ACCIPITRIDAE	<i>Haliastur spheurnus</i>	Whistling Kite	-	-	X	X	X	X	X			X	X							
FALCONIFORMES	ACCIPITRIDAE	<i>Pandion cristatus</i>	Eastern Osprey	M(w)	-		X														
FALCONIFORMES	FALCONIDAE	<i>Falco berigora</i>	Brown Falcon	-	-	X	X							X							
GALLIFORMES	MEGAPODIIDAE	<i>Megapodius reinwardt</i>	Orange-footed Scrubfowl	-	-	X	X		X		X		X	X	X						
GALLIFORMES	PHASIANIDAE	<i>Coturnix ypsilophora</i>	Brown Quail	-	-		X	X		X				X	X				X		
GALLIFORMES	PHASIANIDAE	<i>Excalfactoria chinensis</i>	King Quail	-	-		X														
GRUIFORMES	GRUIDAE	<i>Grus rubicunda</i>	Brolga	-	-		X				X										
GRUIFORMES	RALLIDAE	<i>Eulabeornis cristatus</i>	Chestnut Rail	-	-		X												X		
GRUIFORMES	RALLIDAE	<i>Gallirallus philippensis</i>	Buff-banded Rail	-	-									X					X		
PASSERIFORMES	ACANTHIZIDAE	<i>Gerygone chloranota</i>	Green-backed Gerygone	-	-	X	X														
PASSERIFORMES	ACANTHIZIDAE	<i>Gerygone levigaster</i>	Mangrove Gerygone	-	-		X														
PASSERIFORMES	ACANTHIZIDAE	<i>Gerygone magnirostris</i>	Large-billed Gerygone	-	-	X	X														
PASSERIFORMES	ARTAMIDAE	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	-	-	X	X														
PASSERIFORMES	ARTAMIDAE	<i>Artamus minor</i>	Little Woodswallow	-	-	X	X														
PASSERIFORMES	ARTAMIDAE	<i>Cracticus nigrogularis</i>	Pied Butcherbird	-	-	X	X	X	X	X		X	X	X		X	X	X	X		
PASSERIFORMES	ARTAMIDAE	<i>Cracticus tibicen</i>	Australian Magpie	-	-	X	X	X		X		X	X	X		X	X	X	X		
PASSERIFORMES	ARTAMIDAE	<i>Cracticus torquatus</i>	Grey Butcherbird	-	-											X					
PASSERIFORMES	CAMPEPHAGIDAE	<i>Coracina nouaehollandiae</i>	Black-faced Cuckoo-shrike	-	-	X	X	X		X											
PASSERIFORMES	CAMPEPHAGIDAE	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike	-	-	X	X	X		X											
PASSERIFORMES	CAMPEPHAGIDAE	<i>Coracina tenuirostris</i>	Cicadabird	-	-	X	X														
PASSERIFORMES	CAMPEPHAGIDAE	<i>Lalage leucomela</i>	Varied Triller	-	-	X	X														
PASSERIFORMES	CAMPEPHAGIDAE	<i>Lalage sueurii</i>	White-winged Triller	-	-		X														
PASSERIFORMES	CISTICOLIDAE	<i>Cisticola exilis</i>	Golden-headed Cisticola	-	-		X														
PASSERIFORMES	CORVIDAE	<i>Corvus orru</i>	Torresian Crow	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X		
PASSERIFORMES	DICRURIDAE	<i>Dicrurus bracteatus</i>	Spangled Drongo	-	-	X	X	X	X	X											

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)
						Survey Location														
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease
PASSERIFORMES	ESTRIDIDAE	<i>Taeniopygia bichenovii</i>	Double-barred Finch	-	-	X	X	X	X	X				X				X	X	
PASSERIFORMES	HIRUNDINIDAE	<i>Petrochelidon nigricans</i>	Tree Martin	-	-		X													
PASSERIFORMES	MALURIDAE	<i>Malurus</i>	Red-backed Fairy-wren	-	-	X	X	X		X			X		X			X	X	
PASSERIFORMES	MEGALURIDAE	<i>Megalururus timoriensis</i>	Tawny Grassbird	-	-		X													
PASSERIFORMES	MELIPHAGIDAE	<i>Conopophila albogularis</i>	Rufous-banded Honeyeater	-	-	X	X													
PASSERIFORMES	MELIPHAGIDAE	<i>Conopophila rufogularis</i>	Rufous-throated Honeyeater	-	-							X								
PASSERIFORMES	MELIPHAGIDAE	<i>Lichmera indistincta</i>	Brown Honeyeater	-	-	X	X	X	X	X				X				X	X	
PASSERIFORMES	MELIPHAGIDAE	<i>Meliphaga albogularis</i>	White-throated Honeyeater	-	-	X	X	X		X										
PASSERIFORMES	MELIPHAGIDAE	<i>Myzomela</i>	Red-headed Honeyeater	-	-		X													
PASSERIFORMES	MELIPHAGIDAE	<i>Myzomela obscura</i>	Dusky Honeyeater	-	-			X												
PASSERIFORMES	MELIPHAGIDAE	<i>Philemon argenticeps</i>	Silver-crowned Eucalyptbird	-	-	X	X	X	X	X				X		X	X	X		
PASSERIFORMES	MELIPHAGIDAE	<i>Philemon citreogularis</i>	Little Friarbird	-	-	X	X	X	X	X										
PASSERIFORMES	MELIPHAGIDAE	<i>Philemon sp.</i>		-	-									X						
PASSERIFORMES	MELIPHAGIDAE	<i>Ramsayornis fasciatus</i>	Bar-breasted Honeyeater	-	-	X	X													
PASSERIFORMES	MELIPHAGIDAE	<i>Stomiopora unicolor</i>	White-gaped Honeyeater	-	-	X	X	X		X										
PASSERIFORMES	MONARCHIDAE	<i>Grallina cyanoleuca</i>	Magpie-lark	-	-	X								X	X					
PASSERIFORMES	MONARCHIDAE	<i>Myiagra alecto</i>	Shining Flycatcher	-	-	X	X	X			X			X				X		
PASSERIFORMES	MONARCHIDAE	<i>Myiagra inquieta</i>	Restless Flycatcher	-	-		X													
PASSERIFORMES	MONARCHIDAE	<i>Myiagra rubecula</i>	Leadend Flycatcher	-	-	X	X	X	X	X									X	
PASSERIFORMES	MONARCHIDAE	<i>Myiagra ruficollis</i>	Broad-billed Flycatcher	-	-		X	X												
PASSERIFORMES	MONARCHIDAE	<i>Myiagra sp.</i>		-	-													X	X	
PASSERIFORMES	MONARCHIDAE	<i>Symphoricarpos</i>	Spectacled Monarch	M(t)	-	X														
PASSERIFORMES	MOTACILLIDAE	<i>Anthus novaeseelandiae</i>	Australasian Pipit	-	-	X								X						
PASSERIFORMES	NECTARINIIDAE	<i>Dicaeum</i>	Mistletoebird	-	-	X	X	X												
PASSERIFORMES	ORIOLIDAE	<i>Oriolus flavocinctus</i>	Yellow Oriole	-	-	X	X			X										
PASSERIFORMES	ORIOLIDAE	<i>Oriolus sagittatus</i>	Olive-backed Oriole	-	-	X	X	X	X											
PASSERIFORMES	ORIOLIDAE	<i>Sphecotheres vieilloti</i>	Australasian Figbird	-	-	X	X													
PASSERIFORMES	PACHYCEPHALIDAE	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	-	-	X	X	X		X				X		X		X	X	
PASSERIFORMES	PACHYCEPHALIDAE	<i>Colluricincla melanochloros</i>	Little Shrike-thrush	-	-	X		X	X											
PASSERIFORMES	PACHYCEPHALIDAE	<i>Pachycephala rufiventris</i>	Rufous Whistler	-	-	X	X	X	X	X				X		X		X	X	
PASSERIFORMES	PACHYCEPHALIDAE	<i>Pachycephala simplex</i>	Grey Whistler	-	-	X	X	X												
PASSERIFORMES	PARDALOTIDAE	<i>Pardalotus striatus</i>	Striated Pardalote	-	-	X	X	X		X		X		X				X	X	
PASSERIFORMES	PETROICIDAE	<i>Microeca flavigaster</i>	Lemon-bellied Flycatcher	-	-	X	X	X		X				X	X		X	X	X	
PASSERIFORMES	PITTIDAE	<i>Pitta iris</i>	Rainbow Pitta	-	-	X	X					X	X	X						
PASSERIFORMES	POMATOSTOMIDAE	<i>Pomatostomus</i>	Grey-crowned Babbler	-	-	X	X	X		X			X		X			X	X	
PASSERIFORMES	PTILONORHYNCHIDAE	<i>Ptilonorhynchus</i>	Great Bowerbird	-	-	X	X			X		X	X		X			X	X	
PASSERIFORMES	RHIPIDURIDAE	<i>Rhipidura dryas</i>	Arafura Fantail	-	-		X			X				X						
PASSERIFORMES	RHIPIDURIDAE	<i>Rhipidura leucophrys</i>	Willie Wagtail	-	-					X										
PASSERIFORMES	RHIPIDURIDAE	<i>Rhipidura rufifrons</i>	Rufous Fantail	-	-	X														
PASSERIFORMES	RHIPIDURIDAE	<i>Rhipidura rufiventris</i>	Northern Fantail	-	-	X	X	X	X	X				X				X	X	
PASSERIFORMES	TIMALIDAE	<i>Zosterops luteus</i>	Yellow White-eye	-	-	X	X			X										
PELECANIFORMES	ANHINGIDAE	<i>Anhinga</i>	Australasian Darter	-	-		X													
PELECANIFORMES	PHALACROCORACIDAE	<i>Phalacrocorax</i>	Little Black Cormorant	-	-	X														
PODICIPEDIFORMES	PODICIPEDIDAE	<i>Tachybaptus</i>	Australasian Grebe	-	-	X	X													
PSITTACIFORMES	CACATUIDAE	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	-	-	X	X	X	X	X										
PSITTACIFORMES	CACATUIDAE	<i>Cacatua sanguinea</i>	Little Corella	-	-	X	X		X			X								
PSITTACIFORMES	CACATUIDAE	<i>Calyptorhynchus banksii</i>	Red-tailed Black-Cockatoo	-	-	X														
PSITTACIFORMES	PSITTACIDAE	<i>Aprosmictus</i>	Red-winged Parrot	-	-	X	X	X	X	X								X		
PSITTACIFORMES	PSITTACIDAE	<i>Trichoglossus</i>	Rainbow Lorikeet	-	-	X	X	X	X	X										

