

APPENDIX B ECOLOGY REPORT



Ecological assessment BP33 Lithium Project Core Lithium



DOCUMENT CONTROL RECORD

Job	EZ19171
Document ID	185337-51
Author(s)	Ella-Monique Mason, Nicole Clark

DOCUMENT HISTORY

Rev	Reviewed by	Approved by	Issued to	Date
1	Glen Ewers	Glen Ewers	Internal (for NOI)	23 April 2020

Recipients are responsible for eliminating all superseded documents in their possession.

EcOz Pty Ltd.
ABN: 81 143 989 039
Level 1, 70 Cavenagh Street
DARWIN NT 0800
GPO Box 381, Darwin NT 0800

Telephone: +61 8 8981 1100
Email: ecoz@ecoz.com.au
Internet: www.ecoz.com.au



QMS Certification Services



QMS Certification Services



QMS Certification Services

RELIANCE, USES and LIMITATIONS

This report is copyright and is to be used only for its intended purpose by the intended recipient, and is not to be copied or used in any other way. The report may be relied upon for its intended purpose within the limits of the following disclaimer.

This study, report and analyses have been based on the information available to EcOz Environmental Consultants at the time of preparation. EcOz Environmental Consultants accepts responsibility for the report and its conclusions to the extent that the information was sufficient and accurate at the time of preparation. EcOz Environmental Consultants does not take responsibility for errors and omissions due to incorrect information or information not available to EcOz Environmental Consultants at the time of preparation of the study, report or analyses.

TABLE OF CONTENTS

1	INTRODUCTION	4
2	LAND UNITS	6
2.1	Method	6
2.2	Results	6
3	WEEDS	9
4	THREATENED SPECIES ASSESSMENT.....	10
4.1	Project footprint	10
4.2	Categories	10
4.3	Likelihood of occurrence within the Project footprint	11
4.4	Habitat quality assessment	12
4.4.1	Bare-rumped Sheath-tail Bat.....	12
4.4.2	Black-footed Tree-rat	13
4.4.3	Partridge Pigeon	13
4.5	Field surveys	14
4.5.1	<i>Typhonium praetermisum</i>	14
4.5.2	<i>Stylidium ensatum</i>	17
5	DISCUSSION & CONCLUSIONS	20
6	REFERENCES	21
APPENDIX A	VEGETATION DESCRIPTIONS.....	23
APPENDIX B	EPBC PROTECTED MATTERS SEARCH REPORT	24
APPENDIX C	THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE.....	25

Tables

Table 1.	Ground-truthed land units within survey area	7
Table 2.	Declared weed species within a 20 km buffer surrounding the Project area	9
Table 3.	Threatened species 'likelihood of occurrence' assessment.....	12

Figures

Figure 1.	Map of the location of the Project area.....	5
Figure 2.	Photographs showing land units 2a1 (left) and 5a (right)	6
Figure 3.	Map of ground-truthed land units relevant to the Project area	8
Figure 4.	The IUCN red list categories of risk for species	10
Figure 5.	Photographs showing typical Eucalyptus woodlands with sparse understorey	13
Figure 6.	Photographs of active <i>Typhonium praetermisum</i>	14
Figure 7.	Photographs of potential <i>Typhonium praetermisum</i> habitat (2a1 left & 6b right).....	15
Figure 8.	Map of <i>Typhonium praetermisum</i> survey areas	16
Figure 9.	Photographs of <i>Stylidium ensatum</i> leaf (left) and flower (right).....	17
Figure 10.	Map of modelled <i>Stylidium ensatum</i> habitat in proximity to the project footprint.....	19

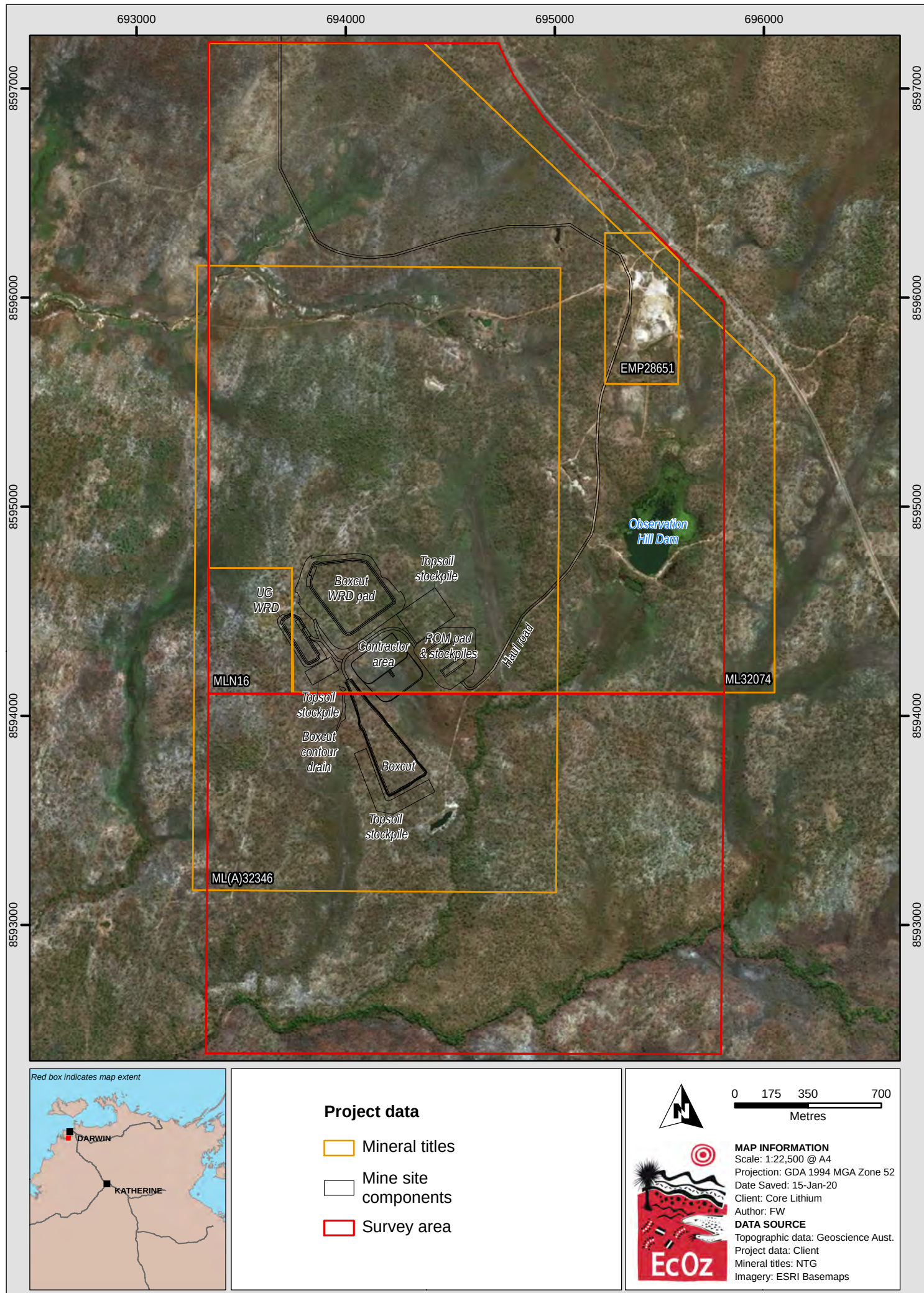
1 INTRODUCTION

Core Lithium (Core) is proposing to develop and operate an underground lithium mine on the Cox Peninsula, approximately 33 km west of Berry Springs. The project is known as BP33 Lithium Project and comprises a box cut portal to the underground resource, onsite waste rock dumps and a 12 km haul road to the Grants project processing plant. Collectively, these components are referred to throughout this report as the 'Project area' (Figure 1).

The project is being referred to the Northern Territory Environmental Protection Authority under the *Environmental Assessment Act* (Northern Territory) through a Notice of Intent. To inform an assessment of the potential impacts from the project, EcOz Environmental Consultants (EcOz) were engaged to assess and report on the ecological values within, and surrounding, of the Project area.

To address these requirements, this report presents:

- Verification of existing land unit to a scale of 1:10 000 to identify sensitive vegetation and to inform suitable habitat for threatened species.
- A 'likelihood of occurrence' assessment using desktop information to determine which threatened species have a reasonable likelihood of occurring within the Project footprint (as defined in Section 4.1).
- The methods and results of targeted threatened species surveys within the Project area to identify the presence (or likely presence) of threatened species.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\IEZ19171 - BP33 NOI\01 Project Files\Report maps\Ecology assessment\Fig 1-1 Location map.mxd

Figure 1. Map of the location of the Project area

2 LAND UNITS

A land unit is 'a reasonably homogenous part of a land surface, distinct from surrounding terrain with consistent properties in landform, soil and vegetation' (Jessop & King 1997). Land unit mapping can be used to help identify ecological values, such as threatened species habitat and sensitive vegetation types.

2.1 Method

The current *Land Units of the Greater Darwin Region* 1:25,000 (Fogarty et al. 1984) was used as a basis to select sites within and surrounding the Project area for ground-truthing land units. Further assessment was undertaken to validate desktop land unit information according to visually uniform land, soil and vegetation features. This involved referencing 1:10,000 aerial imagery to realign mapped land unit boundaries of Fogarty et al. (1984) according to visually uniform land, soil and vegetation features.

The field survey involved collecting flora composition and structural data of vegetation communities at 48 survey sites across the survey area; with varying number sites located within each vegetation community. The survey area covered approximately 1,100 ha inclusive of the Project area. Vegetation sites provide a description of the landform, vegetation and soil. The information collected was: landform, soil type (surface examination only), vegetation structure, vegetation description and three dominant flora species within each stratum (including height range, average height and percent cover). The vegetation community assessments and mapping techniques were in accordance with the *Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al. 2007). Field work was undertaken by EcOz botanists David van den Hoek and Nicole Clark between 28 November and 13 December 2019.

Representative site photographs were taken at each survey site. All mapping and editing was performed using GIS software (ArcGIS 10.2) in ESRI shape file format.

2.2 Results

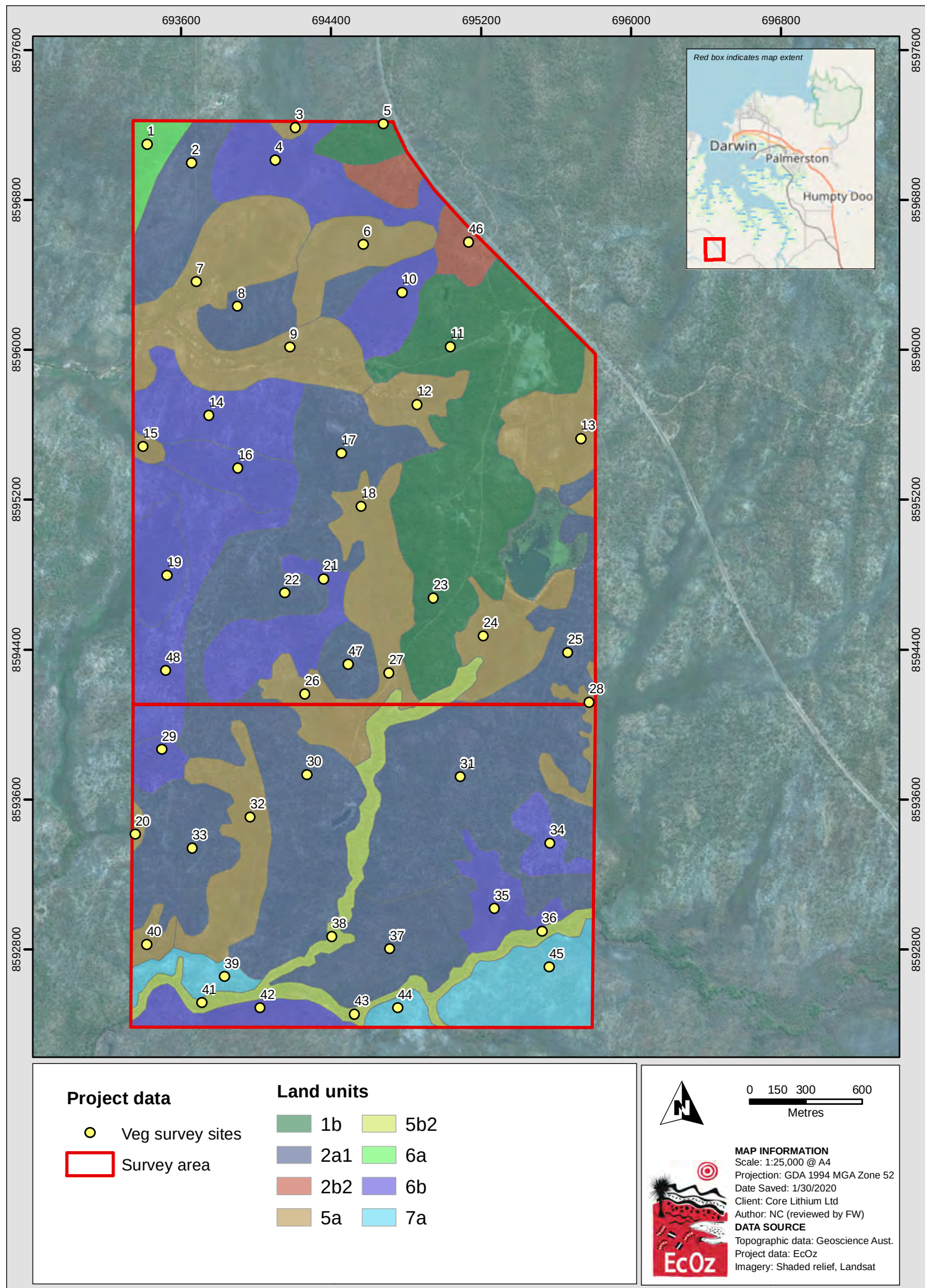
Eight distinct land units were described within the survey area at a scale of 1:10,000 – see Table 1 and Figure 3. Full land unit descriptions are provided in Appendix A. Land unit 2a1 – *Eucalyptus miniata* and *Eucalyptus tetradonta* mid high woodland on rises – is the most widespread within the survey area, followed by land unit 5a – *Eucalyptus alba* mid open woodland in alluvial plains (Figure 2). There are also significant areas of poorly-drained *Grevillea pteridifolia*, *Pandanus spiralis*, and *Lophostemon lactifluus* shrublands.



Figure 2. Photographs showing land units 2a1 (left) and 5a (right)

Table 1. Ground-truthed land units within survey area

No.	Landform	Vegetation description	Drainage	Soil	Total (ha)
1b	Low hills	<i>Eucalyptus tetradonta</i> , <i>Eucalyptus miniata</i> , <i>Eucalyptus tectifica</i> mid woodland over <i>Terminalia ferdinandiana</i> , <i>Eucalyptus tetradonta</i> , <i>Erythrophleum chlorostachys</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland	Very rapid	Rudosols	130.4
2a1	Rises	<i>Eucalyptus miniata</i> , <i>Eucalyptus tetradonta</i> mid high woodland over <i>Erythrophleum chlorostachys</i> , <i>Livistona humilis</i> , <i>Eucalyptus miniata</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland	Rapid	Rudosols	386.3
2b2	Rises	<i>Eucalyptus tetradonta</i> , <i>Eucalyptus miniata</i> , <i>Eucalyptus tectifica</i> mid woodland over <i>Terminalia ferdinandiana</i> , <i>Eucalyptus tetradonta</i> , <i>Erythrophleum chlorostachys</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland	Rapid	Kandosols	16.1
5a	Alluvial plains	<i>Eucalyptus alba</i> mid open woodland over <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> , <i>Xanthostemon paradoxus</i> mid sparse shrubland over <i>Sorghum intrans</i> , <i>Imperata cylindrica</i> mid tussock grassland <i>Grevillea pteridifolia</i> , <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> mid sparse shrubland over <i>Alloteropsis semialata</i> , <i>Sorghum intrans</i> mid tussock grassland	Slow (subject to wet-season waterlogging and inundation)	Hydrosols	244.2
7a	Alluvial plains	<i>Grevillea pteridifolia</i> , <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> mid sparse shrubland over <i>Alloteropsis semialata</i> , <i>Sorghum intrans</i> mid tussock grassland	Moderate (occasional wet-season inundation)	Kandosols	47.1
5b2	Drainage system	<i>Melaleuca leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Xanthostemon eucalyptoides</i> mid open forest over <i>Pandanus aquaticus</i> , <i>Xanthostemon eucalyptoides</i> , <i>Leptospermum madidum</i> tall shrubland over sedge sp., <i>Alloteropsis semialata</i> high open tussock grassland	Poor (waterlogged in wet-season)	Hydrosols	40.6
6a	Drainage system	<i>Corymbia polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Corymbia confertiflora</i> mid open woodland over <i>Grevillea pteridifolia</i> , <i>Xanthostemon paradoxus</i> , <i>Livistona humilis</i> mid shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland	Very poor (subject to wet-season inundation)	Hydrosols	8.8
6b	Drainage system	<i>Corymbia polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Corymbia confertiflora</i> mid open woodland over <i>Grevillea pteridifolia</i> , <i>Xanthostemon paradoxus</i> , <i>Livistona humilis</i> mid shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland	Poor (waterlogged in wet-season)	Hydrosols	229.3



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\IEZ19264 - LSA Scaturchio subdivision\01 Project Files\Fig 2. Land unit map.mxd

Figure 3. Map of ground-truthed land units relevant to the Project area

3 WEEDS

Some species of introduced flora are declared to be weeds under the NT *Weeds Management Act* because of the environmental and economic harm they can cause. Class A weeds are to be eradicated by land owners and occupiers. Class B weeds must have their growth and spread controlled by land owners and occupiers. Introduced flora species that are not covered under the *Weeds Management Act* are referred to as *environmental weeds*. The Commonwealth Government has also categorised some species as Weeds of National Significance (WoNS).

Weed distribution is often related to environmental disturbances caused by the construction of roads and tracks, cattle grazing and feral animals. A review of the NT Weed Branch weed dataset shows no declared weed species have been recorded within the Project area, but there are a few records adjacent to it on the Cox Peninsula Rd for Gamba Grass (*Andropogon gayanus*), Perennial Mission Grass (*Cenchrus polystachios*) and Paddy's Lucerne (*Sida rhombifolia*).

Field surveys determined that weed density is relatively low across the project area, despite a land use history of exploration activities and resource extraction. A few Gamba Grass and Perennial Mission Grass plants were observed along the access track from the Cox Peninsula Rd. All these records are located in the disturbed area in the north-east corner of the survey area.

The Project area lies within the *Darwin Regional Weed Management Plan 2015-2020* (DLRM 2015). The plan focusses on weeds that are most important to the region, categorising them as either:

- *Priority weeds* (requiring priority management action).
- *Opportunistic weeds* (requiring management because they commonly appear after control of priority weeds).
- *Alert weeds* (has the potential to have a high level of impact to the region should it become established, and the likelihood of the species naturalising and spreading in the region is perceived to be high).

All such weeds listed in Table 2 were recorded within a 20 km buffer surrounding the Project area. The buffered zone surrounding the Project area was chosen to account for potential weed spread and/or introduction.

Table 2. Declared weed species within a 20 km buffer surrounding the Project area

Common name	Botanical name	Class*	WoNS	Status in management plan	Records within Project footprint
Gamba Grass	<i>Andropogon gayanus</i>	B	Yes	Priority	Yes
Bellyache Bush	<i>Jatropha gossypifolia</i>	A	Yes	Priority	
Mimosa	<i>Mimosa pigra</i>	B	Yes	Priority	-
Olive Hymenachne	<i>Hymenachne amplexicaulis</i>	B	Yes	Priority	-
Parkinsonia	<i>Parkinsonia aculeata</i>	B	Yes	Priority	-
Perennial Mission Grass	<i>Cenchrus polystachios</i>	B	-	Priority	Yes
Grader Grass	<i>Themeda quadrivalvis</i>	B	-	Priority	-

*Class A = to be eradicated; Class B = growth and spread to be controlled; WONS = Weed of National Significance

4 THREATENED SPECIES ASSESSMENT

This section outlines the procedure and results of the threatened species 'likelihood of occurrence' assessment conducted for this report. The assessment was undertaken using available mapping information, as well as databases of existing records and potential species.

The purpose of this assessment is to identify those species that may need to be included in the project's risk assessment, and those that can be reasonable excluded from further consideration because they are unlikely to occur within the Project footprint.

Note: This process is not a risk assessment as it does not take into account project activities and their potential impacts.

4.1 Project footprint

The project footprint is the extent to which project activities (during construction and/or operations) could have a significant impact upon ecological values and/or sensitive receptors.

