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NATIVE VEGETATION CLEARING PERMIT APPLICATION

SHIRE BORROW PIT EXPANSION SUPPORTING INFORMATION

20 SEPTEMBER 2017

PREPARED FOR THE SHIRE OF WYNDHAM EAST KIMBERLEY
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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	<i>Project Background.....</i>	1
1.2	<i>Purpose.....</i>	5
2	STUDY AREA AND PERMIT AREA.....	6
2.1	<i>Study Area.....</i>	6
2.2	<i>Permit Area.....</i>	6
2.3	<i>Tenure and Land Access.....</i>	7
3	PROPOSED ACTIVITIES.....	8
3.1	<i>Description of Proposed Activities.....</i>	8
3.2	<i>Estimated Vegetation Disturbance Requirements.....</i>	8
3.3	<i>Method of Vegetation Disturbance.....</i>	9
3.4	<i>Timelines.....</i>	9
4	RELEVANT ENVIRONMENTAL CHARACTERISTICS.....	10
4.1	<i>Biogeographic Regions.....</i>	10
4.2	<i>Land Systems and Soils.....</i>	10
4.3	<i>Flora and Vegetation.....</i>	12
4.3.1	<i>Conservation Significant Flora.....</i>	12
4.3.2	<i>Threatened and Priority Ecological Communities.....</i>	16
4.3.3	<i>Introduced Flora Species.....</i>	18
4.4	<i>Fauna.....</i>	18
4.5	<i>Surface Water Drainage.....</i>	28
4.6	<i>Ramsar Wetlands.....</i>	28
4.7	<i>Current Land Use.....</i>	28
5	STAKEHOLDER CONSULTATION.....	29
6	ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES	29
7	SUMMARY AND CONCLUSION	33
8	REFERENCES	34
9	GLOSSARY	46
10	APPENDICES.....	47



LIST OF TABLES

Table 1: Summary of estimated vegetation disturbance requirements	8
Table 2: Threatened Fauna species and/or species habitat potentially occurring within a 1 km buffer of the Study Area	20
Table 3: Assessment of proposed vegetation disturbance against the ten clearing principles....	30

LIST OF FIGURES

Figure 1: Location of the Project and Study Area (Phoenix, 2017)	2
Figure 2: SWEK's Key Road Network	3
Figure 3: Permit Area Boundary and Ramsar Wetlands	4
Figure 4: Aerial image of an existing borrow pit and representation of proposed expansion boundary	5
Figure 5: Land Systems of the Study Area (Phoenix, 2017)	11
Figure 6: Location of conservation significant flora from DBCA database searches occurring within 20 km of the Study Area (Phoenix, 2017)	14
Figure 7: Locations of Priority Flora during the field survey (Phoenix, 2017)	15
Figure 8: Location of PECs within 40 km of the Study Area (Phoenix, 2017).....	17

LIST OF APPENDICES

Appendix 1: Phoenix Flora and Vegetation Survey Report
Appendix 2: PMST and NatureMap Reports (Fauna)



1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Shire of Wyndham East Kimberley (SWEK) is responsible for many of the roads within the Shire. SWEK is proposing to expand four of their existing borrow pits located in Kununurra (three) and Wyndham (one) to provide material for road maintenance and upgrades within SWEK's Local Government Area boundary. The clearing and operation of the borrow pits is referred to as the Project. Figure 1 shows the location of the Project in relation to key geographical and conservation features.

The borrow pits have historically been utilised by SWEK for maintaining and upgrading roads within the Shire boundary and hence are already disturbed and material has been removed. SWEK has completed planning to identify materials to support road maintenance and upgrade activities over an approximate ten year period. The planning has identified existing cleared borrow pits and potential expansion of the areas as the existing accessible borrow is exhausted. Each of the areas will need to be expanded to support the road maintenance and upgrade activities over the next ten years to service the road network that SWEK is responsible for (Figure 2).

The following three borrow pits are located around Kununurra (Figure 3):

- Carlton Hill;
- Gravel Reserve/Mulligans Lagoon Rd; and
- Crossing Falls Road.

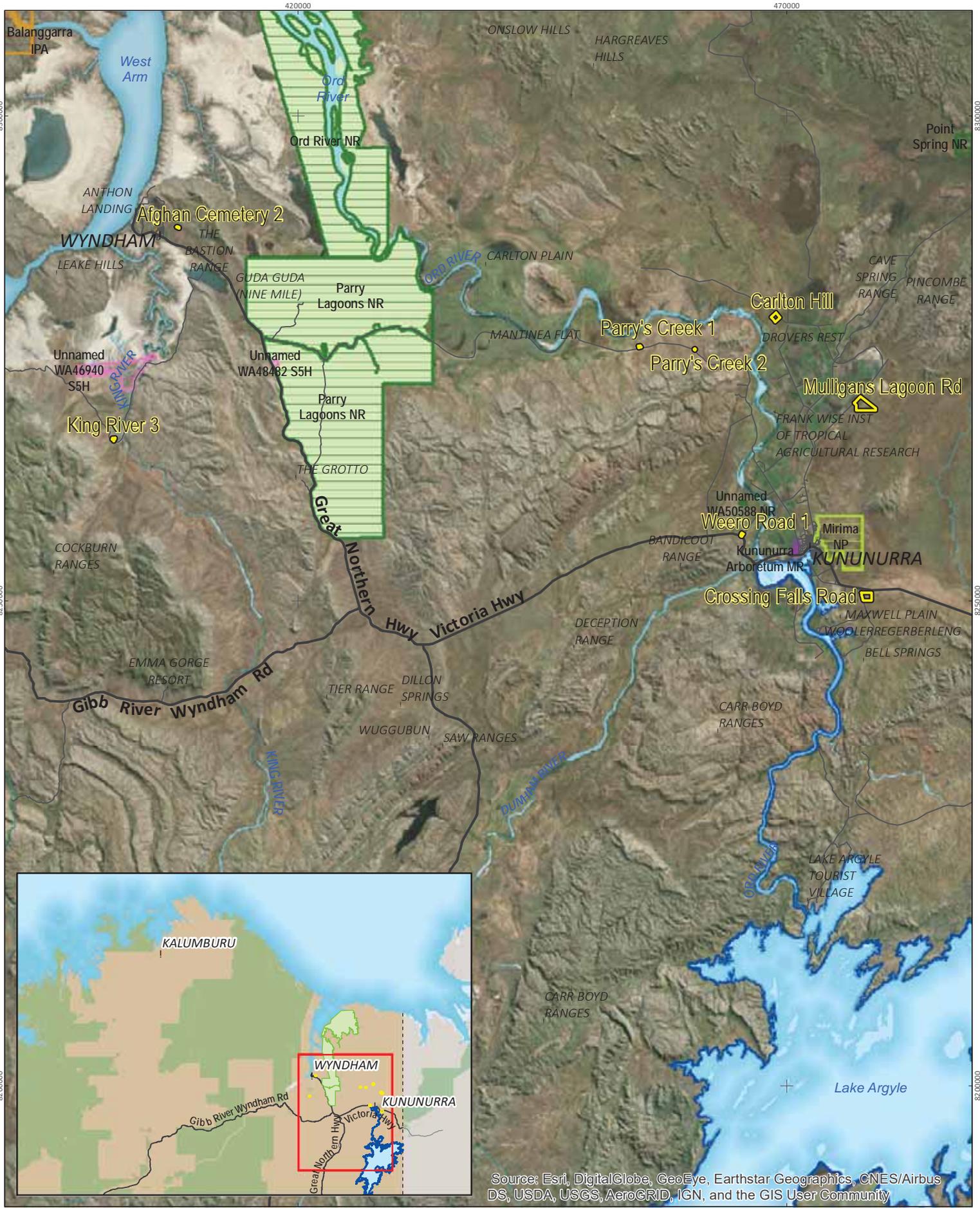
The following borrow pit is located in Wyndham (Figure 3):

- Afghan Cemetery 2.

A photograph which is indicative of one of the existing borrow pits and a proposed expansion boundary (representing a disturbance envelope within which all clearing will be completed) is shown in Figure 4. A Purpose Permit is being sought to enable flexibility in the areas to be utilised.

The proposed clearing is expected to be implemented over approximately ten years.





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



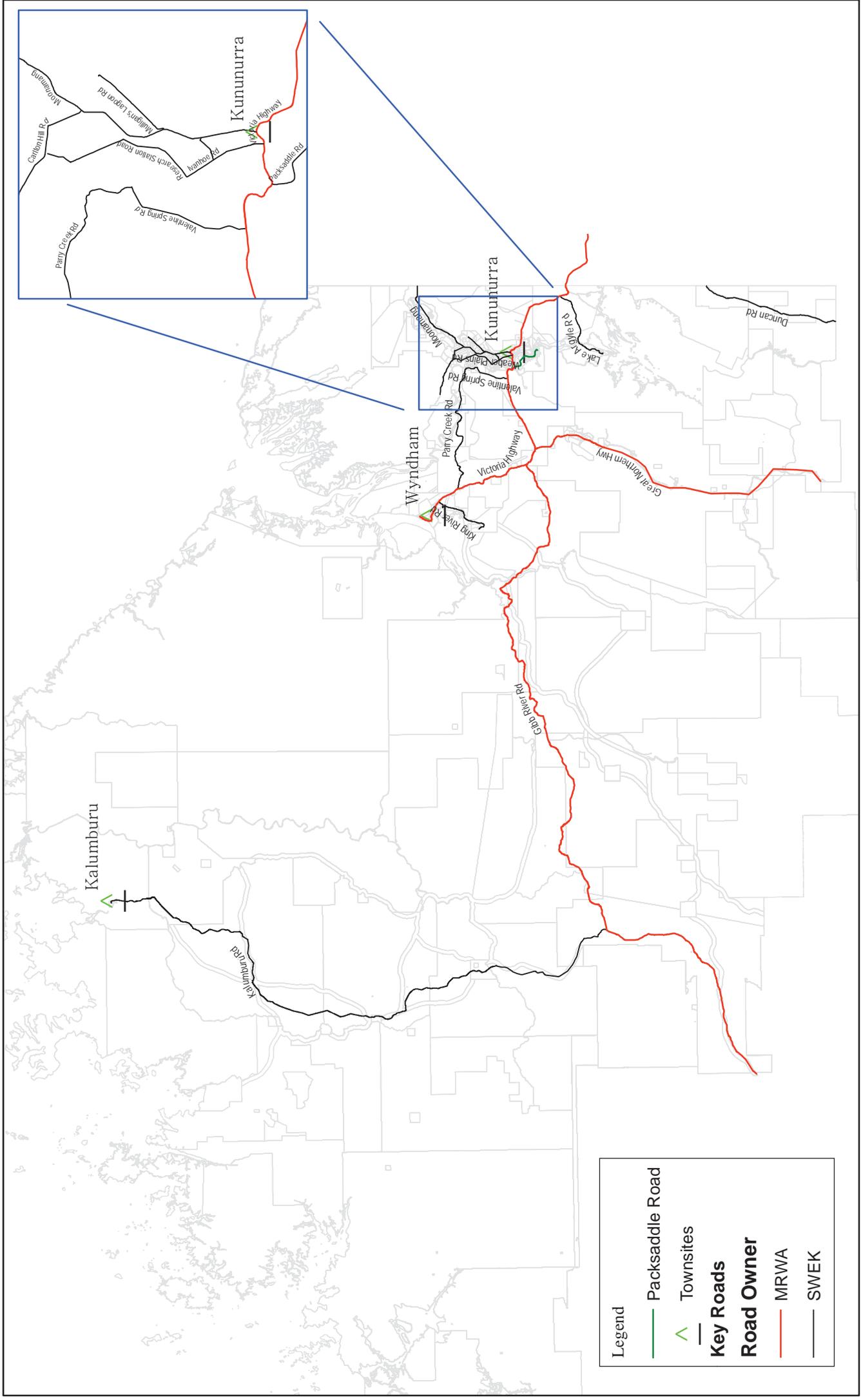
Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:500,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- Major towns
- Place names
- Australian Protected Areas Database (CAPAD) 5(1)(h) Reserve (S5H)
- Nature Reserve (NR)
- Miscellaneous Reserve (MR)
- Indigenous Protected Area (IPA)
- National Park (NP)
- RAMSAR wetlands
- Lakes Argyle and Kununurra
- Ord River Floodplain

Figure 1-1
Location of the Project

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Shire Wyndham East Kimberley Key Roads

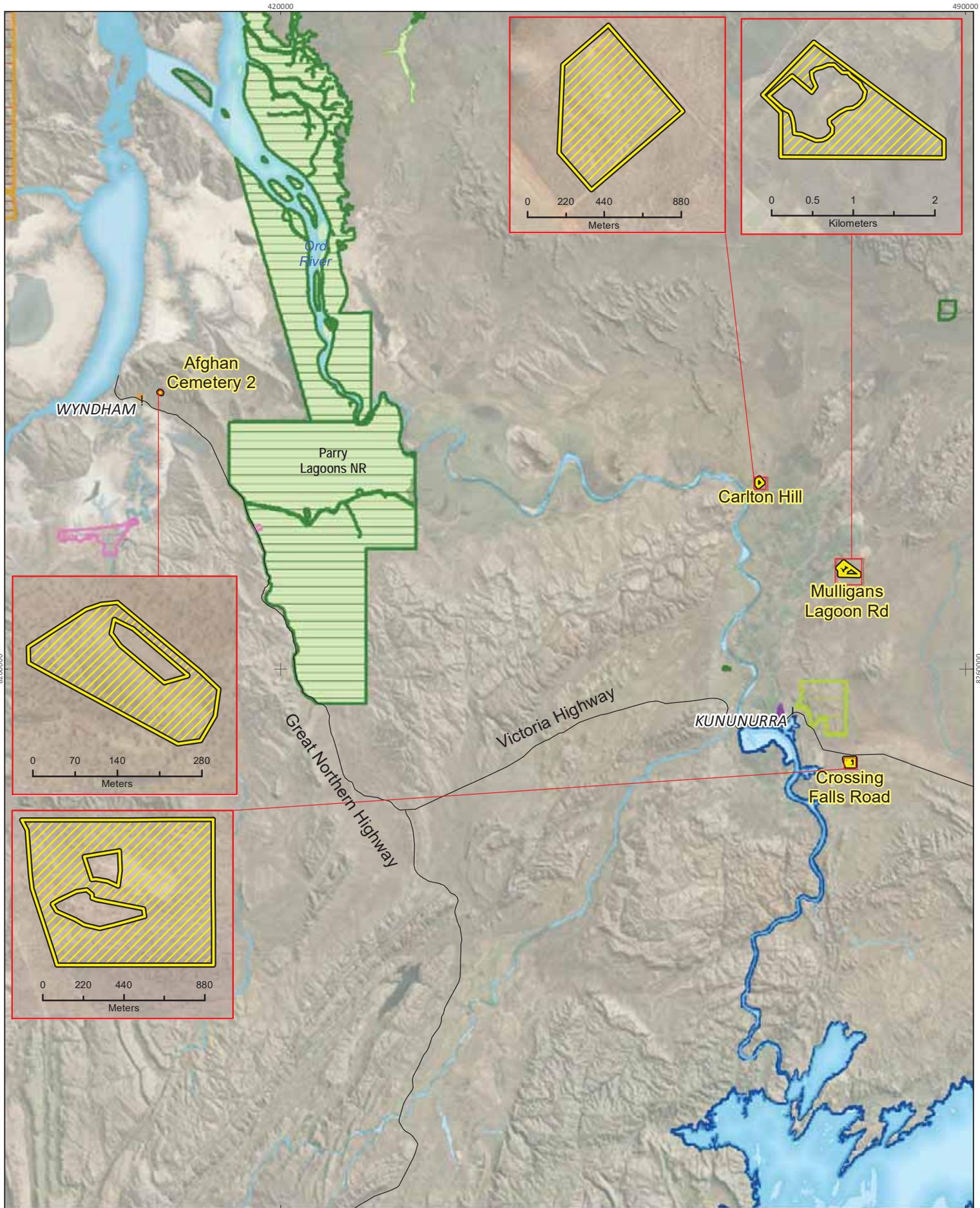


Legend

- Packsaddle Road
- ▲ Townsites
- Key Roads**
- Road Owner**
- MRWA
- SWEK



Key roads only - not all roads managed by S.W.E.K are shown on this map.



Shire of Wyndham East Kimberley borrow pits		○
Project No	1149	
Date	30-Aug-17	
Drawn by	AL	
Map author	GW	
1:500,000 (at A4)		GDA 1994 MGA Zone 52

- Permit Area
- Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (SSH)
- Nature Reserve (NR)
- Miscellaneous Reserve (MR)
- Indigenous Protected Area (IPA)
- National Park (NP)
- RAMSAR wetlands
- Lakes Argyle and Kununurra
- Ord River Floodplain

Figure
Permit Areas

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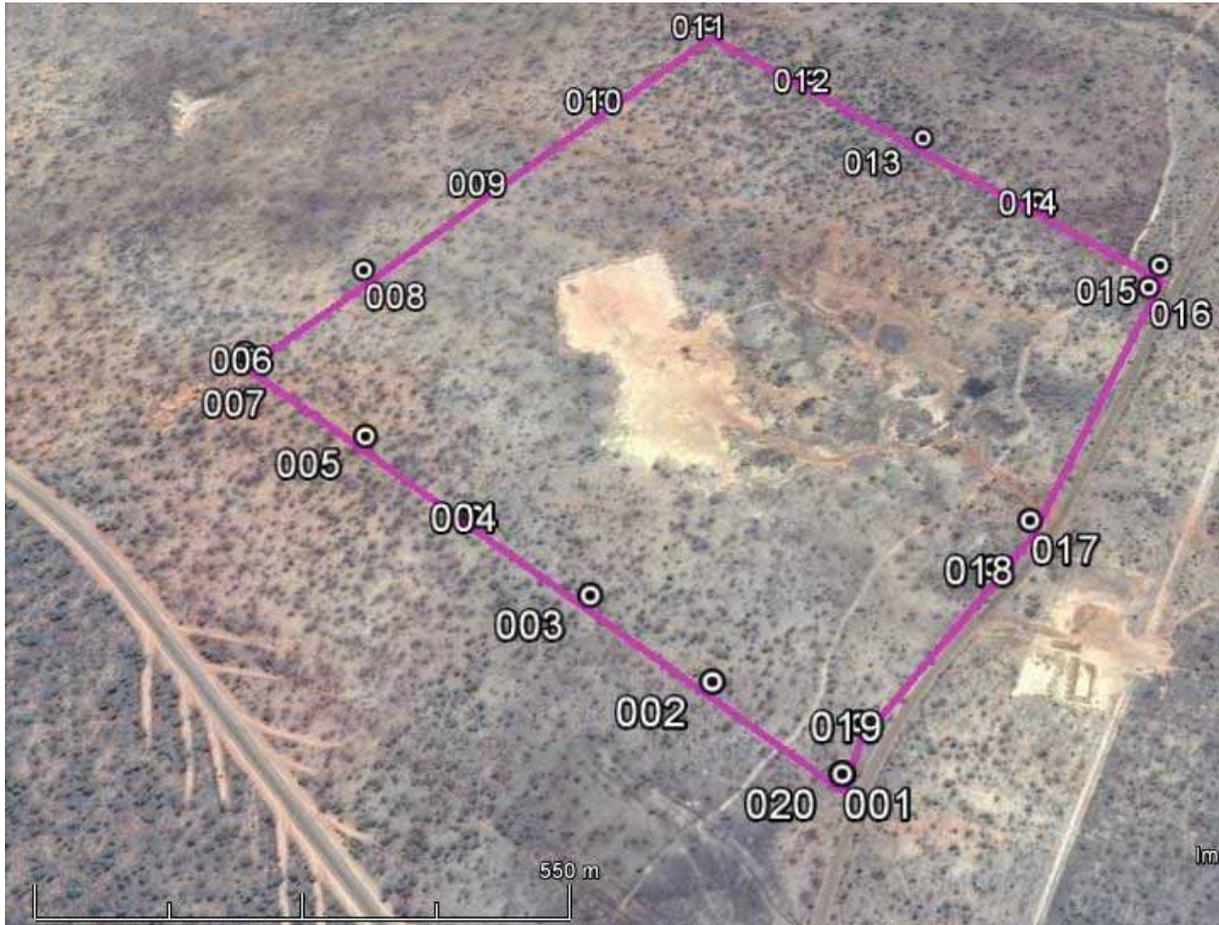


Figure 4: Aerial image of an existing borrow pit and representation of proposed expansion boundary

1.2 PURPOSE

The purpose of this NVCP application is to allow the necessary clearing of native vegetation to enable the area of the borrow pits to be expanded and continued access to the required road maintenance raw materials.