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)
						Survey Location														
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease
STRIGIFORMES	STRIGIDAE	<i>Ninox novaeseelandiae</i>	Southern Boobook	-	-	X	X	X		X			X							
STRIGIFORMES	TYTONIDAE	<i>Tyto novaehollandiae kimberli</i>	Masked Owl (northern)	V	V		X	X		X					X		X			X
TURNICIFORMES	TURNICIDAE	<i>Turnix castanotus</i>	Chestnut-backed Button-quail	-	-	X	X	X			X		X	X			X	X	X	
MAMMALS																				
CARNIVORA	CANIDAE	<i>Canis familiaris</i>	Domestic Dog	-	-	X	X							X						
CARNIVORA	CANIDAE	<i>Canis familiaris/lupus</i>	Domestic Dog / Dingo	-	-		X	X	X	X								X	X	
CARNIVORA	CANIDAE	<i>Canis lupus</i>	Dingo	-	-	X						X	X	X	X	X	X			
CARNIVORA	FELIDAE	<i>Felis catus</i>	Cat	-	-	X	X	X					X	X	X			X	X	
CHIROPTERA	EMBALLONURIDAE	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	-	-		X	X	X	X				X	X	X		X	X	
CHIROPTERA	EMBALLONURIDAE	<i>Taphozous georgianus</i>	Common Sheath-tail-bat	-	-		X	X		X	X									
CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros ater</i>	Dusky Leaf-nosed-bat	-	-			X												
CHIROPTERA	MEGADERMATIDAE	<i>Macroderma gigas</i>	Ghost Bat	V	-		X													
CHIROPTERA	MOLOSSIDAE	<i>Chaerephon jobensis</i>	Northern Freetail-bat	-	-			X^												X
CHIROPTERA	MOLOSSIDAE	<i>Mormopterus beccarii</i>	Beccari's Freetail-bat	-	-					X^										
CHIROPTERA	PTEROPODIDAE	<i>Macroglossus minimus</i>	Northern Blossom-bat	-	-		X		X											
CHIROPTERA	PTEROPODIDAE	<i>Pteropus alecto</i>	Black Flying-fox	-	-		X	X												
CHIROPTERA	PTEROPODIDAE	<i>Pteropus scapulatus</i>	Little Red Flying-fox	-	-	X	X													
CHIROPTERA	VESPERTILIONIDAE	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	-	-			X^												
CHIROPTERA	VESPERTILIONIDAE	<i>Chalinolobus</i>	Hoary Wattled Bat	-	-		X	X												
CHIROPTERA	VESPERTILIONIDAE	<i>Chalinolobus nigrogriseus</i> / <i>Chalinolobus nigrogriseus</i>		-	-			X	X^	X^	X^									
CHIROPTERA	VESPERTILIONIDAE	<i>Myotis macropus</i>	Large-footed Myotis	-	-		X	X												
CHIROPTERA	VESPERTILIONIDAE	<i>Nyctophilus arnhemensis</i>	Arnhem Long-eared Bat	-	-		X													
CHIROPTERA	VESPERTILIONIDAE	<i>Nyctophilus sp.</i>		-	-			X		X^										
CHIROPTERA	VESPERTILIONIDAE	<i>Nyctophilus walkeri</i>	Pygmy Long-eared Bat	-	-			X												
CHIROPTERA	VESPERTILIONIDAE	<i>Vespadelus caurinus</i>	Northern Cave Bat	-	-	X	X	X		X	X									
CHIROPTERA	VESPERTILIONIDAE	<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat	-	-		X			X	X									
DASYUROMORPHIA	DASYURIDAE	<i>Dasyurus hallucatus</i>	Northern Quoll	E	CE	X	X	X	X	X		X	X	X	X	X	X	X	X	X
DASYUROMORPHIA	DASYURIDAE	<i>Planigale maculata</i>	Common Planigale	-	-	X	X					X	X	X	X			X		
DIPROTODONTIA	MACROPODIDAE	<i>Macropus agilis</i>	Agile Wallaby	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X	
DIPROTODONTIA	MACROPODIDAE	<i>Petrogale brachyotis</i>	Short-eared Rock-wallaby	-	-	X		X					X	X	X	X	X	X	X	
DIPROTODONTIA	MACROPODIDAE	<i>Unidentified spp.</i>		-	-												X			
DIPROTODONTIA	PETAURIDAE	<i>Petaurus breviceps</i>	Sugar Glider	-	-	X	X	X		X			X	X	X			X	X	
DIPROTODONTIA	PHALANGERIDAE	<i>Trichosurus vulpecula arnhemensis</i>	Common Brushtail Possum (northern)	V	-		X													
DIPROTODONTIA	PSEUDOCHEIRIDAE	<i>Petrapseudes dahl</i>	Rock Ringtail Possum	-	-	X								X	X	X				
MONOTREMATA	TACHYGLOSSIDAE	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	-	-	X	X	X		X		X	X	X	X	X	X	X	X	
PERAMELEMORPHIA	PERAMELIDAE	<i>Isodon macrourus</i>	Northern Brown Bandicoot	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X	
RODENTIA	MURIDAE	<i>Conilurus penicillatus</i>	Brush-tailed Rabbit-rat	V	E			X					X				X		X	
RODENTIA	MURIDAE	<i>Hydromys chrysogaster</i>	Water-rat	-	-		X							X						
RODENTIA	MURIDAE	<i>Melomys burtoni</i>	Grassland Melomys	-	-	X	X	X	X	X		X	X	X	X			X	X	
RODENTIA	MURIDAE	<i>Mus musculus*</i>	House Mouse	-	-			X												
RODENTIA	MURIDAE	<i>Notomys aqualis</i>	Northern Hopping-mouse	E	E			X					X	X						
RODENTIA	MURIDAE	<i>Pseudomys delicatulus</i>	Delicate Mouse	-	-	X	X	X	X	X		X	X	X	X			X	X	
RODENTIA	MURIDAE	<i>Rattus rattus</i>	Black Rat*	-	-			X												
RODENTIA	MURIDAE	<i>Zyomys argurus</i>	Common Rock-rat	-	-	X		X						X	X			X		
REPTILES																				
CROCODYLIA	CROCODYLIDAE	<i>Crocodylus porosus</i>	Saltwater Crocodile	M(m)	-	X	X	X		X	X									
SQUAMATA	AGAMIDAE	<i>Chlamydosaurus kingii</i>	Friilled Lizard	-	-	X	X	X	X	X		X	X	X	X	X	X	X	X	
SQUAMATA	AGAMIDAE	<i>Diporiphora bilineata</i>	Two-lined Dragon	-	-	X	X	X		X		X	X	X	X					
SQUAMATA	AGAMIDAE	<i>Diporiphora magna</i>	Yellow-sided Two-line Dragon	-	-			X												

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)
						Survey Location														
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease
SQUAMATA	AGAMIDAE	<i>Lophognathus gilberti</i>	Gilbert's Dragon	-	-	X	X					X	X	X	X	X				
SQUAMATA	AGAMIDAE	<i>Unidentified spp.</i>		-	-								X	X	X			X	X	
SQUAMATA	BOIDAE	<i>Antaresia childreni</i>	Children's Python	-	-	X	X											X		
SQUAMATA	BOIDAE	<i>Liasis fuscus</i>	Water Python	-	-	X	X													
SQUAMATA	BOIDAE	<i>Liasis olivaceus</i>	Olive Python	-	-	X		X		X			X	X						
SQUAMATA	BOIDAE	<i>Morelia spilota</i>	Diamond Python	-	-			X												
SQUAMATA	COLUBRIDAE	<i>Boiga irregularis</i>	Brown Tree Snake	-	-	x	X	X												
SQUAMATA	COLUBRIDAE	<i>Dendrelaphis</i>	Common Tree Snake	-	-		X													
SQUAMATA	COLUBRIDAE	<i>nuoctulatus</i>		-	-	X	X													
SQUAMATA	COLUBRIDAE	<i>Tropidonophis mairii</i>	Freshwater Snake	-	-	X	X													
SQUAMATA	DIPLODACTYLIDAE	<i>Amalosia rhombifer</i>	Zigzag Velvet Gecko	-	-	X	X													
SQUAMATA	DIPLODACTYLIDAE	<i>Oedura marmorata</i>	Marbled Velvet Gecko	-	-	X														
SQUAMATA	ELAPIDAE	<i>Acanthophis praelongus</i>	Northern Death Adder	-	-		X													
SQUAMATA	ELAPIDAE	<i>Demansia olivacea</i>	Olive Whip Snake	-	-									X	X					
SQUAMATA	ELAPIDAE	<i>Pseudechis australis</i>	King Brown Snake	-	-	X														
SQUAMATA	ELAPIDAE	<i>Pseudechis weigeli</i>	Weigel's Black Snake	-	-		X						X	X	X					
SQUAMATA	ELAPIDAE	<i>Pseudonaja nuchalis</i>	Western Brown Snake	-	-									X	X					
SQUAMATA	ELAPIDAE	<i>Pseudonaja nuchalis</i>	Northern Brown Snake	-	-			X	X											
SQUAMATA	ELAPIDAE	<i>Unidentified spp.</i>		-	-								X		X				X	
SQUAMATA	GEKKONIDAE	<i>Gehyra australis</i>	Northern Dttella	-	-	X	X													
SQUAMATA	GEKKONIDAE	<i>Gehyra pameia</i>	Arnhemland	-	-	X														
SQUAMATA	GEKKONIDAE	<i>Macrotiscolus Dttella</i>	House Gecko	-	-		X			X										
SQUAMATA	GEKKONIDAE	<i>Hemidactylus frenatus</i>		-	-		X													
SQUAMATA	GEKKONIDAE	<i>Heteronotia binoei</i>	Bynoe's Gecko	-	-	X	X	X	X	X										
SQUAMATA	GEKKONIDAE	<i>Unidentified spp.</i>		-	-								X	X	X					
SQUAMATA	HOMALOPSIDAE	<i>Enhydrys polylepis</i>	Macleay's Water Snake	-	-	X	X													
SQUAMATA	PYGOPODIDAE	<i>Delma borea</i>	Rusty-topped Delma	-	-	X	X	X		X										
SQUAMATA	PYGOPODIDAE	<i>Lialis burtonis</i>	Burton's Snake-lizard	-	-	X	X	X	X	X									X	
SQUAMATA	SCINCIDAE	<i>Carlia amax</i>	Bauxite Rainbow-skink	-	-	X	X	X	X	X										
SQUAMATA	SCINCIDAE	<i>Carlia longipes</i>	Closed-litter Rainbow-skink	-	-	X														
SQUAMATA	SCINCIDAE	<i>Carlia munda</i>	Shaded-litter Rainbow-skink	-	-	X	X	X		X										
SQUAMATA	SCINCIDAE	<i>Carlia sexdentata</i>		-	-		X	X												
SQUAMATA	SCINCIDAE	<i>Cryptoblepharus</i>	Metallic Snake-eyed Skink	-	-		X													
SQUAMATA	SCINCIDAE	<i>Cryptoblepharus</i>	Péron's Snake-eyed Skink	-	-	X		X												
SQUAMATA	SCINCIDAE	<i>clausenianus</i>	Skink	-	-			X												
SQUAMATA	SCINCIDAE	<i>Ctenotus arnhemensis</i>	Arnhem Land Ctenotus	-	-			X												
SQUAMATA	SCINCIDAE	<i>Ctenotus essingtonii</i>	Port Essington	-	-	X		X												
SQUAMATA	SCINCIDAE	<i>Ctenotus inornatus</i>	Bar-shouldered Ctenotus	-	-	X	X			X										
SQUAMATA	SCINCIDAE	<i>Ctenotus quiritus</i>		-	-		X			X										
SQUAMATA	SCINCIDAE	<i>Ctenotus robustus</i>	Robust Ctenotus	-	-		X	X	X											
SQUAMATA	SCINCIDAE	<i>Ctenotus spaldingi</i>	Spalding's Ctenotus	-	-		X	X		X										
SQUAMATA	SCINCIDAE	<i>Eremiascincus isolepis</i>	Northern Bar-lipped Skink	-	-	X	X	X												
SQUAMATA	SCINCIDAE	<i>Glaphyromorphus</i>	Black-tailed Bar-lipped Skink	-	-	X	X													
SQUAMATA	SCINCIDAE	<i>niaticus</i>	Skink	-	-															
SQUAMATA	SCINCIDAE	<i>Lerista carpentariae</i>	Carpentaria Fine-lined Slider	-	-	X	X	X												
SQUAMATA	SCINCIDAE	<i>Menetia alanae</i>	Alana's Menetia	-	-	X	X													
SQUAMATA	SCINCIDAE	<i>Menetia greyii</i>	Common Dwarf Skink	-	-			X												
SQUAMATA	SCINCIDAE	<i>Menetia maini</i>	Northern Dwarf Skink	-	-			X												
SQUAMATA	SCINCIDAE	<i>Notoscincus ornatus</i>	Ornate Soil-crevice Skink	-	-	X	X	X												
SQUAMATA	SCINCIDAE	<i>Prooblepharus tenuis</i>	Northern Soil-crevice Skink	-	-	X	X	X		X										
SQUAMATA	SCINCIDAE	<i>Tiliqua scincoides</i>	Eastern Blue-tongue	-	-			X												
SQUAMATA	SCINCIDAE	<i>Tiliqua scincoides</i>	Northern Blue-tongue	-	-	X	X	X				X	X	X	X	X			X	
SQUAMATA	SCINCIDAE	<i>linxian</i>	Skink	-	-							X	X	X	X			X	X	
SQUAMATA	SCINCIDAE	<i>Unidentified spp.</i>		-	-							X	X	X	X			X	X	
SQUAMATA	TYPHLOPIDAE	<i>Ramphotyphlops</i>	Groote Dwarf Blind Snake	-	-			X												