Relevant potential impacts to threatened species include loss of habitat due to land clearing and changes in surface water quality and/or quantity. Therefore, the Project footprint is considered to be the Project area – i.e. all areas that will be subject to land disturbance (with a buffer of a few hundred metres), the drainage lines leading from those areas into Charlotte River, and the Charlotte River itself downstream from those drainage lines to the tidal zone.

4.2 Categories

The International Union for the Conservation of Nature (IUCN) nominates a set of criteria used to identify species at risk of extinction. These criteria are used to define categories of risk – see Figure 4 – which are used by the Northern Territory Government to determine which threatened species are listed under the *TPWC Act*, and by the Commonwealth Government to determine which threatened species are listed under the *EPBC Act*. This report focuses on species that are listed as Vulnerable, Endangered or Critically Endangered under the *TPWC Act*, the *EPBC Act* or both.

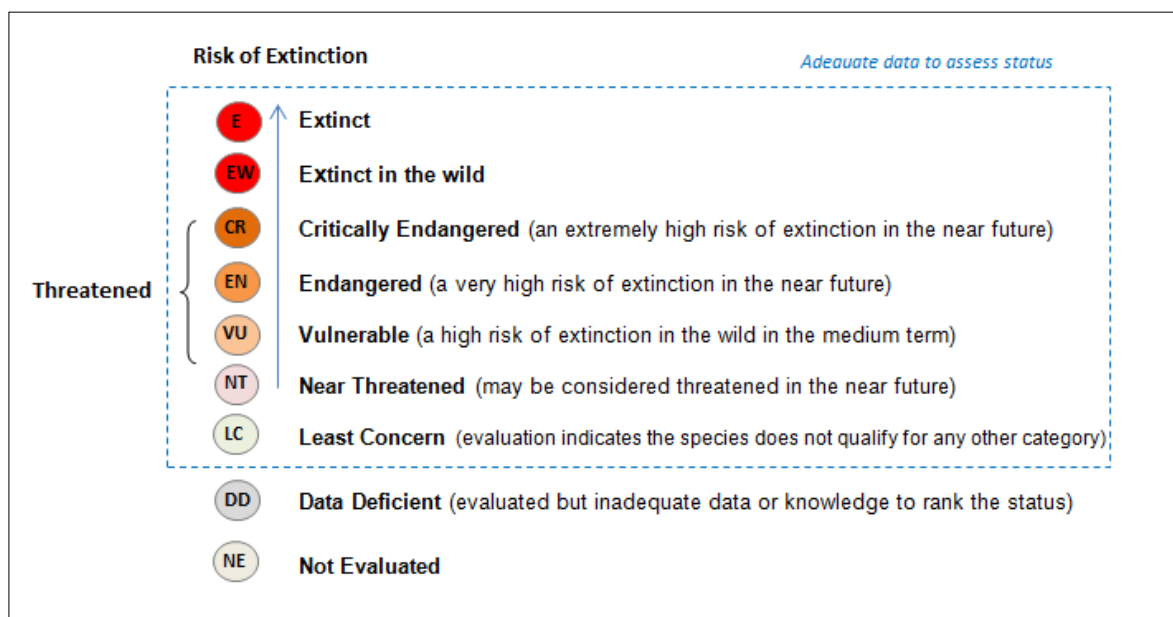


Figure 4. The IUCN red list categories of risk for species

4.3 Likelihood of occurrence within the Project footprint

The following procedure was used to determine which threatened species have the potential to occur in the project footprint:

- Species records from the latest version of the NT Flora and Fauna Atlas were clipped to the Darwin Coastal bioregion. Bioregions give a broad area with largely similar habitat characteristics and species assemblages. Clipping data to them ensures all potential species are captured in order to undertake a project-specific 'likelihood of occurrence' assessment.
- The [EPBC Protected Matters Search Tool](#) (PMST) was used to generate a report using a 100 km buffer from the project area. This PMST is an online enquiry tool managed by the Commonwealth Department of the Environment and Energy which interrogates a range of existing flora and fauna data, as well as predictive modelling to speculate on the presence of species within a search area. The PMST uses a grid system to determine which protected matters it encapsulates for a particular search. The PMST report (Appendix B) was generated on 19 December 2019.
- As detailed in Appendix C, a list of 73 threatened species have the potential to occur in the terrestrial ecosystems within the Darwin Coastal bioregion. For each of these threatened species, the likelihood of it occurring within the project footprint was then assessed based on desktop information that relates to habitat requirements, distribution, number and dates of proximate records, and the land unit information described in Section 2. Likelihood ratings were defined as follows:
 - a) **HIGH** – it is expected that this species lives within the Project footprint because there is core habitat and recent proximate records.
 - b) **MEDIUM** – this species may live within the Project footprint because there is suitable habitat; however, there is evidence that lowers its likelihood of occurrence (known range contraction of the species in the region, no recent records with the search area, substantial loss of habitat within the Project footprint since previous records, species is naturally-rare or occurs at a low density etc.).
 - c) **LOW** – this species may occur, as a vagrant, within the Project footprint; however, there is only marginally-suitable habitat.
 - d) **NONE** – there is strong evidence (no suitable habitat and/or the species is considered likely to be regionally-extinct) that this species will not occur within the Project footprint.

Those species that have a high or medium likelihood of occurrence are listed in Table 3. A discussion was had with David Rhind from the Flora and Fauna Division of the Department of Environment and Natural Resources on 25 September 2019 to ensure that these results aligned with the concerns of the department. Given the small Project area, it was decided to only survey for species for which the project footprint represented important habitat. This is akin to the process followed for the Grants Project EIS.

Table 3. Threatened species 'likelihood of occurrence' assessment

Likelihood	Species	Class	Status	
			EPBC	TPWC
HIGH	Partridge Pigeon (eastern subspecies) (<i>Geophaps smithii smithii</i>)	Bird	VU	VU
	Black-footed Tree-rat (Kimberley and mainland NT subspecies) (<i>Mesembriomys gouldii gouldii</i>)	Mammal	EN	VU
	Bare-rumped Sheath-tail Bat (<i>Saccolaimus saccolaimus (nudiclunatus)</i>)	Mammal	VU	-
	a plant (<i>Typhonium praetermissum</i>)	Plant	-	VU
MEDIUM	Masked Owl (northern subspecies) (<i>Tyto novaehollandiae kimberli</i>)	Bird	VU	VU
	Northern Quoll (<i>Dasyurus hallucatus</i>)	Mammal	EN	CR
	Pale Field-rat (<i>Rattus tunneyi</i>)	Mammal	-	VU
	Mertens' Water Monitor (<i>Varanus mertensi</i>)	Reptile	-	VU
	Mitchell's Water Monitor (<i>Varanus mitchelli</i>)	Reptile	-	VU
	Floodplain Monitor (<i>Varanus panoptes</i>)	Reptile	-	VU
	Trigger plant (<i>Stylidium ensatum</i>)	Flora	EN	EN
LOW	Red Goshawk (<i>Erythroriorchis radiatus</i>)	Bird	VU	VU
	Gouldian Finch (<i>Erythrura gouldiae</i>)	Bird	EN	VU
	Grey Falcon (<i>Falco hypoleucos</i>)	Bird	-	VU
	Crested Shrike-tit (northern subspecies) (<i>Falcunculus frontatus whitei</i>)	Bird	VU	-
	Australian Painted Snipe (<i>Rostratula (benghalensis) australis</i>)	Bird	EN	VU
	Fawn Antechinus (<i>Antechinus bellus</i>)	Mammal	VU	EN
	Ghost Bat (<i>Macroderma gigas</i>)	Mammal	VU	-
	Northern Brush-tailed Phascogale (<i>Phascogale pirata</i>)	Mammal	VU	EN
	False Water Rat (<i>Xeromys myoides</i>)	Mammal	VU	-
	Darwin Cycad (<i>Cycas armstrongii</i>)	Flora	-	VU
	a plant (<i>Helicteres macrothrix</i>)	Flora	EN	EN

4.4 Habitat quality assessment

Three threatened fauna species were determined to have a high likelihood of occurrence within the Project footprint – Bare-rumped Sheath-tail Bat, Black-footed Tree-rat and Partridge Pigeon. Habitat values for these three species are assessed below. Broadly, throughout the Cox Peninsula there are many areas of suitable habitat for these species; the quality of that habitat within the Project footprint is similar to that elsewhere in the region. If these species are present, the Project footprint does not contain especially important habitat for them.

4.4.1 Bare-rumped Sheath-tail Bat

Bare-rumped Sheath-tail Bat is a large insectivorous bat that occurs in north-eastern Queensland and in the monsoonal tropics of the NT. There have been relatively few records of the species across this wide distribution, which suggest either that the subspecies is rare, that it has a fragmented distribution or that

records may also have been confused with closely-related species. In the NT, specimens have been collected from Pandanus woodland fringing the sedgeland of the South Alligator River and Eucalyptus tall open forests (Friend & Braithwaite 1986; Churchill 1998) with more recent records from Howard Springs (Milne et al. 2009). Most records occur within near-coastal habitats with one recent exception (Jasper Gorge) 150 km inland (Woinarski et al. 2014). The species forages above the canopy and roosts in deep tree hollows within *Eucalyptus miniata*, *E. tetradonta* and *Melaleuca leucadendra* (Churchill 1998). Hollows in these tree species have also been used as breeding roosts (Churchill 1998).

The most severe threat to Bare-rumped Sheath-tail Bats is habitat loss and fragmentation – in particular the loss of roost trees (Woinarski et al. 2014). Throughout the Cox Peninsula there are many areas of suitable tall Eucalypt nesting habitat. Within the Project footprint, land units 1b, 2a1 and 2b2 have tall Eucalypts.

4.4.2 Black-footed Tree-rat

This species is known from woodlands and open forests with large trees and a moderately diverse mid-storey in near-coastal areas (Figure 5). Black-footed Tree-rats require fruit and seed resources including Pandanus fruits, and fruiting trees and shrubs (Rankmore 2006). The species shelters in tree hollows and occasionally Pandanus (Hill 2012), and is thought to be more prevalent in woodlands with infrequent and low intensity fires (Price et al. 2005).

Throughout the Cox Peninsula there are large areas of woodland that is potential habitat for the Black-footed Tree-rat. Within the Project footprint, such habitat occurs within land units 1b, 2a1, 2b2, 5a, 5b2, 6a and 6b.

4.4.3 Partridge Pigeon

The Partridge Pigeon occurs in open forests and woodlands with an understorey of grasses (Woinarski 2006). The species prefers woodland dominated by *Eucalyptus tetradonta* and *E. miniata* (Braithwaite 1985; Garnett et al. 2011; Higgins & Davies 1996). According to Fraser (2001), Partridge Pigeons favour a structurally-patchy savanna understorey at a relatively intricate scale. In all seasons, the species prefers to feed in areas that have an open ground layer (e.g. following fire); however, pairs are more likely to nest where there is dense vegetation cover.

Throughout the Cox Peninsula there are large areas of woodland that is potential habitat for the Partridge Pigeon (Figure 5). Within the Project footprint, such habitat occurs within land unit 1b, 2a1, 2b2, 5a, 6a and 6b.



Figure 5. Photographs showing typical Eucalyptus woodlands with sparse understorey

4.5 Field surveys

Two flora species were determined to have a high or medium likelihood of occurrence within the Project footprint – *Typhonium praetermissum* and *Stylidium ensatum*. That assessment was based on NT Government habitat modelling and the land unit mapping presented in Section 2.2. This section of the report describes the field surveys for these two species.

4.5.1 *Typhonium praetermissum*

Background

Typhonium praetermissum is a small perennial herb with aerial parts present during the annual wet season, usually between December and April (Figure 6). This species occurs in open woodland and favours relatively unshaded areas in red brown clay and shallow or gravelly lateritic soils (Cowie & Westaway 2012). *T. praetermissum* plants are typically found in small, relatively open (unshaded) patches of gravel or gravelly sandy substrate supporting less than 20 % vegetation ground cover and located on the edge of lateritic plateau areas in a somewhat subdued landscape. Emergence of plants is most likely after sufficient rainfall from at least one significant monsoon event, usually from around the end of January (Ian Cowie, Senior Botanist NT Herbarium, pers. comm., Jan. 2020).

T. praetermissum is endemic to the Northern Territory and Greater Darwin region, the known distribution extending from the Gunn Point area, south to Noonamah Ridge and west to Cox Peninsula (Cuff & Green 2019). A targeted survey for this species for the adjacent Grants Project by EcOz in 2019 did not result in any records.

Previous surveys in other areas have recorded the species in four land units; 3b, 3c, 2a1 and 1c (Cuff & Green 2019). Within the Project footprint, land units 2a1 and 6b potentially provide suitable habitat for the species. The species is most likely to occur along the margin of land units where the eroding low rise of one land unit creates a gravelly surface adjacent to a low lying wetter area. This type of habitat was observed during the field surveys



Figure 6. Photographs of active *Typhonium praetermissum*

Methods

DENR has developed a habitat model for *Typhonium praetermissum* for the Greater Darwin region. A desktop search found there are areas modelled as containing moderate likelihood *Typhonium praetermissum* habitat within the survey area (see Figure 8).

A survey for *T. praetermissum* was undertaken, subsequent to the land unit survey, to determine presence/absence. Prior to heading to the site, EcOz contacted the NT Herbarium to confirm the emergence of the species for the beginning of the season. Surveyors also visited a known sub-population. The survey

was led by Nicole Clark who has significant previous experience in surveying for the species. The survey focused on three areas modelled as moderate likelihood habitat within the disturbance footprint (Figure 8). Those areas were navigated by foot using a random meander method, with the intent of covering at least 10% of the survey area. Surveyors walked adjacent to each other (10 m apart) and an average survey width of 2m observed either side was applied while meandering. A waypoint was recorded with handheld GPS for each plant observed during the survey. The GPS was also used to record survey range and effort.

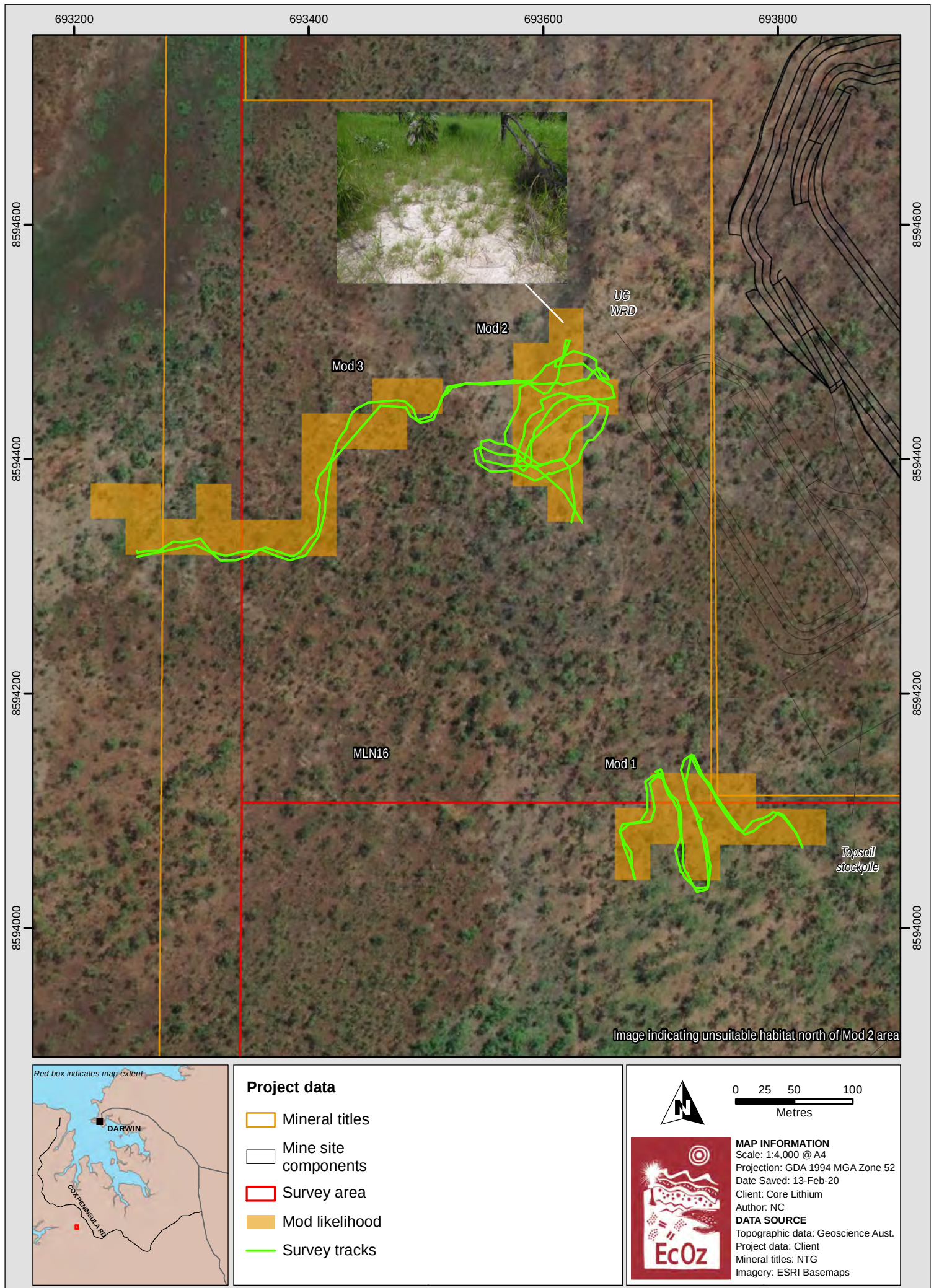
Results

Although there were patches of potentially-suitable habitat; well drained reddish/brown lateritic surface gravels, *T. praetermissum* was not detected during the February 2020 field survey (Figure 8 and Figure 7 for habitat photographs). A total of 3.8 km of meander lines were searched within the 3.4 ha of moderate likelihood area associated with the disturbed area (see Figure 8).

Areas modelled as moderate likelihood, but supporting wet indicator species and subject to poor drainage species, were considered unlikely habitat and, for this reason, not surveyed. A drainage area was noted north of Moderate likelihood Area 2 (Mod 2), and sections to the north of Moderate likelihood Area 3 (Mod 3) also appeared unsuitable and not surveyed – see Figure 8.



Figure 7. Photographs of potential *Typhonium praetermissum* habitat (2a1 left & 6b right)



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19171 - BP33 NOI\01 Project Files\Report maps\Ecology assessment\Fig XX Typhonium survey results v2.mxd

Figure X-X. Map of project location

4.5.2 *Stylidium ensatum*

Background

Stylidium ensatum is a small annual herb that inhabits margins of drainage areas in damp heavy clay or peaty soil (Cowie & Westaway 2012b). These drainage margins are required to stay wet well into the dry season (Holmes et al. 2005). The species is identifiable when flowering in June-July. Field surveys were undertaken November to January, therefore, the presence of water in the mid dry season water could not be determined. However, within the Project footprint, the broad drainage areas which experience more severe waterlogging for extended periods, could be expected to be the most suitable habitat. This corresponds to areas within land unit 5a, 6b and 7a on alluvial plains or drainage systems (as per Figure 3). These areas of potential habitat are shown in Figure 10 within land units 5a, 6b and 7a).

A targeted survey for this species for the adjacent Grants Project did not result in any records.



Figure 9. Photographs of *Stylidium ensatum* leaf (left) and flower (right)

Survey area selection

DENR has developed a habitat model for *Stylidium ensatum* for the Greater Darwin region. A desktop search found there are areas of high likelihood of *Stylidium ensatum* habitat within the survey area (see Figure 10).