2 STUDY AREA AND PERMIT AREA

2.1 STUDY AREA

The Study Area for the assessment comprised the aggregation of eight potential borrow pits, six in Kununurra and two in Wyndham (Figure 1). Approximately 331 ha was surveyed for the expansion of the eight potential borrow pits. All clearing will be completed within a subset of the Study Area (Permit Area; Section 2.2).

The scope of the Study Area was based on the additional disturbance potentially required at the borrow pits to provide sufficient material for the planned Shire road upgrade and maintenance works.

Shape files of the Study Area are provided in Appendix 2.

2.2 PERMIT AREA

The boundary of the proposed Permit Area is effectively a disturbance envelope and is hereafter referred to as the Permit Area.

A review of the Shire tenure provisions indicated that several of the borrow areas require additional tenure arrangements and whilst they have been included in the Study Area, they are not requested (at this stage) within the Permit Area. SWEK will notify DWER by letter when suitable tenure is in place to enable assessment and inclusion of the additional borrow pits into the Permit Area.

The Permit Area includes only the following borrow pits:

- Carlton Hill;
- Gravel Reserve/Milligan's Lagoon Rd;
- Crossing Falls Road; and
- Afghan Cemetery.

The Permit Area, is the boundary within which all proposed clearing shall occur and is shown in Figure 3. No clearing shall occur within any other borrow pit until the Permit Area is expanded to include them.

Shape files of the current Permit Area (excluding previously cleared areas within each borrow pit) are provided in Appendix 2.



2.3 TENURE AND LAND ACCESS

All proposed vegetation disturbance addressed in this NVCP application will occur within Crown Reserves:

- **Crossing Falls Road:** Crown Reserve R 47333 / Land Act Lot Number 796;
- **Gravel Reserve/Mulligans Lagoon Rd:** Crown Reserve R 31491 / Land Act Lot Numbers 500, 331;
- **Carlton Hill:** Crown Reserve R 31124 / Land Act Lot Number 366; and
- **Afghan Cemetery 2:** Crown Reserve R 33896 / Land Act Lot Number 1792.

The Permit Area and Study Area is entirely within the SWEK Local Government area.



3 PROPOSED ACTIVITIES

Roads within SWEK’s Local Government Area require general maintenance and minor upgrade works on a regular basis to enable safe public use. SWEK will continue to apply for funds to support road maintenance, widening and upgrades of the roads.

The proposed activities may include:

- Access to borrow materials and water supply for road upgrade works;
- Rehabilitation of areas where borrow materials have been exhausted; and
- Laydown and machinery storage whilst works are being completed as required.

Any clearing associated with road upgrade works themselves do not form part of this NVCP application Supporting Document.

3.1 DESCRIPTION OF PROPOSED ACTIVITIES

The road upgrade activities are scheduled to commence in quarter four of 2017 and may continue for up to ten years depending upon funding arrangements.

Four existing SWEK borrow pits have been selected that are capable of providing the required construction materials. The four pits were used for the original road construction works within the SWEK. One or more of the borrow pits will be used over the course of the Project. Any one of the borrow pits could potentially provide most of the required construction materials for future road upgrades. Four have been nominated to provide SWEK with flexibility to manage costs and works. At least one of these pits will need to remain available for maintenance works as required.

Topsoil will be salvaged from clearing areas at the borrow pits and either stored in already cleared areas or placed directly on to areas to be rehabilitated.

3.2 ESTIMATED VEGETATION DISTURBANCE REQUIREMENTS

Table 1 summarises the maximum potential vegetation disturbance requirements for each borrow pit. All proposed clearing shall be undertaken within the Permit Area shown in Figure 3.

Table 1: Summary of estimated vegetation disturbance requirements

Borrow Pit	Maximum Disturbance Expected (ha)
Kununurra	
Carlton Hill	38.8
Gravel Reserve/Mulligans Lagoon Rd	126.0
Crossing falls Road	67.6
Wyndham	
Afghan Cemetery 2	3.6
TOTAL	236.0



3.3 METHOD OF VEGETATION DISTURBANCE

Vegetation will generally be cleared with bulldozers or graders within the borrow pit boundaries. Diggers and loaders may be used around drainage lines as required. Areas with sparse vegetation may not require removal of cleared vegetation.

Vegetation will typically be cleared and pushed to the side of the disturbed area. Areas with thicker vegetation will need to have the vegetation pushed into piles, mulched and removed.

3.4 TIMELINES

SWEK proposes to commence the activities in quarter four 2017. The road works will be implemented in seasonal programmes (i.e. during the dry season) over a ten year period. It is not feasible to complete the works during the wet season.

Any rehabilitation works in borrow pits would be completed immediately prior to the annual onset of the wet season.



4 RELEVANT ENVIRONMENTAL CHARACTERISTICS

This section contains information about the environmental characteristics of the Study (within the context of the region) that may be relevant to this NVCP application.

4.1 BIOGEOGRAPHIC REGIONS

Biogeographic regions are delineated on the basis of similar climate, geology, landforms, vegetation and fauna and are defined in the Interim Biogeographic Regionalisation for Australia (IBRA).

The Study Area lies entirely within the Victoria Bonaparte P1 (VB1) subregion of the Victoria Bonaparte bioregion. The VB1 sub-region covers 1,932,467 ha (Phoenix, 2017). The Bonaparte Basin in the north-west comprises Quaternary marine sediments supporting Samphire – *Sporobolus* grasslands and mangal and open savannah of high grasses on red earth plains and black soil plains. The Victoria Plateau occurs in the south and east with plateau and abrupt ranges of Proterozoic sandstone covered by skeletal sandy soils with low tree savannahs and hummock grasslands. Limited areas of gently undulating terrain support low snappy gum over hummock grasslands and gentle sloping floodplains with *Melaleuca minutifolia* low woodland over annual sorghums.

Rare features of the VB1 subregion include:

- Ramsar listed wetlands of the Ord floodplain and Lake Kununurra;
- ‘Wet’ tropical river of the lower Ord River;
- Man-made wetlands of Lake Kununurra; and
- Alluvial plain systems of the Ord and Weaber plains.

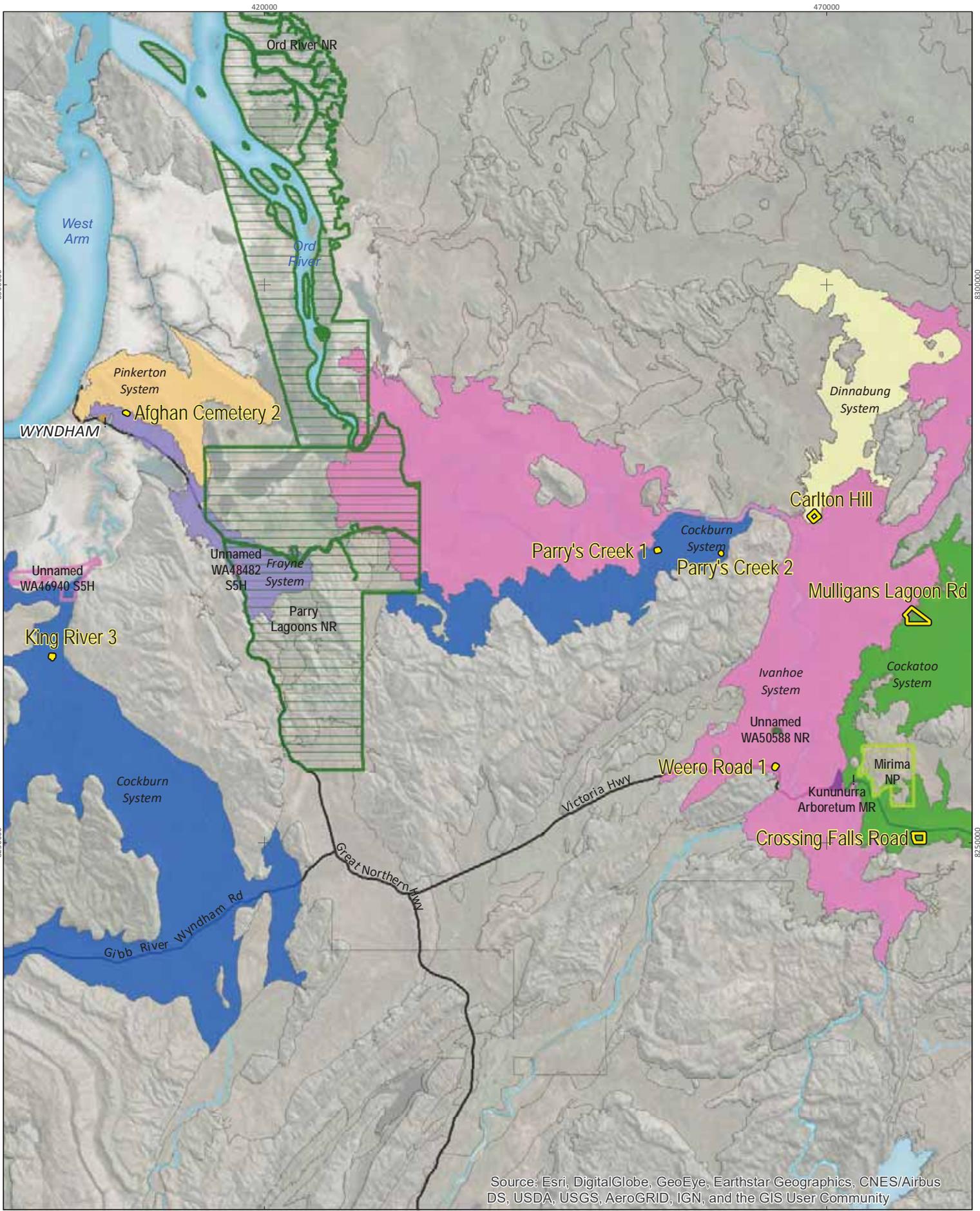
The VB1 subregion is described as having a protection level of 10-15% (DoEE, 2017a).

4.2 LAND SYSTEMS AND SOILS

The Department of Agriculture and Food WA has mapped broad land systems from aerial photography. Land systems are grouped according to a combination of landform, soils, vegetation and drainage patterns (Schoknecht & Payne, 2011). As part of this process an inventory of land types, land systems and land units with particular use capabilities, habitats or conservation values were established to assist in land use planning. According to this mapping, the location of these land systems within the Study Area are shown in Figure 5.

The Study Area contains six land systems (Figure 5) with the Cockatoo (74% of the Study Area) and Dinnabung (13% of the Study Area) systems comprising the majority of the Study Area. Less than 1% of each land system, and in most cases less than 0.1%, is represented in the Study Area.





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:435,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- Land systems within the study area
- Cockatoo System
 - Cockburn System
 - Dinnabung System
 - Frayne System
 - Ivanhoe System
 - Pinkerton System
 - All other land systems

- Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (SSH)
 - Nature Reserve (NR)
 - Miscellaneous Reserve (MR)
 - Indigenous Protected Area (IPA)
 - National Park (NP)

Figure 3-2
Land systems of the study area



4.3 FLORA AND VEGETATION

A review of habitat requirements and species descriptions of the conservation significant flora and ecological communities, declared pests and WoNS identified from the database searches was subsequently undertaken in on 29 May 2017 to assess the potential for each to occur in the Study Area, and to inform the field survey. Following the desktop review, Phoenix Environmental Sciences Pty Ltd (Phoenix) completed a targeted flora and vegetation survey of the Study Area in June 2017. The information in this section has been sourced from Phoenix' targeted flora and vegetation survey report (Phoenix, 2017) which is attached in Appendix 1. The Study Area is shown in yellow on Figure 1.

4.3.1 CONSERVATION SIGNIFICANT FLORA

Sixty-five conservation significant flora species were identified from the database searches as previously recorded within a 40 km radius of the Study Area. These species are listed in Phoenix (2017) and included:

- 1 Threatened Flora species, listed under the WC Act as Endangered;
- 33 Priority 1 species;
- 9 Priority 2 species;
- 21 Priority 3 species; and
- 1 Priority 4 species.

Of the species listed above, 52 were recorded within a 20 km buffer of the Study Area (Figure 6). No database records of conservation significant species occurred within the Study Area (Phoenix, 2017).

The desktop review provided the opportunity for the botanists to familiarise themselves with the conservation significant flora that may be encountered in the field and to enable planning for the field survey approach. The desktop review and consultation with the Department of Biodiversity, Conservation and Attractions (DBCA) was completed prior to planning and commissioning the survey. Timing for the survey was dependent upon the Kalumburu-Gibb River Road re-opening after the wet season and was completed 1–12 June 2017.

No Commonwealth or State listed Threatened Flora were recorded in the Study Area during the field survey (Phoenix, 2017). Targeted searches for the Threatened species *Typhonium* sp. Kununurra (A.N. Start ANS 1467) at four database records, two located in close proximity to the Weero Road borrow pit and two located near the Crossing Falls Road borrow pit, were conducted to familiarise field staff with habitat for the species, but no plants were located (Phoenix, 2017).

It is considered unlikely that any Threatened Flora listed under the *Environment Protection and Biodiversity Conservation Act 1999* or the *Wildlife Conservation Act 1950* is present in the Study Area. No suitable habitat for the Threatened Flora species was recorded in the Study Area and no plants were observed during the transect searches of each borrow pit (Phoenix, 2017).

Populations of One Priority 3 Flora species (*Brachychiton tuberculatus*) was recorded in two borrow pits (Gravel Reserve and Crossing Falls Road) during the survey (Figure 7). At Crossing Falls Road large groups of *Brachychiton tuberculatus* were scattered through the natural



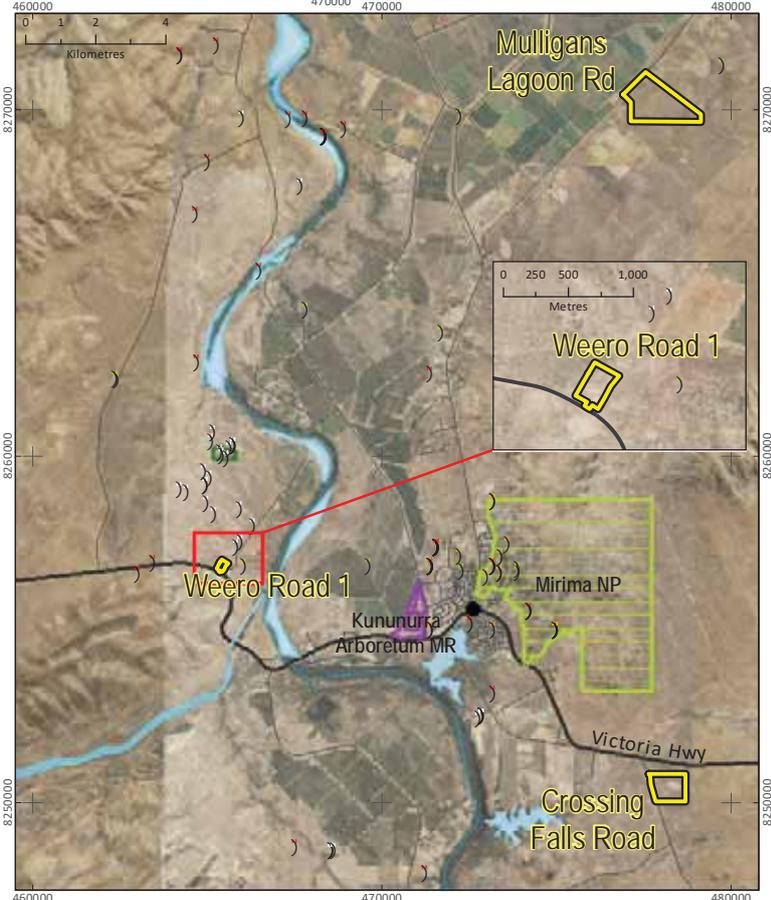
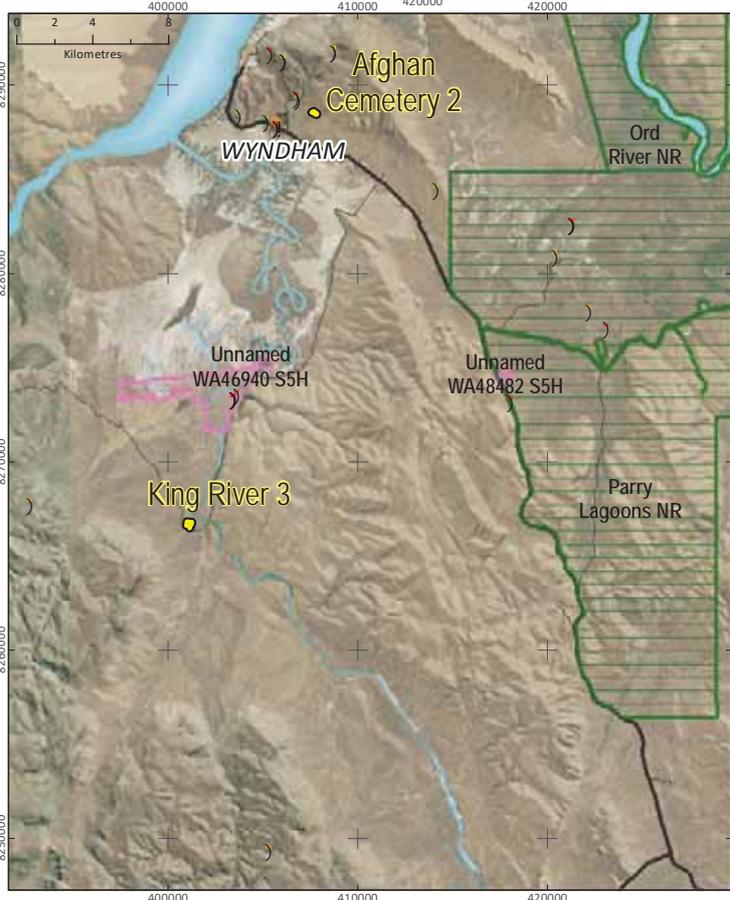
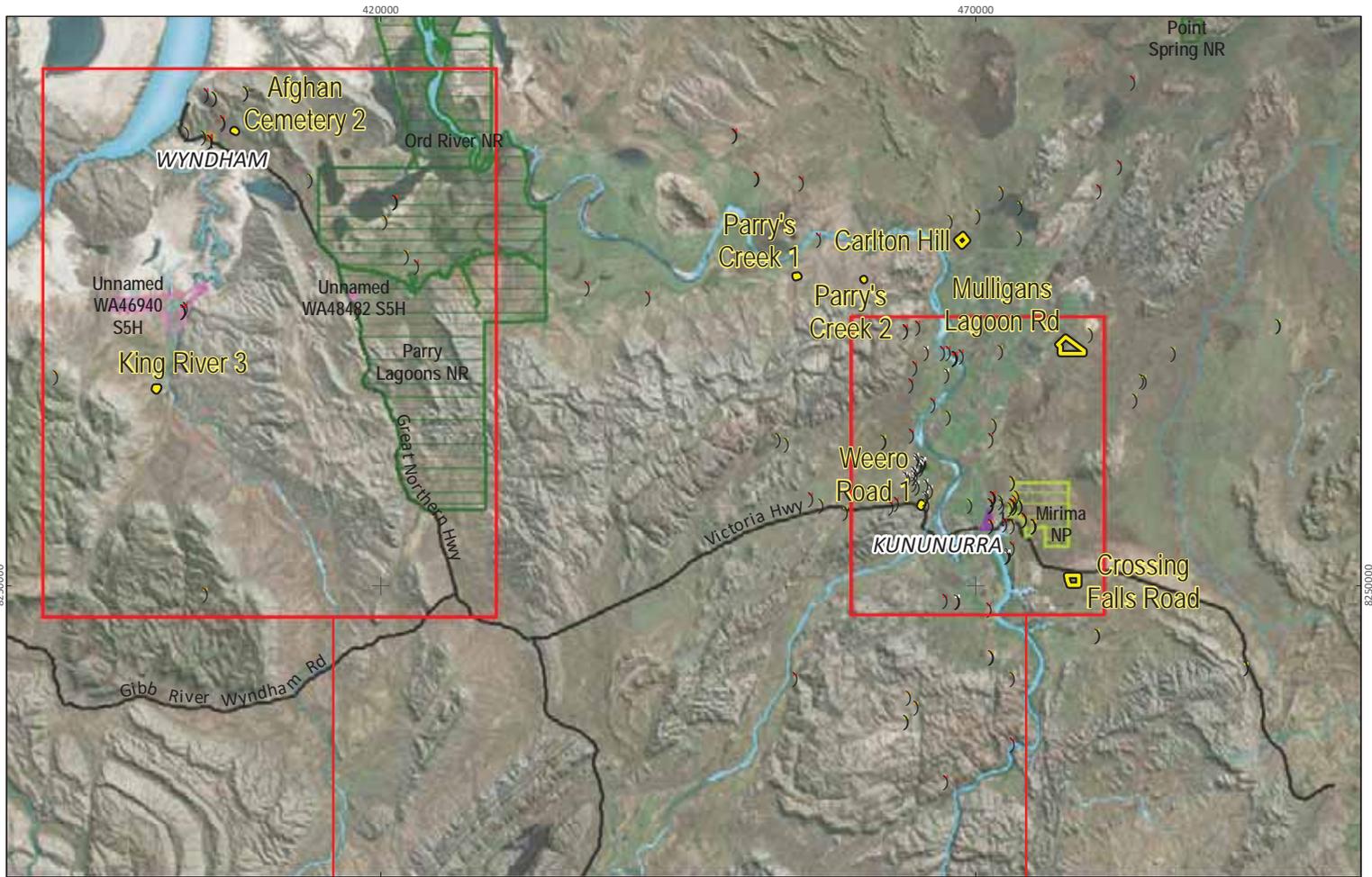
vegetation and a total of 1,433 plants were recorded. At the Gravel Reserve borrow pit, 58 plants were recorded and the species comprised a mid to tall shrub layer (Phoenix, 2017).