Order	Family	Scientific Name	Common Name	EPBC Act Status	TPWC Act Status	Webb (1992)	URS (2012)	Cumberland Ecology (2015)	Cumberland Ecology (2015)	Cumberland Ecology (2016)	Cumberland Ecology (2016)	Heiniger and Gillespie (2017)	Heiniger and Gillespie (2017)	Cumberland Ecology (2019a)	Cumberland Ecology (2019a)	Heiniger et al. (2020)	Heiniger et al. (2020)	Cumberland Ecology (2023)	Cumberland Ecology (2023)	Cumberland Ecology (unpublished)
						Survey Location														
						Eastern Leases & existing mine	Existing mine	Eastern Leases	Rehab areas of existing mine	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North and East of Southern Lease	Within Southern Lease	Adjacent to Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease	North of Southern Lease	Within Southern Lease
SQUAMATA	TYPHLOPIDAE	<i>Ramphotyphlops</i>	Claw-snouted Blind Snake	-	-	X														
SQUAMATA	VARANIDAE	<i>Varanus acanthurus</i>	Ridge-tailed Monitor	-	-										X					
SQUAMATA	VARANIDAE	<i>Varanus glebopalma</i>	Black-palmed Monitor	-	-	X	X							X						
SQUAMATA	VARANIDAE	<i>Varanus gouldii</i>	Sand Goanna	-	-							X	X	X	X	X	X	X	X	
SQUAMATA	VARANIDAE	<i>Varanus mertensi</i>	Mertens' Water Monitor	-	V	X	X	X	X											X
SQUAMATA	VARANIDAE	<i>Varanus panoptes</i>	Yellow-spotted Monitor	-	V		X	X	X											
SQUAMATA	VARANIDAE	<i>Varanus scalaris</i>	Spotted Tree Monitor	-	-	X	X	X	X			X	X	X	X			X	X	
SQUAMATA	VARANIDAE	<i>Varanus sp.</i>		-	-									X	X		X		X	
SQUAMATA	VARANIDAE	<i>Varanus tristis</i>	Black-headed Monitor	-	-							X	X	X	X	X	X	X	X	

1. Conservation Status: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory [(m) = marine, (t) = terrestrial, (w) = wetland]

2. Species listed as *Pandion haliaetus* the Protected Matters Search report. *Pandion haliaetus cristatus* was previously recognised as a subspecies for Australasia and New Caledonia, however it is currently recognised as a species in its own right.

* Denotes an exotic species

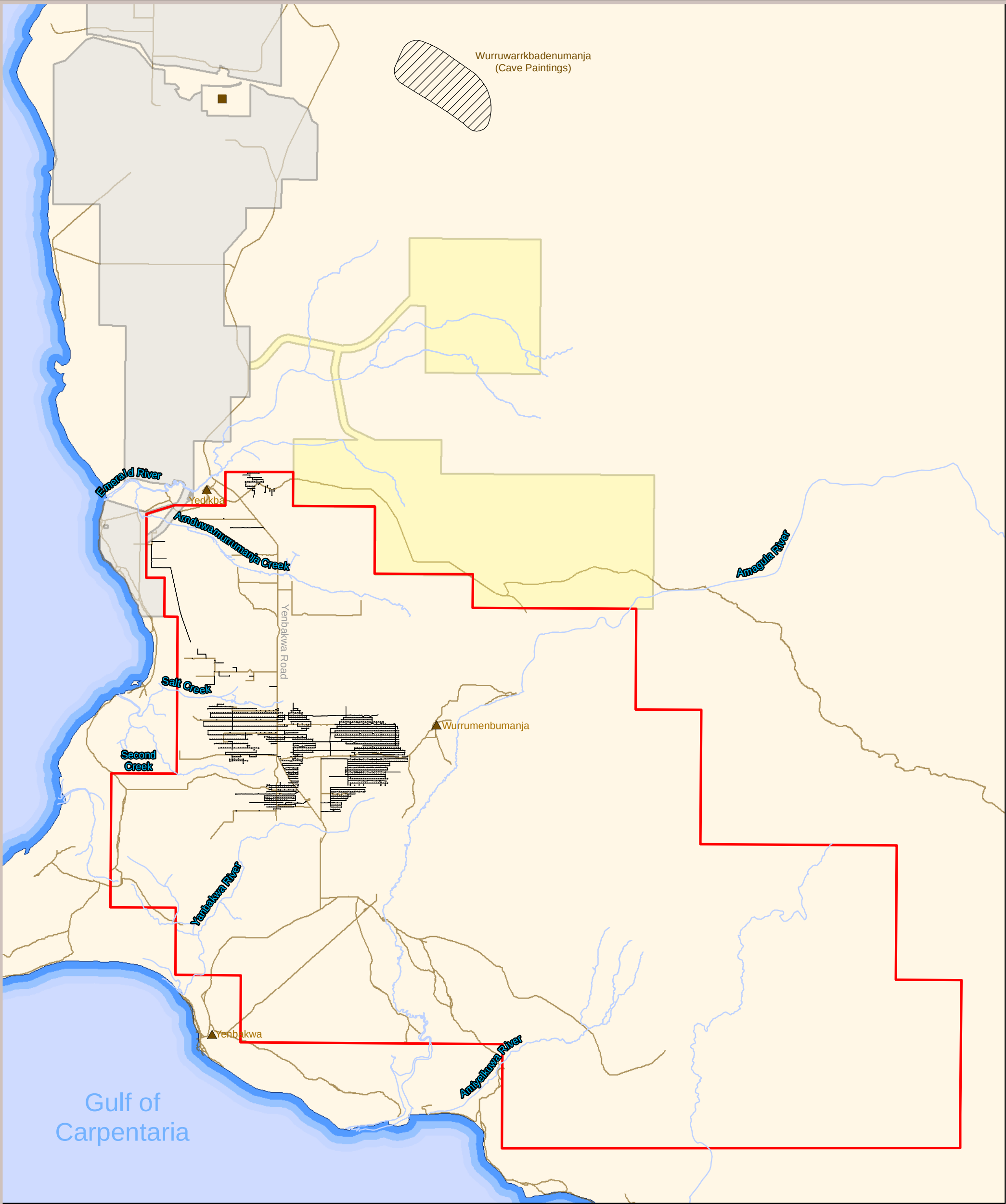
^Species identification was not possible, as call could not be positively identified.