Existing land unit and vegetation mapping, and satellite imagery were examined to identify potential areas of suitable *Stylidium ensatum* habitat to be targeted for on-ground investigation. Relevant features used to determine potentially suitable locations for on-ground survey were:

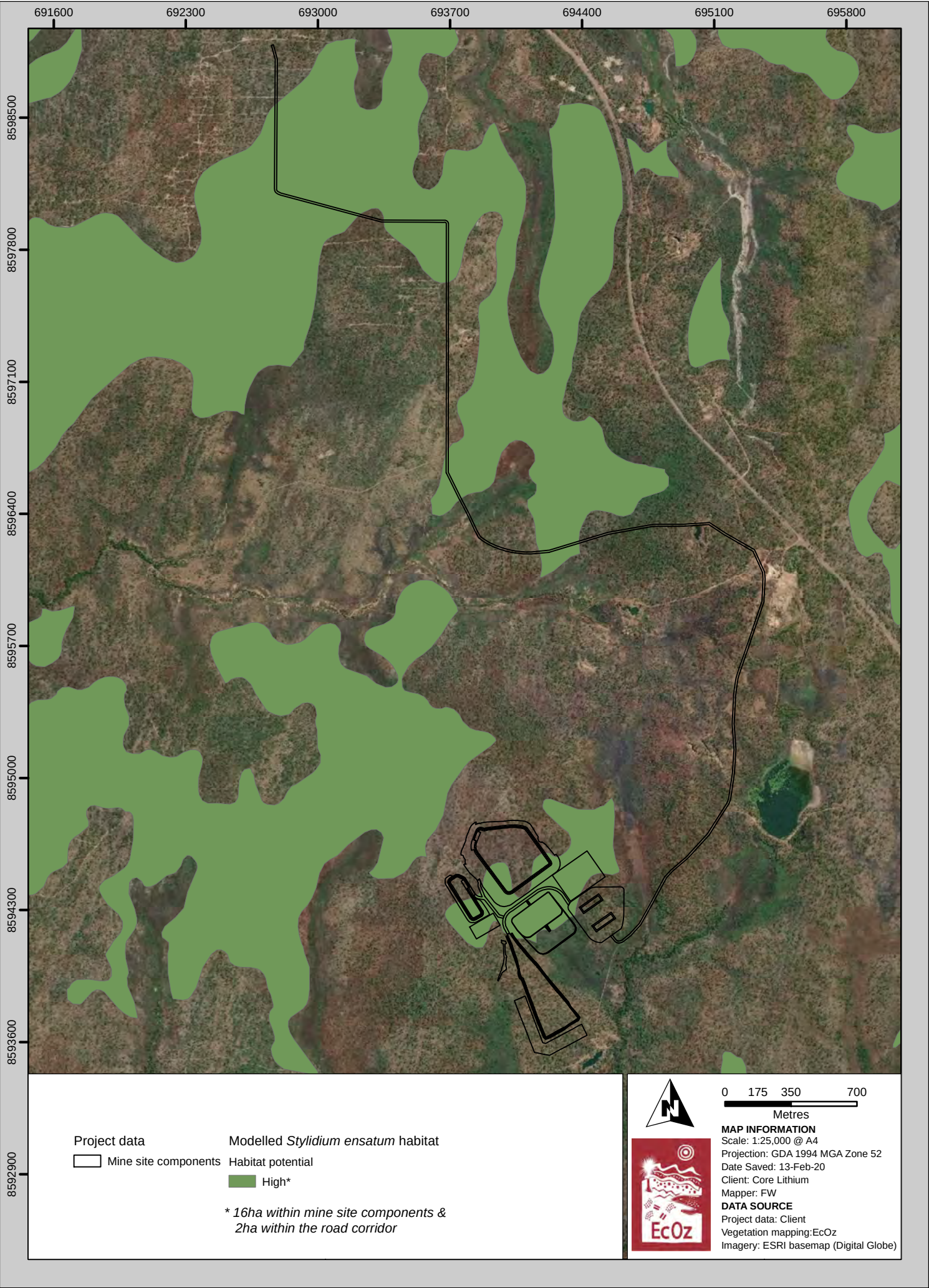
- Areas that are poorly drained with seasonal inundation or waterlogging and have hydrosols soils – i.e. they are saturated with water for extended periods, are generally a greyish colour and have a high organic content.
- Shallow inundation or saturated soils in the mid dry season.
- Overstorey consisting of *Lophostemon lactifluus*, *Pandanus spiralis* and/or *Melaleuca* spp.
- Ground layer incorporating grasses and herbs that occur in poorly-drained habitats.
- Relatively open overstorey.

Proposed methods

The survey will focus on areas modelled as high likelihood habitat within the Project footprint (excluding tracks) – see Figure 10. During the surveys, areas of high and moderate likelihood habitat will be walked and navigated using GPS.

Potential habitat will be surveyed in June-July 2020, led by EcOz botanist Nicole Clark who has previous experience in surveying for the species. A check site located near Girraween Road will be visited prior to survey to inspect a known population of *S. ensatum* for flowering, detectability, and to record attributes of the habitat where the species is known to occur.

Given the relative area within the disturbance footprint, identified areas of suitable habitat will be surveyed using a random meander method with the aim of assessing the entire area of suitable habitat. GPS tracks will record survey range and effort, and photographs of habitats will be taken.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19171 - BP33 NOI\01 Project Files\Report maps\Figure X-X. Map of modelled Stylidium ensatum habitat in proximity to the project footprint.mxd

Figure X-X. Map of modelled Stylidium ensatum habitat in proximity to the project footprint

5 DISCUSSION & CONCLUSIONS

The survey area comprised of eight land units. *Eucalyptus miniata* and *Eucalyptus tetradonta* mid high woodland on rises is the most widespread within the survey area, followed by *Eucalyptus alba* mid open woodland in alluvial plains. There are also significant areas of poorly-drained *Grevillea pteridifolia*, *Pandanus spiralis*, and *Lophostemon lactifluus* shrublands.

Three threatened fauna species were determined to have a high likelihood of occurrence within the Project footprint – Bare-rumped Sheath-tail Bat, Black-footed Tree-rat and Partridge Pigeon. Habitat values for these three species are assessed below. Broadly, throughout the Cox Peninsula there are many areas of suitable habitat for these species; the quality of that habitat within the Project footprint is similar to that elsewhere in the region. If these species are present, the Project footprint does not contain especially important habitat for them.

Government modelling indicates that the Project footprint also provides potential habitat for two threatened flora species – *Typhonium praetermissum* and *Stylidium ensatum*. Surveys during November and December were not able to determine the presence of these species as individuals are only emergent in the mid wet and early dry. A *Typhonium praetermissum* targeted survey in February 2020 did not result in any occurrence records for the species. A *Stylidium ensatum* survey is proposed for June-July. The species was not previously recorded in a similar nearby survey in 2019.

6 REFERENCES

- Braithwaite, R.W. (1985). *The Kakadu fauna survey: an ecological survey of Kakadu National Park*. Australian National Parks & Wildlife Service, Canberra.
- Churchill, S. (1998). *Australian Bats*. Reed New Holland, Sydney.
- Cuff, N. and Green, C. (2019). Threatened species distribution in the Greater Darwin Region: *Typhonium praetermissum*. Department of Environmental and Natural Resources, Northern Territory Government.
- Cowie, I. and Westaway, J. (2012b). Threatened Species of the Northern Territory: *Stylidium ensatum*. Department of Environment and Natural Resources, Northern Territory Government. [Online] Available at: https://nt.gov.au/_data/assets/pdf_file/0009/208494/stylidium-ensatum.pdf [Accessed February 2020].
- Department of Land Resource Management (DLRM) (2015). *Darwin Regional Weed Management Plan*. Northern Territory Government, Darwin.
- Fogarty, P.J. Lynch, B. & Wood, B. (1984). *The Land Resources of the Elizabeth, Darwin and Blackmore Rivers*. Land Conservation Unit, Conservation Commission of the Northern Territory.
- Fraser, F. (2000). Species profile: Partridge Pigeon *Geophaps smithii*. *Northern Territory Naturalist* 16, 38-39.
- Friend, G.R. and Braithwaite, R.W. (1986). Bat fauna of Kakadu National Park, Northern Territory. *Australian Mammalogy*, Vol. 9, pp. 43-52.
- Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. Birds Australia, CSIRO Publishing, Melbourne.
- Higgins, P.J. and Davies S.J.J.F. (eds) (1996). *Handbook of Australian, New Zealand and Antarctic Birds*. Volume Three: Snipe to Pigeons. Oxford University Press. Melbourne, Victoria.
- Hill, B. (2012). *Threatened Species of the Northern Territory- Black-footed Tree-rat - Mesembriomys gouldii*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0018/205515/black-footet-tree-rat.pdf [Accessed September 2017].
- Holmes, J., Bisa, D., Hill, A. and Crase, B. (2005). *A guide to Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory*. Sydney, WWF-Australia.
- Jessop P.J. and King, D. (1997). *The Land Resources of New Crown Station*, NTG Technical Report No. TM96/18.
- Milne, D.J., Jackling, F.C., Sidhu, M., and Appleton, B.R. (2009). Shedding new light on old species identifications: morphological and genetic evidence suggest a need for conservation status review of the critically endangered bat, *Saccolaimus saccolaimus*. *Wildlife Research*, Vol. 36, pp. 496–508.
- Northern Territory Herbarium (2015). *FloraNT Northern Territory Flora Online*. Department of Land Resource Management, Palmerston. [Online] Available at: <http://eflora.nt.gov.au>. [Accessed February 2020].
- Price, O., Rankmore, B., Milne, D.J., Brock, C., Tynan, C., Kean, L. and Roger, L. (2005). Regional patterns of mammal abundance and their relationships to landscape variables in eucalypt woodlands near Darwin, northern Australia. *Wildlife Research*, Vol. 32, pp. 435-446.
- Rankmore, B.R. (2006). *Impacts of Habitat Fragmentation on the Vertebrate Fauna of the Tropical Savannas of Northern Australia; with Special Reference to Medium-sized Mammals*. PhD Thesis, Charles Darwin University, Darwin.

Woinarski, J.C.Z. (2006). *Threatened Species of the Northern Territory - Partridge Pigeon (eastern subspecies) - Geophaps smithii*. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0003/206355/partridge-pigeon.pdf [Accessed February 2020].

Woinarski, J., Burbidge, A. and Harrison, P. (2014). *The Action Plan for Australian Mammals 2012*. CSIRO Publishing: pp. 511-514.

APPENDIX A VEGETATION DESCRIPTIONS

Land unit – 1b				
NVIS Code: T7i				
Vegetation Description: <i>Eucalyptus tetrodonta</i> +/- <i>Eucalyptus miniata</i> , <i>Eucalyptus tectifica</i> mid woodland over <i>Terminalia ferdinandiana</i> , <i>Eucalyptus tetrodonta</i> , <i>Erythrophleum chlorostachys</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp., <i>Eucalyptus tetrodonta</i> (re-sprouts) mid tussock grassland				
Upper 1: Mid high woodland dominated by <i>Eucalyptus tetrodonta</i> (100%), <i>Eucalyptus miniata</i> (75%), <i>Eucalyptus tectifica</i> (30%)				
Mid 1: Mid open shrubland dominated by <i>Terminalia ferdinandiana</i> (100%), <i>Erythrophleum chlorostachys</i> (66.6%), <i>Eucalyptus tetrodonta</i> (66.6%)				
Ground 1: Mid high tussock grassland dominated by <i>Alloteropsis semialata</i> (100%), <i>Eriachne</i> sp. (66.6%), <i>Eucalyptus tetrodonta</i> (re-sprouts) (33.3%)				
				
No. of sites: 3 (5,11, 23)				
Other common species				
Upper stratum (U1): -				
Mid stratum (M1): <i>Livistona humilis</i> (33.3%) and <i>Eucalyptus miniata</i> (33.3%)				
Ground stratum (G1): <i>Hibbertia dilatata</i> (33.3%), <i>Brachychiton paradoxus</i> (33.3%), and <i>Pandanus spiralis</i> (33.3%)				
Total area of project area: 130.421 ha				
Land form: Steeply sloping ridge terrain, slope 10 to 40%				
Soils: Leptic Rudosol			Drainage: Very rapid	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	33.3 (25 – 40)	18 (16 – 20)	T7i
Mid M1	Shrub	23.3 (20 – 25)	9.3 (8 – 11)	S3i
Ground G1	Tussock grass	55 (40 – 60)	0.7 (0.5 – 0.8)	G2c

Land unit – 2a1				
NVIS Code: T7i, T7c				
Vegetation Description: <i>Eucalyptus tetradonta</i> +/- <i>Eucalyptus miniata</i> , <i>Eucalyptus tectifica</i> mid woodland over <i>Terminalia ferdinandiana</i> , <i>Eucalyptus tetradonta</i> , <i>Erythrophleum chlorostachys</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp., <i>Eucalyptus tetradonta</i> (re-sprouts) mid tussock grassland				
Upper 1: Mid high woodland dominated by <i>Eucalyptus miniata</i> (90%), <i>Corymbia certiflora</i> (20%)				
Mid 1: Mid high open shrubland of <i>Erythrophleum chlorostachys</i> (60%), <i>Livistona humilis</i> (40%), <i>Eucalyptus miniata</i> (40%).				
Ground 1: Mid high tussock grassland dominated by <i>Alloteropsis semialata</i> (100%), <i>Eriachne</i> sp. (60%), <i>Heteropogon triticeus</i> (30%) and <i>Hibbertia dilatata</i> (30%).				
				
No. of sites: 10 (2,8,25,31,37,33,47,17,22,30)				
Other common species				
Upper stratum (U1): <i>Eucalyptus tectifica</i> (10%), <i>Eucalyptus tetradonta</i> , (20%), <i>Corymbia bleeseri</i> (10%), <i>Corymbia foelscheana</i> (10%)				
Mid stratum (M1): <i>Acacia lamprocarpa</i> (30%), <i>Corymbia bleeseri</i> (10%), <i>Corymbia foelscheana</i> (10%), <i>Eucalyptus tectifica</i> (10%), <i>Eucalyptus tetradonta</i> (10%), <i>Grevillea decurrens</i> (20%), <i>Pandanus spiralis</i> (20%), <i>Terminalia ferdinandiana</i> (10%) and <i>Xanthostemon paradoxus</i> (10%).				
Ground stratum (G1): <i>Erythrophleum chlorostachys</i> (20%), <i>Eucalyptus miniata</i> (10 %), <i>Eucalyptus tetradonta</i> (10%), <i>Sorghum intrans</i> (10%) and <i>Syzygium eucalyptoides bleeseri</i> (10%).				
Total area of project area: 386.346 ha				
Land form: Low rises and associated upper, slope 0.5 to 4 %				
Soils: Brown kandosols			Drainage: Rapid	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	27 (15 – 40)	15.35 (11.5 - 18)	T7i
Mid M1	Shrub	30 (10-70)	6.6 (3 - 10)	S3i
Ground G1	Tussock grass	50 (40 – 60)	0.93 (0.6 –1.5)	G2c

Land unit – 2b2				
NVIS Code: T7r, (T7i)				
Vegetation Description: <i>Eucalyptus tetrodonta</i> , <i>Eucalyptus miniata</i> , <i>Eucalyptus tectifera</i> mid woodland over <i>Terminalia ferdinandiana</i> , <i>Eucalyptus tetrodonta</i> , <i>Erythrophleum chlorostachys</i> mid open shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland				
Upper 1: Mid high woodland dominated by <i>Eucalyptus tetrodonta</i> (100%)				
Mid 1: Mid high shrubland dominated by <i>Eucalyptus tetrodonta</i> (100%), <i>Livistona humilis</i> (100%) and <i>Corymbia foelscheana</i> (100%).				
Ground 1: Mid high closed tussock grassland dominated by <i>Alloteropsis semialata</i> (100%), <i>Petalostigma quadriloculare</i> (100%) and <i>Eucalyptus tetrodonta</i> (100%).				
				
No. of sites: 2 (46)				
Other common species				
Upper stratum (U1): -				
Mid stratum (M1): -				
Ground stratum (G1): -				
Total area of project area: 16.182 ha				
Land form: Gentle side slope, slope 2 to 5%				
Soils: Brown Kandosols			Drainage: Rapid	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	40	16	T7i
Mid M1	Shrub	35	8	S3i
Ground G1	Tussock grass	70	1	G2c

Land unit – 5a				
NVIS Code: T7r, (T7i)				
Vegetation Description: <i>Eucalyptus alba</i> mid open woodland over <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> , <i>Xanthostemon paradoxus</i> mid sparse shrubland over <i>Sorghum intrans</i> , <i>Imperata cylindrica</i> mid tussock grassland. And/or <i>Grevillea pteridifolia</i> , <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> mid sparse shrubland over <i>Alloteropsis semialata</i> , <i>Sorghum intrans</i> mid tussock grassland				
Upper 1: Mid high open woodland dominated by <i>Eucalyptus alba</i> (50%), <i>Syzygium eucalyptoides</i> subsp. <i>bleeseri</i> ((25%) and <i>Erythrophleum chlorostachys</i> (25%)				
Mid 1: Mid high sparse shrubland dominated by <i>Pandanus spiralis</i> (80%), <i>Grevillea pteridifolia</i> (66.6%) and <i>Lophostemon lactifluus</i> (53.3%)				
Ground 1: Mid high tussock grassland dominated by <i>Alloteropsis semialata</i> (73.3%), <i>Sorghum intrans</i> (60%) and <i>Lophostemon lactifluus</i> (40%).				
				
No. of sites: 15 (3,6,7,9,15,13,24,28,32,20,18,26,27,12,40)				
Other common species				
Upper stratum (U1): -				
Mid stratum (M1): <i>Banksia dentata</i> (6.67%), <i>Livistona humilis</i> (20%), <i>Melaleuca nervosa</i> (20%), <i>Petalostigma pubescens</i> (6.67 %) and <i>Xanthostemon paradoxus</i> (6.67%)				
Ground stratum (G1): <i>Heteropogon triticeus</i> (20%), <i>Imperata cylindrica</i> (6.6%), <i>Melaleuca nervosa</i> (20%), <i>Pandanus spiralis</i> (6.6%), <i>Eriachne</i> Sp. (20%) and <i>Sehima nervosum</i> (13.3%).				
Total area of project area: 244.224 ha				
Land form: Narrow alluvial plains with upland terrain, slope <1.0%				
Soils: Chromosolic Redoxic Hydrosol			Drainage: Slow, subject to wet season waterlogging and inundation	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	10.6 (2 - 25)	11.3 (3 - 15)	T7i
Mid M1	Shrub	17.6 (5 - 65)	4.9 (2 - 10)	S3i
Ground G1	Tussock grass	67 (50 - 85)	0.7 (0.5 – 1)	G2c

Land unit – 5b2				
NVIS Code: T7c (T8c)				
Vegetation Description: <i>Melaleuca leucadendra</i> , <i>Corymbia polycarpa</i> , <i>Xanthostemon eucalyptoides</i> mid open forest over <i>Pandanus aquaticus</i> , <i>Xanthostemon eucalyptoides</i> , <i>Leptospermum madidum</i> tall shrubland over sedge sp., <i>Alloteropsis semialata</i> high open tussock grassland				
Upper 1: Mid high open forest dominated by <i>Melaleuca leucadendra</i> (75%), <i>Corymbia polycarpa</i> (75%) and <i>Xanthostemon eucalyptoides</i> (50%)				
Mid 1: Tall shrubland dominated by <i>Leptospermum madidum</i> (75%), <i>Pandanus aquaticus</i> (75%) and <i>Xanthostemon eucalyptoides</i> (75%)				
Ground 1: Mid high open tussock grassland dominated by <i>Sedge sp.</i> (75%), <i>Pandanus aquaticus</i> (50%) and <i>Alloteropsis semialata</i> (50%).				
				
No. of sites: 4 (36,38,41 & 43)				
Other common species				
Upper stratum (U1): <i>Melaleuca viridiflora</i> (25%) and <i>Syzygium armstrongii</i> (25%)				
Mid stratum (M1): <i>Barringtonia acutangula</i> (25%), <i>Helicia australasica</i> (25%) and <i>Calophyllum sp.</i> (25%).				
Ground stratum (G1): <i>Flagellaria indica</i> (25%), <i>Germania sp</i> (25%) and <i>Xanthostemon eucalyptoides</i> (25%).				
Total area of project area: 40.625 ha				
Land form: Narrow drainage floors with incised drainage lines, slope < 1.5%				
Soils: Kandosolic Redoxic Hydrosol			Drainage: Slow, water logged in wet season	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	55 (50 - 60)	24 (16 – 32)	T7i
Mid M1	Shrub	71.25 (65 – 85)	12.75 (10 – 16)	S3i
Ground G1	Tussock grass	15 (10 - 20)	0.72 (0.5 – 1)	G2c

Land unit – 6a				
NVIS Code: T7i, T7c				
Vegetation Description: <i>Corymbia polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Corymbia confertiflora</i> mid open woodland over <i>Grevillea pteridifolia</i> , <i>Xanthostemon paradoxus</i> , <i>Livistona humilis</i> mid shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne</i> sp mid tussock grassland				
Upper 1: low open woodland dominated by <i>Erythrophleum chlorostachys</i> (100%) and <i>Xanthostemon paradoxus</i> (100%).				
Mid 1: Mid high shrubland dominated by <i>Xanthostemon paradoxus</i> (100%), <i>Grevillea pteridifolia</i> (100%) and <i>Banksia dentata</i> (100%).				
Ground 1: Mid high tussock grassland dominated by <i>Alloteropsis semialata</i> (100%), <i>Syzygium eucalyptoides</i> subsp. <i>bleeseri</i> (100%) and <i>Eriachne</i> sp. (100%)				
				
No. of sites: 1 (1)				
Other common species				
Upper stratum (U1): -				
Mid stratum (M1): -				
Ground stratum (G1): -				
Total area of project area: 8.886 ha				
Land form: Broad lowland plains, slope >0.5%				
Soils: Chromosolic Redoxic Hydrosol			Drainage: Very Slow, subject to wet season inundation	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	15	7.5	T7i
Mid M1	Shrub	10	6	S3i
Ground G1	Tussock grass	60	0.8	G2c

Land unit – 6b				
NVIS Code: T7r (T6r, T7i)				
Vegetation Description: <i>Corymbia polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Corymbia confertiflora</i> mid open woodland over <i>Grevillea pteridifolia</i> , <i>Xanthostemon paradoxus</i> , <i>Livistona humilis</i> mid shrubland over <i>Alloteropsis semialata</i> , <i>Eriachne sp</i> mid tussock grassland				
Upper 1: Mid high open woodland dominated by <i>Corymbia polycarpa</i> (72.7%), <i>Corymbia polycarpa</i> (54.5%) and <i>Corymbia confertiflora</i> (27.2%).				
Mid 1: Mid high shrubland dominated by <i>Grevillea pteridifolia</i> (53.33%), <i>Livistona humilis</i> (45.45%) and <i>Xanthostemon paradoxus</i> (33.33%).				
Ground 1: Mid high tussock grassland dominated by <i>Alloteropsis semialata</i> (100%), <i>Eriachne sp.</i> (54.5%) and <i>Lophostemon lactifluus</i> (26.6%).				
				