Of the 65 conservation significant flora species identified in the desktop review, suitable habitat was identified in the Study Area for an additional three Priority Flora (Phoenix, 2017). It is considered unlikely (limited suitable habitat that was thoroughly searched) or highly unlikely (no suitable habitat or soil type in the Study Area) that any of the remaining species would occur in the Study Area. These species are listed in Phoenix' (2017) Memo Report (Appendix 1).

The following three Priority Flora species that were considered to have potential to occur within the Study Area are all known from multiple records and most have distributions extending beyond WA (Phoenix, 2017):

- *Goodenia brachypoda* (P1);
- *Iseilema trichopus* (P1); and
- *Euphorbia stevenii* (P3).





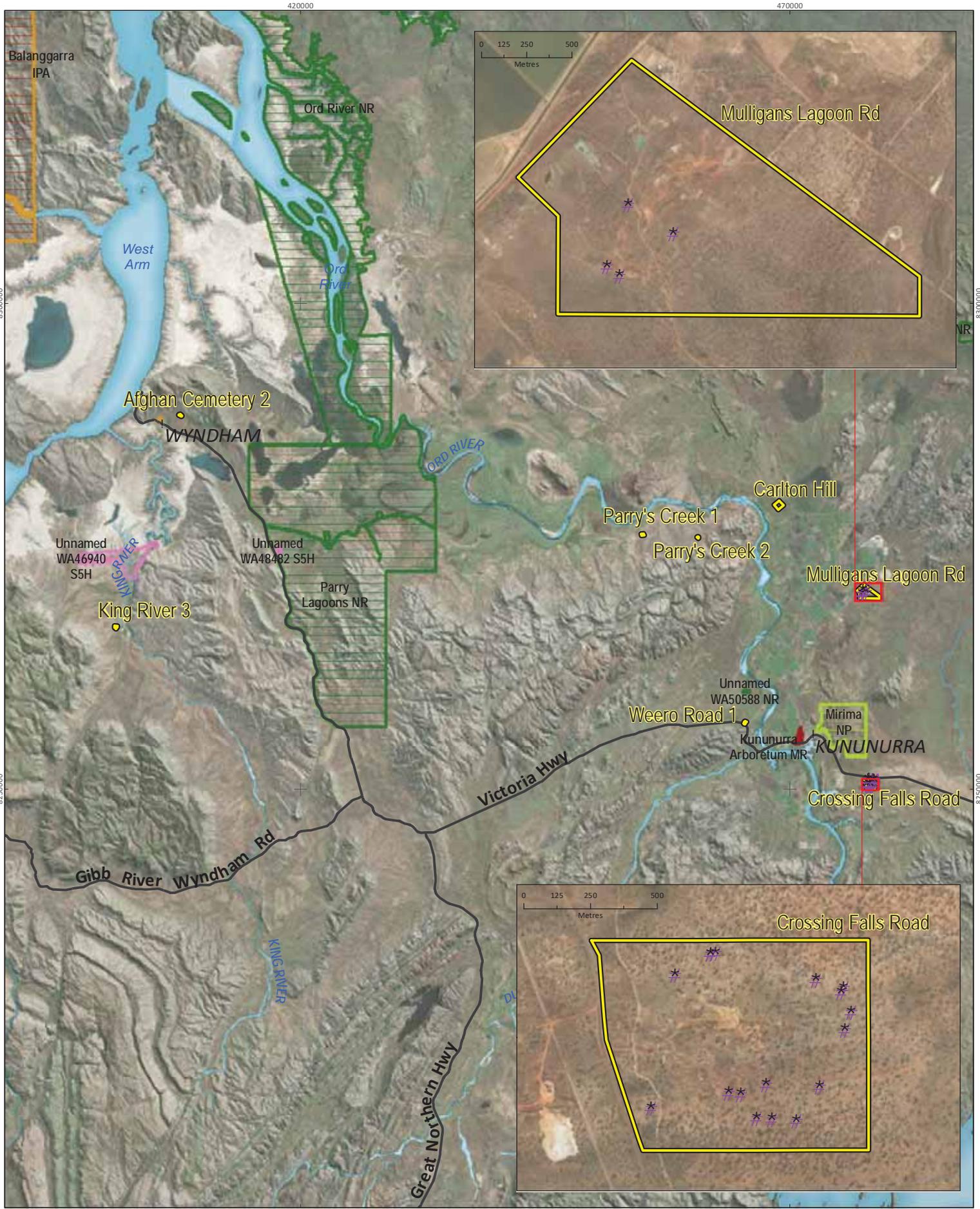
Shire of Wyndham	
East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:575,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- DBCA conservation significant flora
- T
- P1
- P2
- P3
- P4

- Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (S5H)
 - Nature Reserve (NR)
 - Miscellaneous Reserve (MR)
 - Indigenous Protected Area (IPA)
 - National Park (NP)

Figure 4-1
Location of conservation significant flora from DBCA database searches occurring within 20 km of the study area





Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:500,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- * *Brachychiton tuberculatus* (P3) record
Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (S5H)
- Nature Reserve (NR)
- Miscellaneous Reserve (MR)
- Indigenous Protected Area (IPA)
- National Park (NP)

Figure 4-4
Locations of Priority Flora recorded during the field survey

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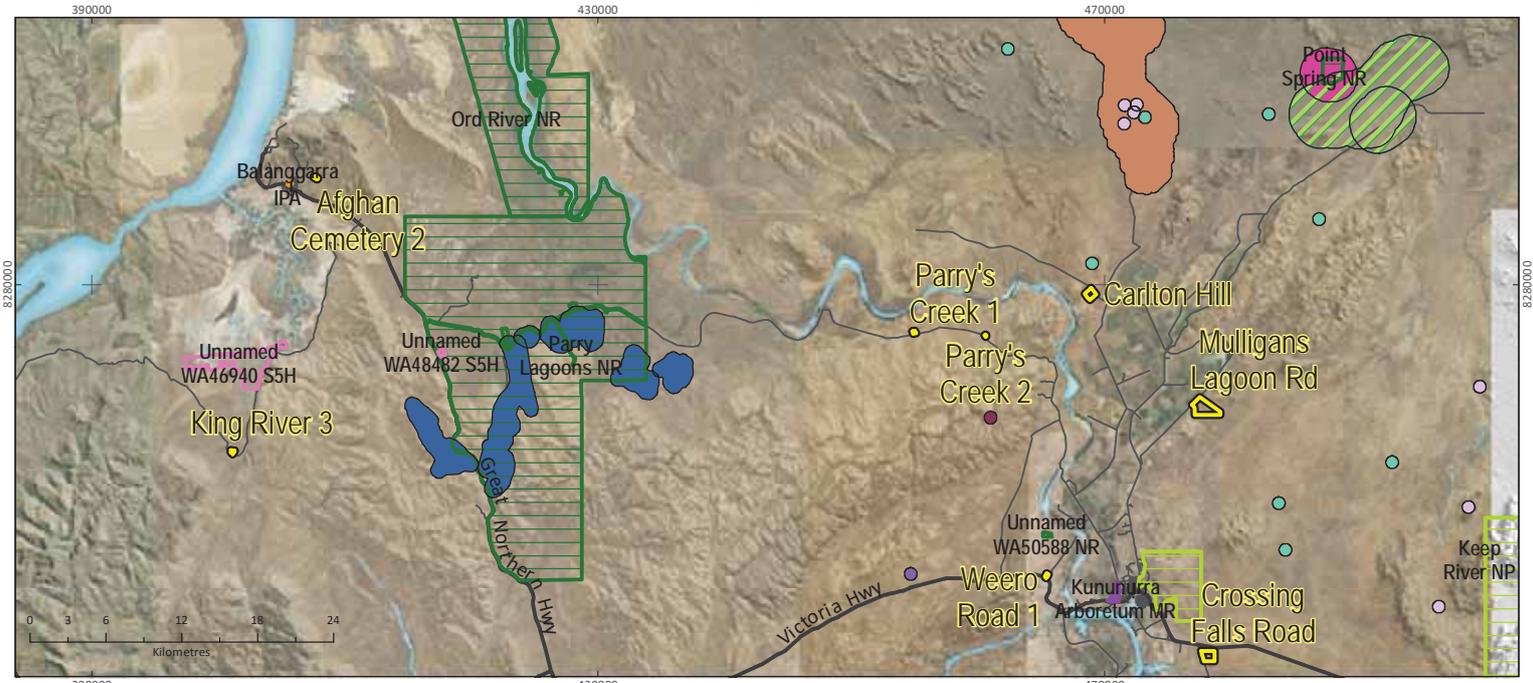
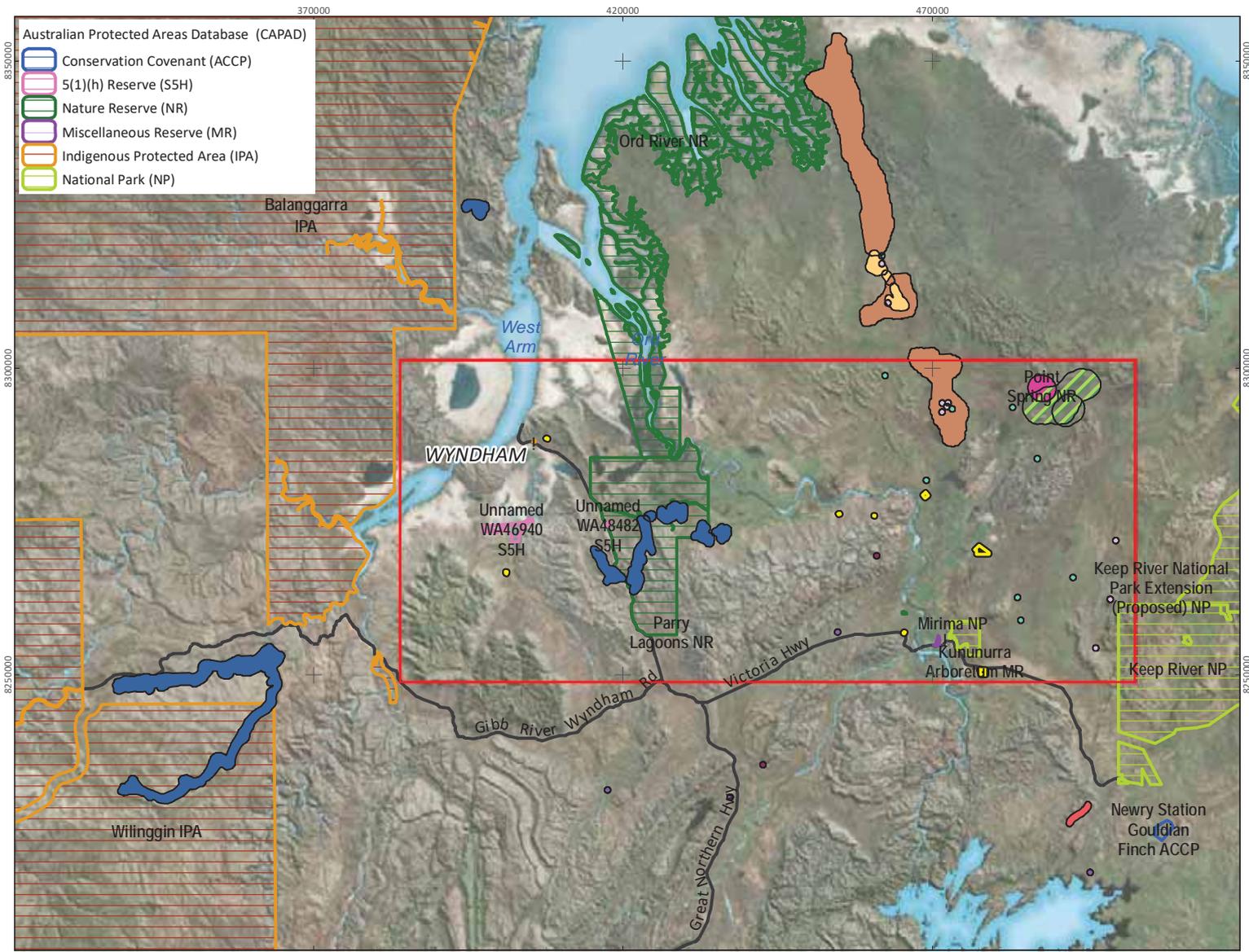
4.3.2 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

A search of DBCA's Threatened and Priority Ecological Communities (TECs and PECs) database search identified 10 PECs within a 40 km buffer of the Study Area (Figure 8). The closest PEC, Dinnabung Land System (P3) occurs approximately 1.1 km away from the Study Area near the Carlton Hill borrow pit (Figure 8). None of the habitat described in the Study Area appears representative of this PEC, lacking the outcropping limestone prevalent in the PEC (Phoenix, 2017).

Other PECs occur more than 5 km from the Study Area. No TECs were identified within 40 km of the Study Area in the desktop review (Phoenix, 2017).

None of the vegetation surveyed in the Study Area was considered to represent a TEC or PEC (Phoenix, 2017).





	Shire of Wyndham East Kimberley borrow pits	Study area TEC/PEC search results	Plant assemblages on vertical sandstone surfaces (P1) Dinnabung Land System (P3) Ivanhoe Land System (P3) Kimberley Vegetation Association 838 (P3) Kimberley Vegetation Association 908 (P3) Tanmurra Land System (P3) Willeroo Land System (P3)
	Project No 1149 Date 28-Aug-17 Drawn by KW Map author GW		Assemblages of Point Spring rainforest swamp (P1) Camaenid land snail and vine thicket assemblage of limestone hills (Jeremiah Hills and Ningbing Ranges) (P1) Oryza australiensis (wild rice) grasslands on alluvial flats of the Ord River (P1)

1:1,000,000(at A4) GDA 1994 MGA Zone 52
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4.3.3 INTRODUCED FLORA SPECIES

A total of 16 declared pest flora species were identified from the database searches as previously recorded within 40 km radius of the Study Area. These species are listed in the Phoenix (2017) Memo Report. The list of species included one Weed of National Significance (WoNS), **Vachellia nilotica* subsp. *indica*.

During the field survey, no WoNS were recorded in the Study Area (Phoenix, 2017).

4.4 FAUNA

Desktop database searches for the Study Area included a Federal *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool and a State NatureMap Tool search. The Protected Matters Search Tool (PMST) and NatureMap search reports are provided in Appendix 2.

Thirty seven listed Threatened (conservation significant) fauna species (including 27 birds, seven mammals, two reptiles and one shark) and/or habitat were identified in the EPBC Act PMST as potentially occurring in the area.

The State's NatureMap search identified 18 additional conservation significant fauna species (including 16 birds, one mammal and one reptile) and/or habitat as potentially occurring in the Study Area.

Sixteen additional listed Migratory species and/or habitat were also identified as potentially occurring in the Study Area during the State and Federal database searches.

The primary impact for concern to the fauna species identified in the State and Federal database searches would be any direct loss of habitat from clearing. The impacts from direct clearing are likely to be insignificant as the Study Area largely consists of areas of existing disturbance and clearing for past and current sourcing of materials. The fauna habitats occurring within the Study Area are relatively homogeneous and often extend well beyond the Study Area (pers. comm. Mr Ryan Ellis. 22 August 2017).

The proposed clearing is for up to 236 ha within the Permit Area. This clearing represents approximately 0.012 % of the 1,932,467 ha (almost entirely uncleared) VB1 IBRA subregion. The proposed borrow pit expansion activities are planned to occur within a relatively conservative footprint, and represent a small incremental expansion to allow ongoing maintenance works on public road infrastructure.

Based on aerial imagery, the existing Kununurra and Wyndham borrow pits are located within several homogeneous broad fauna habitats that will remain mostly undisturbed as the proposed activities are simply expanding on existing disturbance within the Study Area. Disturbance of significant habitat such as wetlands and permanent watercourses shall be avoided. Any potential impacts associated with the proposed activities have historically already occurred and the borrow pit expansion activities are not expected to have a significant impact on any of the fauna species and associated habitat identified in the State and Federal database searches.

The Freshwater Crocodile (*Crocodylus johnstoni*) identified in the NatureMap search, and the Freshwater Sawfish (*Pristis pristis*), Plains Death Adder (*Acanthophis hawkei*), and Salt-water



Crocodile, Estuarine Crocodile (*Crocodylus porosus*) identified in the PMST have not been included in Table 3 due to the absence of suitable habitat present in the Study Area (pers. comm. Mr Ryan Ellis. 22 August 2017). There is no evidence that the Plains Death Adder occurs in WA (Maddock, *et al.*, 2015; pers. comm. Mr Ryan Ellis. 22 August 2017).

Table 3 provides details of the species identified in the EPBC Act Protected Matters Search Tool Report and the NatureMap Search Tool Reports as species and/or habitat potentially occurring in or within a 1 km buffer of the Study Area, their conservation category, distribution and habitat.