FIGURES



Figure 1. Location of the Southern Lease

0 5 10 15 20 km



Legend

	Disturbance Footprint		Recreation Area
	Southern Lease		Watercourse
	Existing GEMCO Mine		Roads and Access Tracks
	Eastern Leases		Township
			Outstation

Coordinate System: MGA Zone 53 (GDA 94) 



Figure 2. Location of the disturbance footprint

0 2 4 km

I:\... \20003\Figures\RP13\20221214\Figure 2. Location of the disturbance footprint

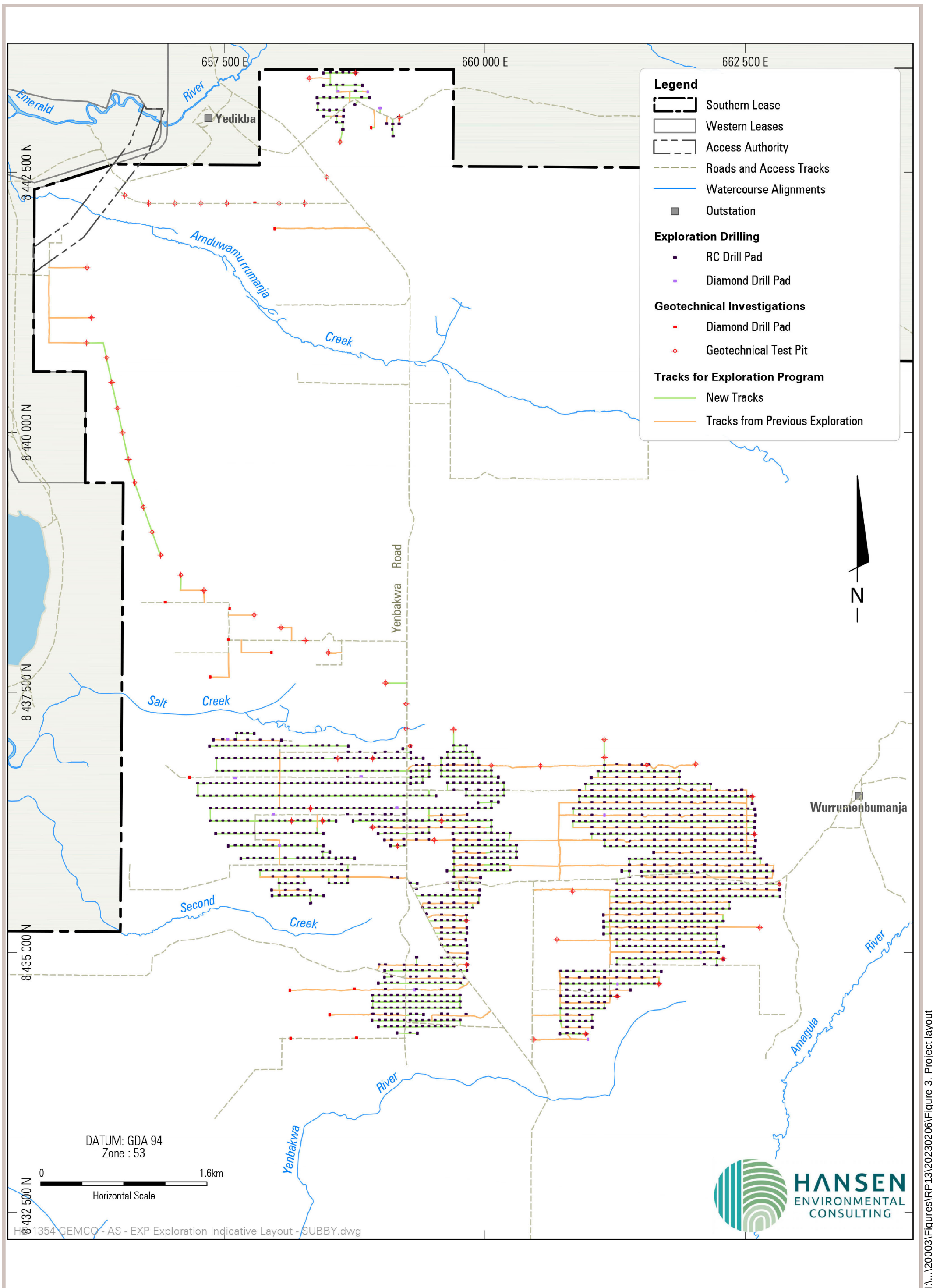


Figure 3. Project layout



Figure 4. Bioregion setting

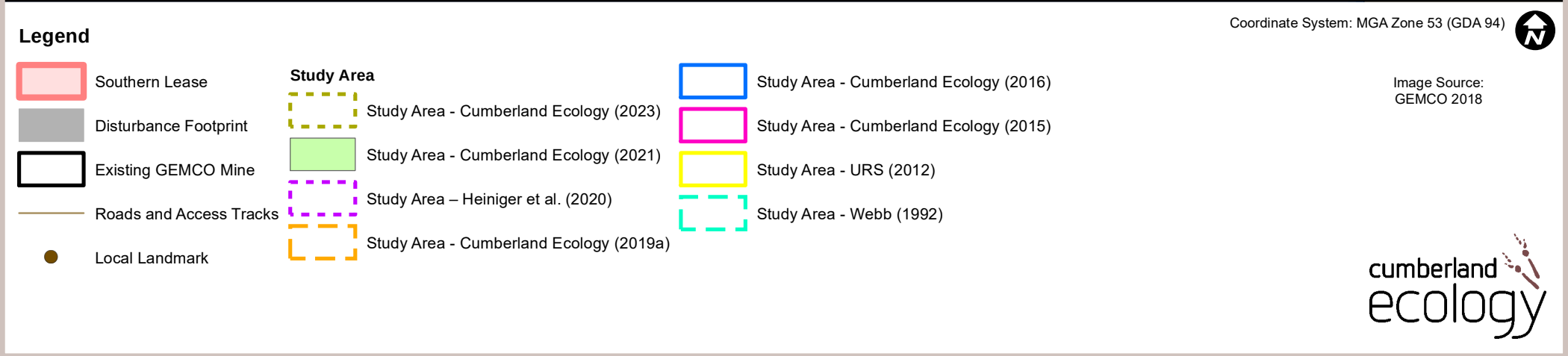
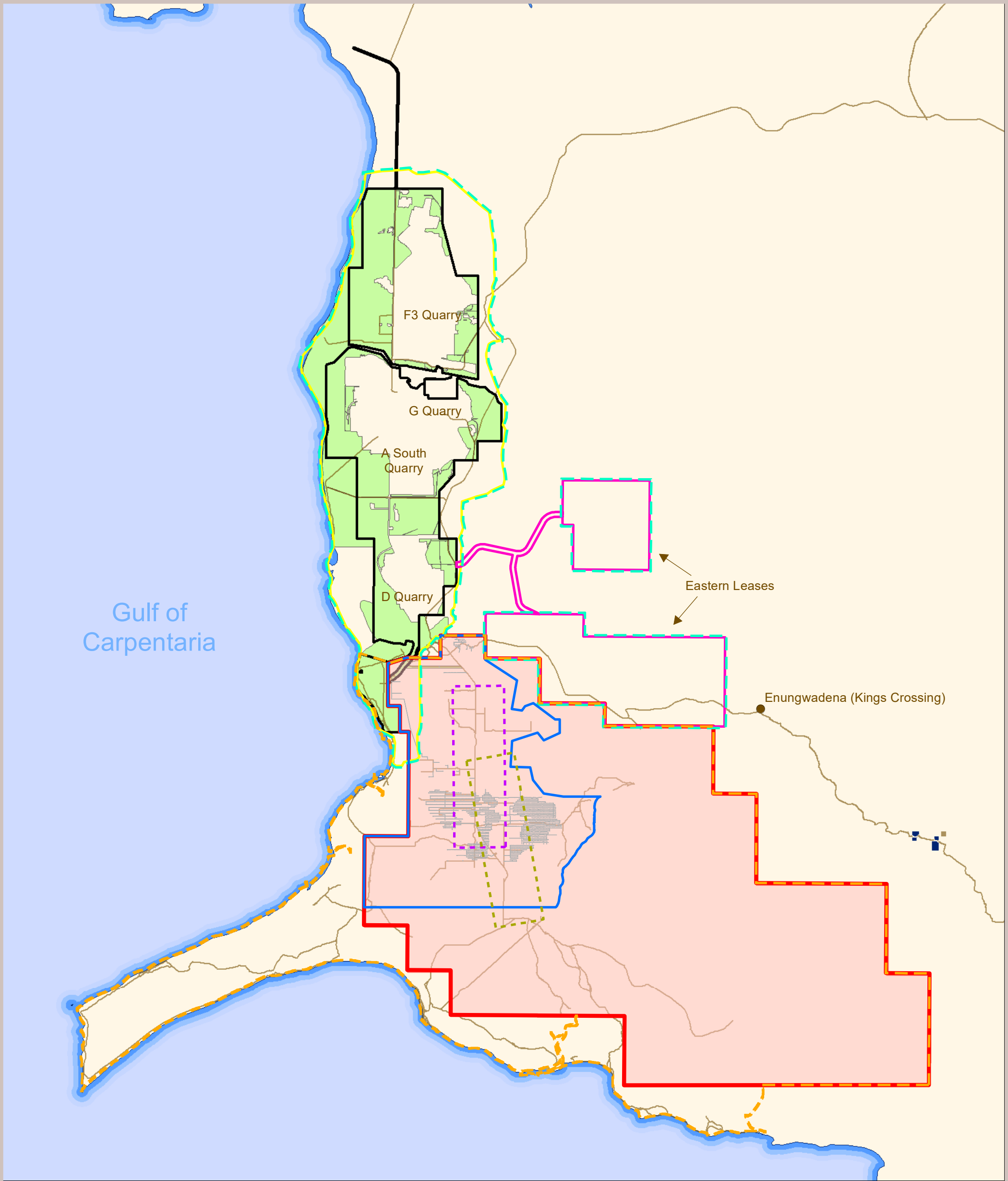