No. of sites: 11 (4,10,14,16,19,21,29,34,35,42,48)				
Other common species				
Upper stratum (U1): - <i>Corymbia bella</i> (9.09%), <i>Lophostemon lactifluus</i> (9.09%), <i>Melaleuca nervosa</i> (9.09%) and <i>Syzygium eucalyptoides subsp. bleeseri</i> (9.09%).				
Mid stratum (M1): - <i>Banksia dentata</i> (18.18%), <i>Erythrophleum chlorostachys</i> (18.18%), <i>Lophostemon lactifluus</i> (18.18%), <i>Melaleuca nervosa</i> (9.09%) and <i>Verticordia cunninghamii</i> (9.09%)				
Ground stratum (G1): - <i>Heteropogon triticeus</i> (9.09%), <i>Melaleuca nervosa</i> (9.09%), <i>Sorghum intrans</i> (9.09%), <i>Sehima nervosum</i> (9.09%), <i>Eriachne sp.</i> (18.18%) and <i>Eriachne ciliata</i> (9.09%).				
Total area of project area: 229.350 ha				
Land form: Broad drainage floors and creek margins				
Soils: Tenosolic Oxyaquic Hydrosol			Drainage: Slow, subject to wet season inundation	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	17.8 (2 – 35)	11.3 (7 – 16)	T7i
Mid M1	Shrub	32.3 (10 – 60)	7.1 (6 – 9)	S3i
Ground G1	Tussock grass	53.2 (30 – 70)	0.81 (0.8 – 1)	G2c

Land unit – 7a				
NVIS Code: T7r (T6r, T7i)				
Vegetation Description: <i>Grevillea pteridifolia</i> , <i>Pandanus spiralis</i> , <i>Lophostemon lactifluus</i> mid sparse shrubland over <i>Alloteropsis semialata</i> , <i>Sorghum intrans</i> mid tussock grassland				
Upper 1: Mid high shrubland dominated by <i>Corymbia confertiflora</i> (33.3%)				
Mid 1: Mid high shrubland dominated by <i>Melaleuca viridiflora</i> (66.6%)				
Ground 1: Mid high tussock grassland dominated by <i>Sehima nervosum</i> ((66.6%) and <i>Eriachne sp.</i> (66.6%)				
				
No. of sites: 3 (39,44,45)				
Other common species				
Upper stratum (U1): -				
Mid stratum (M1): <i>Banksia dentata</i> (33.3%), <i>Erythrophleum chlorostachys</i> (33.3%), <i>Grevillea pteridifolia</i> , <i>Livistona humilis</i> (33.3%) and <i>Xanthostemon paradoxus</i> (33.3%).				
Ground stratum (G1): <i>Alloteropsis semialata</i> (33.3%), <i>Melaleuca viridiflora</i> (33.3%), <i>Sorghum intrans</i> (33.3%), <i>Syzygium eucalyptoides subsp.bleeseri</i> (33.3%) and <i>Eriachne ciliata</i> (33.3%).				
Total area of project area: 47.156 ha				
Land form: Fringes and levees of major channels, Slope 0.5 to 2%				
Soils: Brown Kandosols			Drainage: Medium, occasional wet season inundation	
Structural summary:				
Strata	Modal growth form	Mean cover %	Mean height (m)	NVIS code
Upper U1	Tree	4	10	T7i
Mid M1	Shrub	25 (15 – 30)	6.6 (5 – 9)	S3i
Ground G1	Tussock grass	51.6 (50 – 55)	0.9 (0.8 – 1)	G2c

APPENDIX B EPBC PROTECTED MATTERS SEARCH REPORT



EPBC Act Protected Matters Report

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

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

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

Report created: 19/12/19 13:11:32

[Summary](#)

[Details](#)

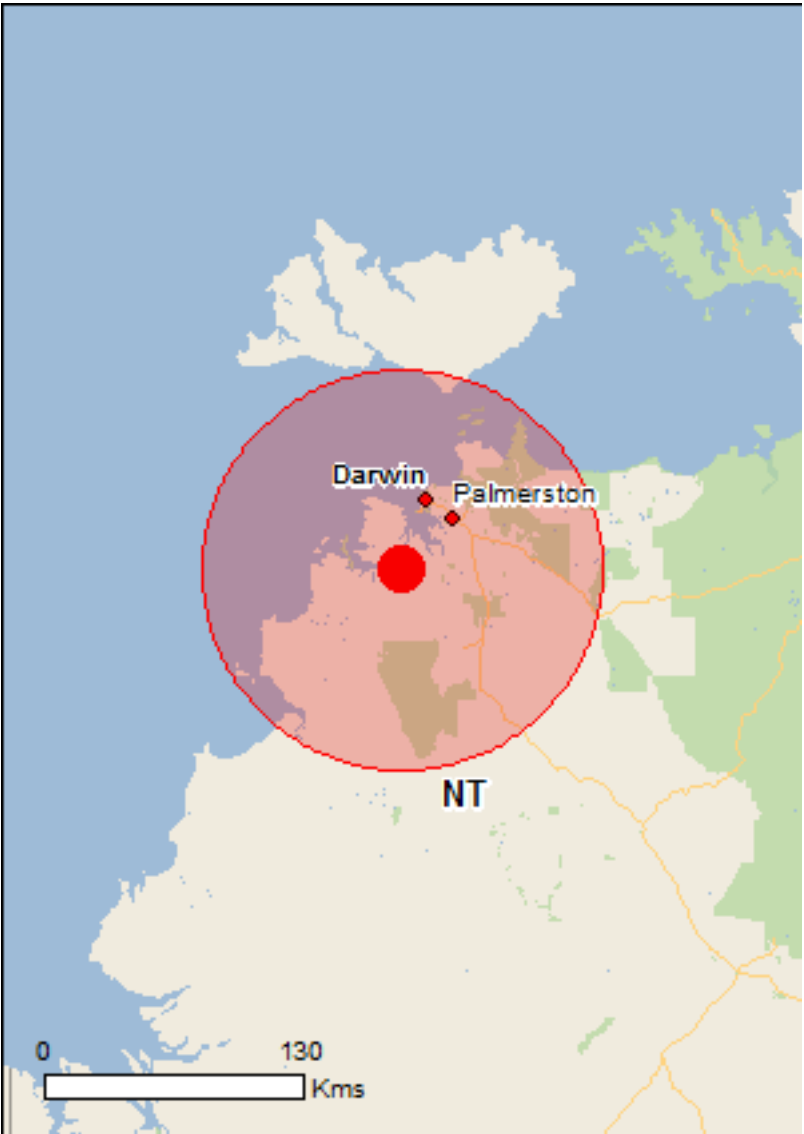
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

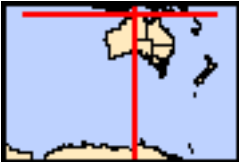
[Acknowledgements](#)



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

[Coordinates](#)

[Buffer: 100.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	58
Listed Migratory Species:	73

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	36
Commonwealth Heritage Places:	8
Listed Marine Species:	111
Whales and Other Cetaceans:	15
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	25
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	7
Key Ecological Features (Marine)	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 the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name

EEZ and Territorial Sea

Marine Regions

[Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name

[North](#)

Listed Threatened Species

[Resource Information]

Name

Status

Type of Presence

Birds

[Calidris canutus](#)

Red Knot, Knot [855]

Endangered

Species or species habitat known to occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat known to occur within area

[Calidris tenuirostris](#)

Great Knot [862]

Critically Endangered

Roosting known to occur within area

[Charadrius leschenaultii](#)

Greater Sand Plover, Large Sand Plover [877]

Vulnerable

Roosting known to occur within area

[Charadrius mongolus](#)

Lesser Sand Plover, Mongolian Plover [879]

Endangered

Roosting known to occur within area

[Epthianura crocea_tunneyi](#)

Alligator Rivers Yellow Chat, Yellow Chat (Alligator Rivers) [67089]

Endangered

Species or species habitat known to occur within area

[Erythrotriorchis radiatus](#)

Red Goshawk [942]

Vulnerable

Species or species habitat known to occur within area

[Erythrura gouldiae](#)

Gouldian Finch [413]

Endangered

Species or species habitat known to occur within area

[Falcunculus frontatus_whitei](#)

Crested Shrike-tit (northern), Northern Shrike-tit [26013]

Vulnerable

Species or species habitat likely to occur within area

[Geophaps smithii_smithii](#)

Partridge Pigeon (eastern) [64441]

Vulnerable

Species or species

Name	Status	Type of Presence
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	habitat known to occur within area Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Melanodryas cucullata melvillensis Tiwi Islands Hooded Robin, Hooded Robin (Tiwi Islands) [67092]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat known to occur within area
Tyto novaehollandiae melvillensis Tiwi Masked Owl, Tiwi Islands Masked Owl [26049]	Endangered	Species or species habitat known to occur within area
Mammals		
Antechinus bellus Fawn Antechinus [344]	Vulnerable	Species or species habitat known to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Conilurus penicillatus Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma [132]	Vulnerable	Species or species habitat known to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Hipposideros inornatus Arnhem Leaf-nosed Bat [86675]	Endangered	Species or species habitat may occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
Mesembriomys gouldii gouldii Black-footed Tree-rat (Kimberley and mainland Northern Territory), Djintamoonga, Manbul [87618]	Endangered	Species or species habitat known to occur within area
Mesembriomys gouldii melvillensis Black-footed Tree-rat (Melville Island) [87619]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
within area		
Petrogale concinna canescens Nabarlek (Top End) [87606]	Endangered	Species or species habitat known to occur within area
Phascogale pirata Northern Brush-tailed Phascogale [82954]	Vulnerable	Species or species habitat known to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat known to occur within area
Sminthopsis butleri Butler's Dunnart [302]	Vulnerable	Species or species habitat known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area
Plants		
Atalaya brevialata [86125]	Critically Endangered	Species or species habitat known to occur within area
Burmannia sp. Bathurst Island (R.Fensham 1021) [82017]	Endangered	Species or species habitat likely to occur within area
Clausena excavata [68631]	Critically Endangered	Species or species habitat known to occur within area
Goodenia quadrifida [56035]	Vulnerable	Species or species habitat known to occur within area
Helicteres macrothrix [86586]	Endangered	Species or species habitat known to occur within area
Stylidium ensatum a triggerplant [86366]	Endangered	Species or species habitat known to occur within area
Typhonium jonesii a herb [62412]	Endangered	Species or species habitat likely to occur within area
Typhonium mirabile a herb [79227]	Endangered	Species or species habitat likely to occur within area
Typhonium taylori a herb [65904]	Endangered	Species or species habitat likely to occur within area
Xylopia monosperma a shrub [82030]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur

Name	Status	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	within area Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area
Lucasium occultum Yellow-snouted Gecko, Yellow-snouted Ground Gecko [82993]	Endangered	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Sharks		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Glyphis garricki Northern River Shark, New Guinea River Shark [82454]	Endangered	Breeding known to occur within area
Glyphis glyphis Speartooth Shark [82453]	Critically Endangered	Species or species habitat known to occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat likely to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur

Name	Threatened	Type of Presence
Calidris alba Sanderling [875]	Endangered	within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]	Critically Endangered	Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]	Critically Endangered	Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]		Roosting known to occur within area
Charadrius dubius Little Ringed Plover [896]	Vulnerable	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]	Endangered	Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting known to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]	Critically Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area

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

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
-------------------	--

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian Customs Service
Commonwealth Land - Australian Government Solicitor
Commonwealth Land - Department of Administrative Services
Commonwealth Land - Department of Community Services & Health
Commonwealth Land - Department of Immigration Local Government & Ethnic Affairs
Commonwealth Land - Department of Transport & Regional Development
Commonwealth Land - Deputy Crown Solicitor
Commonwealth Land - Director of Property Services Defence Estate
Commonwealth Land - National Transmission Agency
Defence - AUSTRALIAN ARMY BAND - DARWIN
Defence - BERRIMAH ONE
Defence - DARWIN - AP10 RADAR SITE - LEE POINT
Defence - DARWIN - AP3 RECEIVING STATION - LEE POINT
Defence - DARWIN - TRANSMITTING STATION '11 MILE'
Defence - DARWIN RELOCATIONS CENTRE
Defence - DARWIN RIVER GRAVEL QUARRY
Defence - DEFENCE FORCE CAREERS REFERENCE CENTRE
Defence - ELIZABETH DOWNS STATION RADAR SITE
Defence - Esanda Builidng
Defence - HMAS COONAWARRA (Berrimah)
Defence - HUMPTY DOO TRANSMITTING STATION
Defence - KANGAROO FLATS TRAINING AREA
Defence - KOWANDI NORTH COMMUNICATION STATION
Defence - KOWANDI SOUTH REPEATING STATION
Defence - LARRAKEYAH BARRACKS
Defence - LEANYER BOMBING RANGE
Defence - MT GOODWIN RADAR SITE
Defence - Patrol Boat Base (DARWIN NAVAL BASE)
Defence - QUAIL ISLAND BOMBING RANGE
Defence - RAAF BASE DARWIN
Defence - ROBERTSON BARRACKS (Waler Barracks)
Defence - SHOAL BAY RECEIVING STATION
Defence - STOKES HILL OIL FUEL INSTALLATION

Name		
Defence - WINNELLIE ONE		
Defence - WINNELLIE TWO		
Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Adelaide River War Cemetery	NT	Listed place
Larrakeyah Barracks Headquarters Building	NT	Listed place
Larrakeyah Barracks Precinct	NT	Listed place
Larrakeyah Barracks Sergeants Mess	NT	Listed place
RAAF Base Commanding Officers Residence	NT	Listed place
RAAF Base Precinct	NT	Listed place
RAAF Base Tropical Housing Type 2	NT	Listed place
RAAF Base Tropical Housing Type 3	NT	Listed place

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur

Name	Threatened	Type of Presence
Calidris tenuirostris Great Knot [862]	Critically Endangered	within area
Calonectris leucomelas Streaked Shearwater [1077]		Roosting known to occur within area
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]	Endangered	Roosting known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Roosting known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting known to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Roosting known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Breeding known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Roosting known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Roosting known to occur within area
		Species or species

Name	Threatened	Type of Presence
Limosa limosa Black-tailed Godwit [845]		habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Roosting known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]	Critically Endangered	Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]	Endangered*	Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]		Species or species habitat known to occur within area
Sterna albifrons Little Tern [813]		Breeding known to occur within area
Stiltia isabella Australian Pratincole [818]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area
Corythoichthys haematopterus Reef-top Pipefish [66201]		Species or species habitat may occur within area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus spirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys parvicarinatus Short-keel Pipefish, Short-keeled Pipefish [66230]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Enhydrina schistosa Beaked Seasnake [1126]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]		Foraging, feeding or related behaviour known to occur within area
Hydrelaps darwiniensis Black-ringed Seasnake [1100]	Vulnerable	Species or species habitat may occur within area
Hydrophis atriceps Black-headed Seasnake [1101]		Species or species habitat may occur within area
Hydrophis coggeri Slender-necked Seasnake [25925]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Hydrophis inornatus Plain Seasnake [1107]		Species or species habitat may occur within area
Hydrophis mcdowellii null [25926]		Species or species habitat may occur within area
Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [1111]		Species or species habitat may occur within area
Hydrophis pacificus Large-headed Seasnake, Pacific Seasnake [1112]	Endangered	Species or species habitat may occur within area
Lapemis hardwickii Spine-bellied Seasnake [1113]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]		Breeding known to occur within area
Natator depressus Flatback Turtle [59257]		Breeding known to occur within area
Parahydrophis mertoni Northern Mangrove Seasnake [1090]		Species or species habitat may occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]	Vulnerable	Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		

Name	Status	Type of Presence
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Adelaide River Foreshore	NT
Black Jungle / Lambells Lagoon Conservation Reserve	NT
Blackmore River	NT
Buffalo Creek	NT
Casuarina	NT
Channel Island	NT
Channel Point	NT
Charles Darwin	NT

Name	State
Djukbinj	NT
Fogg Dam	NT
George Brown Darwin	NT
Harrison Dam	NT
Holmes Jungle	NT
Howard Springs	NT
Howard Springs	NT
Knuckey Lagoons	NT
Leaning Tree Lagoon	NT
Litchfield	NT
Manton Dam Recreation Area	NT
Mary River	NT
Melacca Swamp	NT
Shoal Bay	NT
Territory Wildlife Park / Berry Springs	NT
Territory Wildlife Park / Berry Springs	NT
Tree Point Conservation Area	NT

Invasive Species

[Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Bubalus bubalis Water Buffalo, Swamp Buffalo [1]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Andropogon gayanus Gamba Grass [66895]		Species or species habitat likely to occur within area
Annona glabra Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311] Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507] Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223] Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Pennisetum polystachyon Mission Grass, Perennial Mission Grass, Missiongrass, Feathery Pennisetum, Feather		Species or species habitat likely to occur

Name	Status	Type of Presence
Pennisetum, Thin Napier Grass, West Indian Pennisetum, Blue Buffel Grass [21194] Sagittaria platyphylla		within area
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat may occur within area

Reptiles

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

Nationally Important Wetlands	[Resource Information]
Name	State
Adelaide River Floodplain System	NT
Daly-Reynolds Floodplain-Estuary System	NT
Finniss Floodplain and Fog Bay Systems	NT
Mary Floodplain System	NT
Mount Bunday Training Area - Mary River Floodplain	NT
Port Darwin	NT
Shoal Bay - Micket Creek	NT

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-12.71103 130.75848

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.

APPENDIX C THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE

Name	Status		Summary	Likelihood of Occurrence
	Cth	NT		
BIRDS				
Red Knot <i>Calidris canutus</i>	EN	VU	Habitat: Coastal and estuarine with tidal mudflats. May roost during high tide on nearby beaches. May also be found at near-coastal swamps and lakes (apart from Red and Great Knot) Distribution: Mostly widespread around the northern Australian coast, less common in the south, with few inland records. Eastern Curlew is uncommon across Australia while Asian Dowitcher is rare. Every year these species breed in the northern hemisphere in the summer, and migrate to Australia for the southern hemisphere summer. Some birds remain in Australia during the winter. Wilson et al. (2007) have shown that the two main Australian non-breeding regions belong to separate populations of Godwit. Subspecies <i>menzbieri</i> is generally present in north-western Australia and breed in north-eastern Russia, and subspecies <i>baueri</i> is generally present in south-eastern Australia and breed in northern and western Alaska (Wilson et al. 2007). It is thought that both subspecies probably migrate to the NT. Due to the difficulties of distinguishing between the two, they are treated within the NT as <i>Limosa lapponica</i> and listed collectively as Vulnerable (Ward 2012). <i>Information summarised from Chatto (2003), DoE (2015) and Garnett et al. (2011)</i>	NONE • No suitable coastal or estuarine tidal mudflats present within the project area.
Curlew Sandpiper <i>Calidris ferruginea</i>	CR	VU		
Great Knot <i>Calidris tenuirostris</i>	CR	VU		
Greater Sand Plover <i>Charadrius leschenaultii</i>	VU	VU		
Lesser Sand Plover <i>Charadrius mongolus</i>	EN	VU		
Asian Dowitcher <i>Limnodromus semipalmatus</i>	-	VU		
Bar-tailed Godwit (Western Alaskan subspecies) <i>Limosa lapponica baueri</i>	VU	VU		
Bar-tailed Godwit (northern Siberian subspecies) <i>Limosa lapponica menzbieri</i>	CR	VU		
Eastern Curlew <i>Numenius madagascariensis</i>	CR	VU		
Geering, A., Agnew, L. and Harding, S. (2007). <i>Shorebirds of Australia</i> . CSIRO Publishing, Collingwood, Australia. Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i> . CSIRO Publishing, Collingwood, Australia. Chatto, R. (2003). <i>The distribution and status of shorebirds around the coast and coastal wetlands of the Northern Territory</i> . Technical Report 73, Parks and Wildlife Commission of the Northern Territory, Darwin. https://dtc.nt.gov.au/_data/assets/pdf_file/0008/279917/2003_shorebirds_rpt76.pdf .				

	Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i>. CSIRO Publishing, Collingwood, Australia. Geering, A., Agnew, L. and Harding, S. (2007). <i>Shorebirds of Australia</i>. CSIRO Publishing, Collingwood, Australia. Marchant, S. and Higgins, P. (eds.) (1993). <i>Handbook of Australian, New Zealand and Antarctic Birds. Vol. 2 - Raptors to Lapwings</i>. Oxford University Press, Melbourne, Victoria Wilson, J.R., Nebel, S. and Minton, C.D.T. (2007). Migration ecology and morphometrics of two Bar-tailed Godwit populations in Australia. <i>Emu</i>, Vol. 107, pp. 262–274. Ward, S. (2012). <i>Threatened Species of the Northern Territory –Bar-tailed Godwit – Limosa lapponica</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0008/373544/bar-tailed-godwit.pdf . Chatto, R. (2003). <i>The distribution and status of shorebirds around the coast and coastal wetlands of the Northern Territory</i>. Technical Report 73, Parks and Wildlife Commission of the Northern Territory, Darwin. https://dtc.nt.gov.au/_data/assets/pdf_file/0008/279917/2003_shorebirds_rpt76.pdf . Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i>. CSIRO Publishing. Collingwood, Australia. Geering, A., Agnew, L. and Harding, S. (2007). <i>Shorebirds of Australia</i>. CSIRO Publishing, Collingwood, Australia.			
White-throated Grasswren <i>Amytoris woodwardi</i>	VU	VU	Habitat: Confined to hummock grasslands, sometimes with open shrubland or woodland overstorey, mixed among dense boulder fields or sandstone pavements (Schodde 1982; Noske 1992) and escarpment drainage lines. Distribution: NT only – patchily distributed from Nitmuluk National Park to western Arnhem Lank (Noske 1992). Within expert distribution: No	NONE • Project footprint is outside the species distribution. • No preferred sandstone or escarpment habitat within project footprint.
Noske, R. (1992). The status and ecology of the white-throated grass-wren Amytornis woodwardi. Emu, Vol. 92, pp. 39-51. Schodde, R. (1982). The fairy-wrens - A monograph of the Maluridae. Landsdowne Editions, Melbourne.				
Yellow Chat (Alligator River subspecies) <i>Epthianura crocea tunneyi</i>	EN	EN	Habitat: Grassy floodplain depressions and channels, concentrating around refugial waterholes at the end of the dry season (Armstrong 2004). Distribution: Top End of the NT, where restricted to a small number of sites in the floodplains from the Adelaide River to the East Alligator River (Woinarski & Armstrong 2006).	NONE • Project footprint is outside the species range (floodplains from the Adelaide to East Alligator Rivers). • No suitable glassy floodplain habitat
Armstrong, M. (2004). <i>The yellow chat Epthianura crocea tunneyi in Kakadu National Park</i> . Report to Parks Australia (North), NT Department of Infrastructure Planning and Environment Darwin.				
Woinarski, J. and Armstrong, M. (2006). <i>Threatened Species of the Northern Territory - Yellow Chat (Alligator River subspecies) - Epthianura crocea tunneyi</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0019/206344/yellow-chat.PDF .				
Schodde, R. and Mason, I.J. (1999). <i>The Directory of Australian Birds: Passerines</i> . CSIRO Publishing, Melbourne.				
Red Goshawk <i>Erythrotriorchis radiatus</i>	VU	VU	Habitat: Prefers tall, open Eucalypt forest and riparian areas. Nests in large trees, frequently the tallest and most massive in a tall stand, nest trees are invariably within 1 km of permanent water (Debus & Czechura 1988; Aumann & Baker-Gabb 1991). Rarely breeds in areas with fragmented native vegetation (Aumann & Baker-Gabb 1991; Czechura 2001). Home range of up to 200 km2 (Czechura & Hobson 2000). Distribution: Solitary and secretive hawk that is sparsely distributed across much of northern Australia, from the Kimberley in WA to south-eastern Qld. Within this range, generally confined to taller forests characteristic of higher rainfall coastal and sub-coastal areas (Debus 1998), but there are some isolated records of wandering birds from central Australia (Woinarski 2006).	LOW • Preferred habitat and nesting habitat within Project footprint. • Closest records are >30 km from project footprint along significant waterways which are not found within Project footprint. • Project footprint may be utilised for vagrant foraging only.
Aumann, T. and Baker-Gabb, D. (1991). <i>A Management Plan for the Red Goshawk</i> . RAOU Report 75, Royal Australasian Ornithologists Union, Melbourne.				
Czechura G.V. and Hobson R.G. (2000). <i>The Red Goshawk Erythrotriorchis radiatus in northern Queensland: status and distribution</i> . Report to Queensland Parks and Wildlife Service.				
Czechura G.V. (2001). <i>The status and distribution of the Red Goshawk Erythrotriorchis radiatus on Cape York Peninsula, Queensland</i> . Unpublished report to Birds Australia.				

			Debus, S. and Czechura, G. (1988). Field identification of the Red Goshawk <i>Erythrorchis radiatus</i>. <i>Australian Bird Watcher</i>, Vol. 12, pp. 154-159. Debus, S. (1998). <i>The Birds of Prey of Australia</i>. Oxford University Press, Melbourne. Woinarski, J. (2006). <i>Threatened Species of the Northern Territory - Red Goshawk - Erythrorchis radiatus</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0018/206352/red-goshawk.pdf.	
Gouldian Finch <i>Erythrura gouldiae</i>	EN	VU	Habitat: Prefers areas with an adequate supply of seed from annual and perennial grasses (especially Sorghum), a nearby source of surface water and – in the breeding season – unburnt, hollow-bearing Eucalyptus trees (especially <i>E. tintinnans</i>, <i>E. brevifolia</i> and <i>E. leucophloia</i>) (Tidemann 1996; O'Malley 2006). Distribution: Patchily distributed across northern Australia from the Kimberley to north-central Qld (Dostine 1998; Franklin et al. 1999; Barrett et al. 2003; Franklin et al. 2005). In the NT, most known breeding populations occur in the Top End. Non-breeding birds disperse widely (Garnett et al. 2011), greatly increasing the possible range of this species.	LOW • Suitable foraging habitat. However, no preferred species of nesting trees within the project footprint. • Project footprint is well away from the nearest known breeding site of Yinberrie Hills (Pine Creek bioregion). • Project footprint may be utilised for vagrant foraging only.
			Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). <i>The New Atlas of Australian Birds</i>. Royal Australian Ornithologists Union, Melbourne, Victoria. Dostine, P. (1998). <i>Gouldian Finch Recovery Plan Erythrura gouldiae</i>. Gouldian Finch Recovery Team and Parks & Wildlife Commission NT, Darwin. Franklin, D.C., Burbidge, A.H. and Dostine, P.L. (1999). The harvest of wild birds for aviculture: an historical perspective on finch trapping in the Kimberley with special emphasis on the Gouldian Finch. <i>Australian Zoologist</i>, Vol. 31, pp. 92-109. Franklin, D.C., Whitehead, P.J., Pardon, G., Matthews, J., McMahon, P. and McIntyre, D. (2005). Geographic patterns and correlates of the decline of granivorous birds in northern Australia. <i>Wildlife Research</i>, Vol. 32, pp. 399-408. Garnett, S.T., Szabo, J.K. and Dutton, G. (2011). <i>The Action Plan for Australian Birds 2010</i>. CSIRO Publishing, Collingwood, Australia. O'Malley, C. (2006). <i>National Recovery Plan for the Gouldian Finch (Erythrura gouldiae)</i>. WWF-Australia, Sydney and Parks and Wildlife NT, Department of Natural Resources, Environment and the Arts, NT Government, Palmerston. Tidemann, S.C. (1996). Causes of the decline of the Gouldian Finch <i>Erythrura gouldiae</i>. <i>Biological Conservation International</i>, Vol. 6, pp. 49-61.	
Grey Falcon <i>Falco hypoleucos</i>	-	VU	Habitat: Occurs in areas of lightly-timbered lowland plains, typically on inland drainage systems, where the average annual rainfall is less than 500 mm (Ward 2012). Distribution: Sparsely distributed through much of the arid and semi-arid areas of Australia but is recorded in all Australian mainland states and territories. In the NT, the majority of records are from the southern half, but there are records all the way up to Darwin (Ward 2012).	LOW • Project footprint is in area of higher rainfall than preferred by the species. • <i>Eucalyptus</i> open woodland within the project footprint is potential foraging habitat. • Typical distribution is central Australia. • Potential for vagrant foraging within project footprint.
			Ward, S. (2012). Threatened Species of the Northern Territory - Grey Falcon - <i>Falco hypoleucos</i>. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/_data/assets/pdf_file/0020/206354/grey-falcon.pdf [Accessed 30 May 2017].	
Crested Shrike-tit (northern subspecies) <i>Falcunculus frontatus whitei</i>	VU	-	Habitat: Recorded in eight different woodland types in northern Australia, mainly those dominated by <i>Eucalyptus miniata</i>, <i>E. tetrodonta</i> or <i>E. bleeseri</i> (Robinson & Woinarski 1992). Nests have been found in the canopy of <i>E. tectifera</i>, <i>C. grandifolia</i> and <i>C. latifolia</i> at >12 m above the ground in open woodland habitat (Ward et al. 2009). Distribution: North-western Australia from the Kimberley in WA, across the Top End of the NT to Borroloola (TSSC 2016). In the NT, recorded in very low densities in many isolated sub-populations (Garnett & Crowley 2000) between north-east Arnhem Land and semi-arid Victoria River District. Scarcity of records suggests	LOW • Suitable woodland habitat dominates the project footprint. • Project footprint is outside the expert distribution of the species • Only one record from the Darwin Coastal bioregion: ~160 km south-east of the project footprint

			that populations are at very low density (Woinarski 2004). Not known to have disappeared from any area where recorded historically (TSSC 2016).	
			Garnett, S.T. and Crowley, G.M. (2000). <i>The Action Plan for Australian Birds 2000</i>. Environment Australia and Birds Australia, Canberra, ACT. Robinson, D. and Woinarski, J.C.Z. (1992). 'A review of records of the Northern Shrike-tit <i>Falcunculus frontatus whitei</i> in north-western Australia'. <i>South Australian Ornithologist</i>, Vol. 31, pp. 111-117. Threatened Species Scientific Committee (2016). <i>Approved Conservation Advice for Falcunculus frontatus whitei - crested shrike-tit (northern)</i>. Canberra: Department of the Environment. In effect under the EPBC Act from 02-May-2016. Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/26013-conservation-advice-05052016.pdf. Ward, S.J., Berghout, M. & Baker, B. (2009). Notes on the form and habitat of nests of the Northern Shrike-tit. <i>Northern Territory Naturalist</i>, Vol. 21, pp. 54-60. Woinarski, J.C.Z. (2004). <i>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, 2004-2008</i>. NT Department of Infrastructure Planning and Environment, Darwin.	
Christmas Frigatebird <i>Fregata andrewsi</i>	EN	-	Habitat: Inhabits tropical waters of the Indian Ocean. Nests in tall trees, also sometimes on the slope of the inland cliff or higher up on the terraces (Gibson-Hill 1947). Distribution: Breeds only on Christmas Island. In non-breeding season, disperses mostly to south-east Asia and Indian Ocean (Marchant et al. 1990). The few NT records are of small numbers of birds seen in during the wet season over the Darwin coastline – usually during north-westerly winds (including McKean et al. 1975).	NONE Only NT records have been along the Darwin coastline, the associated habitat and range of which is not within the project footprint.
			Gibson-Hill, C.A. (1947). Notes on the birds of Christmas Island. Bulletin of the Raffles Museum, Vol. 18, pp.87-165. Marchant, S. and Higgins, P.J. (eds.) (1990). Handbook of Australian, New Zealand and Antarctic Birds: Volume 1 - Ratites to Ducks. Oxford University Press, Melbourne, Victoria McKean, J.L., Bartlett, M.C. and Perrins, C.M. (1975). New records from the Northern Territory. Australian BirdWatcher, Vol. 6, pp. 45-46.	
Partridge Pigeon (eastern subspecies) <i>Geophaps smithii smithii</i>	VU	VU	Habitat: Open forests and woodlands with an understorey of grasses (Woinarski 2006). Prefers woodland dominated by Eucalyptus tetradonta and E. miniata (Braithwaite 1985; Garnett et al. 2011; Higgins & Davies 1996). According to Fraser (2001), favour a structurally-patchy savanna understorey at a relatively intricate scale. In all seasons, prefer to feed in areas that have an open ground layer (e.g. following fire); however, more likely to nest where there is dense vegetation cover. Largely sedentary; however, can travel distances of 5 to 10 km in the wet season on search of food and water resources (Fraser 2001). Home ranges vary seasonally between 8 – 31 hectares Fraser (2001). Distribution: Historically, across the Top End (from Kununurra in WA to Borroloola in the NT). Since early 20th century a severe range contraction from the western, eastern and southern parts of the former distribution (Higgins & Davies 1996; Woinarski et al. 2007). Currently, distribution is limited to sub-coastal NT from Yinberrie Hill in the south, Litchfield NP in the west and (western) Arnhem Land in the east (Garnett et al. 2011).	HIGH - Suitable Eucalyptus woodland habitat dominates the project footprint. - Project footprint is within the expert distribution for the species and there are nearby records from similar vegetation communities.

	Braithwaite, R.W. (1985). <i>The Kakadu fauna survey: an ecological survey of Kakadu National Park</i> . Australian National Parks & Wildlife Service, Canberra. Fraser, F. (2000). Species profile: Partridge Pigeon <i>Geophaps smithii</i> . <i>Northern Territory Naturalist</i> 16, 38-39. Fraser, F., Lawson V., Morrison S., Christophersen P., McGregor S. and Rawlinson M. (2003). Fire management experiment for the declining partridge pigeon, Kakadu National Park. <i>Ecological Management and Restoration</i> 4, 94–102. Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i> . Birds Australia, CSIRO Publishing, Melbourne. Higgins, P.J. and Davies S.J.J.F. (eds) (1996). <i>Handbook of Australian, New Zealand and Antarctic Birds. Volume Three: Snipe to Pigeons</i> . Oxford University Press. Melbourne, Victoria. Woinarski, J.C.Z. (2006). <i>Threatened Species of the Northern Territory - Partridge Pigeon (eastern subspecies) - Geophaps smithii</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0003/206355/partridge-pigeon.pdf . Woinarski, J., Pavey, C., Kerrigan, R., Cowie, I. and Ward, S. (Eds) (2007). <i>Lost from Our Landscape: Threatened Species of the Northern Territory</i> . Northern Territory Government, Darwin		
Australian Painted Snipe <i>Rostratula (benghalensis) australis</i>	EN	VU	Habitat: Fringes of permanent and temporary wetlands, swamps and inundated grasslands (Taylor et al. 2013). Distribution: Nomadic and scattered across Australia with no predictable occurrence (Rogers 2001), but could occur at any wetland or inundated grassland across its distribution, including nearly all of the NT and Qld (Garnett et al. 2011). LOW • No permanent habitat for the nomadic species within the project footprint, however, seasonal inundation may provide temporary habitat. • Within the expert distribution of the species but species is nomadic and naturally rare. • Very few records for the bioregion.
Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i> . CSIRO Publishing. Collingwood, Australia. Rogers, D. (2001). Painted Snipe. <i>Wingspan</i> , Vol. 11 (No. 4), pp. 6-7. Taylor, R., Chatto, R. and Woinarski, J.C.Z. (2013). <i>Threatened Species of the Northern Territory - Australian painted snipe - Rostratula australis</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0018/206361/australian-painted-snipe.pdf .			
Masked Owl (northern subspecies) <i>Tyto novaehollandiae kimberli</i>	VU	VU	Habitat: Mainly in <i>Eucalyptus</i> tall open forests (especially those dominated by <i>Eucalyptus miniata</i> and <i>E. tetradonta</i>), but also roosts in monsoon rainforests and forages in more open vegetation types, including grasslands (Woinarski & Ward 2012). Usually nests in tree hollows, within patches of closed forest (Garnett et al. 2011). Little else known about the subspecies, but the species in general is resident in pairs within a territory up to 3,000 hectares (Debus 2009). Nest in large hollows with an entrance more than 20 cm wide and that is greater than 10 m above the ground (Debus 2009). Breeding poorly known, but thought to occur between March and October (DEWHA 2010). Distribution: Poorly known, with few records from across a broad range in northern Australia. In the NT, records from the Top End, Kakadu, Coburg Peninsula (majority of records) and south-west Gulf country (Woinarski & Ward 2012). MEDIUM • Suitable <i>Eucalyptus</i> woodland foraging habitat is present within project footprint. • Tall <i>Eucalyptus</i> open forest habitat within the project footprint. • Within the expert distribution of the species, although no nearby records.
Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). <i>The Action Plan for Australian Birds 2010</i> . CSIRO Publishing. Collingwood, Australia. Woinarski, J.C.Z. and Ward, S. (2012). <i>Threatened Species of the Northern Territory - Masked Owl (north Australian mainland subspecies) - Tyto novaehollandiae kimberli</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/word_doc/0008/373553/masked-owl-mainland-top-end.docx .			
MAMMALS (TERRESTRIAL)			
Fawn Antechinus	VU	EN	Habitat: Mostly in open forests and woodlands dominated by <i>Eucalyptus miniata</i> and/or <i>E. tetradonta</i> , particularly where these forests have a relatively dense LOW • Potential <i>Eucalyptus</i> woodland habitat

<i>Antechinus bellus</i>			shrubby understorey (Friend 1985; Friend & Taylor 1985). Declines in areas with frequent intense fires (Corbett et al. 2003) but not necessarily common in areas where fire has been excluded for long periods (>20 years; Woinarski et al. 2004). Breeding occurs mid-June to late August, after which a synchronous male die-off occurs (TSSC 2015). Distribution: Restricted to the Top End of the NT (Watson & Calaby 2008), with one record from Melville Island. Recent surveys have failed to record it across central and eastern Arnhem Land (TSSC 2015).	exists within the project footprint, however, the lack of a dense shrubby understorey and high fire frequency reduce habitat suitability. • The project footprint is within the expert distribution, however, there are no records near the project footprint. • Significant range contraction in the past few decades.
Brush-tailed Rabbit-Rat <i>Conilurus penicillatus</i>	VU	EN	Habitat: Largely restricted to mixed <i>Eucalypt</i> open forest and woodland, or on dunes with <i>Casuarina</i> – seeming to prefer habitats that are not burnt annually, that have an understorey of predominantly perennial grasses and a sparse-to-moderate middle storey (Firth et al. 2006; Firth 2007; Kemper & Firth 2008). Distribution: Formerly widespread across northern Australia, but has declined extensively from Qld and lower rainfall areas of the Kimberley in WA and the Top End in the NT. No recent records from much of the historically-recorded NT range between near the mouth of Victoria River (in the west) and Sir Edward Pellew island group (in east). Most recently known from Cobourg Peninsula, Tiwi Islands, Groote Eylandt and a small area within Kakadu National Park (Woinarski & Hill 2012).	NONE • Suitable <i>Eucalyptus</i> forest and woodland habitat exists within the project footprint, however, the lack of a dense shrubby understorey and high fire frequency reduce habitat suitability. • The project footprint is within the expert distribution, however, there are no records near the project footprint and species is considered locally extinct.
			Firth, R.S.C. (2007). <i>Ecology and conservation status of the brush-tailed rabbit-rat Conilurus penicillatus</i>. PhD thesis, Charles Darwin University, Darwin, Northern Territory. Firth, R.S.C., Woinarski, J.C.Z. and Noske, R.A. (2006). Home range and den characteristics of the brush-tailed rabbit-rat <i>Conilurus penicillatus</i> in the monsoonal tropics of the Northern Territory, Australia. <i>Wildlife Research</i>, Vol. 33, pp. 397-408. Kemper, C.M. and Firth, R.S.C. (2008). Brush-tailed Rabbit-rat. In: Van Dyck, S. and Strahan, R. (eds). <i>The Mammals of Australia</i>. Reed New Holland, Chatswood, NSW. Woinarski, J.C.Z. and Hill, B. (2012). <i>Threatened Species of the Northern Territory - Brush-tailed rabbit-rat, Brush-tailed tree-rat - Conilurus penicillatus</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0016/205504/brush-tailed-rabbit-rat.pdf.	
Northern Quoll <i>Dasyurus hallucatus</i>	EN	CR	Habitat: Wide range of habitats, but since the arrival of Cane Toads generally restricted to the most suitable habitats which are rocky upland areas with numerous crevices and rock piles (Van Dam et al. 2002). Prime habitat in the NT consists of rocky sandstone escarpments and outliers (Braithwaite & Griffiths 1994). Home range varies from 35 to 100 ha (Oakwood 2002). Breeding occurs in May and June, with male die-off occurring shortly afterwards (Oakwood 2000). Distribution: Historically occurred in the NT from Borroloola in the south-east as far west as the NT/WA border (Woinarski et al. 2007), and extends into the	MEDIUM • The project footprint is within the expert distribution, however, the species has experienced significant range contraction since Cane Toad invasion. • There is <i>Eucalyptus</i> habitat within the project footprint; however, there are no preferred rocky habitat areas.