Table 2: Threatened Fauna species and/or species habitat potentially occurring within a 1 km buffer of the Study Area

Species	Conservation category	Database	Distribution	Habitat
Birds				
Curlew Sandpiper (<i>Calidris ferruginea</i>)	Critically Endangered, Migratory	PMST, NatureMap	Intercontinental distribution, breeds in arctic coastal tundra of central and eastern Siberia and migrates to Africa, southern Asia and Australasia (Greening et al. 2007). In Australia, Curlew Sandpiper's predominantly occur around the coasts; with occasional records of small groups from inland regions occasionally recorded in inland areas (Greening et al. 2007).	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often and typically in smaller numbers compared to near coastal occurrences, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters and are occasionally recorded around floodwaters (Higgins & Davies, 1996).
Eastern Curlew, Far Eastern Curlew (<i>Numenius madagascariensis</i>)	Critically Endangered	PMST	Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern Curlews are rarely recorded inland. They have a continuous distribution from Barrow Island and Dampier Archipelago, WA, through the Kimberley and along the NT, Queensland, and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere (Threatened Species Scientific Committee (TSSC), 2015c).	During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (<i>Zosteraceae</i>) (TSSC, 2015c). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal saltworks and sewage farms (Marchant & Higgins, 1993).
Gouldian Finch (<i>Erythrura goeldiae</i>)	Endangered, Priority 4	PMST, NatureMap	Occurs in disjunct populations across the Australian monsoon tropics from Cape York Peninsula in Queensland, through the Top End of the NT, to the Kimberley in WA (Higgins et al. 2006). A DBCA NatureMap search found 380 sightings of the Gouldian Finch across the majority of the Kimberley region. Given the relatively high number of sightings, Gouldian Finch are not listed under the WC Act however they are listed by DBCA as a Priority 4 species (relatively low level of concern).	Known breeding habitat for Gouldian Finches is characterised by rocky hills with hollow-bearing smooth-barked gums near to water sources, dry season feeding habitat is dominated by annual spear grasses or native sorghum (<i>Sorghum</i> species), and in the wet season birds shift to feeding from scattered patches of cockatoo grass (<i>Allotheropsis semialata</i>), golden beard grass (<i>Chrysopogon fallax</i>) or spinifex-dominated communities (<i>Triodia bixetura</i> , <i>T. acutispicula</i> , <i>T. bynoei</i> ; T. schinzii) (O'Malley, 2006).
Purple-crowned Fairy-wren (western) (<i>Malurus coronatus coronatus</i>)	Endangered	PMST	The western subspecies of the Purple-crowned Fairy-wren occurs across the northern Kimberley region of WA and east to Victoria River Downs in the western Top End in the NT (Barrett et al., 2003; Blakers et al., 1984; Rowley, 1993; Schodde & Mason, 1999). The extent of occurrence is estimated to be 250 000 km ² (Garnett & Crowley, 2000).	The Purple-crowned Fairy-wren (western) inhabits dense, riparian vegetation in the wet-dry tropics of WA and the NT often in association with permanent natural water sources including permanent rivers and springs (or associated billabongs and swamps) where it occupies dense thickets of <i>Pandanus aquaticus</i> or canegrass and also occurs, less frequently, in rushes and shrubs (DoteE, 2017c; Higgins et al 2001).
Australian Painted Snipe (<i>Rostratula australis</i>)	Endangered	PMST	Transcontinental distribution with records in all states of Australia (Barrett et al., 2003; Blakers et al. 1984). It is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern SA. It has been recorded less frequently at a smaller number of more scattered locations farther west in SA, the NT and WA (Barrett et al., 2003; Blakers et al., 1984; Marchant & Higgins, 1993; Rogers et al., 2005). The extent of occurrence is estimated, with low reliability, to be 4,500,000 km ² (Garnett & Crowley, 2000).	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands and marshes, including temporary and permanent lakes, swamps and claypans (Geering et al 2007). They also use inundated or water-logged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (DoteE, 2017f).
Night Parrot (<i>Pezoporus occidentalis</i>)	Endangered	PMST	The current distribution of the night parrot is not known. Historic records and observations are scanty and anecdotal with few substantiated records since 1935. There are accepted historical records from remote arid and semi-arid inland regions of WA, NT, SA and Queensland (Higgins, 1999). It is possible that the night parrot may continue to occur throughout much of this range (Garnett et al., 1993; Blyth, 1996; Garnett & Crowley, 2000; Garnett et al. 2011). Despite numerous unverified sightings, several dedicated searches and public campaigns there have been only two areas (western Queensland and the Pilbara in WA) where reliable records indicate that populations may persist (pers comm. in Night Parrot Recovery Team, 2016). Sometime prior to 2013, a population was located in southwestern Queensland by naturalist John Young (Koch, 2013). An unknown number (suspected to be small) of individuals were detected every month during a survey between August 2013 and January 2016 (Murphy, 2016). This population is thought to be part of a larger, regional-scale extant population (pers comm. in Night Parrot Recovery Team, 2016). The location of this area has not been identified in order to protect the species (TSSC, 2016b).	Most habitat records are of <i>Triodia</i> (Spinifex) grasslands and/or chenopod shrublands (Garnett et al., 2011) in the arid and semi-arid zones, and Higgins (1999) listed <i>Astirella</i> spp. (Mitchell grass), shrubby samphire and chenopod associations, scattered trees and shrubs, <i>Acacia aneura</i> (Mulga) woodland, treeless areas and bare gibber as associated with sightings of the species. S. Murphy (pers. comm. in TSSC, 2016b) recorded a similar range of habitats used or traversed by individuals in southwestern Queensland: Cretaceous sandstone, claystone, and siltstone residuals; either dominated by <i>Triodia</i> longiiceps on slopes and margins of duricrust plateaus or with <i>Sclerolaena</i> spp., <i>Maireana</i> spp. (Saltbush spp.), <i>Philotus</i> spp. (<i>Mulla Mulla</i> spp.), and small areas of <i>T. longiiceps</i> ; with occasional watercourses with <i>Acacia cambagei</i> (stinkling gidgee). Photographs (Murphy, 2015; 2016) of roost and suspected foraging locations in these habitats show isolated Spinifex and chenopod clumps on bare gibber, and scattered <i>Sclerolaena</i> plants growing in the margins of an erosion rannel on bare gibber (TSSC, 2016b).
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	Vulnerable	PMST	Sparsely dispersed across a coastal and subcoastal strip extending from the Kimberley through the Top End of the NT and Gulf of Carpentaria to eastern Queensland and far north-eastern NSW with occasional records from parts of central Australia (Debus, 2012).	In the NT and the Kimberley, tall open forest and woodland, or tall fringing woodlands along rivers in grasslands, shrub-lands, and low open woodlands are preferred (Aumann & Baker-Gabb, 1991).
Crested Shrike-tit (northern), Northern Shrike-tit (<i>Falculculus frontalis</i>)	Vulnerable	PMST	The northern subspecies of the Crested Shrike-tit is endemic to north-WA. It occurs in the Kimberley and in the north of NT (Higgins & Peter, 2002). Historically, it was distributed from Wofulum Mission and Beverley Springs Station in the Kimberley, east in a narrow band to Borroloola in the NT (Robinson & Woinarski, 1992).	Crested Shrike-tits have been recorded in eight different woodland types in northern Australia, mainly those that are dominated by Darwin Woollybutt (<i>Eucalyptus miniata</i>), Darwin Stringybark (<i>E. tetradonta</i>) or Smooth-stemmed Bloodwood (<i>E. bleeseri</i>) (Robinson & Woinarski, 1992). In the NT and WA the species forages for invertebrates, mostly in foliage, branches, and the trunk and bark across a range of eucalypt and other tree species; individual populations are thought to occupy



Species	Conservation category	Database	Distribution	Habitat
White)				a large home range (Woinarski, 2004).
Masked Owl (northern) (<i>Tyto novaehollandiae kimmerlii</i>)	Vulnerable	PMST	Occurs in disjunct populations across the Australian monsoon tropics. The few records that are available show the Masked Owl (northern) to be present in the Kimberley region of WA, where it occurs from Yampi Sound north-east to Cambridge Gulf, including Windjana Gorge and Augustus Island (DotEE, 2017d).	In northern Australia, the Masked Owl has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields (DotEE, 2017d).
Fork-tailed Swift (<i>Apus pacificus</i>)	Migratory, Protected under International Agreement	PMST, NatureMap	In WA, there are sparsely scattered records of the Fork-tailed Swift along the south coast, ranging from near the Eyre Bird Observatory and west to Denmark. They are widespread in coastal and subcoastal areas between Augusta and Carnarvon, including some on nearshore and offshore islands. They are scattered along the coast from south-west Pilbara to the north and east Kimberley region, near Wyndham. There are sparsely scattered inland records, especially in the Wheatbelt, from Lake Amnean and Wittenoom. They are found in the north and north-west Gascoyne Region, north through much of the Pilbara Region, and the south and east Kimberley (Higgins, 1999).	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (Higgins, 1999). Although the species is unlikely to land or nest within the Study Area, it may occasionally forage in the airspace above (pers. comm. Mr Ryan Ellis. 22 August 2017).
Red-rumped Swallow (<i>Cecropis daurica</i>)	Migratory, Protected under International Agreement	PMST, NatureMap	Records in Australia are of nonbreeding migrants (December - February) and confined to the north of the country, particularly around Cairns, Gulf of Carpentaria, Darwin and Broome (DOE, 2015).	Predominately found over wetlands: e.g. swamps, rivers, dams etc. or open areas such as golf course or cane fields, where insects are taken on the wing. They have been recorded feeding in mixed flocks with other aerial insectivores. As with most swallows and martins, Red-rumped Swallows often perch on bare branches or wires (DotEE, 2015).
Oriental Cuckoo, Horsfield's Cuckoo (<i>Cuculus optatus</i>)	Migratory, Protected under International Agreement	PMST, NatureMap	The Oriental Cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept- May) in coastal regions across northern and eastern Australia as well as offshore islands (DOE, 2015). Vagrant in Pilbara region, more widespread in north and west Kimberley Land Division with scattered records from the Dampier Peninsula and Fitzroy Rive (DOE, 2015).	The species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests; or ecotones between forest types. This cuckoo feeds arboreally, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground, but requires shrubs or trees from which it sallies and returns to consume prey items (DOE, 2015).
Barn Swallow (<i>Hirundo rustica</i>)	Migratory, protected Under International Agreement	PMST, NatureMap	The Barn Swallow usually occurs in northern Australia, on Cocos-Keeling Island, Christmas Island (Stokes et al., 1984; Stokes 1988). Ashmore Reef (Higgins et al., 2006), and patchily along the north coast of the mainland from the Pilbara region, WA, to Fraser Island in Queensland. The species has been recorded irregularly further south in WA, in areas such as Derby and Carnarvon, and in South Australia near Koolunga, Roxby Downs, Nantawarra and south of Innamincka (Higgins et al., 2006). Vagrants have also been recorded as far south as Sydney (Blakers et al., 1984; Gill, 1970; Pizzey, 1980; Schodde & Mason, 1999; Slater, 1961).	In Australia, the Barn Swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires (Pizzey, 1980; Blakers et al. 1984), and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland (Schodde & Mason, 1999).
Grey Wagtail (<i>Motacilla cinerea</i>)	Migratory, Protected under International Agreement	PMST, NatureMap	The Grey Wagtail is a scarce but regular visitor to northern Australia, generally arriving during the last 10 days of October and departing around March. Records from Christmas Island suggest the species arrives there earlier (September) than on mainland Australia (DOE, 2015).	Grey Wagtails are found across a variety of wetlands, especially water courses, but also on the banks of lakes and marshes, as well as artificial wetlands such as sewage farms, reservoirs and fishponds (DOE, 2015).
Yellow Wagtail (<i>Motacilla flava</i>)	Migratory, Protected under International Agreement	PMST, NatureMap	The Yellow Wagtail is a regular wet season visitor to northern Australia. The species is considered a vagrant to Victoria, South Australia and southern WA. In WA it is found in the Pilbara Region and Kimberley Land Division (DOE, 2015).	Habitat requirements for the Yellow Wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves (DOE, 2015).
Common Sandpiper (<i>Actitis hypoleucos</i>)	Migratory, Migratory birds protected under an international agreement	PMST, NatureMap	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Blakers et al., 1984; Higgins & Davies 1996).	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs; reservoirs, dams and claypans, and occasionally pliers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (Geering et al., 2007; Higgins & Davies, 1996).
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	Migratory, Migratory birds protected under an international agreement	PMST, NatureMap	In WA, scattered records occur along the Nullarbor Plain and the southern areas of the Great Victoria Desert. They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of Pilbara Region to south-west and east Kimberley Division. Inland records indicate the species is widespread and scattered from Newman, east to Lake Cohen, south to Boulder and west to Meeleatharra (Higgins & Davies, 1996).	In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent species, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs (Higgins & Davies, 1996).
Common Greenshank,	Migratory, Migratory birds	PMST, NatureMap	The Common Greenshank is generally absent from the Western Deserts although there are a few	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal



Species	Conservation category	Database	Distribution	Habitat
Greenshank (<i>Tringa nebularia</i>)	protected under an international agreement		records from the Great Sandy Desert and the Nullarbor Plain. It occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberleys it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago (Higgins & Davies, 1996).	habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock pastures. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores (Higgins & Davies, 1996).
Oriental Pratincole (<i>Glareola maldivarum</i>)	Migratory, Migratory birds protected under an international agreement	PMST, NatureMap	Within Australia the Oriental Pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in WA, the Top End of the NT, and parts of the Gulf of Carpentaria (Barrett et al., 2003; Blakers et al., 1984; Higgins & Davies, 1996; Stewart et al., 2007)	The Oriental Pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas (Bravery, 1970; Campbell, 1920; Carruthers, 1968; Garnett, 1986; Jaensch, 2004; Klapste, 1977a; van Tets et al., 1969, 1977). They often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, saltworks and sewage farms, especially around the margins (Boekel, 1980; Garnett 1986; Jaensch 1985, 2004; Liddy 1959; Lloyd & Lloyd, 1991; Smith, 1963). The species also occurs along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons (Corben, 1972; Finch & Cox, 1974; Garstone, 1978; Hobbs & McGill, 1973).
Rainbow Bee-eater (<i>Merops ornatus</i>)	Marine/ Migratory birds protected under an international agreement	PMST/NatureMap	The Rainbow Bee-eater is distributed across much of mainland Australia and several near-shore islands with occasional migration between Australia and parts of Asia (Barrett et al., 2003; Blakers et al., 1984; Higgins, 1999).	In northern Australia, it often inhabits a broad range of habitat types including mangroves, heathland, sedge/land, woodlands, shrublands, and vine thickets, often in association with areas providing suitable sandy substrates for burrow construction. It also inhabits sand dune systems in coastal areas and at inland sites that are in close proximity to water, and has occasionally been recorded on beaches (DotEE, 2017b).
Cattle Egret (<i>Ardea ibis</i>)	Marine, Migratory birds protected under an international agreement	PMST, NatureMap	The Cattle Egret is widespread and common according to migration movements and breeding localities surveys. Two major distributions have been located: from north-east WA to the Top End of the NT and around south-east Australia. In WA and the NT, the Cattle Egret is located from Wyndham to Arnhem Land. In south-east Australia it is found from Bundaberg, inland to Roma, Thargominda, and then down through Inverell, Walgett, Nyngan, Cobar, Ivanhoe, Balranald to Swan Hill, and then west to Pimmaroo and Port Augusta (Marchant & Higgins, 1990).	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It has been recorded on earthen dam walls and ploughed fields. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs, sheep, horses and deer. The Cattle Egret is known to follow earth-moving machinery and has been located at rubbish tips. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. They have sometimes been observed in swamps with tall emergent vegetation (Marchant & Higgins, 1990; Morton et al., 1989).
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Migratory	PMST	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia (Lindsey, 1992). The species has breeding populations occurring from about the South Australia-Victoria border, through south and central Victoria, on and east of the Great Divide in NSW, and north to about the NSW-Queensland border (Higgins et al., 2006). There is no evidence for historical changes in the distribution of the Rufous Fantail in Australia (Blakers et al., 1984), although populations around Nanango, south-east Queensland, are said to have declined since the 1940s (Templeton, 1992). There is one historical record from Tasmania, in March 1945, but this was probably a vagrant (Sharland, 1946). The Rufous Fantail is a common and secure species (Blakers et al., 1984).	In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine for ests, semi-deciduous vine thickets or thickets of Paperbarks (<i>Mealeuca spp.</i>) (Higgins et al., 2006).
Oriental Reed-Warbler (<i>Acrocephalus orientalis</i>)	Migratory	PMST	The species is a wet-season (October – March) migrant to northern Australia, and whilst rare, it is probably a regular visitor (DOE, 2015).	The Oriental Reed-warbler is a small insectivore, found in aquatic vegetation along waterways and waterbodies. It has been recorded using <i>Typha</i> sp., in sugar cane plantations, and in mangroves. These habitats are similar to those utilised through the breeding season in eastern Asia, where it is mainly encountered in reed and sedge beds, paddy field, cane grass, grasslands and mangroves (DOE, 2015).
Osprey (<i>Pandion haliaetus</i>)	Migratory	PMST	The total range (breeding plus non-breeding) around the northern coast is more widespread, extending from Esperance in WA to NSW, where records become scarcer towards the south, and into Victoria and Tasmania, where the species is a rare vagrant (Barrett et al., 2003; Blakers et al., 1984; Johnstone & Storr, 1998; Marchant & Higgins, 1993; Morris et al., 1981). The distribution of the species around the northern coast (south-western WA to south-eastern NSW) appears continuous except for a possible gap at Eighty Mile Beach (Barrett et al., 2003; Blakers et al., 1984).	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia (Johnstone & Storr, 1998; Marchant & Higgins, 1993; Olsen, 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins, 1993). They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (Zechura, 1985; Domm, 1977; Fleming, 1987; Gosper, 1983; Gosper & Holmes, 2002; Johnstone & Storr, 1998; Olsen, 1995; Roberts & Ingram, 1976).
Pectoral Sandpiper (<i>Callidris melanotos</i>)	Migratory	PMST	In WA, the species is rarely recorded. It has been observed at the Nullarbor Plain, Reid, Stoke's Inlet, Grassmere Lake, Warden Lake, Dalyup and Yellup Swamp, Swan River, Bengier Swamp, Guraga Lake, Wittacarra, Harding River, coastal Gascoyne, the Pilbara and the Kimberley (Higgins & Davies, 1996).	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They



Species	Conservation category	Database	Distribution	Habitat
Magpie Goose (<i>Anseranas semipalmata</i>)	Marine	PMST	The Magpie Goose is widespread throughout coastal northern and eastern Australia. It can be seen from Fitzroy River, WA, through northern Australia to Rockhampton, Queensland, and has been extending its range into coastal New South Wales to the Clarence River and further south (Birdlife, 2017a).	forage in shallow water or soft mud at the edge of wetlands (Higgins & Davies, 1996).
White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>)	Marine	PMST	The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The inland limits of the species are most restricted in south-central and south-western Australia, where it is confined to a narrow band along the coast (Barrett et al., 2003; Binley & Emison, 1983; Blakers et al., 1984; Marchant & Higgins, 1993).	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats (Marchant & Higgins, 1993).
Black-tailed Godwit (<i>Limosa limosa</i>)	Migratory birds protected under an international agreement	NatureMap	The Black-tailed Godwit is found in all states and territories of Australia, however, it prefers coastal regions and the largest populations are found on the north coast between Darwin and Weipa. It is generally found in small numbers elsewhere and there are scattered inland records (Watkins, 1993).	In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks (Higgins & Davies 1996).
Little Curlew (<i>Numenius minutus</i>)	Migratory birds protected under an international agreement	NatureMap	Little Curlews generally spend the non-breeding season in northern Australia from Port Hedland in WA to the Queensland coast (Minton, 2002 pers. comm.). There are records of the species from inland Australia, and widespread but scattered records on the east coast. The species has also been recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island (Higgins & Davies, 1996). The species is recorded in Australia between September and April and there are few winter records (Blakers et al., 1984). In WA, the species is recorded from Peron Peninsula, Carnarvon, McNeill Claypan and Port Clouates-Ningaloo in low numbers; and in the northern Pilbara region around Port Hedland, and in south-west, north and east Kimberley it is widespread. The Little Curlew has also been recorded in the Great Sandy Desert (Higgins & Davies 1996). In the NT, it is widespread in the top end, from Keep River National Park, east to Gove Peninsula and Groote Eylandt, and south to Kidman Springs. Also recorded in inland regions such as Alice Springs and the Tanami Desert (Higgins & Davies 1996).	the Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated (Higgins & Davies 1996). Birds may also rest in grassy, open woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, which may be without vegetation for hundreds of metres, and occasionally on mudflats when nearby grasslands are unburnt, or around swamps. Resting has also been recorded under partly submerged vegetation. After freshwater pools dry up, roosting may occur in the shallows of reservoirs and the sea (Higgins & Davies 1996).
Glossy Ibis (<i>Plegadis falcinellus</i>)	Migratory birds protected under an international agreement	NatureMap	Within Australia, the Glossy Ibis is generally located east of the Kimberley in WA and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of WA. The species is rare or a vagrant in Tasmania (Beehler et al., 1986; Coates & Bishop, 1997; Marchant & Higgins, 1990).	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (del Hoyo et al., 1992; Hancock et al., 1992; Marchant & Higgins, 1990). Within Australia, the largest contiguous areas of prime habitat is inland and northern floodplains. The Glossy Ibis is commonly in largest numbers in drying Top End grass/edge swamps and Channel Country grass/forb meadows. The species is sometimes recorded in wooded swamps, artificial wetlands (such as irrigated fields), and in mangroves for breeding (Chatto, 2000; Marchant & Higgins, 1990). The species may retreat to permanent wetlands and/or coastal areas (including tidal wetlands) during drought (Marchant & Higgins, 1990).
Pacific Golden Plover (<i>Pluvialis fulva</i>)	Migratory birds protected under an international agreement	NatureMap	In WA, the species is seldom recorded along the southern or south-western coasts, but is more widespread along the Pilbara and Kimberley coasts between North-West Cape and the NT border. They are regularly recorded in coastal areas of the Top End of the NT (Alcorn et al., 1994; Barrett et al., 2003; Blakers et al., 1984; Marchant & Higgins 1993). The species is often recorded on Australia's outlying islands, including Lord Howe and Norfolk Islands, as well as on Christmas and Cocos-Keeling Islands in the Indian Ocean (McAllan et al., 2004; Schodde et al., 1983; Stokes, 1988; Stokes et al., 1984).	In Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass. Other terrestrial habitats inhabited include short (or, occasionally, long) grass in paddocks, crops or airstrips, or ploughed or recently burnt areas, and they are very occasionally recorded well away from water (Marchant & Higgins, 1993). On its breeding grounds it occurs in tundra (Dement'ev & Gladkov, 1951).
Wood Sandpiper (<i>Tringa glareola</i>)	Migratory birds protected under an international agreement	NatureMap	The Wood Sandpiper has its largest numbers recorded in north-west Australia, with all areas of national importance located in WA (Watkins, 1993). In the NT they are found at the Top End, scattered from Keep River, south and east to the Victoria River Downs and Crocodile Billabong and Ngukurr, and to Kakadu National Park and Darwin. In southern NT they are found mostly	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus



Species	Conservation category	Database	Distribution	Habitat
Swinhoe's Snipe (<i>Gallinago megala</i>)	Migratory birds protected under an international agreement	NatureMap	The species has been recorded in the north between the Kimberley Divide and Cape York Peninsula. In WA the species has been recorded in Pilbara, the Kimberley region, Mount Goldsworthy, Mount Blazine and in the north-west regions around the Mitchell Plateau. In the NT the species is believed to be common and widespread in the Top End. Definite records exist from Darwin, Melville Island, Cannon Hill, Red Lily Lagoon and Mount Brockman. In Queensland specimens have been taken at Normanton. The species has also been sighted at Mount Isa (Higgins & Davies, 1996).	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens (Higgins & Davies, 1996). Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes (Higgins & Davies, 1996).
Gull-billed Tern (<i>Gelochelidon nilotica</i>)	Migratory birds protected under an international agreement	NatureMap	The Gull-billed Tern occurs on all continents except Antarctica (Birdlife, 2017c).	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean (Birdlife, 2017c).
Eastern Great Egret (<i>Ardea modesta</i>)	Migratory birds protected under an international agreement	NatureMap	Great Egrets are widespread in Australia. They occur in all states/territories of mainland Australia and in Tasmania. They have also been recorded as vagrants on Lord Howe, Norfolk and Macquarie Islands (Barrett et al. 2003; Blakers et al., 1984; Hermes et al., 1986; Marchant & Higgins, 1990; McKilligan, 2005). In Australia, the largest breeding colonies, and greatest concentrations of breeding colonies, are located in near-coastal regions of the Top End of the NT. A minimum 20 breeding colonies are confirmed along the coast of the NT (Chatto, 2000).	The Great Egret has been reported in a wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). These include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs (Kushlan & Hancock, 2005; Marchant & Higgins, 1990; Martinez-Vilalta & Motts, 1992). The species usually frequents shallow waters. The Eastern Great Egret may retreat to permanent wetlands or coastal areas when other wetlands are dry (for example, during drought). This may occur annually in some regions with regular wet and dry seasons or erratically where the availability of wetland habitat is also erratic.
White-winged Black Tern (<i>Chlidonias leucopterus</i>)	Migratory birds protected under an international agreement	NatureMap	The species is a non-breeding migrant to Australia, where it is widespread and common along south-western, northern and central-eastern coasts, with only scattered records of small numbers along the coasts elsewhere in southern Australia (Barrett et al., 2003; Blakers et al., 1984; Chatto, 2006; Higgins & Davies, 1996; Johnstone & Storr, 1998). In WA, the species is widespread on the southern west coast, mainly from Ballingup and the estuary of Vasse River north to Mongers Lake, and also on coasts of the Pilbara region and the Kimberley Division, with occasional records farther inland, mainly along major river systems, such as the Ord. The species only rarely occurs in the Gascoyne Region of the central-western coast, and is occasionally recorded along the southern coast, for example a single bird was recorded at Eyre Bird Observatory in October 1980 (Johnstone & Storr, 1998). In the NT, White-winged Black Terns are a widespread annual visitor to coastal areas from Joseph Bonaparte Gulf east through the Top End to Groote Eylandt and the Sir Edward Pellew Group and widespread elsewhere in the Gulf of Carpentaria (Chatto, 2006).	The species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. White-winged Black Terns frequent tidal wetlands, such as harbours, bays, estuaries and lagoons, and their associated tidal sandflats and mudflats. Terrestrial wetlands, including swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls are also inhabited. Wetlands may be open, or with floating emergent or marginal vegetation. They rarely occur on inland wetlands in Australia. The species is usually only recorded offshore when on passage (Chan & Deaing, 2007; Chan et al., 2008; Chatto, 2006; Cramp, 1985; Deaing, 2003; Gochfeld & Burger, 1996; Higgins & Davies, 1996; Johnstone & Storr, 1988; Urban et al., 1986).
Common Sandpiper (<i>Actitis hypoleucos</i>)	Migratory birds protected under an international agreement	NatureMap	Intercontinental distribution, breeds across most of Eurasia, migrates to Africa, southern Asia, New Guinea, Australia and occasionally New Zealand (Geering et al 2007). In Australia, the species has a near-continuous coastal distribution and many inland areas. The population when in Australia is concentrated in northern and western Australia (Blakers et al., 1984; Higgins & Davies, 1996).	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (Geering et al., 2007; Higgins & Davies, 1996).
Oriental Plover (<i>Charadrius veredus</i>)	Migratory birds protected under an international agreement	NatureMap	Intercontinental distribution, breeds in northern China and Mongolia, migrates to coastal parts of South-east Asia, New Guinea and northern Australia. In Australia, it occurs in both coastal and inland areas, mostly in northern Australia with occasional records in parts of central and southern Australia (Geering et al. 2007). Most records are along the north-western coast, between Exmouth Gulf and Derby in WA, and there are records at a few scattered sites elsewhere, mainly along the northern coast, such as in the Top End, the Gulf of Carpentaria and on Cape York Peninsula. The species also often occurs further inland on the 'blacksoil' plains of northern WA, the Northern Territory and north-western Queensland (the Gulf Country) (Barrett et al., 2003; Blakers et al., 1984; Garnett, 1989; Lane, 1987; Marchant & Higgins, 1993; Stewart et al., 2007).	Immediately after arriving in non-breeding grounds in northern Australia, Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland (Bigg, 1981; Bransbury, 1985; Crawford 1972; Murlis et al., 1988; Serventy & Whittell, 1977; Storr, 1977, 1980, 1984). Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps (Boekel, 1980; Carruthers, 1966; Close, 1982; Fletcher, 1980; Pedler 1982; Storr, 1980), or open areas that have been recently burnt (Boekel, 1980; Chatto, 2003; Crawford 1972; Garnett 1986; Storr, 1977). At the onset of the Wet Season, some may move into lightly wooded grasslands (Storr, 1977). Some remain in estuarine and littoral environments, and a



Species	Conservation category	Database	Distribution	Habitat
Marsh Sandpiper (<i>Tringa stagnatilis</i>)	Migratory birds protected under an international agreement	NatureMap	The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. There are scattered records in WA and the NT. In WA they are mainly found around the coast (Higgins & Davies, 1996).	few are occasionally recorded around terrestrial wetlands or flooded paddocks (Boeke, 1980; Close, 1982; McGrie, 1984). The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia they prefer intertidal mudflats (Higgins & Davies, 1996), although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide (Bamford, 1988). At the Top End they often use ephemeral pools on inundated freshwater and tidal floodplains (Higgins & Davies, 1996).
Peregrine Falcon (<i>Falco peregrinus</i>)	Other specially protect fauna	NatureMap	The Peregrine Falcon has a cosmopolitan distribution and is found throughout Australia. It is found across Australia, but often occurs in low abundance (Debus 2012).	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water (Birdlife, 2017e; Debus 2012). Habitat loss is a major threat, in particular, loss of woodland trees where the Peregrine Falcon nest in areas where there are no cliffs (DotEE, 2017a).
Grey Falcon (<i>Falco hypoleucos</i>)	Priority 4	NatureMap	The Grey Falcon is endemic to Australia and occurs very sparsely across the interior and north of the Australian mainland (Debus 2012). There has been a contraction of its breeding range in some parts of its distribution into arid zone areas (Debus 2012).	The Grey Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses (Debus 2012). Grey Falcons use standing dead trees as lookout posts (NSW Scientific Committee, 2009).
Letter-winged Kite (<i>Elanus scriptus</i>)	Priority 4	NatureMap	The Letter-winged Kite is an endemic species; found in the arid inland regions of western Queensland, northern South Australia and the south of NT. However it is an irruptive species (has sudden population increases), dispersing to the coast when food is plentiful and there are rat or mouse plagues (Birdlife, 2017b).	The Letter-winged Kite is a bird of open country and grasslands in arid and semi-arid Australia, where there are tree-lined streams or water courses. When food is plentiful, the species irrupts and birds may disperse to higher rainfall coastal regions. This kite roosts by day in the high canopy of leafy trees and is the only member of its family that hunts at night (birdlife, 2017b).
Australian Little Bittern (<i>Ixobrychus dubius</i>)	Priority 4	NatureMap	A migratory species in the southern part of its range, the ALB occurs locally across south-eastern and southwestern Australia during spring and summer. Its status in northern Australia uncertain, but recent records suggest that some sites (mostly artificial) support a resident breeding population (Birdlife, 2017d).	It occurs in diverse freshwater swamp habitats, mainly where tall rushes, reeds, Typha (Cumbungi), shrub thickets or other dense cover is inundated by at least 30 cm of water. It can be found in vast swamps, but unlike the Australasian Bittern, it often inhabits small patches of dense wetland vegetation such as Typha along drains or in small urban lakes (Birdlife, 2017d).
Mammals				
Black-footed Tree-rat (Kimberley and mainland Northern Territory), Djintamooonga, Manbul (Mesembryomys gouldii gouldii)	Endangered	PMST	The distribution of the Kimberley and mainland Northern Territory subspecies of the black-footed tree-rat is restricted to forests and woodlands of the north Kimberley and mainland NT (van Dyck & Strahan 2008; van Dyck et al. 2013). Within those broad areas, its distribution is patchy and generally poorly known, particularly so in the Kimberley (Kitchener et al., 1981), where it has not been recorded since 1981–82 (Bradley et al., 1987; Radford et al., 2011; Corey et al., 2013; Radford et al., 2014). Its distribution has contracted in all parts of its mainland range, but the rate, timing and extent of this contraction are poorly known. Recent marked declines have been reported for the Kakadu area (Woinarski et al., 2001; Woinarski et al., 2010), and more broadly across the Top End of the NT (Ziembicki et al., 2013). Unlike many other medium-sized native mammals, for which islands provide some conservation security, this taxon has not been reported from any islands in the Kimberley or Northern Territory (Abbott & Burbidge, 1995; Woinarski et al., 1999; Gibson & McKenzie, 2012).	The black-footed tree-rat is a nocturnal rodent that dens mostly in tree hollows, but occasionally in dense foliage (notably of Pandanus), and occasionally in buildings. It forages on the ground and in trees, and individuals may make movements of at least 500 m from roost sites to foraging areas (Friend et al., 1992). It occurs mostly in lowland open forests and woodlands dominated by Eucalyptus miniata and/or E. tetradonta, particularly where these forests have a relatively dense shrubby understorey (Friend & Taylor, 1985; Friend, 1987). Such vegetation structure is typical of a regime with a low frequency or intensity of fires; and frequent, intense fires may also be detrimental by reducing the abundance of hollow-bearing large trees (Price et al., 2005).
Nabarlek (<i>Petrogale concinna monastria</i>)	Endangered	PMST	The distribution of the Kimberley subspecies of the Nabarlek is restricted to rugged sandstone areas with high rainfall in north-western Kimberley in WA, from near Kalumburu, inland to the northern edge of Drysdale River National Park, south to the Prince Regent National Park, the Yampi Peninsula and Buccaneer Archipelago (Threatened Species Scientific Committee, 2015b; van Dyck & Strahan 2008). It occurs on four, possibly five, islands: Borda (Osborn Islands, Admiralty Gulf), Augustus (Bonaparte Archipelago), Jungulu (Bonaparte Archipelago; small rock-wallaby, species not confirmed), Hidden (Buccaneer Archipelago) and Long (Buccaneer Archipelago) (Burbidge & McKenzie, 1978; Gibson & McKenzie, 2012). It does not co-occur with other Petrogale species on islands, but was found to co-occur with the Monjon (P. burbidgei) at Prince Regent National Park where a specimen was collected in 1974 (Start et al., 2007). A recent re-examination of WA museum specimens has revealed that some specimens collected since then were incorrectly identified, and that the subspecies has not been recorded on the mainland since 1974 (pers. comm., in A.A. Burbidge 2014; Woinarski et al., 2014b).	The Nabarlek inhabits rugged rocky areas, typically dominated by steep fissured sandstones, granite boulder piles and low latitude breakaways on floodplains with vegetation variable, including vine thickets, moonson rainforest, open woodland and hummock grasslands (Churchill, 1997; Telfer et al., 2008; van Dyck et al. 2013). They shelter in caves in cliffs and rockpiles during the day, emerging at night to feed, although they can be partly diurnal during cooler months. Studies of NT subpopulations have reported that the dietary items include a variety of grasses, sedges, ferns and forbs (Sansom et al., 1985; Telfer & Bowman, 2006).
Northern Quoll (<i>Dasyurus hallucatus</i>)	Endangered	PMST	In the Kimberley, Northern Quoll records are scattered discontinuously from just south of Derby across to Wyndham. Considered locally common in some areas though known to suffer from	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and



Species	Conservation category	Database	Distribution	Habitat
			rapid declines as a result of introduced cane toad (<i>Rhinella marina</i>) invasion across much of its range (van Dyck & Strahan 2008; van Dyck et al. 2013). Declines are known from lowland areas and/or the semi-arid inland fringes of its range eg. the south-west Kimberley (McKenzie, 1981) and Purmululu National Park in south-east Kimberley (Woinarski, 1992).	desert (Threatened Species Scientific Committee, 2005; van Dyck & Strahan 2008). Most common on dissected rocky escarpment and eucalypt forest and woodland (van Dyck & Strahan 2008; van Dyck et al. 2013; Cramer et al. 2016). Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include top fields or caves in low lying areas such as in WA. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds (Threatened Species Scientific Committee, 2005). Northern Quolls sometimes occur around human dwellings and campgrounds. Habitat in the Top End and Kimberley comprises rocky areas and tall open coastal eucalypt forests. Prime habitat in these northern regions is sandstone escarpment (Braithwaite & Griffiths, 1994). Rocky habitats support higher densities and/or longer lived individuals within the species range, due to more protection from predators, better nutrition and less exposure to agricultural practices (Burnett, 1997; Oakwood, 2000). Rocky habitats also supported a higher density of Northern Quoll dens (Oakwood, 1997 in Oakwood, 2000). Breeding success is higher in animals that have a den near a creek line (Braithwaite & Begg, 1995).
Brush-tailed Rabbit-rat, Brush-tailed Tree-rat (<i>Conilurus penticillatus</i>)	Vulnerable	PMST	Formerly widely spread across the tropical woodlands and open forests of northern Australia, the brush-tailed rabbit-rat has declined extensively from the lower rainfall areas of the Kimberley and the Top End (Collett, 1897; Parker 1973; Kitchener 1978; McKenzie 1981; Woinarski et al., 2007; Cramb & Hocknull 2010). The species is considered sparse but can be locally abundant in areas (van Dyck & Strahan 2008; van Dyck et al. 2013). The species was recently recorded from numerous offshore islands (DotEE, 2017e). Recent monitoring indicates that the species may be extinct on Centre Island (Woinarski et al., 2011) and in Kakadu National Park with the decline in Kakadu occurring over the last 20 years and the last known population recorded there in 2008 (Woinarski et al., 2001, 2010; Firth 2010). The species is known from eight populations and its extent of occurrence is estimated to be 120 000 km ² and its area of occupancy is estimated to be 400 km ² (Woinarski et al., 2014a).	Most records of this species are from mixed eucalypt forests and woodlands, particularly those dominated by <i>Eucalyptus miniata</i> (Darwin woollybutt) and/or <i>E. tetradonta</i> (Darwin stringybark) in addition to dune habitats dominated by <i>Casuarina</i> species (van Dyck & Strahan 2008; van Dyck et al. 2013). Modelling analysis of survey records (from a total of 351 sample sites) on the Tiwi Islands (Firth et al., 2006a) showed that the brush-tailed rabbit-rat prefers tall eucalypt forests away from wet areas in sites that had not been exposed to recent severe fires. In a Kimberley study, it was recorded more frequently in coastal woodlands than from tall open forests (Bradley et al., 1987). It has also been recorded in other vegetation types, including <i>Casuarina equisetifolia</i> (coastal she-oak) open woodlands and coastal grasslands (adjacent to woodlands) (Taylor & Horner, 1971; Firth & Calaby 1974). The brush-tailed rabbit-rat has also been recorded foraging on beaches (Frith & Calaby 1974). Brush-tailed rabbit-rats shelter during the day in tree hollows (particularly in large rough-barked trees) and hollow logs (Firth et al., 2006b), and may also occasionally shelter in Pandanus canopies (Dahl, 1897).
Ghost Bat (<i>Macroderma gigas</i>)	Vulnerable	PMST	This Australian endemic species has a discontinuous distribution with geographically disjunct colonies scattered across the Pilbara and Kimberley regions of WA, northern NT and north-eastern Queensland (van Dyck & Strahan 2008; Churchill 2008). There are scattered historical records through arid WA, southern NT, northern South Australia, and western and south-western Queensland (McKenzie & Hall, 2008).	The Ghost Bat is predominantly found in the arid zone near rock outcrops, and roosts in caves, abandoned mines, and rock clefts in a range of habitats including rainforest, vine-thicket, woodland and grassland habitats (van Dyck & Strahan 2008; Churchill 2008). It generally forages within 1-2 km of the roost site. Most of the prey are large invertebrates such as beetles; but it is also known to take small vertebrates including other bats, birds, lizards, and snakes (Tidemann et al., 1985). Most prey is taken to a feeding perch in trees, rock overhangs, or cave entrances (Hutson et al., 2001). Ghost bats move between a number of caves seasonally or as dictated by weather conditions. They require a range of cave sites (Hutson et al., 2001). Most maternity sites appear to require multiple entranced caves (L. Hall pers. comm.).
Greater Billyby (<i>Macrotis lagotis</i>)	Vulnerable	PMST	The species current distribution occurs in two separate geographic areas; one extending from the western deserts region (Tanami, Great Sandy, Gibson) of the NT and WA north to the Pilbara and Kimberley regions, the second in south-western Queensland (van Dyck & Strahan 2008; Cramer et al. in press). The species occurs in the Gibson Desert and Great Sandy Desert bioregions as far south as Tiirikali Community and west to about Newman. Populations exist in the Pilbara bioregion (including the Hamersley Range area, along the Fortescue River and north-east to Shay Gap), in the Dampierland bioregion (along 80 Mile Beach north to Beagle Bay) and in the Central Kimberley and Ord-Victoria Plains bioregions south of the Fitzroy and Margaret Rivers. The distribution is highly fragmented within this area (Pavey, 2006).	The species generally occurs in desert sandplains and dune fields or cracking clays with spinifex hummock grassland and <i>Acacia</i> shrublands (van Dyck & Strahan 2008; van Dyck et al. 2013; Cramer et al. in press). From a survey of sites in WA, Queensland and the NT, Southgate (1990) found that a broad range of habitats are occupied by the greater billyby with three major vegetation types identified: 1. Open tussock grassland (both grasses and forbs) growing on uplands and hills. 2. Mulga woodland/shrubland (both pure mulga and mixed stands of mulga/vitcherry bush) growing on ridges and rises. 3. Hummock grassland growing on sand plains and dunes, drainage systems, salt lake systems and other alluvial areas.
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat (<i>Saccolaimus saccolaimus nudicollumatus</i>)	Vulnerable	PMST	The bare-rumped sheath-tail bat is known to occur in north-eastern Queensland and the monsoonal tropics of the NT (Milne et al., 2009), and is likely to occur in areas of the Kimberley in WA (Milne pers. comm. in Woinarski et al., 2014). There are relatively few records of the subspecies across this extensive range, either suggesting that the subspecies is rare or it has a fragmented distribution. However, issues relating to its detection currently compromise the precise delineation of the subspecies' range and subpopulations.	In Australia, the bare-rumped sheath-tail bat has been recorded mostly in eucalypt forests and woodlands, generally in near-coastal areas (Threatened Species Scientific Committee, 2016). The small number of roosts recorded in Australia have all been found in deep tree hollows of the following species: poplar gum (<i>Eucalyptus platyphyla</i>), Darwin woollybutt (<i>E. miniata</i>), Darwin stringybark (<i>E. tetradonta</i>) and weeping paperbark (<i>Melaleuca leucadendra</i> syn. <i>leucodendron</i>) (McKean et al., 1981; Compton & Joinson, 1983; Churchill 1998; Murphy, 2002). Hollows in these tree species have also been used as breeding roosts.