Figure 5. Location of previous study areas

0 2 4 6 km

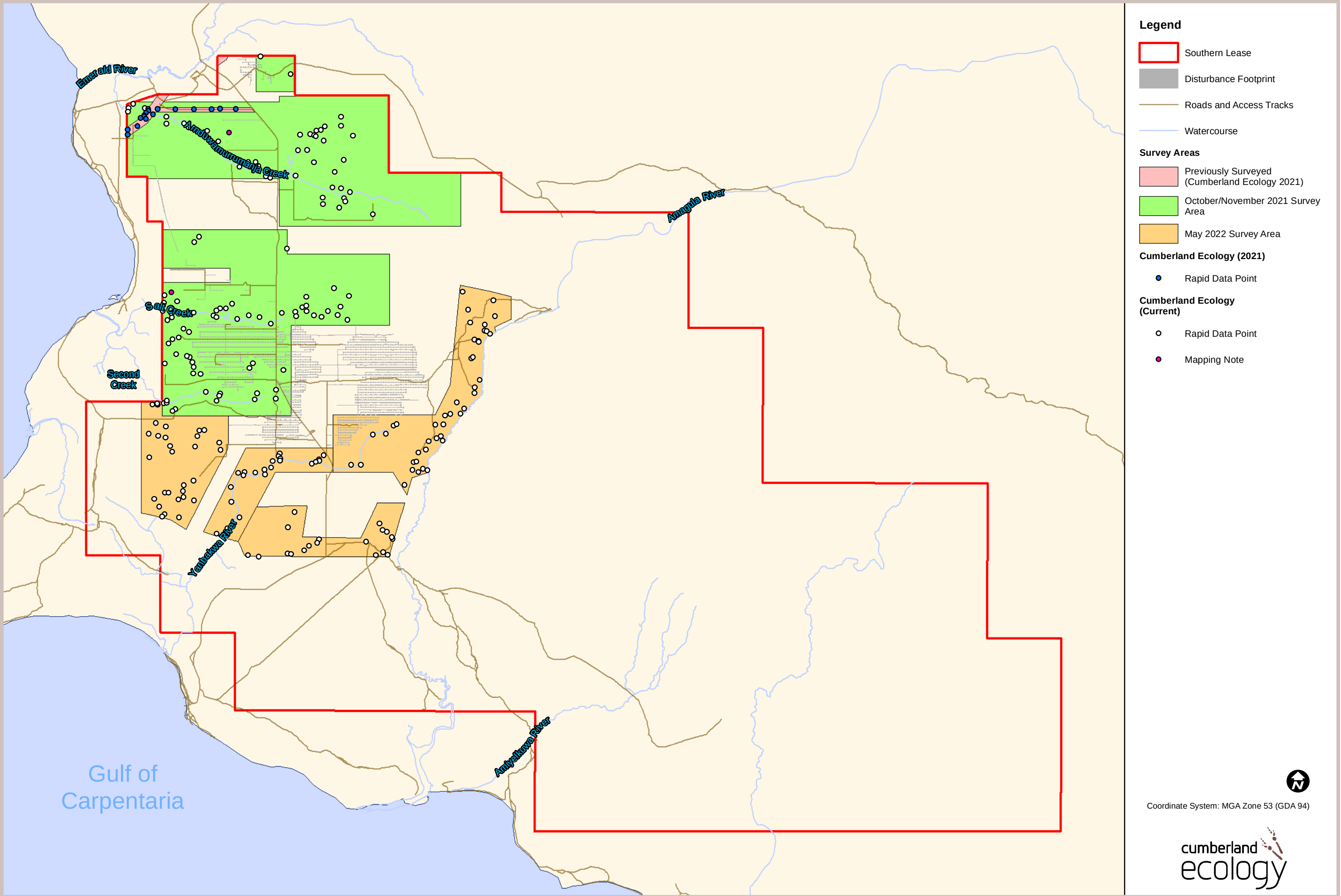


Figure 6. Location of recent flora surveys within the Southern Lease

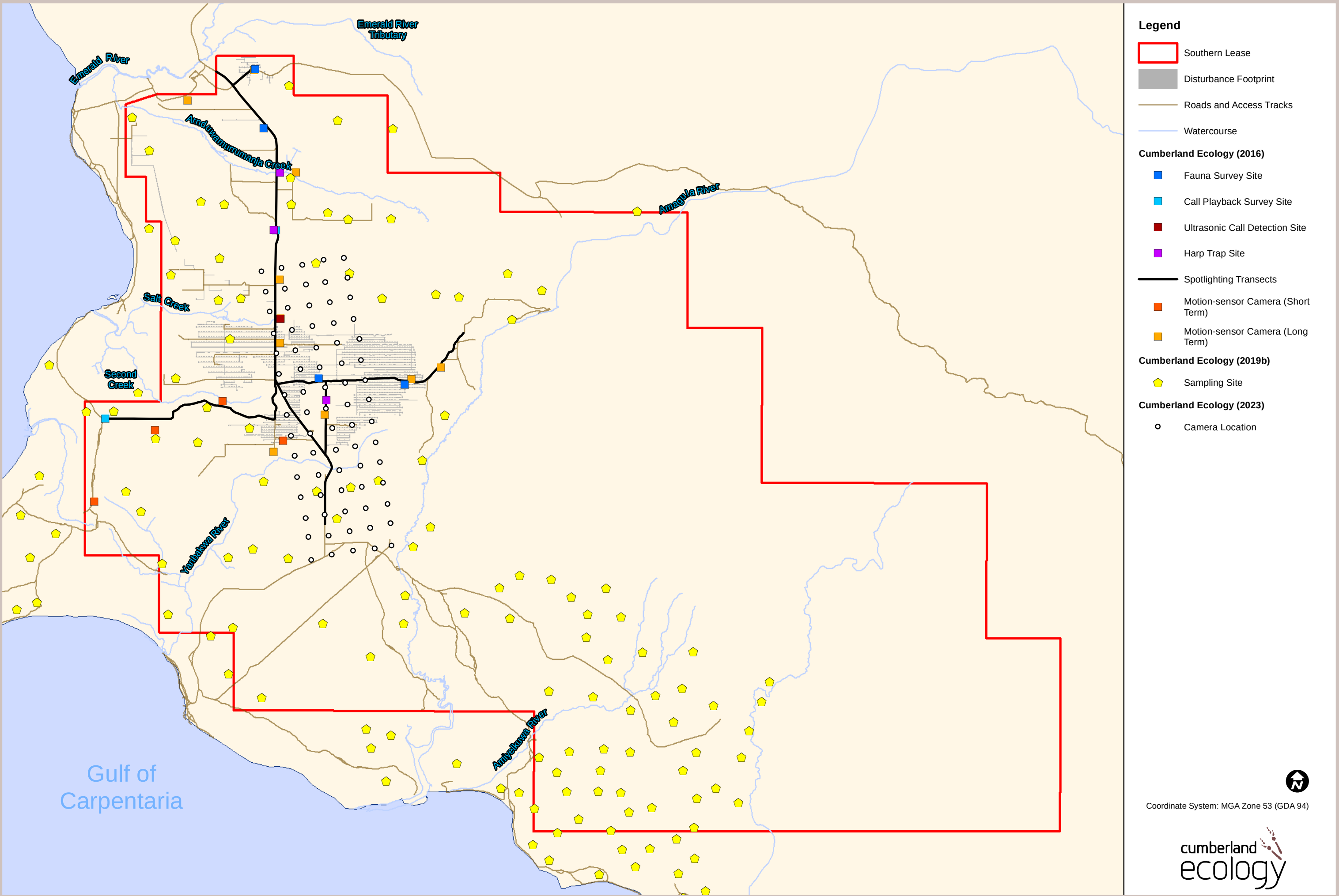


Figure 7. Location of recent fauna surveys within the Southern Lease

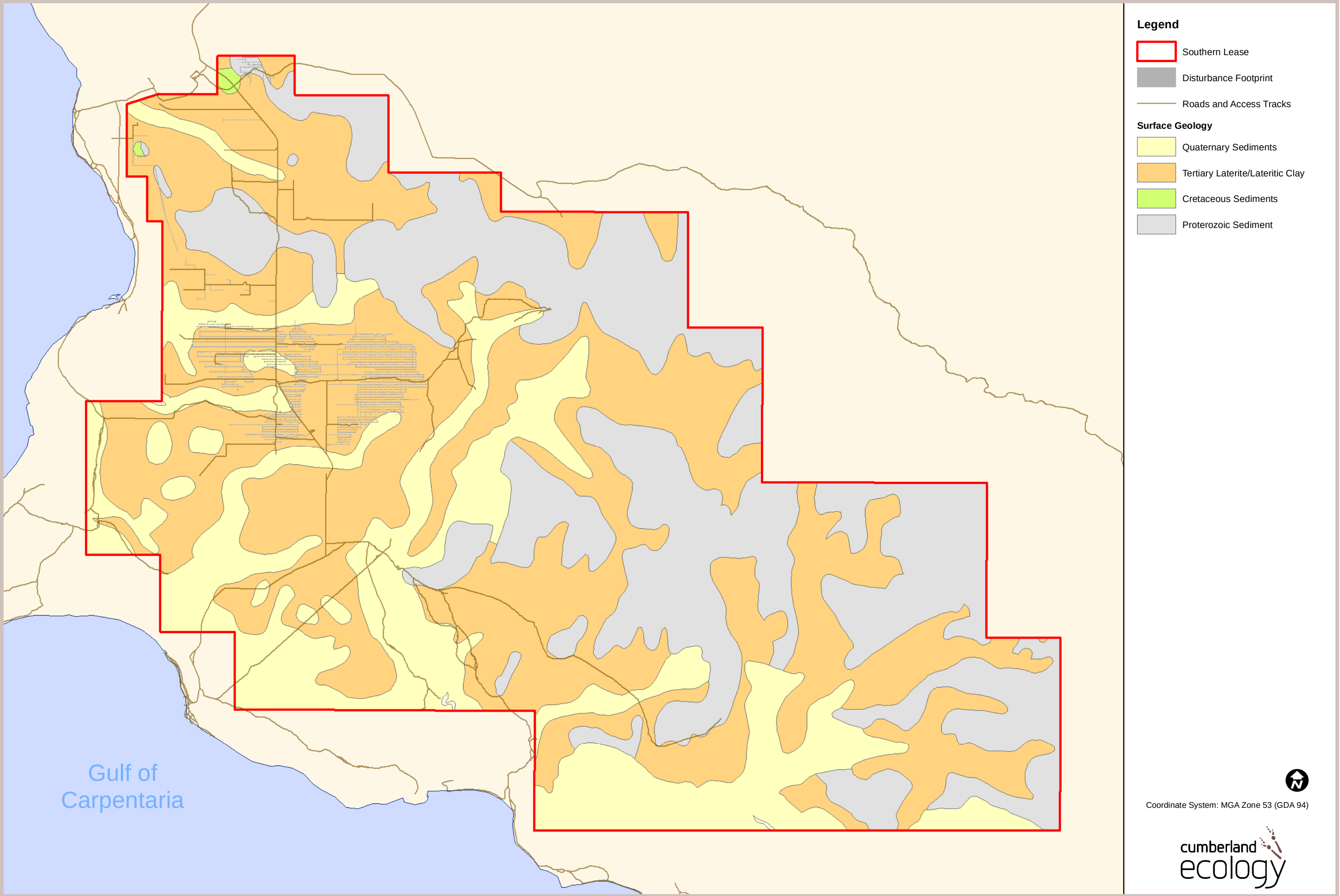


Figure 8. Surface geology within the Southern Lease