			Kimberley and Pilbara regions of WA. Dramatic range contraction and population crash associated with Cane Toad invasion. Now occurs across northern Australia in five regional populations – including the Top End in the NT.	
			Braithwaite, R.W. and Griffiths, A.D. (1994). Demographic variation and range contraction in the Northern Quoll, <i>Dasyurus hallucatus</i> (Marsupialia: Dasyuridae). <i>Wildlife Research</i>, Vol. 21, pp. 203-218. Oakwood, M. (2000). Reproduction and demography of the northern quoll, <i>Dasyurus hallucatus</i>, in the lowland savanna of northern Australia. <i>Australian Journal of Zoology</i>. 48:519-539. Oakwood, M. (2002). Spatial and social organization of a carnivorous marsupial, <i>Dasyurus hallucatus</i>. <i>Journal of Zoology</i>, London. 257:237-248. Van Dam, R.A., Walden, D.J. and Begg, G.W. (2002). <i>A preliminary risk assessment of cane toads in Kakadu National Park</i>. Supervising Scientist Report 164, Darwin, Northern Territory. Woinarski, J.C.Z., Rankmore, B.R., Fisher, A. and Milne, D. (2007). <i>The natural occurrence of northern quolls Dasyurus hallucatus on islands of the Northern Territory: assessment of refuges from the threat posed by cane toads Bufo marinus</i>. Report to Natural Heritage Trust.	
Arnhem Leaf-nosed Bat <i>Hipposideros inornatus</i>	EN	VU	Habitat: Caves or abandoned mine sites in cool draughty areas, close to water (Churchill 1998; Corbett & Richards 2002). Reported as foraging in riparian areas and in Eucalypt tall open forests (Woinarski & Milne 2015). Distribution: Restricted to the NT and only known to occur on the western Arnhem Land sandstone massif (Deaf Adder Gorge and upper South Alligator River area) and from one site – Tolmer Falls – in Litchfield National Park (McKean & Hertog 1979) where population appears to be disappearing (Woinarski & Milne 2015).	NONE • Distribution restricted to western Arnhem Land and Tolmer Falls well outside the project footprint and there are no nearby records.
			Churchill, S. (1998). Australian Bats. Reed New Holland, Sydney. Corbett, L. and Richards, G. (2002). Bat survey: Gunlom land trust area. Report to Parks Australia North, EWL Sciences, Darwin. McKean, J.L. and Hertog, A.L. (1979). Extension of range in the horseshoe bat. Northern Territory Naturalist, Vol. 1, p. 5. Woinarski, D. and Milne, D. (2015). Threatened Species of the Northern Territory – Arnhem Leaf-nosed Bat – <i>Hipposideros inornatus</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0018/205524/arnhem-leaf-nosed-bat.pdf.	
Ghost Bat <i>Macroderma gigas</i>	VU	-	Habitat: Ranging from the arid Pilbara of WA to tropical savanna woodlands and north Qld. rainforests (TSSC 2016). Permanent roost sites are generally deep natural caves or disused mines (TSSC 2016). Move between a number of caves seasonally or as dictated by weather conditions, and require a range of cave sites (Hutson et al. 2001). Most breeding sites are caves with multiple entrances (TSSC 2016). Distribution: Geographically-disjunct colonies occur in the Pilbara and Kimberley in WA, NT north of approximately 17° latitude (including Elcho Island and Groote Eylandt), the Gulf of Carpentaria, eastern Qld from Cape York to near Rockhampton, and western Qld (including Riversleigh and Camooweal districts) (TSSC 2016). Distribution likely influenced by the availability of suitable caves and mines for roost sites (Ward & Milne 2016). Only 14 breeding sites known (Worthington Wilmer 2012). Disperse widely when not breeding (TSSC 2016). In arid Australia, including southern NT until the early 1960's (Ward & Milne 2016).	LOW • No deep cave/abandoned mine habitat for permanent roost sites within the project footprint. • Woodland is potential foraging habitat.
			Hutson, A. M., Mickleburgh, S. P. & Racey, P. A. (2001) Microchiropteran Bats - Global Status Survey and Conservation Action Plan. IUCN/SSC Chiroptera Specialist Group, Gland, Switzerland and Cambridge, U.K. Milne, D. and Ward, S. (2016). Threatened Species of the Northern Territory – Ghost Bat - <i>Macroderma gigas</i>. Northern Territory Department of Environment and Natural Resource. https://nt.gov.au/_data/assets/pdf_file/0010/376138/ghost-bat.pdf. Threatened Species Scientific Committee (2016). Approved Conservation Advice for <i>Macroderma gigas</i> (ghost bat). Canberra: Department of the Environment. Available at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/174-conservation-advice-05052016.pdf.	

Worthington Wilmer, J. (2012). Ghost Bat <i>Macroderma gigas</i> . In: Curtis et al. (eds.). Queensland's Threatened Animals. CSIRO, Canberra: pp. 382-383.			
Black-footed Tree-rat (Kimberley and mainland NT subspecies) <i>Mesembriomys gouldii gouldii</i>	EN	VU	Habitat: Woodlands and open forests with large trees and a moderately diverse mid-storey in near-coastal areas. Generally, require fruit and seed resources including Pandanus fruits, and fruiting trees and shrubs (Rankmore 2006). Shelters in tree hollows and occasionally Pandanus (Hill 2012). Thought to be more prevalent in woodlands with infrequent and low intensity fires (Price et al. 2005). Distribution: Top End of NT, Kimberley region of WA and Cape York Peninsula south to Townsville in Qld. (Hill 2012). Has remained relatively abundant in the Darwin rural area and there are some recent records from Gunn Point (Price et al. 2005), the Lee Point Area and Middle Arm.
	Hill, B. (2012). Threatened Species of the Northern Territory- Black-footed Tree-rat - <i>Mesembriomys gouldii</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0018/205515/black-footed-tree-rat.pdf. Price, O., Rankmore, B., Milne, D.J., Brock, C., Tynan, C., Kean, L. and Roger, L. (2005). Regional patterns of mammal abundance and their relationships to landscape variables in eucalypt woodlands near Darwin, northern Australia. <i>Wildlife Research</i>, Vol. 32, pp. 435-446. Rankmore, B.R. 2006. Impacts of Habitat Fragmentation on the Vertebrate Fauna of the Tropical Savannas of Northern Australia; with Special Reference to Medium-sized Mammals. PhD Thesis, Charles Darwin University, Darwin.		
Golden-backed Tree-rat <i>Mesembriomys macrurus</i>	VU	CR	Habitat: In the NT, little known of the ecology apart that all three records were from riverine vegetation. In the Kimberley, known to occur in open Eucalyptus forests with tussock grass understorey, rainforest patches, sandstone screes, beaches, and black soil plains (Woinarski et al. 2012). Distribution: Historically, known to have occurred in three localities in the NT (Parker 1973) with no new records in the last 30 years. In 1993, reportedly spotted in Kakadu National Park; however, further surveys of suitable habitats in the NT failed to locate the species (Lee 1995). Now only known to occur in some areas of the north-western Kimberley and associated offshore islands (Palmer et al. 2003).
	ee, A.K. (1995). The Action Plan for Australian Rodents. Australian Nature Conservation Agency, Endangered Species Program, Canberra. Palmer, C., Taylor, R. & Burbidge, A. (2003). Recovery plan for the Golden Bandicoot <i>Isodon auratus</i> and golden-backed tree-rat <i>Mesembriomys macrurus</i> 2004-2009. Northern Territory Department of Infrastructure Planning and Environment, Darwin. Parker, S.A. (1973). An annotated checklist of the native land mammals of the Northern Territory. Records of the South Australian Museum, Vol. 16, pp. 1-57. Woinarski, J.C.Z., Palmer, C. & Hill, B. (2012). Threatened Species of the Northern Territory - Golden-backed tree-rat - <i>Mesembriomys macrurus</i>. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/_data/assets/pdf_file/0006/205476/golden-backed-tree-rat.pdf [Accessed 20 April 2017]		
Nabarlek (Top End subspecies) <i>Petrogale concinna canescens</i>	CR	EN	Habitat: Isolated and rocky areas consisting of both sandstone and granite escarpments (Churchill 1997; Telfer et al. 2008). Shelters in caves and crevices during the day (Churchill 1997) and may move from these to forage in adjacent flat areas (Sanson et al. 1985). Distribution: Restricted to the Top End of the NT in scattered populations from sandstone cliffs bordering the Arafura Swamp (Arnhem Land) in the east, to the Daly River catchment in the west (Ward & Woinarski 2012).
	Churchill, S. (1997). Habitat use, distribution and conservation status of the Nabarlek, <i>Petrogale concinna</i>, and sympatric rock-dwelling mammals, in the Northern Territory. <i>Australian Mammalogy</i>, Vol. 19, pp. 297-308. Sanson, G.D., Nelson, J. and Fell, P. (1985). Ecology of <i>Peradorcas concinna</i> in Arnhem Land in a wet and a dry season. <i>Proceedings of the Ecological Society of Australia</i>, Vol. 13, pp. 65-72.		

	Telfer, W.R., Griffiths, A.D. and Bowman, D.M.J.S. (2008). The habitat requirements of four sympatric rock-dwelling macropods of the Australian monsoon tropics. <i>Austral Ecology</i> , Vol. 33, pp. 1033-1044. Ward, S. and Woinarski, J. (2012). Threatened Species of the Northern Territory - Nabarlek - <i>Petrogale concinna</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0017/205523/nabarlek.pdf .			
Northern Brush-tailed Phascogale <i>Phascogale pirata</i>	VU	EN	Habitat: No detailed studies, but ecology is probably similar to that reported for phascogales in southern Australia (Rhind 1998). Most records are from tall open forests dominated by <i>Eucalyptus miniata</i> and <i>E. tetrodonta</i> (Rhind et al. 2008). Brush-tailed Phascogales are primarily arboreal and seldom feed on the ground. Distribution: Probably occurs naturally in low densities (Woinarski et al. 2014). Very few records exist; reported from West Island, east Arnhem Land, Coburg Peninsula, Kakadu, Litchfield and the Tiwi Islands. In the last 10 years only recorded from Kakadu, Coburg Peninsula and the Tiwi Islands, despite many extensive wildlife surveys across regions of the Top End during that time (Woinarski et al. 2014).	LOW - Range contraction to Arnhem Land (on the mainland) means unlikely to occur in the area. - Woodland and forest habitat on site is marginal for the species, which prefers taller forest.
Rhind, S.G. (1998). Ecology of the brush-tailed phascogale in jarrah forest of south-western Australia. PhD thesis, Murdoch University, Perth, Western Australia. Rhind, S.G., Woinarski, J. and Aplin, K.P. (2008). Brush-tailed Phascogale. In: Van Dyck, S. and Strahan, R. (eds). <i>The Mammals of Australia</i> . Reed New Holland, Chatswood, NSW. Woinarski, J., Burbidge, A. and Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing: pp. 125-127.				
Bare-rumped Sheath tail Bat <i>Saccolaimus saccolaimus</i> (<i>nudicluniatatus</i>)	VU	-	Habitat: In the NT, specimens have been collected from Pandanus woodland fringing the sedge lands of the South Alligator River and Eucalypt tall open forests (Friend & Braithwaite 1986; Churchill 1998) with more recent records from Howard Springs (Milne et al 2009). Most records occur within near-coastal habitats with one recent exception (Jasper Gorge) 150 km inland (Woinarski et al. 2014). Distribution: Widely distributed from India through south-east Asia to the Solomon Islands including north-eastern Qld and the NT. The north-eastern Australian population is described as the subspecies <i>S. s. nudicluniatatus</i> , although it is not clear whether this should be applied to NT populations (Milne & Woinarski 2006).	HIGH <i>Eucalyptus</i> woodland within the project footprint is potential habitat for the species, although, there is limited monsoonal and riparian habitat. - The project footprint is within the expert distribution of the species. - Closest record ~35 km south-east of project footprint.
Churchill, S. (1998). <i>Australian Bats</i> . Reed New Holland, Sydney. Friend, G.R. and Braithwaite, R.W. (1986). Bat fauna of Kakadu National Park, Northern Territory. <i>Australian Mammalogy</i> , Vol. 9, pp. 43-52. Milne, D.J., Jackling, F.C., Sidhu, M., and Appleton, B.R. (2009). Shedding new light on old species identifications: morphological and genetic evidence suggest a need for conservation status review of the critically endangered bat, <i>Saccolaimus saccolaimus</i> . <i>Wildlife Research</i> 36: 496–508. Milne, D. and Woinarski, J. (2006). Threatened Species of the Northern Territory - Bare-rumped Sheath-tail Bat - <i>Saccolaimus saccolaimus</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0007/376117/bare-rumped-sheathtail-bat.pdf . Woinarski, J., Burbidge, A. and Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing: pp. 511-514.				
Pale Field-rat <i>Rattus tunneyi</i>	-	VU	Habitat: Historically occurred in a wide range of habitats, but now primarily in dense vegetation along creeks (Aplin et al. 2008). Distribution: Higher rainfall areas of northern Australia, extending from Kimberley in WA to south-eastern Qld, including the Top End of the NT (Braithwaite & Griffiths 1996).	MEDIUM - Core dense riparian habitat is limited within the project footprint - The project footprint is within the extent of occurrence of the species. - Closest record is ~18 km south-east of the project footprint
Aplin, K., Braithwaite, R. and Baverstock, P. (2008). Pale Field-rat: <i>Rattus tunneyi</i> . In: Van Dyck, S. and Strahan, R. (eds.). <i>The Mammals of</i>				

Australia (3rd Edition). Reed New Holland, Sydney, NSW. Braithwaite, R. and Griffiths, A. (1996). The paradox of <i>Rattus tunneyi</i> : endangerment of a native pest. Wildlife Research, Vol. 23, pp. 1-21.			
False Water Rat <i>Xeromys myoides</i>	VU	-	Habitat: Utilises both intertidal and freshwater habitats, with most records from mangrove forests, saltmarsh, sedgelands, clay pans and freshwater Melaleuca wetlands. In the NT, few records in the Darwin Coastal bioregion (DoE 2017). Distribution: Three regions of coastal Australia: the NT, central south Qld and south-east Qld (DoE 2017). In the NT, known only from coastal Top End with ten records at six sites – South Alligator River in 1903, Daly River floodplain in 1972, two sites on the Tomkinson River in 1975, Melville Island in 1975 and Glyde River floodplain in 1998 and 1999 (Cole & Woinarski 2002, Woinarski 2006).
LOW • Suitable intertidal water associated vegetation habitat within the project footprint. • Closest record is ~65 km south-east of the project footprint.			
Cole, J. and Woinarski, J. (2002). Field Guide to the Rodents and Dasyurids of the Northern Territory. Surrey Beatty & Sons, Chipping Norton, NSW. Department of the Environment (2017). <i>Xeromys myoides</i> - Water Mouse, False Water Rat, Yirrkoo. Species Profile and Threats Database, Department of the Environment, Canberra. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66 . Woinarski, J.C.Z. (2006). Threatened Species of the Northern Territory - False water-rat, Water mouse - <i>Xeromys myoides</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0008/376136/false-water-rat.pdf .			
Arnhem Rock-rat <i>Zyzomys maini</i>	VU	VU	Habitat: Rugged sandstone environments, typically where there are many caves, crevices or boulders. Occupies environments in association with monsoonal rainforest, typically those areas which are floristically-rich and provide the fleshy fruits and seeds that form its principal food item (Begg et al. 1980). Distribution: Endemic to the sandstone massif of western Arnhem Land in the NT (Woinarski 2004). Commonly found throughout parts of Kakadu National Park and Warddeken Indigenous protected area (Woinarski et al. 2014).
NONE • Endemic to sandstone massif of western Arnhem Land. • No preferred habitat within project footprint			
Begg, R.J. and Dunlop, C.R. (1980). Security eating, and diet in the large rock-rat, <i>Zyzomys woodwardi</i> (Rodentia: Muridae). Australian Wildlife Research, Vol. 7, pp. 63-70. Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing: pp. 652-654. Woinarski, J.C.Z. (2004). Threatened plants and animals in Kakadu National Park: a review and recommendations for management. Darwin, Northern Territory DIPE.			
REPTILES (TERRESTRIAL)			
Plains Death Adder <i>Acanthophis hawkei</i>	VU	VU	Habitat: Floodplains in the Top End and cracking soil plains inland (Webb et al. 2002). Distribution: Habitat mapping suggests the potential geographic range extends from western Qld, across the sub-coastal north of the NT to the north-eastern Kimberley of WA. Fragmented populations occur in the Mitchell Grass Downs of western Qld, the Barkly Tablelands on the NT/Qld border and east of Darwin (Fogg Dam) in the NT (TSSC 2012; Wuster et al. 2005). Susceptible to ingesting toxic Cane Toads (Phillips et al. 2009).
NONE • No suitable cracking clay habitat within the project footprint. • No nearby records of the species.			
Phillips, B.L., Greenlees, M.J., Brown, G.P. and Shine R (2010). Predator behaviour and morphology mediates the impact of an invasive species: cane toads and death adders in Australia. Animal Conservation, Vol. 13, pp. 53-59. Webb, J.K., Christian, K.A. and Fisher, P. (2002). Fast growth and early maturation in a viviparous sit-and-wait predator, the northern death adder (<i>Acanthophis praelongus</i>) from tropical Australia. Journal of Herpetology, Vol. 36, no. 3, pp. 505-509. Wuster, W., Dumbrell, A.J., Hay, C., Pook, C.E., Williams, D.J. and Fry, B.G. (2005). Snakes across the Strait: trans-Torresian phylogeographic relationships in three genera of Australasian			

	snakes (Serpentes: Elapidae: Acanthophis, Oxyuranus, and Pseudechis). Molecular Phylogenetics and Evolution, Vol. 34. pp. 1-14. Threatened Species Scientific Committee (2015). Approved Conservation Advice – Acanthophis hawkei – Plains Death Adder. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/83821-conservation-advice.pdf .		
Arnhem Land Skink <i>Bellatorias obiri</i>	EN	EN	Habitat: Prefers sandstone outcrops, typically with extensive fissures and cave systems (Sadlier 1990). Distribution: Restricted to the Western Arnhem Land plateau and outliers (e.g. Jabiluka), where it is patchily distributed (Armstrong & Dudley 2004). Nearest record in Darwin Coastal bioregion: Greater than 100 km from project footprint. NONE • Confined to western Arnhem Land Plateau.
	Armstrong, M. and Dudley, A. (2004). The Arnhem Land Egernia Egernia obiri in Kakadu National Park. Report to Parks Australia North, NT Department of Infrastructure Planning and Environment, Darwin. Sadlier, R.A. (1990). A new species of scincid lizard from western Arnhem Land, Northern Territory. The Beagle, Vol. 7, pp. 29-33.		
Yellow-snouted Gecko <i>Lucasium occultum</i>	EN	VU	Habitat: Prefers areas with well-developed leaf litter and grasses (King et al. 1982; Johansen 2006) in open forests dominated by <i>Eucalyptus miniata</i> and <i>E. tetradonta</i>. Commonly found in sandy red-loam substrates. Has been recorded in areas consisting of moderate to sparse Gamba grass (Beggs et al. 2012). Distribution: Endemic to the NT with known populations from north-west of Kakadu National Park and Wildman Reserve (King et al. 1982). NONE • Restricted to Kakadu and Wildman Reserve.
	Beggs, K., Armstrong, M., Woinarski, J. and Ward, S. (2012). Threatened Species of the Northern Territory - Yellow-Snouted Gecko - Lucasium occultum. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/206458/yellow-snouted-gecko.pdf. Johansen, T. (2006). The yellow-snouted gecko (Diplodactylus occultus), a little known endemic species of northern Australia. Report to NT Department of Natural Resources Environment and the Arts. King, M., Braithwaite, R.W. and Wombey, J.C. (1982). A new species of Diplodactylus (Reptilia: Gekkonidae) from the Alligator Rivers region - Northern Territory. Transactions of the Royal Society of South Australia, Vol. 106, pp. 15-18.		
Mertens' Water Monitor <i>Varanus mertensi</i>	-	VU	Habitat: Semi-aquatic, occupying edges of freshwater watercourses and lagoons, but seldom seen far from water (Christian 2004). Distribution: Across far northern Australia from the western Cape York Peninsula in Qld to the Kimberley in WA (Christian 2004). Widespread in the NT, occupying all of the Top End river systems (Ward et al. 2006). MEDIUM • There may be suitable habitat in the minor drainage lines within the project footprint. However, these are ephemeral, tidal for some of their length, and may not contain pools that are adequate to support this species during the dry season. • Closest record is ~21 km east of project footprint.
	Christian, K. (2004). Varanus mertensi. In: Pianka et al. (eds.). Varanoid lizards of the world. Indiana University Press, Bloomington, Indianapolis. Ward, S., Woinarski, J., Griffiths, T. and McKay, L. (2006). Threatened Species of the Northern Territory - Mertens Water Monitor - Varanus mertensi. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0018/206460/mertens-water-monitor.pdf [Accessed 30 May 2017].		
Mitchell's Water Monitor <i>Varanus mitchelli</i>	-	VU	Habitat: Semi-aquatic and arboreal, inhabiting margins of freshwater watercourses, swamps and lagoons (Ward 2012). Distribution: Top End of the NT and Kimberley in WA (Schultz & Doody 2004). In the NT, recorded in most catchments flowing into the Timor Sea, Arafura Sea and the Gulf of Carpentaria (Ward 2012). MEDIUM • There may be suitable habitat in the minor drainage lines within the project footprint. However, these are ephemeral, tidal for some of their length, and may not contain pools that are adequate to support this species during the dry season.