Species	Conservation category	Database	Distribution	Habitat
Orange Leaf-nosed bat (<i>Rhynonictis aurantia</i>)	Priority 4	NatureMap	The bare-rumped sheath-tail bat is likely to be distributed through the Kimberley region of Western Australia as far west as Broome, however this has not been confirmed through genetic analyses (pers. comm. In Milne 2013). Endemic to Australia, the orange leaf-nosed bat is found across the Top End, from the Kimberley to north-west Queensland, and has an isolated population in the Pilbara region of WA (Cramer et al. 2016). The eastern edge of its distribution extends into north-western Queensland, with colonies near Carnoowal and at Lawn Hill Gorge (DEHP, 2017). Note: Orange leaf-nosed-bats in the Pilbara (Pilbara Leaf-nosed Bat) are treated as a separate form to those from the Kimberley, Northern Territory and Queensland (DEHP, 2017).	The orange leaf-nosed bat forages in a range of habitats including grassland, open woodland, savannah woodland, and spinifex covered hills (Churchill, 2007; DEHP, 2017). It roosts by day in caves and mines with a narrow band of high temperature and humidity (28-32°C and 85-100% humidity). This narrow range may limit their distribution. In their roosts, the bats hang from the ceilings or against the walls, with a spacing of 10-15 cm between individuals (DEHP, 2017).

Notes:

- Distribution and habitat information in Table 3 were sourced from <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl> (unless otherwise noted). For completeness, the references from that source are included in the reference list to this Supporting Document.
- A 1 km buffer zone was applied to the NatureMap and PMST searches.
- The NatureMap and PMST reports (including maps) are provided in Appendix 2 for further reference.
- NatureMap and PMST searches were conducted for each of the eight borrow pit location for completeness.



4.5 SURFACE WATER DRAINAGE

The Study Area lies within the following catchment areas:

- **Ord River Catchment Area** – approximately 588 km in length with an area of 53,900 km². The Ord River catchment area receives an average annual rainfall of approximately 560 millimetres (mm) (DoW, 2008).
The Ord River runs in between the Kununurra portion of the Study Area (it does not intersect the Study Area), Carlton Hill, Gravel Reserve/Mulligan’s Lagoon Rd, and Crossing Falls Creek borrow pits (Figure 1).
- **Pentecost River Catchment Area** – approximately 275 km in length with an area of 8,940 km². The Pentecost River catchment area receives an average annual rainfall of approximately 700 mm (DoW, 2008). The King River joins the Pentecost River in the west arm of the Cambridge Gulf (Figure 1).
Afghan Cemetery 2 borrow pit is nearest to the King River in Wyndham.

The Study Area does not intersect any rivers or creeks within these catchment areas.

4.6 RAMSAR WETLANDS

The PMST Reports (Appendix 2) identified the following Ramsar wetland sites in proximity to the Permit Area (Figure 3):

- Ord River Floodplain [within 10 km to the east of the Study Area (Wyndham)]; and
- Lakes Argyle and Kununurra [approximately 20-50 km south of the Study Area (Kununurra)].

The proposed activities will avoid the Ramsar Wetlands outlined above and therefore no detrimental environment impacts to these sites are expected.

4.7 CURRENT LAND USE

The dominant land use in the surrounding area is grazing, native pastures, Unallocated Crown Land, Indigenous and Crown reserves. The area is a renowned wilderness tourism destination and is hosting increasing numbers of tourists and conservation. Figure 1 shows a number of Nature Reserves, a 5(1)(h) Reserve, Miscellaneous Reserves, an Indigenous Protected Area and a National Park surrounding the Study Area.

Each of the proposed borrow pit areas (Study Area) have existing disturbance with them due to historic borrow activities.

To the north-west of the Study Area lies the Balangarra Indigenous Protected Area (Figure 1).

5 STAKEHOLDER CONSULTATION

SWEK identified the following potential stakeholders for the Project:

- Kununurra and Wyndham communities;
- Pastoral lessees;
- Department of Transport;
- Main Roads Western Australia;
- Department of Water and Environmental Regulation;
- Registered Native Title holders;
- Local tourism operators;
- Tourists;
- Department of Planning, Lands and Heritage;
- Department of the Environment and Energy; and
- Department of Primary Industries and Regional Development.

Shire road maintenance is subject to annual funding submissions and the scale and nature of activities may vary from year to year. SWEK have taken the opportunity to review the potential activities over the next ten years and have consulted with key stakeholders during the planning and funding stages, and will continue to consult with key stakeholders during the implementation stages for the Project.

Given the potential ten year implementation time frame, ongoing consultation will be conducted as part of SWEK's normal information and consultation processes. SWEK notifies key stakeholders of road work activities and road status via their website (available at <http://www.swek.wa.gov.au/>).

6 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES

The proposed vegetation disturbance has been assessed against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation under Part V Division 2 of the Environmental Protection Act 1986* (DER, 2014). Table 3 assesses the Project against these ten clearing principles.

The results of the desktop and subsequent targeted flora and vegetation survey for the Project conducted by Phoenix (2017) described in Section 4 has been used in the assessment of the ten clearing principles in Table 3.

Table 3. Assessment of proposed vegetation disturbance against the ten clearing principles

Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<p>1. Native vegetation should not be cleared if it comprises a high level of biological diversity</p> <p>Whilst the Kimberley region is recognised as a biodiversity hotspot, no systematic review of biodiversity has been completed for the region (Graham, 2001).</p> <p>Vegetation communities with high levels of biodiversity are relatively restricted. Graham (2001) documented the biodiversity values at a subregional level for the Victoria Bonaparte 1 subregion. Rare features relevant to the Study Area identified in Graham (2001) include:</p> <ul style="list-style-type: none"> Ramsar listed wetlands of the Ord floodplain and Lake Kununurra; 'Wet' tropical river of the lower Ord River; Man-made wetlands of Lake Kununurra; and Alluvial plain systems of the Ord and Weber plains. <p>None of the vegetation recorded within the Study Area was within the boundaries of any known TECs or PEGs (Phoenix, 2017). The nearest PEC to the Study Area is the Dinnaabang Land System, located approximately 1.09 km away (Figure 8).</p>	<p>The Study Area does not include any of the known documented special values in relation to landscape, ecosystem, species and genetic values listed for the VBI subregion (Graham, 2001).</p> <p>The implementation of the Project will not disturb any conservation significant vegetation within the boundaries of any known TECs or PEGs.</p> <p>The vegetation within the Study Area is broadly representative of vegetation from the surrounding area and is likely to occur in much larger areas outside of the Study Area.</p> <p>All borrow pits within the Study Area include areas previously cleared that were devoid of vegetation (Phoenix, 2017); therefore the Project is simply expanding these areas within the boundary of the Study Area.</p>	<ul style="list-style-type: none"> Clearing of vegetation near known locations of Priority Flora shall be avoided where reasonably practicable within the Permit Area. To avoid disturbance of unknown locations of Priority Flora, all clearing shall be kept to the minimum required areas within the Permit Area. 	<p>Previously cleared areas exist within each of the borrow pit locations; therefore the Project is simply expanding these areas within the boundary of the Permit Area. The Project shall be managed to avoid known locations of Priority Flora.</p> <p>The proposed clearing within the Permit Area is not expected to impact on a high level of biological biodiversity and therefore the proposed vegetation disturbance is not expected to be at variance with this principle.</p>
<p>2. Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA</p> <p>A flora and vegetation desktop assessment and field survey was conducted by Phoenix (2017) of the Study Area.</p> <p>Phoenix (2017) identified 12 habitat types within the Study Area and therefore, many fauna species may utilise part of the Study Area.</p> <p>Vegetation condition in the Study Area varied from completely degraded in previously cleared areas devoid of vegetation to excellent areas of uncleared natural vegetation (Phoenix, 2017).</p> <p>A desktop review of State and Federal listed fauna species has been included in Section 4.4. No fauna-specific field survey has been completed as part of this Supporting Document. The PMST and NatureMap reports are provided in Appendix 2.</p> <p>The Study Area is based on eight existing areas which have historically been used for borrow material. It is essential that these borrow pits are made available to SWEK to implement road maintenance and upgrades to enable safe public use.</p>	<p>The fauna habitat identified within the Study Area is not expected to be a significant fauna habitat as:</p> <ul style="list-style-type: none"> These habitats extend well beyond the boundaries of the Study Area; The habitat within the Study Area contains existing disturbance; The proposed clearing is not likely to lead to significant changes in land use and fauna threat levels; and The habitats outside of the Study Area remain almost completely undisturbed. <p>Table 2 in Section 4.4 reviewed the distribution and habitat information for Threatened and conservation significant fauna highlighted from the desktop review.</p> <p>For the 12 habitats identified by Phoenix (2017), the clearing area will therefore contain only a small percentage of the broader fauna habitat. Impacts on conservation significant fauna habitat therefore will be negligible in extent.</p>	<p>All vegetation clearing shall be kept to the minimum required areas within the Permit Area.</p>	<p>The proposed clearing of native vegetation within the Permit Area is not expected to be at variance within this principle.</p>
<p>3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora</p> <p>Of the 65 conservation significant flora species identified in the desktop review, suitable habitat was identified in the Study Area for an additional three Priority Flora (Phoenix, 2017). The following three Priority Flora were considered to have potential to occur are all known from multiple records and most have distributions extending beyond WA:</p> <ul style="list-style-type: none"> Goodenia brachypoda; Isellema trichopus; and Euphorbia stevenii. <p>During the flora and vegetation field survey, one Priority 3 Flora species was recorded in two borrow pits (Grevel Reserve and Crossing Falls Road) within the Study Area, Brachychiton tuberculatus (Phoenix, 2017; Figure 7).</p> <p>No Commonwealth or State listed Threatened Flora were recorded in the survey (Phoenix, 2017).</p>	<p>It is considered unlikely (limited suitable habitat that was thoroughly searched) or highly unlikely (no suitable habitat or soil type in study area) that any of the remaining 61 flora species identified in the desktop review would occur in the Study Area (excludes Brachychiton tuberculatus, Goodenia brachypoda, Isellema trichopus and Euphorbia stevenii).</p> <p>No Commonwealth or State listed Threatened Flora were recorded in the survey (Phoenix, 2017).</p> <p>Brachychiton tuberculatus (P3) occurs outside of the Study Area, as the species is known from 51 locations, 41 in WA and 10 in the NT.</p>	<ul style="list-style-type: none"> All known locations of Priority Flora species shall be identified and coordinates recorded. All known locations of Priority Flora shall be avoided and a 50 m buffer zone applied from the area of disturbance, where reasonably practicable. The team conducting on-ground clearing works shall be provided with photographs and coordinates of the known P3 Flora species (Brachychiton tuberculatus), be made aware of the plant locations within the Permit Area and instructed to avoid any disturbance to the species. The team conducting on-ground clearing works shall also be instructed to record and report to SWEK, if any additional individual plants or populations are identified in the Permit Area. SWEK shall report these findings to DBCA. 	<p>It is considered very unlikely that any individuals or populations of Commonwealth or State listed Threatened Flora will be cleared by the activities. The proposed clearing of native vegetation is therefore not expected to be at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<p>4. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a threatened ecological community</p> <p>None of the vegetation in the Study Area was considered to represent a TEC or PEC. The P3 PEC, the Dinnaburg land system, is the closest known PEC to the Study Area located 1.9 km from the Carlton Hill borrow pit (Figure 8). However, none of the habitat described in the Study Area appeared representative of this PEC, lacking the outcropping limestone prevalent in the Priority community (Phoenix, 2017).</p>	<p>The implementation of the Project shall not disturb any conservation significant flora or vegetation within the boundaries of any known TECs or PECs, identified in Phoenix (2017).</p>	<p>None required.</p>	<p>The proposed clearing of native vegetation is not at variance with this principle.</p>
<p>5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared</p> <p>The Study Area is located in the Kimberley region, which has not been extensively cleared. The region is widely recognised for its wilderness values. The area surrounding the Study Area is largely uncleared with disturbance limited to that caused by road access and pastoral activity.</p>	<p>236 ha is proposed to be cleared of the 331 ha Study Area. The proposed maximum extent of clearing represents approximately 0.012% of the 1,932,467 ha largely uncleared Victoria Bonaparte IBRA bioregion.</p>	<p>None required.</p>	<p>The proposed clearing of native vegetation is not at variance with this principle.</p>
<p>6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland</p> <p>The Study Area lies within the following catchment areas:</p> <ul style="list-style-type: none"> Ord River Catchment Area – Is approximately 588 km in length with an area of 53,900 km². The Ord River catchment area receives an average annual rainfall of approximately 560 mm (DoW, 2008). The Ord River runs in between the Kununurra portion of the Study Area (it does not intersect the Study Area), near, Carlton Hill, Gravel Reserve, Weero Road 1 and Crossing Falls Creek borrow pits (Figure 1). Pentecost River Catchment Area – Is approximately 275 km in length with an area of 8,940 m². The Pentecost River catchment area receives an average annual rainfall of approximately 700 mm (DoW, 2008). The King River joins the Pentecost River in the west arm of the Cambridge Gulf (Figure 1). <p>Afghan Cemetery 2 and King River 3 borrow pits are nearest to the King River in Wyndham.</p> <p>The Study Area does not intersect any rivers within these catchment areas. The following Ramsar wetlands are located within 50 km of the Permit Area (Figure 3):</p> <ul style="list-style-type: none"> Ord River Floodplain (within 10 km to the east of the Study Area (Wyndham)); and Lakes Argyle and Kununurra [approximately 20-50 km south of the Study Area (Kununurra)]. <p>No Ramsar wetlands or other wetlands shall be disturbed as part of the proposed clearing works.</p>	<p>No native vegetation in areas associated with watercourses, are proposed to be disturbed as part of the Project.</p>	<p>None required.</p>	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
<p>7. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation</p> <p>The surrounding area is almost completely uncleared with disturbance limited to that caused by local activity.</p>	<p>All borrow pits within the Study Area include areas previously cleared that were devoid of vegetation (Phoenix, 2017); therefore the Project is simply expanding these areas within the boundary of the Study Area.</p> <p>The risk of significant erosion events during construction is very limited.</p>	<p>None required.</p>	<p>The proposed clearing of native vegetation is not expected to be at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with principle
<p>8. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area</p> <p>The Study Area is located approximately 22 km south east from the Balangarra Indigenous Protected Area, with the north west corner of the Afghan Cemetery 2 borrow pit being the closest (Figure 1). Indigenous Protected Areas are voluntarily dedicated by Indigenous groups on Indigenous owned or managed land or sea country and are recognised for their biodiversity conservation benefits (DotEE, 2017).</p> <p>The following Ramsar wetlands are located within 50 km of the Permit Area (Figure 3):</p> <ul style="list-style-type: none"> • Ord River Floodplain [within 10 km to the east of the Study Area (Wyndham)]; and • Lakes Argyle and Kununurra [approximately 20-50 km south of the Study Area (Kununurra)]. <p>The Parry Lagoons Nature Reserve is located approximately 7.5 km south east of the Study Area (closest borrow pit being Afghan Cemetery 2) at its closest point (Figure 1).</p> <p>The Mirima National Park is located approximately 2 km north of the Study Area (closest borrow pit being Crossing Falls Road) at its closest point (Figure 1).</p>	<p>The Project shall avoid impacting any nearby conservation areas such as National Parks, Ramsar wetlands, Nature Reserves and Indigenous Protected Areas.</p>	<p>All vegetation clearing shall be kept to the minimum required areas within the Permit Area.</p>	<p>The proposed clearing of native vegetation is not at variance with this principle.</p>
<p>9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water</p> <p>No significant water users (groundwater or surface water) are in close proximity to the proposed works.</p>	<p>Potential impacts to surface or groundwater quality as a result of the clearing include sediment loss from disturbed areas and minor hydrocarbon spills.</p> <p>Hydrocarbon spills may occur as a result of leaks from hydraulics, earthmoving equipment or vehicles.</p>	<ul style="list-style-type: none"> • Standard engineering controls will be used to limit the potential for erosion and sediment loss. • Any significant spillage of hydrocarbons would require removal of the contaminated soil to the nearest licenced landfill facility. 	<p>The proposed clearing of native vegetation is not at variance with this principle.</p>
<p>10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding</p> <p>The Kimberley is subject to regular high-intensity rainfall events, generally associated with the summer wet season. Flooding of watercourses is often the result of these rainfall events.</p> <p>The Study Area is located within the Ord River and Pentecost River Catchment Areas, near the Ord and King Rivers.</p> <p>All borrow pits within the Study Area include areas previously cleared that were devoid of vegetation (Phoenix, 2017); therefore the Project is simply expanding these areas within the boundary of the Study Area.</p>	<p>At a maximum disturbance of 236 ha within the Permit Area, it is estimated that the clearing activities represent less than 0.004% of the catchment area of the Ord River system and 0.0004% of the Pentecost River system.</p> <p>The clearing will only cause localised disturbance that is not expected to exacerbate the incidence or intensity of flooding.</p> <p>The borrow pits will be designed such that they are free draining to prevent ponding and impediments to surface water flow.</p>	<p>None required.</p>	<p>The proposed clearing of native vegetation is not at variance with this principle.</p>



7 SUMMARY AND CONCLUSION

The purpose of the NVCP application is to allow the necessary clearing of native vegetation to enable an expansion of the four existing borrow pits, located in Kununurra and Wyndham in the Kimberley region of WA.

SWEK is obliged to maintain a number of roads within the localities of Kununurra and Wyndham. The requirement to maintain these roads together with the need to improve road safety in the region necessitates the clearing of native vegetation to access borrow materials from the existing borrow pit areas.

SWEK is requesting approval to clear up to 236 ha of native vegetation within the Permit Area (Figure 3). A targeted flora survey was conducted in May 2017 by Phoenix and the memo report is provided in Appendix 1. This NVCP Supporting Document has been prepared on the basis of the flora and vegetation desktop and field survey work undertaken by Phoenix, the desktop fauna review by Preston Consulting, planning with SWEK, and consultation with DBCA.