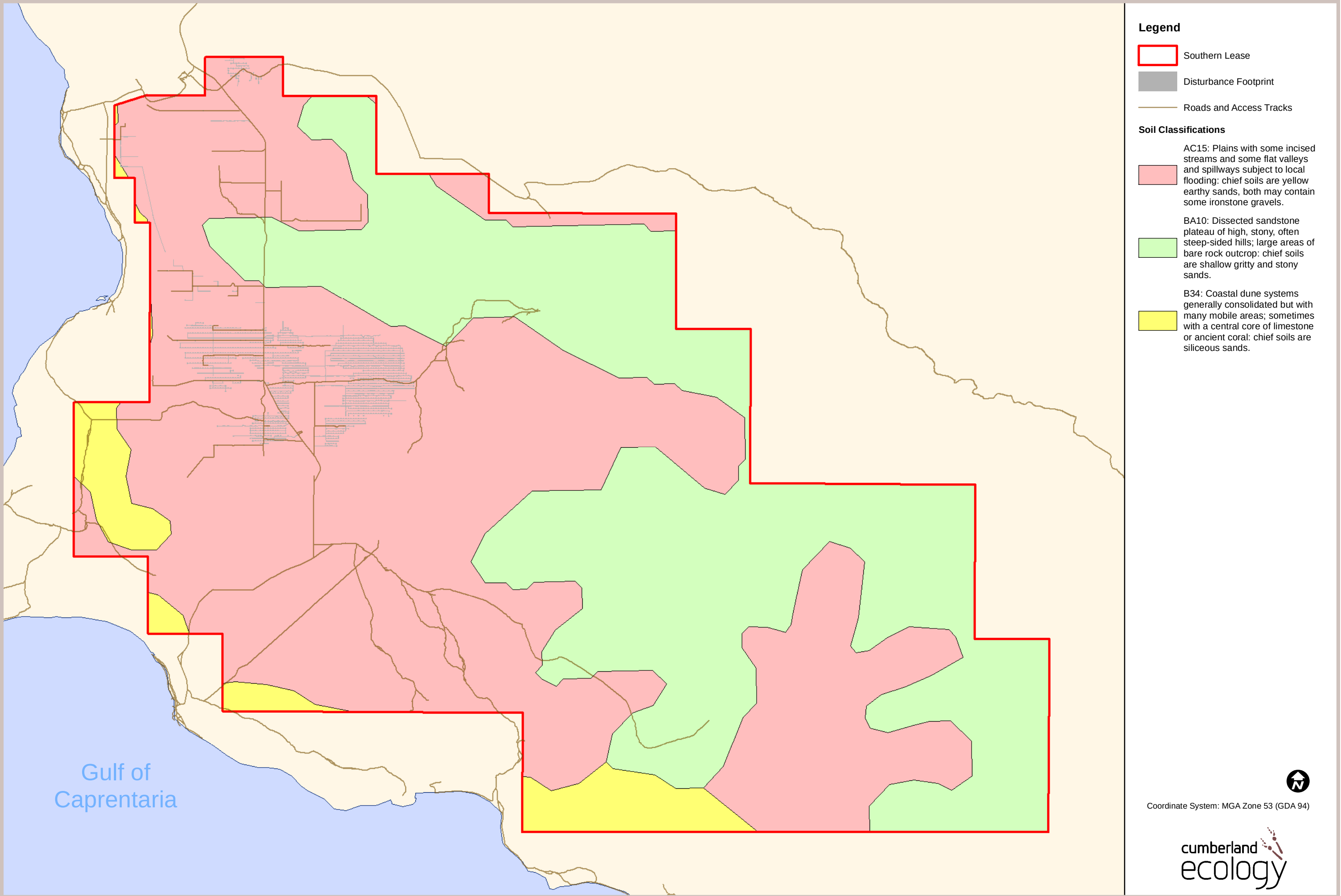


Figure 9. Soils mapping within the Southern Lease

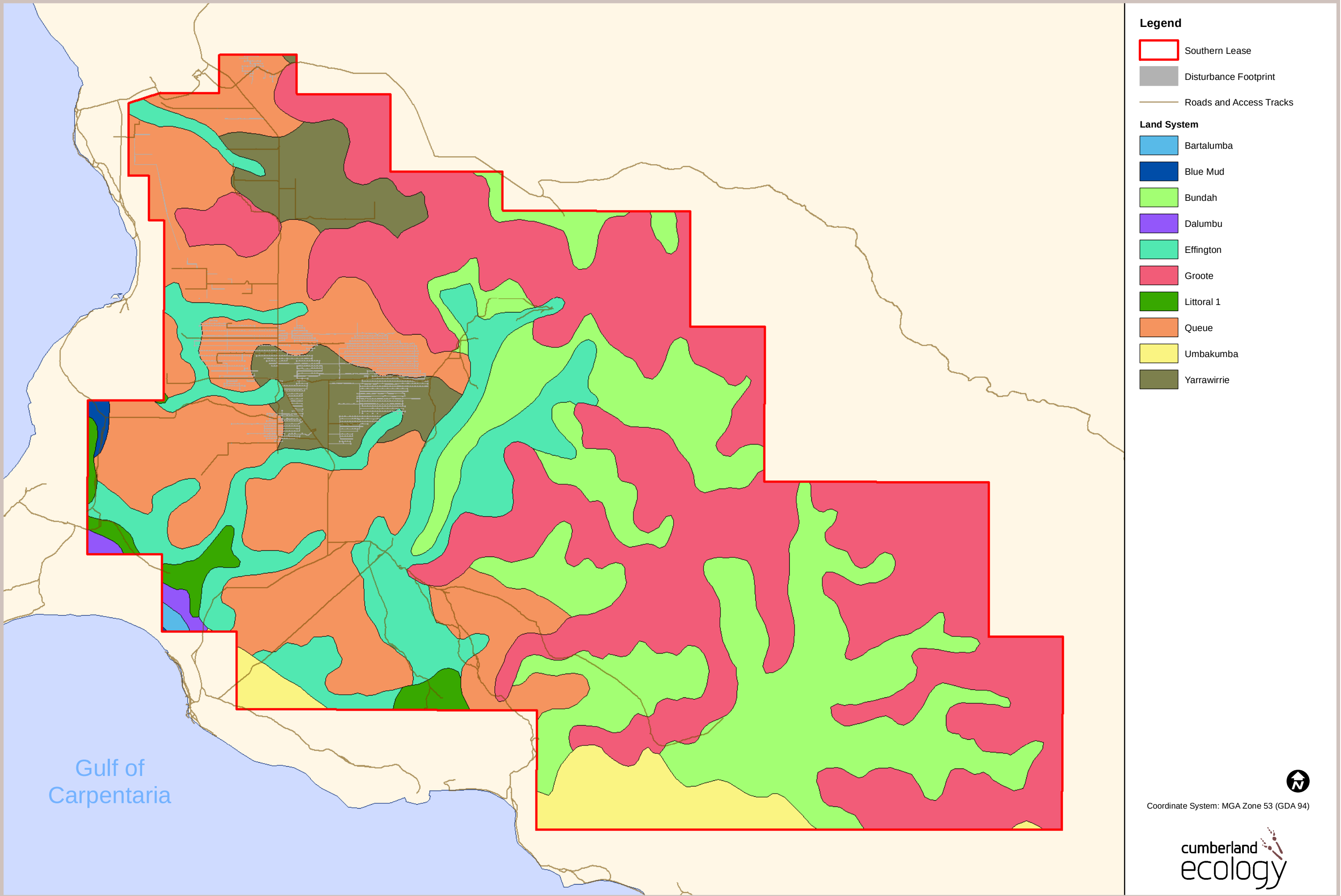


Figure 10. Land systems mapping within the Southern Lease

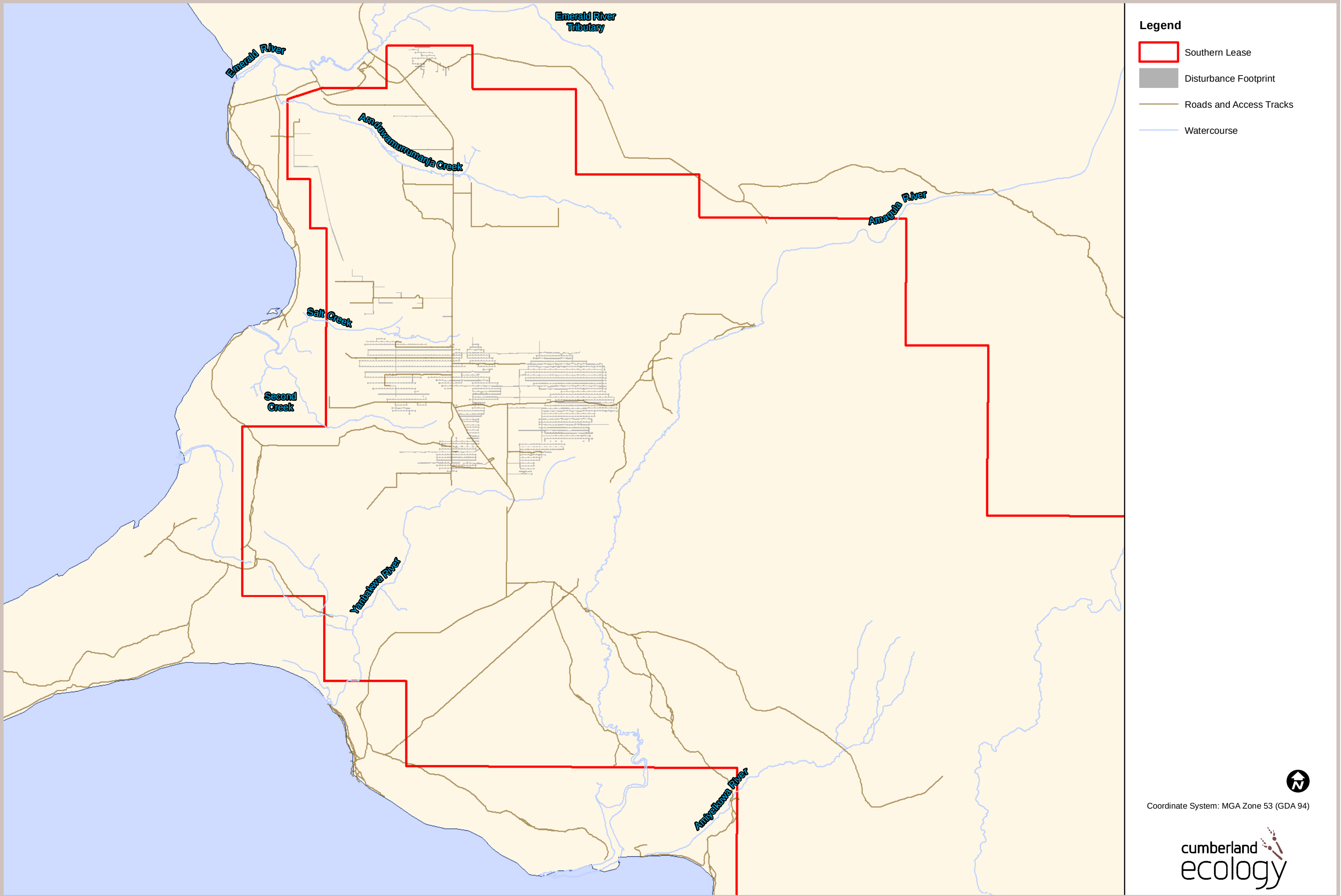


Figure 11. Hydrology within the Southern Lease

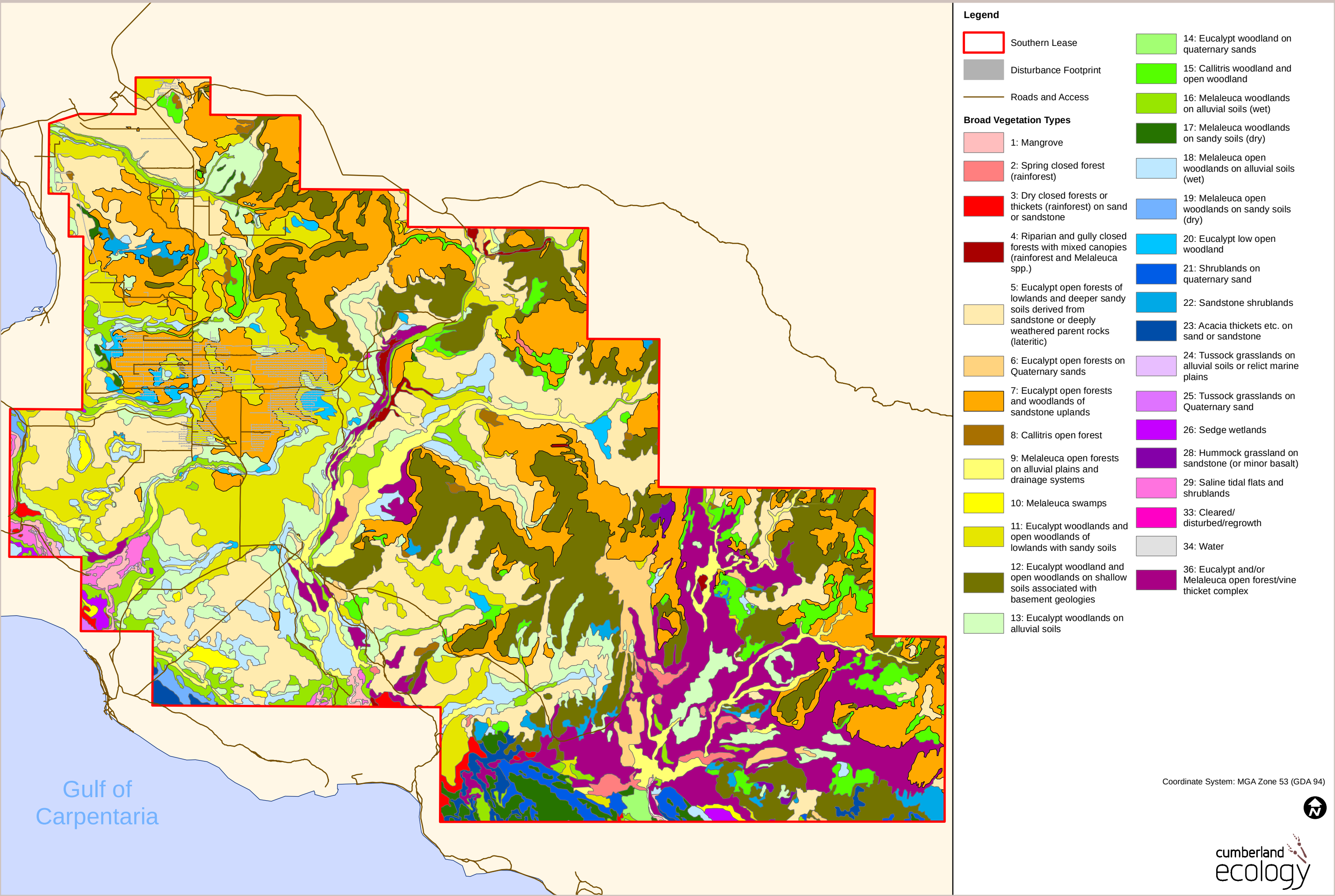


Figure 12. Broad vegetation types within the Southern Lease

I:\...120003\Figures\RP13\20230206\Figure 12. Broad Vegetation Types



Legend

Southern Lease

Disturbance Footprint

Eastern Leases

Existing GEMCO Mine

Locality

Roads and Access Tracks

Threatened Flora

Eleocharis retroflexa

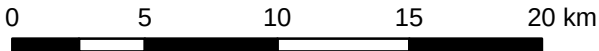
Utricularia singeriana

Coordinate System: MGA Zone 53 (GDA 94)