				• Closest record is ~21 km east of project footprint..
			Doody, J.S., Green, B., Rhind, D., Castellano, C., Sims, R. and Robinson, T. (2009). Population-level declines in Australian predators caused by an invasive species. <i>Animal Conservation</i>, Vol. 12, pp. 46-53. Schultz, T. and Doody, S. (2004). <i>Varanus mitchelli</i>. In: Pianka et al. (eds.). <i>Varanoid lizards of the world</i>. Indiana University Press, Bloomington, Indianapolis. Ward, S. (2012). Threatened Species of the Northern Territory - Mitchell's Water Monitor - <i>Varanus mitchelli</i>. Northern Territory Department of Environment and Natural Resources. [online] Available at: https://nt.gov.au/_data/assets/pdf_file/0019/206461/mitchells-water-monitor.pdf [Accessed 30 May 2017].	
Floodplain Monitor <i>Varanus panoptes</i>	-	VU	Habitat: Broad range of habitats from coastal beaches to savannah woodlands (Christian 2004). Also common throughout floodplains grasslands and a variety of native woodlands (Ward et al. 2012). Distribution: Across northern Australia from the Kimberley in WA to Cape York Peninsula, and southwards through most of Qld. In the NT, recorded across most of the Top End and the Gulf Region (Christian 2004). Experienced significant declines due to cane toad poisoning (Doody et al. 2009).	MEDIUM • Woodland within the project footprint is suitable habitat for the species. • Significant decline within the region reduces the likelihood of occurrence. • Closest record is ~20 km east and north of project footprint
			Christian, K. (2004). <i>Varanus panoptes</i>. In: Pianka et al. (eds.). <i>Varanoid lizards of the world</i>. Indiana University Press, Bloomington, Indianapolis. Doody, J.S., Green, B., Rhind, D., Castellano, C., Sims, R. and Robinson, T. (2009). Population-level declines in Australian predators caused by an invasive species. <i>Animal Conservation</i>, Vol. 12, pp. 46-53. Ward, S., Woinarski, J., Griffiths, T. & McKay, L. (2012). Threatened Species of the Northern Territory - Yellow Spotted Monitor, Northern Sand Goanna, Floodplain Monitor - <i>Varanus panoptes</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0006/206466/floodplain-monitor.pdf [Accessed 30 May 2017].	
REPTILES (MARINE)				
Loggerhead Turtle <i>Caretta caretta</i>	EN	VU	Habitat: Pelagic in tropical, sub-tropical and temperate waters. Nests mainly on sub-tropical sandy beaches (Marquez 1990). Distribution: Global, including the Australian coast (DoE 2017) where nesting is concentrated in southern Qld and from Shark Bay to the North West Cape in WA (DoE 2017). No breeding known to occur in the NT, but records in NT waters (Taylor et al. 2006).	NONE • No nesting habitat within the project footprint. • Potentially-suitable foraging habitat for juveniles within estuarine part of the project footprint.
			Department of Environment (2017). <i>Caretta caretta</i> - Loggerhead Turtle. Species Profile and Threats Database, Department of the Environment, Australian Government, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1763. Marquez, R. (1990). <i>FAO Species Catalogue: Sea Turtles of the World</i>. An annotated and illustrated catalogue of the sea turtle species known to date. Rome: Food and Agriculture Organisation of United Nations. <i>FAO Fisheries Synopsis</i>, Vol. 125 (No. 11), pp. 81. Taylor, R., Chatto, R. and Woinarski, J. (2006). Threatened Species of the Northern Territory - Loggerhead Turtle - <i>Caretta caretta</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0019/206452/loggerhead-turtle-vu.pdf.	
Green Turtle <i>Chelonia mydas</i>	VU	-	Habitat: Pelagic (until adulthood) in tropical and subtropical waters, then shallow benthic foraging habitats containing seagrass beds or algae mats (DoE 2017). In the NT, nesting mainly on wide beaches backed by large dune systems (Chatto 1998). Distribution: Global. Nests, forages and migrates across tropical northern Australia, with main breeding sites being the Great Barrier Reef of Qld, the north-west shelf of WA, Wellesley Island group in the southern Gulf of Carpentaria and the Top End coast (DoE 2017). Many nesting sites in the NT, mostly from the western end of Melville Island to near NT/Qld border (Chatto 1998).	NONE • No nesting habitat within the project footprint. • Potentially-suitable foraging habitat for juveniles within estuarine part of the project footprint.

	Chatto, R. (1998). A preliminary overview of the locations of marine turtle nesting in the Northern Territory. In: Kennett et al. 9eds.). Marine turtle conservation and management in northern Australia. Northern Territory University, Darwin: pp. 33-40. Department of Environment (2017). Chelonia mydas - Green Turtle. Species Profile and Threats Database, Commonwealth Department Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1765 .			
Leatherback Turtle <i>Dermochelys coriacea</i>	EN	CR	Habitat: Pelagic in tropical, subtropical and temperate oceanic waters (DoE 2017). Distribution: Global, including the northern and eastern seaboard of Australia (DoE 2017). No major nesting recorded in Australia. In the NT, only a few records in the waters off northern Arnhem Land and the Gulf of Carpentaria (Taylor et al. 2013).	NONE • No pelagic or nesting habitat within the project footprint.
			Department of Environment (2017). Dermochelys coriacea - Leatherback Turtle, Leathery Turtle, Luth. Species Profile and Threats Database, Commonwealth Department of the Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1768 . Taylor, R., Chatto, R., Whiting, S. and Ward, S. (2013). Threatened Species of the Northern Territory - Leatherback Turtle - Dermochelys coriacea. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0010/206398/leatherback-turtle.pdf .	
Hawksbill Turtle <i>Eretmochelys imbricata</i>	VU	VU	Habitat: Pelagic (until adulthood) in tropical, subtropical and waters, then tropical tidal and sub-tidal coral and rocky reef habitats (less frequently, within seagrass habitats) (DoE 2017). In the NT, most nesting occurs on islands rather than mainland beaches (Taylor et al. 2012). Distribution: Global. In the NT, principal nesting sites are concentrated around north-eastern Arnhem Land and Groote Eylandt (Chatto 1998).	NONE • No nesting habitat within the project footprint. • Potentially-suitable foraging habitat for juveniles within estuarine part of the project footprint.
			Chatto, R. (1998). A preliminary overview of the locations of marine turtle nesting in the Northern Territory. In: Kennett et al. (eds.). Marine turtle conservation and management in northern Australia. Northern Territory University, Darwin: pp. 33-40 Department of the Environment (2017). Eretmochelys imbricata – Hawksbill Turtle. Species Profile and Threats Database, Department of the Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1766. Taylor, R., Chatto, R., Woinarski, J., Whiting, S. and Ward, S. (2012). Threatened Species of the Northern Territory – Hawksbill Turtle - Eretmochelys imbricata. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0003/206454/hawksbill-turtle.pdf .	
Olive Ridley Turtle <i>Lepidochelys olivacea</i>	EN	VU	Habitat: Tropical and subtropical waters, preferring shallow protected waters (DoE 2017). In the NT, breeds at a wide range of sites on island and, less commonly, mainland beaches (Chatto 1998). Distribution: Global. In the NT, second most widespread nesting species (after Flatbacks) (Chatto & Baker 2008). Vast majority of the nesting population recorded from Melville Island to Groote Eylandt (Chatto 1998).	NONE • No nesting habitat within the project footprint. • Potentially-suitable foraging habitat for juveniles within estuarine part of the project footprint.
			Chatto, R. and Baker, B. (2008). The distribution and status of marine turtle nesting in the Northern Territory. Technical Report 77/2008. Department of Natural Resources, Environment, the Arts and Sport, Parks and Wildlife Service, Palmerston. Chatto, R. (1998). A preliminary overview of the locations of marine turtle nesting in the Northern Territory. In Kennett et al. (eds.). Marine turtle conservation and management in northern Australia. Northern Territory University, Darwin: pp. 33-40. Department of the Environment (2017). Lepidochelys olivacea - Olive Ridley Turtle, Pacific Ridley Turtle. Species Profile and Threats Database. Department of the Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1767 .	
Flatback Turtle <i>Natator depressus</i>	VU	-	Habitat: Prefers shallow, soft-bottomed seabed habitats away from reefs (DoE 2017). In the NT, nests on a wide variety of beach types on the coast and on offshore island (Chatto & Baker 2008) Distribution: Northern Australia and New Guinea, with all known breeding sites occurring in Australia (DoE 2017). In the NT, the most widely spread marine turtle	NONE • No nesting habitat within the project footprint. • Potentially-suitable foraging habitat for juveniles within estuarine part of the

			species, nesting on portions of the entire coastline (Chatto & Baker 2008).	project footprint.
Chatto, R. and Baker, B. (2008). The distribution and status of marine turtle nesting in the Northern Territory. Technical Report 77/2008. Department of Natural Resources, Environment, the Arts and Sport, Parks and Wildlife Service, Palmerston. [online] Available at: https://dtc.nt.gov.au/_data/assets/pdf_file/0006/279915/marine_turtle_nesting.pdf . Department of the Environment (2017). Natator depressus - Flatback Turtle. Species Profile and Threats Database. Commonwealth Department of the Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59257 . Taylor, R., Chatto, R. and Woinarski, J. (2006). Threatened Species of the Northern Territory - Flatback Turtle - Natator depressus. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0008/376172/flatback-turtle.pdf .				
FISH				
Northern River Shark <i>Glyphis garricki</i>	EN	EN	Habitat: Little is known of the ecology, probably restricted to shallow, brackish reaches of large rivers (Ward & Larson 2012). Distribution: In Australia, there are few records, including in the NT from the Adelaide, East and South Alligator River systems. Also known from the Kimberley coast and King Sound in WA (Thorburn & Morgan 2004; Compagno et al. 2008). NT distribution does not extend into the Gulf of Carpentaria.	NONE • No large river to provide suitable habitat within project footprint.
	Compagno, L.J.V., White, W.T. and Last, P.R. (2008). <i>Glyphis garricki</i> sp. nov., a new species of river shark (Carcharhiniformes: Carcharhinidae) from northern Australia and Papua New Guinea, with a redescription of <i>Glyphis glyphis</i> (Müller & Henle, 1839). In: Last et al. (eds.). Descriptions of New Australian Chondrichthyans. CSIRO Marine and Atmospheric Research Paper, 022: pp. 203-226. Thorburn, D.C. and Morgan, D.L. (2004). The northern river shark, <i>Glyphis</i> sp. C (Carcharhinidae) discovered in Western Australia. Zootaxa, Vol. 685, pp. 1-8. Ward, S. and Larson, H. (2012). Threatened Species of the Northern Territory – Northern River Shark – <i>Glyphis garricki</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0005/206384/northernr-river-shark.pdf .			
Speartooth Shark <i>Glyphis glyphis</i>	CR	VU	Habitat: Tropical freshwater and marine environments (Bradshaw et al. 2008). May be restricted to low salinity environments such as freshwater or brackish areas of rivers (DoE 2017). Distribution: Papua New Guinea and Northern Australia. Considered to be very rare in Australia as few specimens have been collected (Cavanagh et al. 2003). Three distinct geographical locations in the NT and northern Qld (DoE 2017). In the NT, recorded in the Alligator River region across to Adelaide River, and the Bizant River (Ward and Larson 2012).	NONE • No suitable marine and freshwater estuarine habitat within project footprint. • Outside of known NT range.
	Bradshaw, C.J.A., Fitzpatrick, B.M., Steinberg, C.C., Brook, B.W. and Meekan, M.G. (2008). Decline in whale shark size and abundance at Ningaloo Reef over the past decade: the world's largest fish is getting smaller. Biological Conservation, Vol. 141, pp. 1894–1905. Cavanagh, R., Kyne, P., Fowler, S., Musick, J. and Bennett, M. (eds.) (2003). The Conservation Status of Australian Chondrichthyans. Report of the IUCN Shark Specialist Group Australia and Oceania Red List Workshop. The University of Queensland, School of Biomedical Sciences, Brisbane, Australia. Department of the Environment (2017). <i>Glyphis glyphis</i> - Speartooth Shark. Species Profile and Threats Database, Department of the Environment, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=82453 . Ward, S. and Larson, H. (2012). Threatened Species of the Northern Territory - Speartooth Shark - <i>Glyphis glyphis</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0009/206388/speartooth-shark.pdf .			
Lorentz Grunter <i>Pingalla lorentzi</i>	-	VU	Habitat: Small and large pools with rock and sand substrates, usually in open unshaded sections of streams and in water temperatures between 25°C and 30°C (Allen et al. 2002). Distribution: Rare in Australia, more widespread in PNG. In the NT only known from the Finnis River near Rum Jungle (Stirrat et al. 2006).	NONE • Restricted to the Finnis River, which is outside the project footprint.
	Allen, G.R., Midgley, S.H. and Allen, M. (2002). Field Guide to Freshwater Fishes of Australia. Western Australian Museum, Perth.			

	Stirrat, S., Woinarski, J.C.Z. and Larson, H. (2006). Threatened Species of the Northern Territory – Lorentz Grunter - <i>Pingalla lorentzi</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0020/206390/lorentz-grunter.pdf [Accessed 26 April 2017].		
Dwarf Sawfish <i>Pristis clavata</i>	VU	VU	Habitat: Tropical marine and estuarine habitats, entering estuarine or fresh waters to breed during the wet season and moving into marine waters following the wet season (Peverell 2005). Distribution: Indonesia, South-East Asia and northern Australia (Cavanagh et al. 2003). In the NT, known to occur around Darwin (including Buffalo Creek and Rapid Creek), in Kakadu National Park (Alligator River), Keep River and Victoria River (Thorburn et al. 2003). NONE • No suitable marine and freshwater estuarine habitat within project footprint.
Cavanagh, R., Kyne, P., Fowler, S., Musick, J. and Bennett, M. (eds.) (2003). The Conservation Status of Australian Chondrichthyans. Report of the IUCN Shark Specialist Group Australia and Oceania Red List Workshop. The University of Queensland, School of Biomedical Sciences, Brisbane, Australia. Peverell, S.C. (2005). Distribution of sawfishes (Pristidae) in the Queensland Gulf of Carpentaria, Australia, with notes on their ecology. Environmental Biology of Fishes, Vol. 73, pp. 391-402. Thorburn, D.C., Peverell, S., Stevens, S., Last, J.D. and Rowland, A.J. (2003). Status of freshwater and estuarine elasmobranchs in Northern Australia. Report to Natural Heritage Trust, Canberra.			
Freshwater or Largetooth Sawfish <i>Pristis pristis</i>	VU	VU	Habitat: Tropical marine and estuarine habitats, entering estuarine or fresh waters to breed during the wet season and moving into marine waters following the wet season (Peverell 2005). Of the four <i>Pristis</i> species reported to occur in Australia, is the one most often associated with freshwater, and has been recorded several hundred kilometres upstream (Thorburn et al. 2003). Distribution: Circumtropical, with distinct populations in the eastern Atlantic, western Atlantic, eastern Pacific and Indo-West Pacific – including northern Australia (TSSC 2014). In the NT, reported in Adelaide, Victoria, Daly, East and South Alligator, Goomadeer, Roper, McArthur, Wearyan and Robinson Rivers (TSSC 2014). May potentially occur in all large rivers of northern Australia from the Fitzroy River, WA, to the western side of Cape York Peninsula, Qld (DoE 2018). NONE • No suitable marine and freshwater estuarine habitat within project footprint.
Department of the Environment (DoE) (2018). <i>Pristis pristis</i> in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Peverell, S.C. (2005). Distribution of sawfishes (Pristidae) in the Queensland Gulf of Carpentaria, Australia, with notes on their ecology. Environmental Biology of Fishes, Vol. 73, pp. 391-402. Threatened Species Scientific Committee (2014). Approved Conservation Advice - <i>Pristis pristis</i> (largetooth sawfish). Canberra: Department of the Environment. In effect under the EPBC Act from 11-April-2014. http://www.environment.gov.au/biodiversity/threatened/species/pubs/60756-conservation-advice.pdf.			
Green Sawfish <i>Pristis zijsron</i>	VU	VU	Habitat: Tropical waters – including marine inshore waters, river mouths, estuaries and lagoons – but not freshwater (Thorburn et al. 2003). Enters estuarine to breed during the wet season and moves back into marine waters following the wet season (Peverell 2005). Distribution: Northern Australia, South-East Asia and the Indian Ocean (Cavanagh et al. 2003). Most frequently encountered of the sawfish species in Australian waters (Last & Stevens 1994). Most commonly known from the Gulf of Carpentaria (Stevens et al. 2005). In the NT specimens have only been collected from Buffalo Creek in Darwin (Stirrat et al. 2006). NONE • No suitable marine and freshwater estuarine habitat within project footprint.
Cavanagh, R., Kyne, P., Fowler, S., Musick, J. and Bennett, M. (eds.) (2003). The Conservation Status of Australian Chondrichthyans. Report of the IUCN Shark Specialist Group Australia			

and Oceania Red List Workshop. The University of Queensland, School of Biomedical Sciences, Brisbane, Australia. Last, P.R. and Stevens, J.D. (1994). Sharks and Rays of Australia. CSIRO, Melbourne. Peverell, S.C. (2005). Distribution of sawfishes (Pristidae) in the Queensland Gulf of Carpentaria, Australia, with notes on their ecology. Environmental Biology of Fishes, Vol. 73, pp. 391-402 Stirrat, S., Larson, H. and Woinarski, J. (2006). Threatened Species of the Northern Territory - Green Sawfish - Pristis zijsron. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0006/206394/green-sawfish.pdf . Thorburn, D.C., Peverell, S., Stevens, S., Last, J.D. and Rowland, A.J. (2003). Status of freshwater and estuarine elasmobranchs in Northern Australia. Report to Natural Heritage Trust, Canberra.				
AMPHIBIANS				
Howard Springs Toadlet <i>Uperoleia daviesae</i>	-	VU	Habitat: Very little is known; however, appears to be confined to sandsheet heathland. Suitable habitat consists of short vegetation and sandy substrates which become inundated during the wet season (Ward et al. 2012). Distribution: Endemic to the NT. Confined to sandsheet heathlands in the Howard and Elizabeth River catchments (Ward et al. 2012).	NONE • No suitable sandsheet heath habitat within the project footprint.
	Ward, S., Young, S. and Hill, B. (2012). Threatened Species of the Northern Territory - Howard River Toadlet – <i>Uperoleia daviesae</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/205527/howard-river-toadlet.PDF [Accessed 30 May 2017].			
INVERTEBRATES				
Atlas Moth <i>Attacus wardi</i>	-	VU	Habitat: Coastal monsoon vine forest, where the larval stages feed on the plant <i>Croton habrophyllus</i> at the edges of the forest (Lane et al. 2010). Distribution: On mainland NT, it is confined to three locations; Darwin, Black Point on the Coburg, and Dundee Beach Peninsula (Braby & Nielsen 2011). Also records from Lesuer Island in WA (Braby & Nielsen 2011).	NONE • No suitable coastal monsoon vine forest within project footprint.
	Braby, M.F. and Nielsen, J. (2011). Review of the conservation status of the Atlas Moth, <i>Attacus wardi</i> Rothschild, 1910 (Lepidoptera: Saturniidae) from Australia. Journal of Insect Conservation, Vol. 15, pp. 603-608. Lane, D., Martin, G. and Weir, R.P. (2010). The life history of <i>Attacus wardi</i> Rothschild (Lepidoptera: Saturniidae) from the Northern Territory, Australia. Australian Entomology, Vol. 37, pp. 115-127.			
FLORA				
a shrub <i>Atalaya brevialata</i>	CR	-	Habitat: Restricted to foot-slope sites with more open vegetation on deeper, coarser sandy soils, mostly along a specific, distinct geological boundary (Cowie 2014). Distribution: Endemic to the NT; found south of Darwin, near Elizabeth River at Virginia, and its tributary – Amy’s Creek (Cowie 2014). Few targeted survey and there is uncertainty as to the taxonomic distinctness of the species. Extent of occurrence is 7.6 km ² , with a high degree of confidence as it occurs within one of the most heavily-surveyed areas in the NT (Cowie 2014).	NONE • Restricted to a small range which is outside the project footprint. • There is a high confidence of the species’ range given the level of surveys.
	Cowie, I. (2014). Threatened Species of the Northern Territory - <i>Atalaya brevialata</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0008/376262/atalaya-brevialata.pdf .			
a shrub <i>Clausena excavata</i>	CR	CR	Habitat: Collected from two small monsoonal vine thickets situated on limestone (karst) geology. One population was found in outcropping limestone and the other on the border of a sink hole (Westaway & Cowie 2012).	NONE • Project footprint is outside the species range (outcropping limestone on Tipperary)