This NVCP Supporting Document assesses the proposed vegetation clearing for the Project against the ten clearing principles described in *A Guide to the Assessment of Applications to Clear Native Vegetation Under Part V Division 2 of the Environmental Protection Act 1986* (DER, 2017).

SWEK has designed the Project to minimise potential environmental impacts, including:

- Minimising the scope of the disturbance for the works so that all clearing is kept to minimum required areas and completed only as required;
- Avoiding clearing in areas of known Priority Flora locations, including populations of *Brachychiton tuberculatus* (P3) in two of the borrow pits; and
- Salvaging topsoil from borrow pit clearing for use in rehabilitation.

The proposed clearing is not expected to be at variance with any of the ten clearing principles under Part V Division 2 of the *Environmental Protection Act 1986*.



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9 GLOSSARY

Term	Meaning
DBCA	Department of Biodiversity, Conservation and Attractions
DotEE	Department of the Environment and Energy
DWER	Department of Water and Environment Regulation
EP Act	<i>Environment Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Act 1999</i>
ha	Hectares
IBRA	Interim Biogeographical Regionalisation for Australia
km	Kilometres
m	Metres
mm	Millimetres
NSW	New South Wales
NT	Northern Territory
NVCP	Native Vegetation Clearing Permit
P	Priority (flora)
PEC	Priority Ecological Community
Permit Area	The boundary within which all proposed clearing shall occur (Figure 4).
Phoenix	Phoenix Environmental Sciences Pty Ltd
PMST	Protected Matters Search Tool
Preston Consulting	Preston Consulting Pty Ltd
SA	South Australia
Study Area	The area in which Phoenix conducted the desktop and targeted flora and vegetation surveys within (Phoenix, 2017)
SWEK	Shire of Wyndham East Kimberley
TEC	Threatened Ecological Community
The Project	The Shire of Wyndham East Kimberley is proposing to expand four of their existing borrow pits located in Kununurra (three) and Wyndham (one) to provide material for road upgrades within the Shire of Wyndham East Kimberley's Local Government Area boundary.
Top End	Top End of Australia
TSSC	Threatened Species Scientific Committee
VB1	Victoria Bonaparte P1
WA	Western Australia
WC Act	<i>Wildlife Conservation Act 1950</i>
WoNS	Weeds of National Significance



10 APPENDICES

Appendix 1: Phoenix Flora and Vegetation Survey Report

Appendix 2: PMST and NatureMap Reports (Fauna)



APPENDIX 1

TARGETED FLORA AND VEGETATION SURVEY MEMO REPORT



Memo

To: Phil Scott, Preston Consulting

From: Grant Wells

Date: 30 August 2017

Subject: Targeted flora and vegetation survey for Wyndham and Kununurra borrow pits



Dear Phil,

This memo presents the findings of a desktop review and targeted flora and vegetation field assessment undertaken by Phoenix Environmental Sciences, on behalf of the Shire of Wyndham-East Kimberley (SWEK), for the proposed continued access to a series of borrow pits near Wyndham and Kununurra. We understand that SWEK is planning to utilise these borrow pits with a planning horizon of around 10 years and will seek approval to clear vegetation for the borrow pits project (the Project). The Project is located around Kununurra and Wyndham in the North East Kimberley region of Western Australia (Figure 1-1). The study area for the assessment comprised of eight nominated borrow pit areas near Kununurra and Wyndham (Figure 1-1).

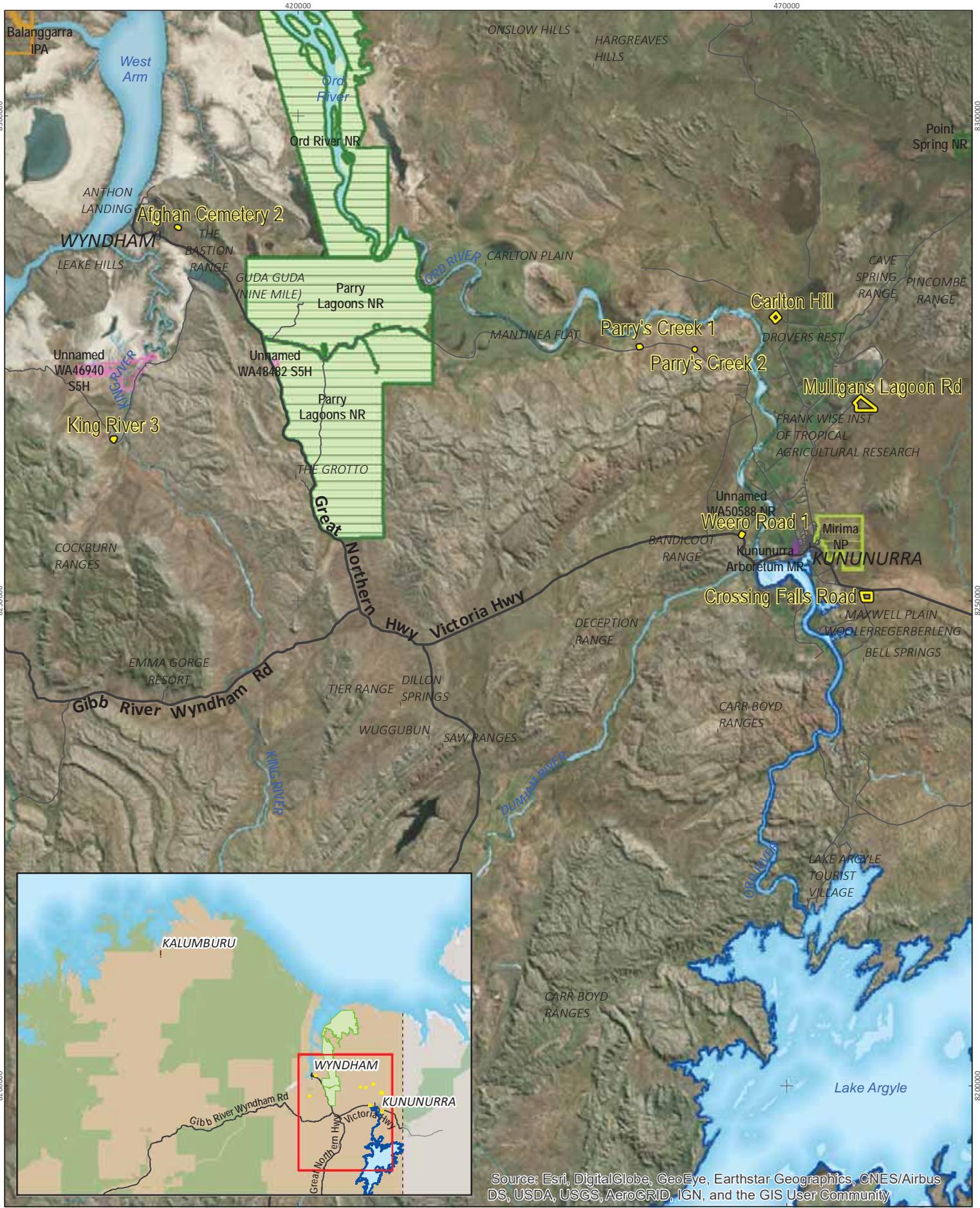
1 INTRODUCTION

1.1 SCOPE

The aim of the survey was to determine if conservation significant flora and/or ecological communities were present within the study area. The survey results are to support a native vegetation clearing permit application for the Project.

To achieve the aim, the scope of works was as follows:

- further review of the desktop study results to establish habitat requirements and key diagnostic features for the potential conservation significant flora and vegetation and identify the number of local and regional population records
- undertake a targeted flora survey and TEC assessment within the study area
- prepare a succinct technical report detailing the findings of the above.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:500,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- 5(1)(h) Reserve (S5H)
- Nature Reserve (NR)
- Miscellaneous Reserve (MR)
- Indigenous Protected Area (IPA)
- National Park (NP)
- RAMSAR wetlands
- Lakes Argyle and Kununurra
- Ord River Floodplain
- Major towns
- Place names

Figure 1-1
Location of the Project



Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

1.2 LEGISLATIVE CONTEXT

In this report, conservation significant flora and ecological communities include those described as follows:

- Threatened Flora and Threatened Ecological Communities (TECs) listed as matters of national environmental significance under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Protected Flora (Threatened Flora) listed under the *WA Wildlife Conservation Act 1950* (WC Act)¹
- species listed as Priority Flora by the Department of Biodiversity, Conservation and Attractions (DBCA; formerly the Department of Parks and Wildlife)
- TECs listed by the WA Minister for Environment
- Priority Ecological Communities (PECs) listed by DBCA.

Key introduced flora (weed) classifications for significant weeds that are relevant to this report are:

- Declared pest – weeds listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) as requiring some form of management and assigned to one of three control categories that dictate level of management required.
- Weed of National Significance (WoNS) – weeds identified at the Commonwealth level as having high impact, causing major economic, environmental, social and/or cultural impacts in a number of states/territories, and which have strong potential for further spread (Australian Weeds Committee 2012).

2 METHODS

The survey was conducted in accordance with the following guidelines where applicable:

- EPA Environmental Factor Guideline – Flora and Vegetation (EPA 2016a)
- EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b).

2.1 DESKTOP STUDY

A desktop study was conducted in two parts prior to the field survey. Searches of relevant databases were initially undertaken in December 2016 to collate a list of conservation significant flora and ecological communities that have been recorded within or in the vicinity of the study area. These included:

- DBCA Threatened and Priority Flora database and WA Herbarium database (DPaW 2016b) within a 20 km radius of the study area

¹ The *Biodiversity Conservation Act 2016* has been partially proclaimed and will eventually supersede the WC Act regarding Threatened species and ecological communities. The part of the Act that deals with Threatened species and communities is not yet in effect, awaiting drafting of supporting regulations.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

- DBCA Threatened and Priority Ecological Communities database (DPaW 2016b) within a 40 km radius of the study area
- DBCA NatureMap database, including Western Australian Herbarium records (DPaW 2016a) within a (maximum) 20 km radius of the study area
- Protected Matters database via the online Search Tool (Department of the Environment and Energy 2016) within a 50 km buffer of the study area.

A list of conservation significant species and ecological communities was generated from the database searches. The NatureMap results were also reviewed to identify existing records of declared pests and WoNS.

A review of habitat requirements and species descriptions of the conservation significant flora and ecological communities, declared pests and WoNS identified from the database searches was subsequently undertaken in May 2017 to assess the potential for each to occur in the study area, and to inform the field survey. Scientific papers detailing species descriptions and habitat preferences were researched for taxa that publicly available databases provided little information for. Databases were interrogated to identify recorded populations for each conservation significant species.

Information attained from the desktop review including species photos, illustrations, written descriptions and descriptions of recorded habitats were compiled into a field guide for reference during the field survey. Where photos or illustrations of the species could not be found, specimens of the target species were inspected at the WA Herbarium by the lead field botanist (Dr Grant Wells) to assist identification during the field survey.

2.2 FLORA SURVEY

A field survey was conducted in the study area by botanists (Dr Grant Wells, Dr Andrew Batty and Ms Alice Watt) and ecologist (Mr Ryan Ellis) on 29 – 31 May 2017. The field survey included:

- inspection of known locations of Priority Flora in the vicinity of the study area that characterised habitat, taxon's presence, and ascertained the reproductive stage (where possible).
- characterisation of vegetation at known locations of TECs (where accessible)
- targeted flora searches for conservation significant flora species and vegetation identified in the desktop review
- targeted flora searches for declared pests and WoNS identified in the desktop review
- description of the vegetation types within the study area for evaluation as potential habitat for conservation significant flora identified in the desktop assessment.

Prior to the commencement of the field survey, data including satellite imagery and study area boundary were loaded onto tablets using the application GIS Pro version 3.18 (Garafa 2016) and Garmin Montera GPS.

2.2.1 Targeted flora searches

Targeted flora searches comprised transect searches spaced at a maximum of 30 m apart over each of the study areas to search for any flora of conservation significance and declared pests and WONS.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

When a weed species was found a GPS location and estimation of extent of the infestation was recorded.

During the field survey, the following information was collected when a flora species or population of conservation significance was found:

- GPS coordinates, including population boundary where applicable
- description of the habitat and floristic community of the conservation significant species
- population size estimate where applicable
- specimen collection for taxonomic identification and lodgement at the WA Herbarium
- photograph of live plant and description of important details, such as flower colour, height of individual or average height of population.

2.2.2 Vegetation description

Prior to conducting the targeted searches, where possible, vegetation of known locations of conservation flora within close proximity to the study area was assessed to inform identification of suitable habitat in the study area.

Relevé (unbound site) surveys were conducted to describe the major vegetation associations within the study area and habitat of any conservation significant flora located. The following information was recorded for each relevé:

- location – the geographic coordinates in WGS84 projection
- description of vegetation – a broad description utilising the structural formation and height classes based on National Vegetation Information System (NVIS 2003)
- habitat – a brief description of landform and habitat
- geology – a broad description of surface soil type and rock type
- disturbance history – a description of any observed disturbance including an estimate of time since last fire, weed invasions, soil disturbance, human activity and fauna activity
- vegetation condition – utilising the condition scale of Trudgen (1988 in EPA 2016b) (Table 2-1).
- photograph – a colour photograph of the vegetation
- flora species list – a list of the dominant flora.

Specimens of unknown species were collected and assigned a unique number to facilitate tracking, for post-field identification with local and regional flora keys and by comparison with the named species held at the Western Australian Herbarium. Unconfirmed or tentative species names are symbolised by a '?' preceding the species name.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Table 2-1 Vegetation condition rating scale (Trudgen 1988, in EPA 2016b)

Vegetation condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

2.2.3 TEC/PEC assessment

The habitat and species composition of the relevés was compared to the habitat and species composition of the TECs and PECs identified in the desktop review to determine whether vegetation in the study area was representative of any conservation significant ecological communities.

2.3 SURVEY LIMITATIONS

The limitations of the survey have been considered in accordance with the *Technical Guidance: Flora and vegetation surveys for Environmental Impact Assessment* (EPA 2016b) (Table 2-2).

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Table 2-2 Survey limitations

Limitations	Limitation for this survey?	Comments
Availability of contextual information at a regional and local scale	No	The database searches provided a comprehensive list of conservation significant flora and ecological communities.
Competency/experience of survey personnel, including taxonomy, and experience in the region surveyed	No	The surveys were conducted by two teams of two personnel. Each team was led by a botanist with more than 20 years experience in conducting flora and vegetation surveys in Western Australia (Dr Grant Wells and Dr Andrew Batty). The other two survey personnel were supporting the lead botanists. Dr Grant Wells undertook his PhD studies in the Kimberley region and is an expert on <i>Triodia</i> species.
Proportion of flora recorded and/or collected, and any identification issues	No	All plant specimens collected that were considered to potentially resemble conservation significant flora were identified to species level.
Effort and extent; was the appropriate area fully surveyed	Slight	Due to the small size of some of the target species (herbs) it is possible that some plants may have been missed during the targeted searches.
Access within the survey area	No	All of the study area was readily accessible.
Timing, rainfall, season	Slight	Above average rainfall in the summer wet season prior to the survey promoted establishment of annual species which were in flower at the time of the survey. However, the survey was conducted outside the flowering period of some conservation significant flora species. In addition, many of the Poaceae species present were sterile or had old inflorescence devoid of flowers or achenes at the time of the survey and it is possible that conservation significant Poaceae species present in the survey area were not identifiable at the time of the survey.
Disturbance that may have affected the results of the survey	Yes	Large areas of the vegetation surrounding the borrow pits were previously cleared. This may have influenced the species present in the area.

3 EXISTING ENVIRONMENT

3.1 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA

The Interim Biogeographic Regionalisation of Australia (IBRA) defines 'bioregions' as large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems (Thackway & Cresswell 1995). They categorise the large-scale geophysical patterns that occur across the Australian continent that are linked to fauna and flora assemblages and processes at the ecosystem scale (Thackway & Cresswell 1995).

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

The study area lies within the Victoria Bonaparte P1 (VB1) subregion of the Victoria Bonaparte bioregion (VB1; Figure 3-1). The VB1 sub-region covers 1,932,467 ha (Graham 2001). The Bonaparte Basin in the north-west comprises Quaternary marine sediments supporting Samphire – *Sporobolus* grasslands and mangal and open savannah of high grasses on red earth plains and black soil plains. The Victoria Plateau occurs in the south and east with plateau and abrupt ranges of Proterozoic sandstone covered by skeletal sandy soils with low tree savannahs and hummock grasslands (Graham 2001). Limited areas of gently undulating terrain support low snappy gum over hummock grasslands and gentle sloping floodplains with *Melaleuca minutifolia* low woodland over annual sorghums.

Rare features of the VB1 subregion include:

- Ramsar listed wetlands of the Ord floodplain and Lake Kununurra
- 'Wet' tropical river of the lower Ord River
- Man-made wetlands of Lake Kununurra
- Alluvial plain systems of the Ord and Weaber plains.

3.2 LAND SYSTEMS

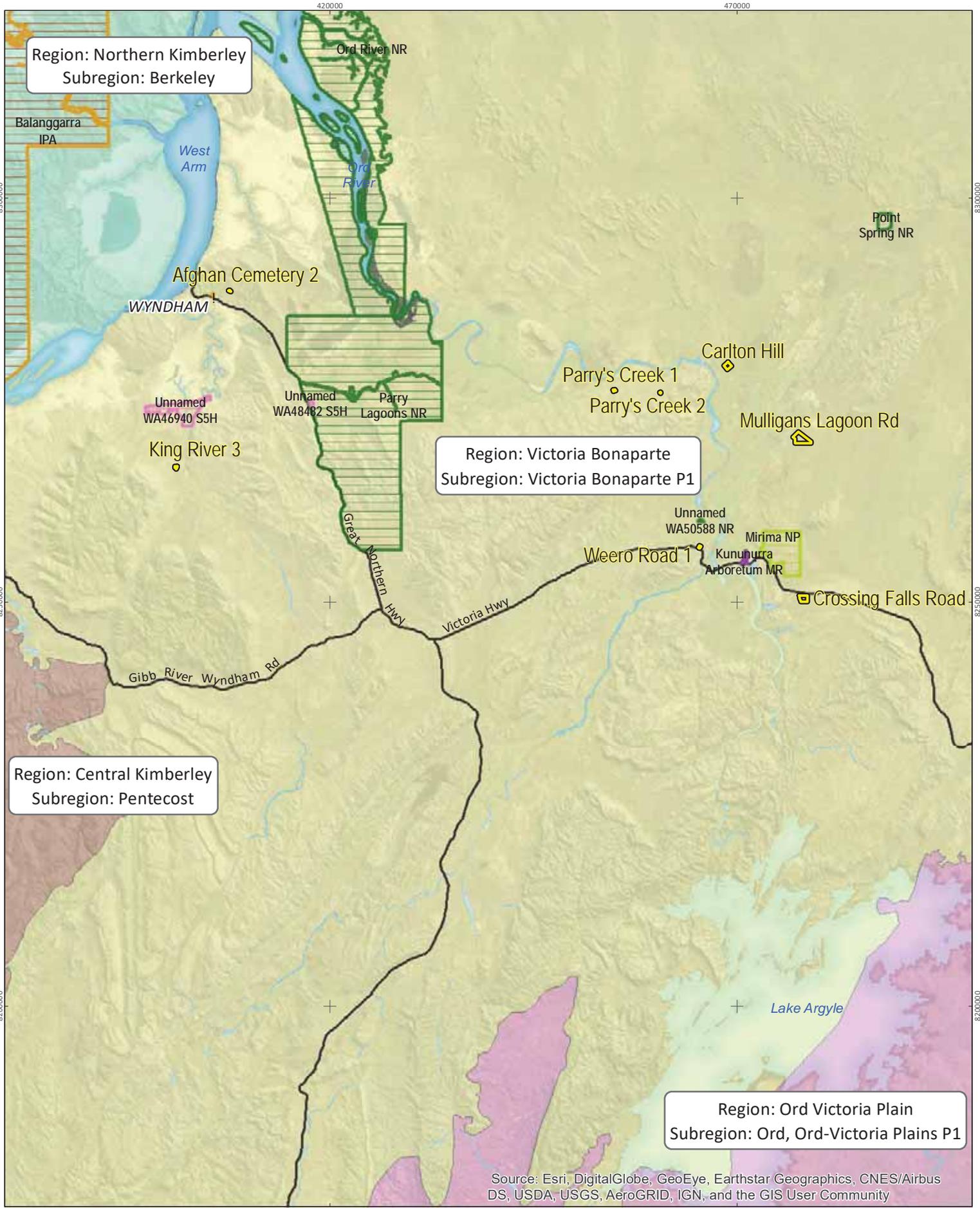
The Department of Agriculture and Food WA has mapped broad land systems from aerial photography. Land systems are grouped according to a combination of landform, soils, vegetation and drainage patterns (Schoknecht & Payne 2011). The study area contains six land systems (Figure 3-2) with the Cockatoo and Dinnabung systems comprising the majority of the study area (Table 3-1). Less than 1% of each land system, and in most cases less than 0.1%, is represented in the study area.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Table 3-1 Extent of each land system present in the study area