cumberland

ecology

Figure 13. NR Maps Database records of threatened flora on Groote Eylandt



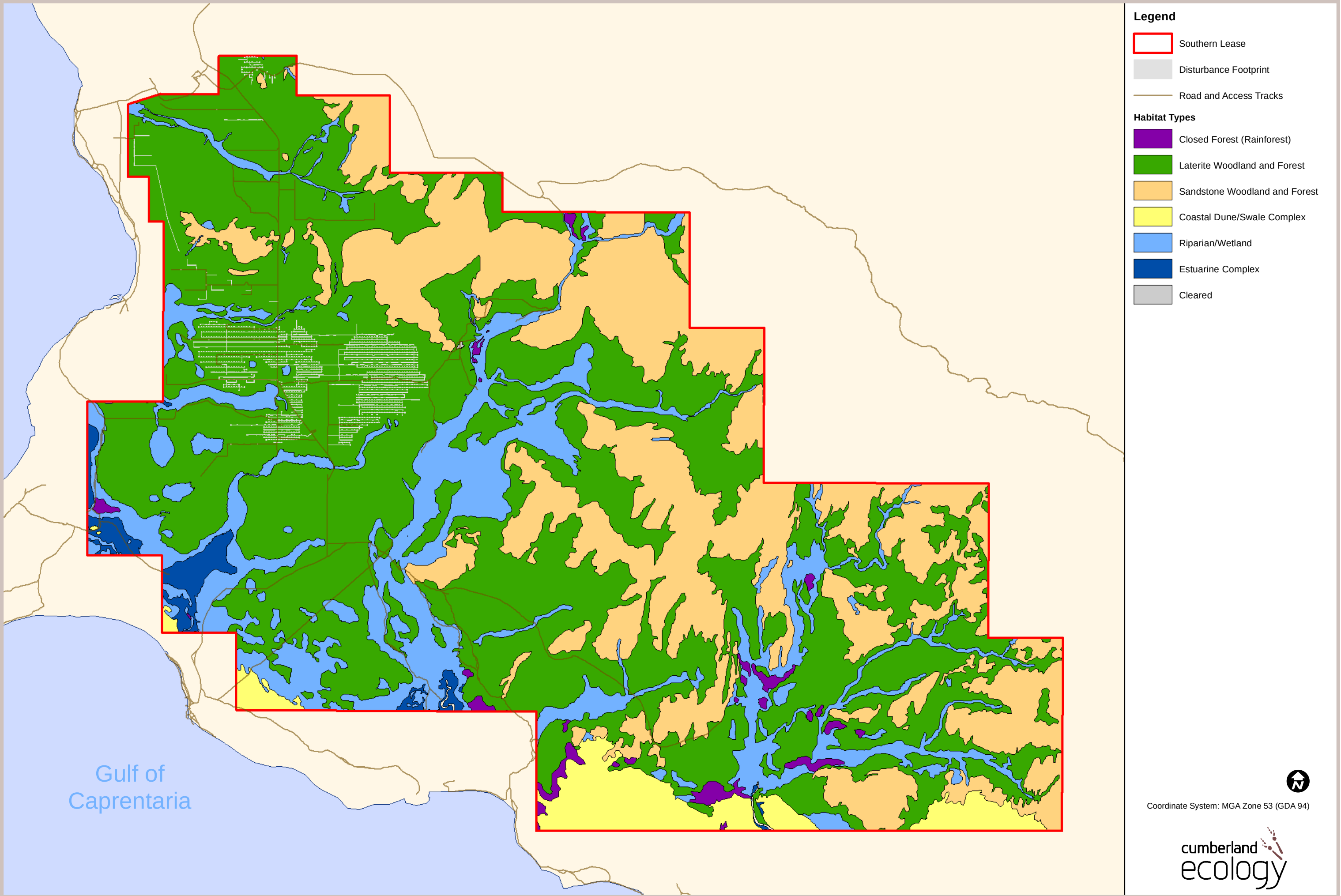


Figure 14. Habitat types within the Southern Lease

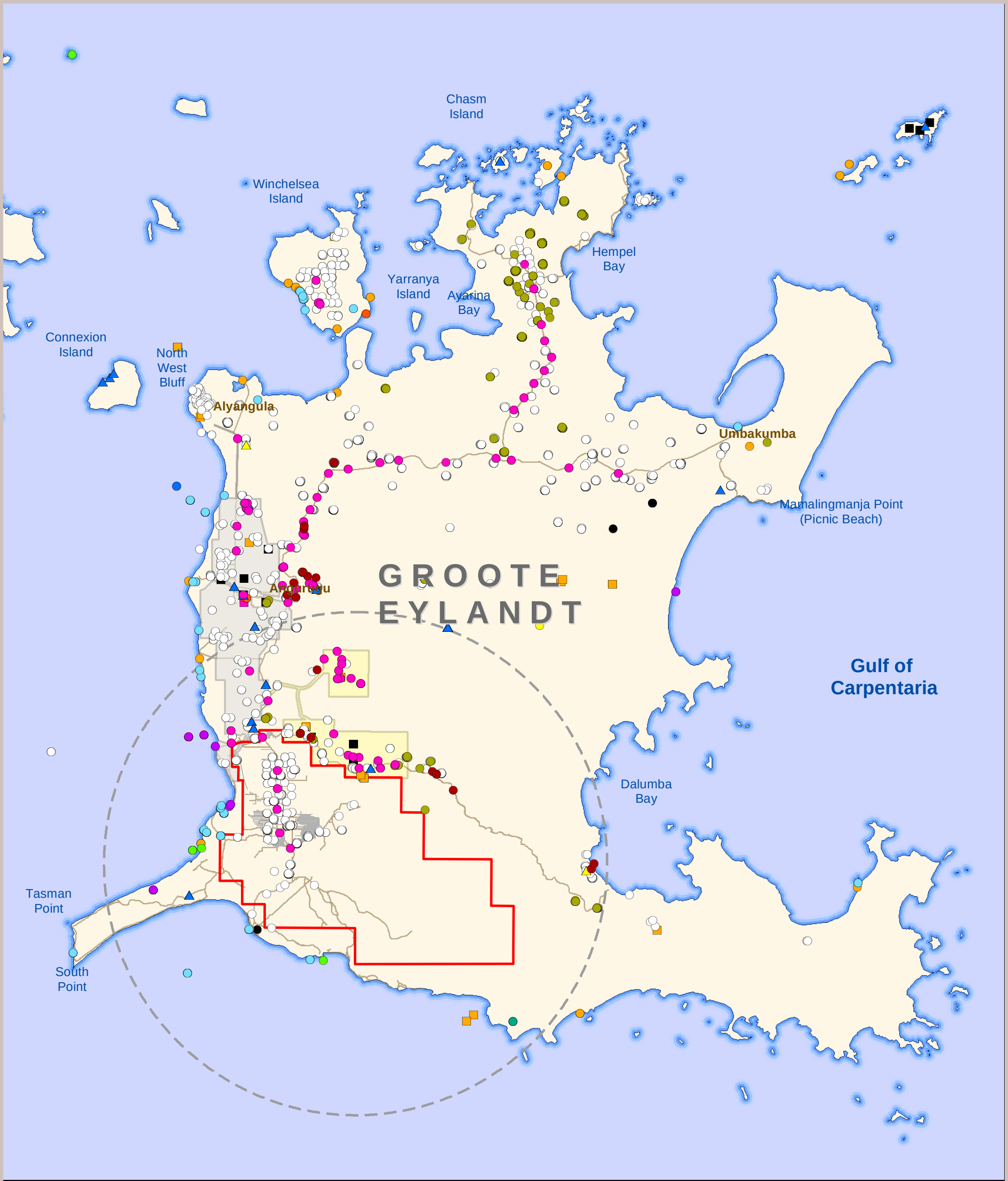
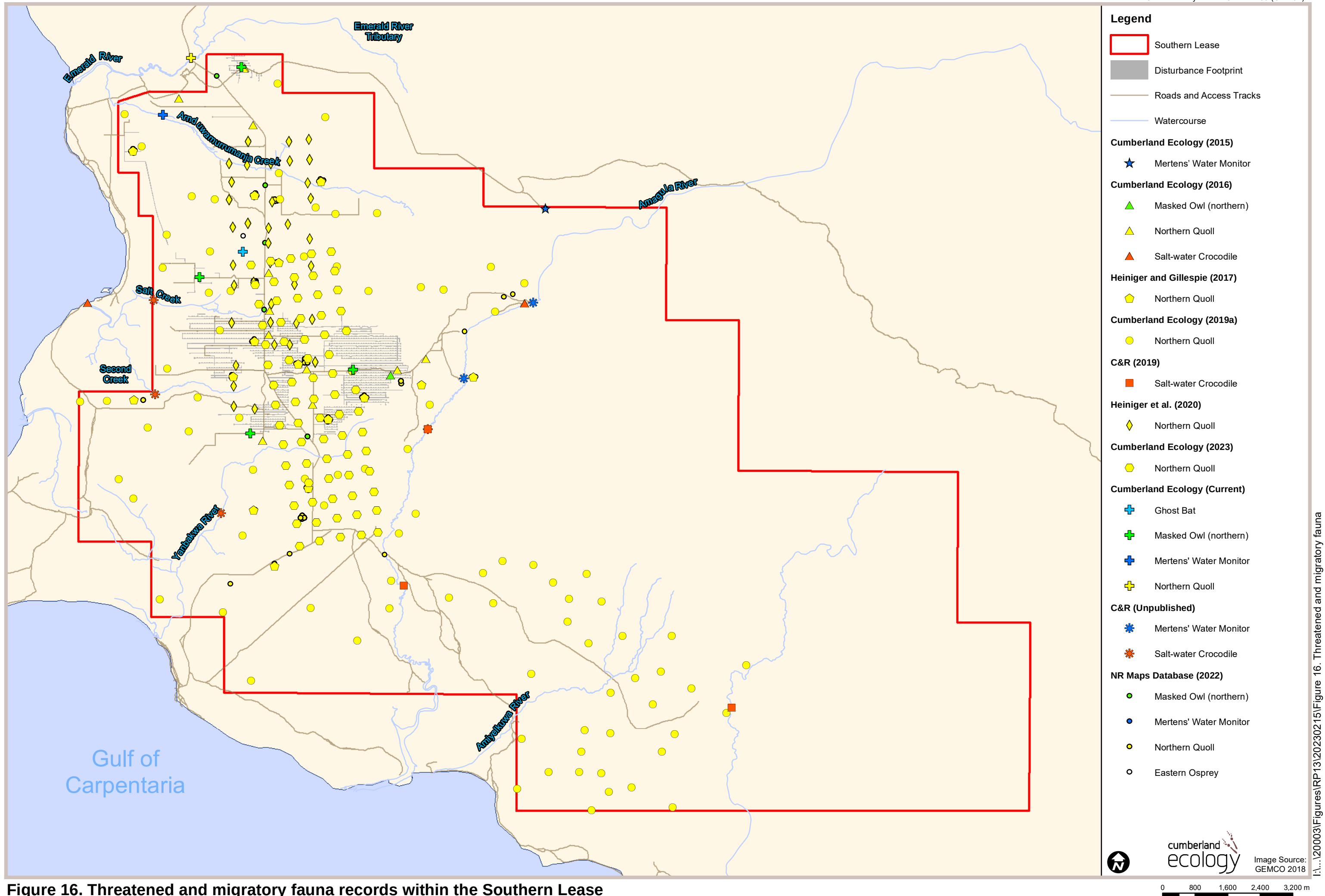


Figure 15. NR Maps database records of threatened fauna on Groote Eylandt

0 3 6 9 12 km



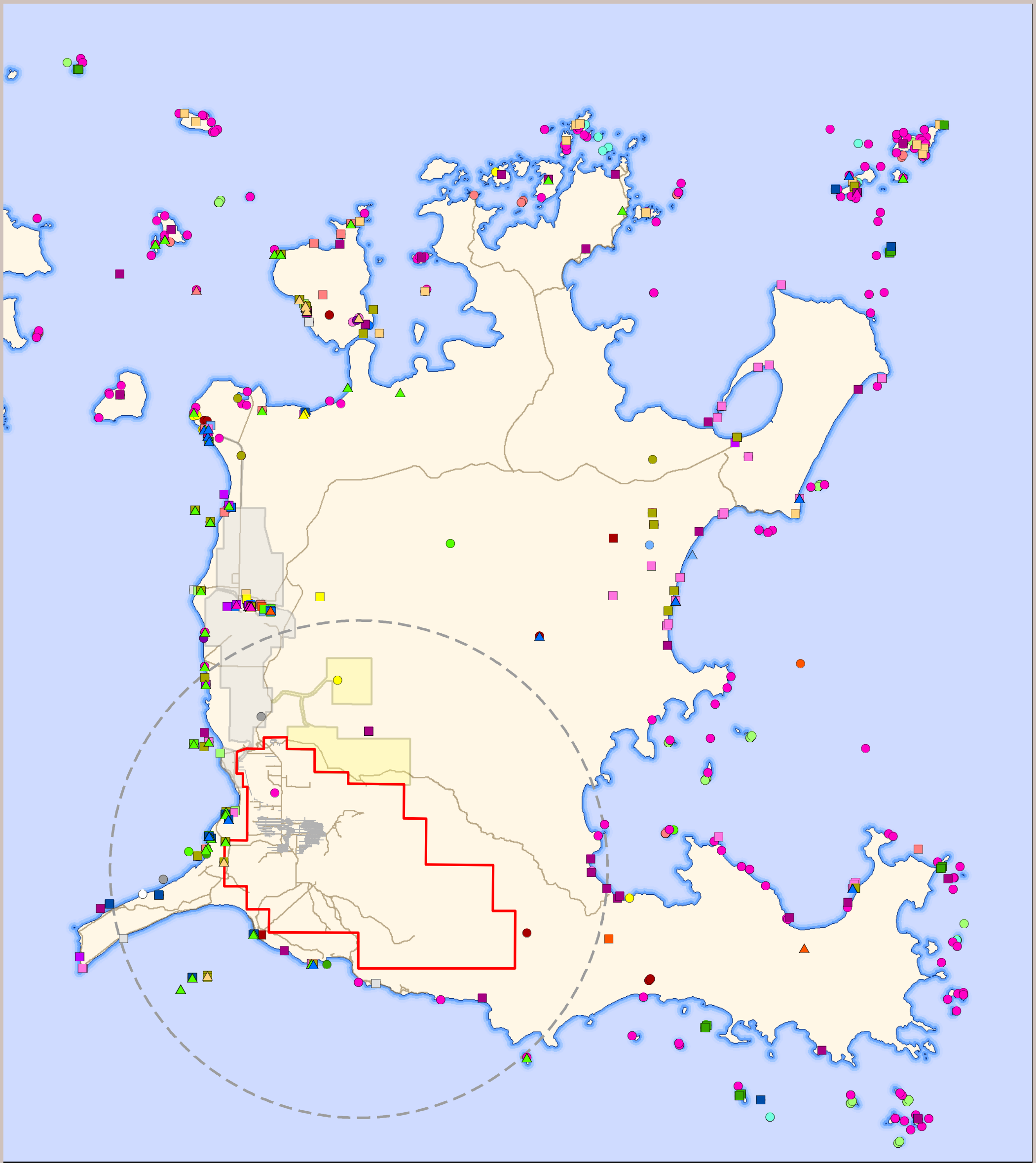


Figure 17. NR Maps database records of migratory fauna on Groote Eylandt