			Distribution: Thought to be endemic to the NT – highly restricted and known only from a small area on Tipperary Station, 5 km north-west of Mt Burrell in the Daly Basin bioregion (Westaway & Cowie 2012).	Station, NT)
Westaway, J. and Cowie, I. (2012). Threatened Species of the Northern Territory - Clausena sp. Tipperary. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0004/208426/clusena-tipperary.pdf .				
a herb <i>Cleome insolata</i>	-	VU	Habitat: Inundated sedge land growing on silty loam with coverage of laterite gravels in close proximity to a river catchment (Short 2010). Distribution: Endemic to the NT, known from a population located near Humpty Doo and three populations in Lloyd Creek in the Darwin rural area (Westaway & Cowie 2012; EcOz records). A species specific survey has not been carried out (Westaway & Cowie 2012).	NONE • Highly restricted range which is outside the project footprint.
Short, P.S. (2010). New species of <i>Cleome</i> L. (Cleomaceae) from the Northern Territory, Australia. The Beagle, Records of the Museum and Art Galleries of the Northern Territory, 2010, Vol. 26, pp. 1–12. https://dtc.nt.gov.au/__data/assets/pdf_file/0011/254954/Short.pdf . Westaway, J. and Cowie, I. (2012). Threatened Species of the Northern Territory - <i>Cleome insolata</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0006/208428/cleome-insolata.pdf .				
an orchid <i>Crepidium marsupichila</i>	-	VU	Habitat: Prefers protected shady areas and moist soils rich in leaf litter along the margins of monsoon rainforest and littoral rainforest (Kerrigan & Cowie 2006). Distribution: An Australian endemic with known populations from north-eastern Qld and the NT. In the NT, only known from one locality, Gunn Point (Kerrigan & Cowie 2006). Limited amount of recent survey in the area, though extensive surveys in the 1980's of rainforest areas failed to find the species (Kerrigan & Cowie 2006).	NONE • Highly restricted range well outside the project footprint. • No monsoon rainforest or littoral rainforest habitat within the project footprint.
Kerrigan, R. and Cowie, I. (2006). Threatened Species of the Northern Territory - <i>Malaxis marsupichila</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/208690/malaxis-marsupichila.pdf .				
Darwin Cycad <i>Cycas armstrongii</i>	-	VU	Habitat: Open grassy woodland where adequate drainage appears to be a limiting factor (Kerrigan et al. 2006). Prime habitat has deep loamy soil (Liddle 2009). Distribution: Restricted to the Top End of the NT – from Gunn Point to Hayes Creek, west to within 50km of the coastline and east to the Wildman River catchment (Kerrigan et al. 2006). Also on the Tiwi Islands and Cobourg Peninsula.	LOW • Cycad species on the Cox Peninsula is typically <i>Cycas maconochiei</i>. • Previous field surveys confirmed cycad present in project footprint was not <i>Cycas armstrongii</i>.
Kerrigan, R., Cowie, I. and Liddle, D. (2006). <i>Threatened Species of the Northern Territory - Cycas armstrongii</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0017/208430/cycas-armstrongii.pdf . Liddle, D.T. (2009). Management Program for Cycads in the Northern Territory of Australia 2009-2014. Northern Territory Department of Natural Resources, Environment, the Arts and Sport, Darwin. http://www.territorystories.nt.gov.au/jspui/bitstream/10070/265358/1/Management%20program%20for%20cycads%20in%20the%20Northern%20Territory%20of%20Australia%202009%20to%202014.pdf .				
a ground orchid <i>Dienia montana</i>	-	VU	Habitat: Wet (spring-fed) rainforest (Kerrigan et al. 2013). Distribution: Northern Qld, and one population in the NT, near Munmarlary in Kakadu National Park. A targeted search in 2003 failed to record any plants at this locality (Kerrigan et al. 2013).	NONE • Highly restricted range (in Kakadu) • No monsoon rainforest or littoral rainforest habitat within the project footprint.
Kerrigan, R., Cowie, I. and Ward S. (2013). Threatened Species of the Northern Territory - <i>Dienia montana</i> . Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0007/208474/dienia-montana-malaxis-latifolia.pdf .				

a sedge <i>Endiandra limnophila</i>	VU	-	Habitat: Margins of seasonal swamps and watercourses with Melaleuca, Eucalyptus and Corymbia species and grasses (Cowie & Kerrigan 2006). Distribution: In the NT, known from Wingate Mountains near Port Keats and Nitmiluk National Park near Katherine (TSSC 2008).	NONE Highly restricted range and no records near the project footprint.
	Cowie, I. and Kerrigan, R. (2006). Threatened Species of the Northern Territory - Eleocharis retroflexa. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0010/376264/eleocharis-retroflexa.pdf . Threatened Species Scientific Committee (2008). Commonwealth Conservation Advice on Eleocharis retroflexa. Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/23672-conservation-advice.pdf .			
Narrow-leaf Climbing Pandan <i>Freycinetia excelsa</i>	-	VU	Habitat: Wet lowland rainforest and spring-fed rainforests in sandstone gullies (Kerrigan & Cowie 2006). Distribution: Known from Papua New Guinea, coastal Qld, and in the NT from seven locations between Bathurst Island and the Arafura Swamp (Kerrigan & Cowie 2006).	NONE No suitable rainforest within project footprint.
	Kerrigan, R. and Cowie, I. (2006). Threatened Species of the Northern Territory - Freyinetia excelsa. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0018/208440/freyinetia-excelsa.pdf .			
a herb <i>Goodenia quadrifida</i>	VU	-	Habitat: Ecology not well known, however, one population was recorded growing in grassland, whilst another grows on the upper parts of estuarine floodplains on poorly drained soils (Cowie & Kerrigan 2006). Distribution: Endemic to the Top End of the NT. Known from the Marrakai Crossing area on the Adelaide River and Hardies Creek (Cowie & Kerrigan 2006).	NONE Highly restricted range which is well away of the project footprint.
	Cowie, I. and Kerrigan, R. (2006). Threatened Species of the Northern Territory - Goodenia quadrifida. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0006/376269/goodenia-quadrifida.pdf .			
a ground orchid <i>Habenaria rumphii</i>	-	EN	Habitat: In the NT, collected on sand plains adjacent to spring-fed rainforests (Kerrigan & Cowie 2006). Distribution: Known from the northern parts of Australia, Papua New Guinea, and South-East Asia. In the NT, only known from a single locality, the Howard River sand plain (upper Howard River catchment) (Kerrigan & Cowie 2006) despite considerable survey effort in potentially-suitable habitat.	NONE - No suitable sand plains habitat within the project footprint. - Single known occurrence well outside project footprint.
	Kerrigan, R. and Cowie, I. (2006). Threatened species of the Northern Territory - Habenaria rumphii. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0004/208444/habenaria-rumphii.pdf .			
a shrub <i>Helicteres macrothrix</i>	EN	EN	Habitat: Woodland dominated by <i>Eucalyptus tectifica</i> , <i>E. tetradonta</i> and <i>E. miniata</i> on sandy loam and rocky siltstone slopes or granitic rocks (Cowie et al. 2012). Absent from the laterite country predominant in the region (DoE 2017). Distribution: Restricted to the Top End of the NT where only three populations known – Mt Bundey, Batchelor/Glenluckie Creek and Lake Bennett (DoE 2017). While it is possible that extensive targeted searches may uncover additional subpopulations, there is a high degree of confidence in the broader distributional data (Cowie et al. 2012).	LOW - Drainage areas within the project footprint are ephemeral and only marginal habitat. - Not within expert distribution.
	Cowie, I. and Westaway, J. (2012). Threatened species of the Northern Territory - Stylidium ensatum. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0009/208494/stylidium-ensatum.pdf .			

	Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). A Guide to Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory. WWF-Australia, Darwin. Threatened Species Scientific Committee. 2016. Conservation Advice. Stylidium ensatum. Department of the Environment, Canberra.		
a shrub <i>Hibiscus brennanii</i>	VU	VU	Habitat: Sandstone cliffs, in gullies and on broken sandstone (Kerrigan & Cowie 2006). Distribution: Endemic to the NT, with restricted population in the Mt Brockman area to the west of Arnhem Land (Kerrigan & Cowie 2006). Considered adequately surveyed (Kerrigan & Cowie 2006). NONE • No suitable sandstone cliff habitat within the project footprint.
Kerrigan, R. and Cowie, I. (2006). Threatened Species of the Northern Territory - Hibiscus brennanii. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0003/208452/hibiscus-brennanii.pdf .			
Luisia Orchid <i>Luisia corrugata</i>	-	VU	Habitat: An epiphyte that commonly grows on trees with scaly bark and prefers the areas of bright light (non-shaded area). Within the NT, collected from the margins of monsoon rainforests (Kerrigan & Cowie 2012). Distribution: Appears to be endemic to the NT with known populations from Melville Island and the mainland (Bankers Jungle and Crocodile Creek in Black Jungle Conservation reserve) (Kerrigan & Cowie 2012). It is likely that the existing collections accurately reflect the abundance and distribution of this species (Kerrigan & Cowie 2012). NONE • Highly restricted range (that is considered accurate) outside project footprint. • Core habitat of monsoon rainforest margins not present within project footprint.
Kerrigan, R. and Cowie, I. (2012). Threatened Species of the Northern Territory - Luisia corrugata. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0005/208472/luisia-corrugata.pdf .			
Arrow-leaf Monochoria <i>Monochoria hastata</i>	-	VU	Habitat: Grows in floating mat vegetation in permanent to near-permanent back-swamps, drainage channels and billabongs (Kerrigan & Cowie 2006). Distribution: In Australia, only found in the NT on the floodplains of the Finniss, Reynolds and Wildman Rivers (Kerrigan & Cowie 2006). There is a negative collection bias associated with the swampy habitat in which this species occurs. However, extensive coverage of floodplains in the Kakadu region detected this species at only one location in that region (Wildman River). Furthermore, it is considered that the extensive surveys of the Top End floodplain communities (Wilson et al. 1991) during the 1990s would have detected this species more often had it been more common or widespread (Kerrigan & Cowie 2006). NONE • No permanent freshwater habitat within the project footprint. • Outside of known distribution.
Kerrigan, R. and Cowie, I. (2006). Threatened Species of the Northern Territory - Monochoria hastata. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/_data/assets/pdf_file/0003/208479/monochoria-hastata.pdf . Wilson, B.A., Brocklehurst, P.S. and Whitehead, P.J. (1991). Classification, distribution and environmental relationships of coastal floodplain vegetation, Northern Territory, Australia. Technical Report 91/2. Conservation Commission of the Northern Territory, Darwin.			
Darwin Palm <i>Ptychosperma macarthurii</i>	-	EN	Habitat: Dense rainforests fed from lowland springs at the edges of tropical riverine floodplains. Common in deep organic loamy clay substrates without humus development (Liddle et al. 2006). Distribution: Within the NT, known from eight locations on the western margin of the Adelaide River Floodplain (Liddle et al. 2006). Survey effort is not documented. NONE • No suitable dense rainforest habitat within the project footprint.
Holmes, J., Bisa, D., Hill, A. and Crase, B. (2007). A Guide to the Threatened, Near Threatened and Data Deficient Plants in the Litchfield Shire of the Northern Territory. WWF-Australia, Darwin.			

Liddle, D.T., Brook, B., Matthews, J., Taylor, S.M. and Caley, P. (2006). Threat and response: A decade of decline in a regionally endangered rainforest palm affected by fire and introduced animals. <i>Biological Conservation</i> , Vol. 132, pp. 362-375.			
Trigger plant <i>Stylidium ensatum</i>	EN	EN	Habitat: Margins of drainage areas in damp heavy clay or peaty soil (Cowie & Westaway 2012). Distribution: Known from three localities in Darwin – Shoal Bay, Girraween Rd, Hayes Creek. Other historical collections recorded; however, the exact locality for these collections is unknown. Not collected since 1974 (Cowie & Westaway 2012). No additional subpopulations have been located despite several flora and biodiversity surveys in the Darwin region over the last ten years (but no systematic survey of potentially suitable habitat at an appropriate time of year). NT Herbarium has conducted surveys in potential suitable habitat on the Cox Peninsula without detecting the species, however, herbarium mapping indicates the presence of suitable habitat within the project footprint (Green & Cuff 2016)
MEDIUM • Drainage areas within the project footprint are ephemeral and only marginal habitat. • Project footprint is outside the expert distribution and there are no nearby records. • Closest record is ~35 km north-east of the project footprint.			
Cowie, I. and Westaway, J. (2012). Threatened species of the Northern Territory - <i>Stylidium ensatum</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0009/208494/stylidium-ensatum.pdf. Green, C. & Cuff, N. (2016). Threatened species distribution in the Greater Darwin Region – <i>Stylidium ensatum</i>. Department of Land Resources Management, Northern Territory Government.			
a herb <i>Typhonium praetermissum</i>	-	VU	Habitat: Open woodland including relatively unshaded areas in red brown clay and shallow or gravely lateritic soil (Cowie & Westaway 2012). Surveys have recorded the species in four land units; 3b, 3c, 2a1 and 1c (Green & Cuff 2016). NT Herbarium mapping indicates there is suitable habitat near the project footprint. Distribution: Endemic to the NT. Previously recorded at six locations in the Darwin/Litchfield area – Virginia, Karama, the Palmerston escarpment, Mandorah and Humpty Doo (Cowie & Westaway 2012). Two new sub-populations recorded in Lloyd Creek (EcOz records). Herbarium mapping includes the project footprint within the extent of occurrence (Green & Cuff 2016).
HIGH • Open woodland areas in 2a1 land unit within project footprint is potential habitat. • The project footprint is within the extent of occurrence of the species; however, the closest record is 10 km west. • There is modelled high and moderate likelihood habitat within the project footprint.			
Cowie, I. and Westaway, J. (2012). Threatened species of the Northern Territory - <i>Typhonium praetermissum</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0017/208502/typhonium-praetermissum.pdf Green, C. & Cuff, N. (2016). Threatened species distribution in the Greater Darwin Region – <i>Typhonium praetermissum</i>. Department of Land Resources Management, Northern Territory Government.			
a herb <i>Typhonium taylori</i>	EN	EN	Habitat: Seasonally-saturated sandy substrate in nutrient-deficient grass/sedge land (Kerrigan & Cowie 2006). Distribution: Endemic to the NT, with the only known population from the edge of the Howard River floodplain (Kerrigan & Cowie 2006). Targeted survey for this species in the Howard River Floodplain as part of a biodiversity assessment survey (Cowie 2002) did not relocate or uncover any additional populations of this species. Considered adequately surveyed, based on the strong survey effort in the area and the high profile of this genus amongst collectors. While more populations may exist, the paucity of collections of this species is considered to accurately reflect its very restricted distribution and abundance (Kerrigan & Cowie 2006).
NONE • Only known population on the Howard River floodplain which is well away from project footprint. • No suitable habitat			
Cowie, I. D. (2002). Preliminary report on a survey of <i>Utricularia</i> (Lentibulariaceae) in the Howard River – Shoal Bay area. NT Department of Infrastructure Planning and Environment,			

	Darwin. Kerrigan, R. and Cowie, I. (2006). Threatened species of the Northern Territory - Typhonium taylori. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0019/208504/typhonium-taylori.pdf			
a bladderwort <i>Utricularia dunstaniae</i>	-	VU	Habitat: Wet sand, often in shallow water, in paperbark (<i>Melaleuca nervosa</i>) woodland or Feather-flower (<i>Verticordia</i>) shrub land. Occurs in slightly wetter micro-habitats than other sympatric <i>Utricularia</i> species, frequently where water is percolating from the ground (Kerrigan & Cowie 2012). Distribution: Endemic to Australia, known from WA and the NT – where known from nine locations. Locations near Darwin are Noonamah, Howard Springs and the Howard River floodplain. Other subpopulations on the Cobourg Peninsula, near Murgarella and near Finnis River (Kerrigan & Cowie 2012). As apparently suitable habitat within the extent of occurrence remains unsurveyed, it is likely that additional, undiscovered subpopulations exist (Kerrigan & Cowie 2012).	NONE • No suitable wet sand/inundated habitat within the project footprint. • Project footprint outside the extent of occurrence for the species.
Kerrigan, R. and Cowie, I. (2012). Threatened Species of the Northern Territory - <i>Utricularia dunstaniae</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0020/208505/utricularia-dunstaniae.pdf				
a bladderwort <i>Utricularia singeriana</i>	-	VU	Habitat: Margins of wet sandy flats and swamps with short grasses and sedges (Kerrigan & Cowie 2012). Distribution: Endemic to the NT with known populations from five locations between Darwin and Katherine – the nearest Darwin being Finn Rd in Weddell. Other sites are the Edith River area, near the Finnis River, and the Marrawal Plateau east of Pine Creek. Port Darwin population (early 1900's record) no longer in existence (Kerrigan & Cowie 2012). As much apparently suitable habitat within the extent of occurrence remains unsurveyed, it is likely that additional undiscovered sub-populations exist (Kerrigan & Cowie 2012).	NONE • No suitable wet sandy flat or swamp habitat within project footprint • Project footprint is on the edge of the extent of occurrence.
Kerrigan, R. and Cowie, I. (2012). Threatened Species of the Northern Territory - <i>Utricularia singeriana</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0003/208506/utricularia-singeriana.pdf				
a ground orchid <i>Zeuxine oblonga</i>	-	VU	Habitat: Grows in clusters in dark and moist situations on the rainforests floor or in wet peaty areas near streams (Jones 1988). Distribution: Qld, NSW and in the NT, where known from five widely-spaced locations south and southwest of Darwin, from Keep River near the WA border to south-west of Adelaide River (Liddle et al. 1994). Not collected since 1992, despite efforts to relocate the Keep River population in 2000 and 2001 (Kerrigan & Cowie 2006). There is a negative collection bias associated with this species due to its ephemeral nature.	NONE • No suitable rainforest habitat within the project footprint. • Project footprint well outside extent of occurrence of the species.
Jones, D.L. (1988). Native Orchids of Australia. Reed, Sydney. Kerrigan, R. and Cowie, I. (2006). Threatened Species of the Northern Territory – <i>Zeuxine oblonga</i>. Northern Territory Department of Environment and Natural Resources. https://nt.gov.au/__data/assets/pdf_file/0008/208691/zeuxine-oblonga.pdf Liddle, D.T., Russell-Smith, J., Brock, J., Leach, G.J. and Connors, G.T. (1994). Atlas of the vascular rainforest plants of the Northern Territory. Flora of Australia Supplementary Series No. 3, Australian Biological Resources Study, Canberra.				



EcOz Environmental Consultants

EcOz Pty Ltd.

ABN 81 143 989 039

Level 1, 70 Cavenagh St,
GPO Box 381,
Darwin, NT 0801

T: +61 8 8981 1100

E: ecoz@ecoz.com.au

www.ecoz.com.au



QMS Certification Services



QMS Certification Services



QMS Certification Services