Land system	Description	Total area (ha)	Area in study area (ha)	Proportion (%) of land system in study area	Proportion (%) of study area represented by land system
Cockatoo System	Gently undulating plains with deep sand soils on sandstone and calcareous sandstone supporting stringybark-bloodwood woodlands over upland tall grass.	23,7290.36	246.37	0.10	74.52
Cockburn System	Low hills and undulating plains on shale supporting curly spinifex grasslands or paperbark sparse low woodlands over curly spinifex.	23,4043.59	13.86	0.01	4.19
Dinnabung System	Gently undulating plains and low rises on limestone and shale supporting grey box-bloodwood woodlands over Tippera tall grass and upland tall grass.	107,120.53	44.74	0.04	13.53
Frayne System	Undulating plains, slopes and low hills of basalt with predominantly red soils supporting bloodwood-southern box or silver box sparse low woodlands over Tippera tall grasses.	118,672.98	4.03	0.00	1.22
Ivanhoe System	Alluvial flood plains with black cracking clay soils supporting blue grass grasslands and minor eucalypt woodlands with frontage tall grasses.	135,925.50	21.63	0.02	6.54
Pinkerton System	Ridges, hogbacks, cuervas, and structural plateaux of sandstone, siltstone, and shale supporting stringybark-bloodwood woodlands over upland tall grass.	2,572,677.61	0.00	0.00	0.00
	TOTAL		330.62		100.00



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

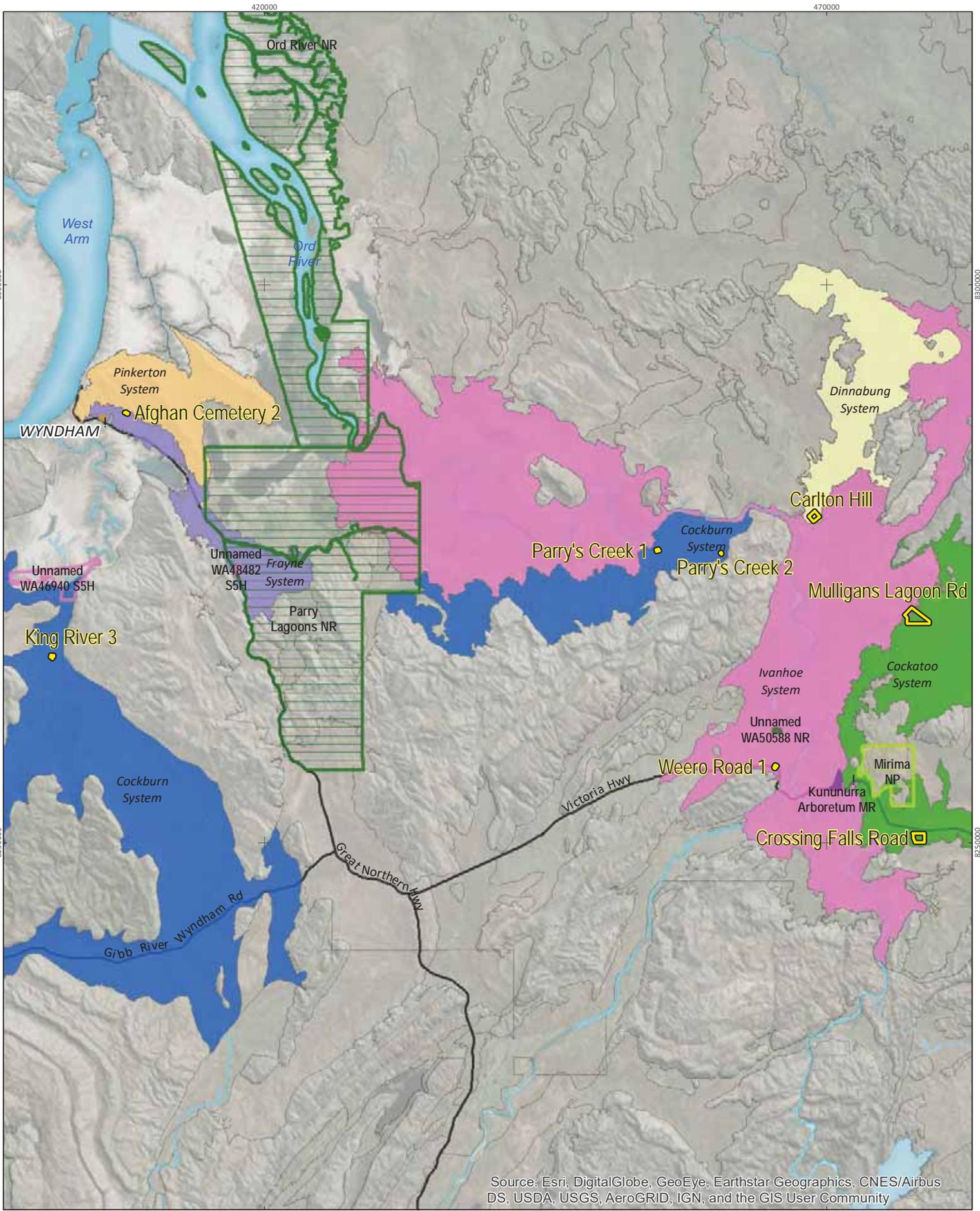


Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:600,000 (at A4) GDA 1994 MGA Zone 52	

- | | |
|--------------------|---------------------------------|
| Study area | 5(1)(h) Reserve (S5H) |
| IBRA region | Nature Reserve (NR) |
| Victoria Bonaparte | Miscellaneous Reserve (MR) |
| Central Kimberley | Indigenous Protected Area (IPA) |
| Northern Kimberley | National Park (NP) |
| Ord Victoria Plain | |
- Australian Protected Areas Database (CAPAD)

Figure 3-1
IBRA region of the study area





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Shire of Wyndham East Kimberley borrow pits		○
Project No	1149	
Date	28-Aug-17	
Drawn by	KW	
Map author	GW	
1:435,000 (at A4)		GDA 1994 MGA Zone 52

- Study area**
- Land systems within the study area
 - Cockatoo System
 - Cockburn System
 - Dinnabung System
 - Frayne System
 - Ivanhoe System
 - Pinkerton System
 - All other land systems

- Australian Protected Areas Database (CAPAD)**
- 5(1)(h) Reserve (SSH)
 - Nature Reserve (NR)
 - Miscellaneous Reserve (MR)
 - Indigenous Protected Area (IPA)
 - National Park (NP)

Figure 3-2
Land systems of the study area



Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

3.3 CLIMATE AND WEATHER

The nearest Bureau of Meteorology (BOM) weather station to the study area with comprehensive data collection and historic climate data is located at Kununurra (Latitude: 15.78°S, Longitude: 128.71 °E). On average, Kununurra records the highest maximum mean monthly temperature (39 °C) in November and the lowest maximum mean monthly temperature (30.4 °C) in June. Average annual rainfall is 833.4 mm with December to March (the wet season) recording the highest monthly averages (141.7, 209.6, 216.7 and 149.8 mm respectively) and very little rain in the dry season, June to September (Figure 3-3). Tropical rain-bearing depressions can cause heavy rainfall events in the wet season (BoM 2016).

Mean monthly temperatures recorded in the 12 months preceding the field survey were comparable with averages, aside from June 2016, which had higher temperatures than average. Total monthly rainfall for the 12 months preceding the survey was above the long-term monthly average (1,468.2 mm) with approximately 70% above average rainfall recorded in December, January and February 2017. The largest difference in rainfall occurred in September 2016, which received more than 10 times the average rainfall amount for the month with the majority of the rain falling in just two days.

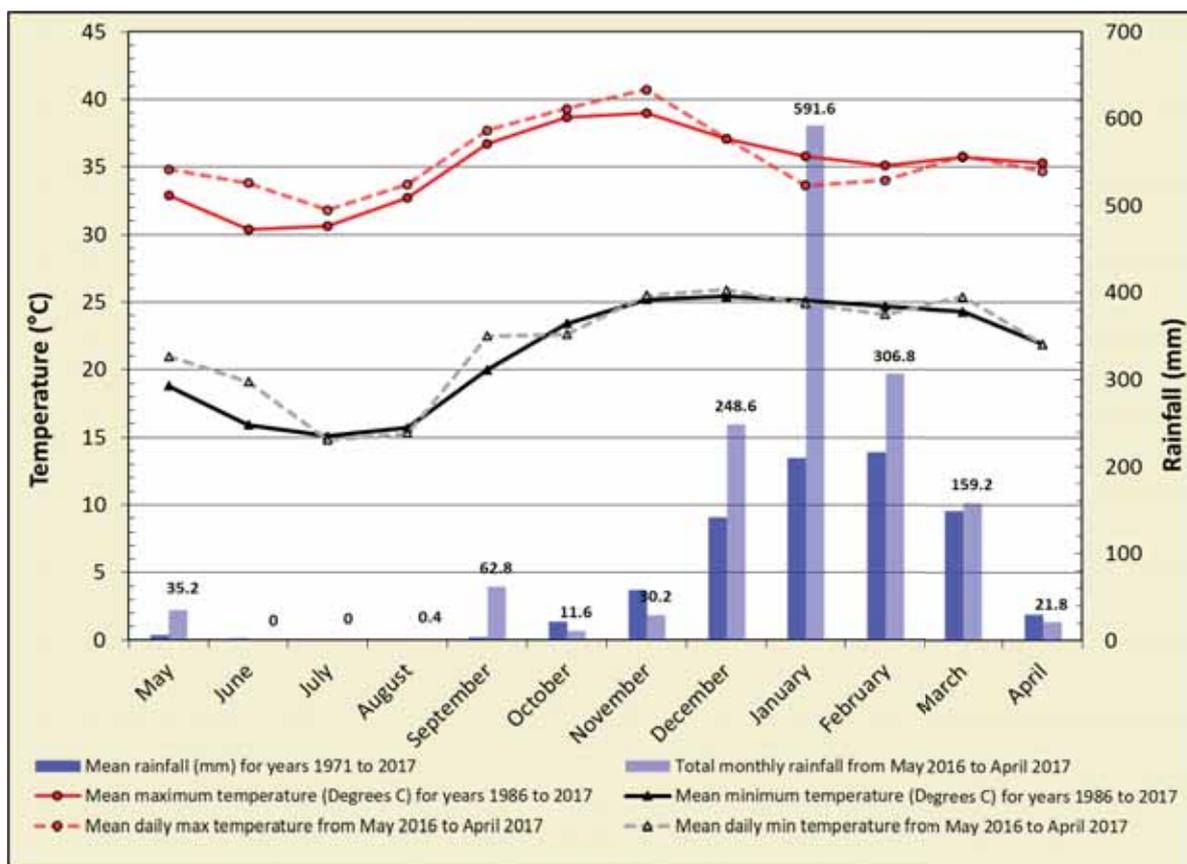


Figure 3-3 Annual climate data (average monthly temperatures and rainfall records) and records for the year preceding the field survey for 'Kununurra Aero' weather station (no. 002056) (BoM 2016)

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

4 RESULTS

4.1 DESKTOP REVIEW

4.1.1 Conservation significant flora

A total of 65 conservation significant flora species were identified from the database searches as previously recorded within a 40 km radius of the study area (Table 4-1). These species included:

- 1 Threatened Flora species, listed under the WC Act as Endangered
- 33 Priority 1 species
- 9 Priority 2 species
- 21 Priority 3 species
- 1 Priority 4 species.

Of the species listed above, 52 were recorded within a 20 km buffer of the study area (Figure 4-1). No database records of conservation significant species occurred within the study area.

Table 4-1 Conservation significant flora species identified by the database searches

Species	Conservation status	Habitat
<i>Typhonium</i> sp. Kununurra (A.N. Start ANS 1467)	Threatened (S2, EN)	Dark grey clay, black soil. Sites which are waterlogged in summer and inundated after rain (DBCA 2017).
<i>Acacia hypermeces</i>	Priority 1	Alluvial sand over sandstone (ALA 2017; DBCA 2017).
<i>Clerodendrum inerme</i>	Priority 1	Somewhat saline habitats, behind beach (DBCA 2017). Primarily found in scattered shrublands, closed and sparse woodlands (ALA 2017).
<i>Croton arnhemicus</i>	Priority 1	Found in monsoon forest, drier rain forest and along creeks and rivers through open forest country (Centre for Australian National Biodiversity Research 2010). In a cleft in sandstone rocks at the base of a sandstone cliff (DPaW 2016b).
<i>Cyperus digitatus</i>	Priority 1	Found in swamps or seasonally flooded areas, ditches and river banks and also open grasslands (Kumar 2011).
<i>Desmodium flagellare</i>	Priority 1	Cracking clay (DBCA 2017). Primarily found in sparse woodlands often with herbaceous graminoids open tussock grasslands, also found in open and scattered woodlands, and rarely in rainfed graminoids and closed shrublands (ALA 2017).
<i>Echinochloa kimberleyensis</i>	Priority 1	Found in swamps and black soils (DBCA 2017). In moist brown loam in sedgeland and woodland of <i>Melaleuca viridiflora</i> with <i>Stylosanthes hamata</i> , <i>Waltheria indica</i> , <i>Brachychiton tuberculata</i> , <i>Goodenia sepalosa</i> . Also found with <i>Eucalyptus microtheca</i> and <i>Exoecaria parvifolia</i> (DPaW 2016b).
<i>Fimbristylis pachyptera</i>	Priority 1	Sand in shallow channels and depressions on low barren gravelly laterite ridge slopes (DBCA 2017).
<i>Goodenia brachypoda</i>	Priority 1	Red sandy loam (DBCA 2017). Primarily found in sparse woodlands sometimes with herbaceous graminoids sparse hummock grasslands, can also be found in open woodlands (ALA

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Conservation status	Habitat
		2017).
<i>Goodenia durackiana</i>	Priority 1	Found in grasslands on black cracking soils (Carolin 1990).
<i>Goodenia malvina</i>	Priority 1	Grasslands on cracking black clay soils in seasonally wet areas (Carolin 1990; DBCA 2017). Primarily found in sparse to open woodlands sometimes with herbaceous graminoids open tussock grasslands in rainfed areas (ALA 2017).
<i>Heliotropium alcyonium</i>	Priority 1	Found in disturbed open forest on sandy laterite, in laterite on gentle slopes from sandstone hills, in skeletal laterite with slight podsolisation, and in woodland in reddish brown sandy soil with laterite (Craven 1996).
<i>Heliotropium cupressinum</i>	Priority 1	Found in mixed woodland on the lower reaches of steep sandstone slopes, and on an open flat with stony yellow sandy soil dominated by <i>Aristida hygrometrica</i> (Craven 1996).
<i>Heliotropium tachyglossoides</i>	Priority 1	Cockatoo sand (DBCA 2017). <i>Eucalyptus brevifolia</i> open woodland, sandy soil amongst rocks in small sandstone valley (ALA 2017), mid high open woodland of <i>Eucalyptus pruinosa</i> with some <i>Corymbia terminalis</i> over medium grass layer, sandy site on edge of levee forming high bank of Humbert River channel.
<i>Hullisia argillicola</i>	Priority 1	Heavy clay soils, in seasonally inundated regions e.g. swamps, cracking clay plains, paddocks (DBCA 2017). Damper lower areas of cracking clay plain with nardoo (ALA 2017), in and out of water on edge of seasonal (<i>Eucalyptus microtheca</i>) swamp, widely scattered plants in ephemeral marsh, sparse cover of annual herbs and grasses.
<i>Hydrolea zeylanica</i>	Priority 1	Found on pond margins, along creeks in swampy or inundated soils in open forests (DBCA 2017; Gupta 2011).
<i>Iseilema trichopus</i>	Priority 1	Sandy loam (DBCA 2017). Primarily found in herbaceous graminoids open tussock grasslands, can also be found in sparse to open woodlands, rarely in non-vegetated waterbodies and herbaceous graminoids rainfed pastures (ALA 2017).
<i>Jacquemontia</i> sp. Keep River (J.L. Egan 5051)	Priority 1	Primarily occurs in sparse woodland (ALA 2017). Found in lower sandy slope from large sandstone hills in Eucalypt sorghum savannah (DPaW 2016b).
<i>Lepturus copeanus</i>	Priority 1	Soil pockets in cracks in dolomite hills (DBCA 2017). In a mixed shrubland with <i>Sorghum stipoides</i> (DPaW 2016b).
<i>Marsdenia glandulifera</i>	Priority 1	Found in vine thickets (DBCA 2017). Primarily occurs in closed forests and in open woodland (ALA 2017).
<i>Polygala crassitesta</i>	Priority 1	Almost always found on black clay or cracking clay soils in grasslands with <i>Dichanthium</i> Willemet, <i>Astrelba</i> F.Muell. and <i>Iseilema</i> Andersson, often with <i>Eucalyptus microtheca</i> F.Muell., <i>E. pruinosa</i> Schauer, <i>Corymbia terminalis</i> (F.Muell.) K.D.Hill & L.A.S.Johnson or <i>Bauhinia cunninghamiana</i> (Benth.) Benth (Kerrigan 2012).
<i>Scaevola</i> sp. Cockburn Range (G.W. Carr 3369 & A.C. Beaglehole 47147)	Priority 1	Recorded at a single location growing close to creekline in a sandstone gorge (ALA 2017).

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Conservation status	Habitat
<i>Scleria annularis</i>	Priority 1	Sandy soils (DBCA 2017). Primarily occurs in sparse woodlands (ALA 2017) can also be found in scattered and open woodlands sometimes with herbaceous graminoids sparse hummock grasslands, recorded in open swampy drainage line in grassland with scattered <i>Eucalyptus confertiflora</i> and <i>E. pruinosa</i> .
<i>Solanum pugiunculiferum</i>	Priority 1	Heavy soils (DBCA 2017). Margins of seasonal wetlands or lagoons (ALA 2017), flat marine plain, adjacent to salt pans, Grasslands, dark grey silty cracking clay, scattered along roadside. Herbland. Saltflat. Saline soil. In saline depression behind coastal sand dune (ALA 2017).
<i>Sphaeranthus africanus</i>	Priority 1	Foreshore, grassy area near tidal zone of Adolphus island (DBCA 2017).
<i>Sphenoclea zeylanica</i>	Priority 1	Occurs in seasonally wet areas, on moist soil or on low riverbanks, along ditches, marshes, dry riverbeds and ponds (Mani 2014). Grey clay to black peaty clay. Monsoon thickets, mound spring (DBCA 2017).
<i>Tephrosia</i> sp. Saw Ranges (D. Kabay s.n. PERTH 06720544)	Priority 1	Found on sandstone substrate, with <i>Triodia</i> , or in <i>Corymbia collina</i> or <i>E. miniata</i> woodland (Butcher <i>et al.</i> no date).
<i>Trachymene oleracea</i> subsp. <i>sedimenta</i>	Priority 1	Limestone or sandstone on inland ranges (DBCA 2017).
<i>Triodia fitzgeraldii</i>	Priority 1	Occurs on rocky skeletal soils and sandstone hills (DBCA 2017).
<i>Triodia racemigera</i>	Priority 1	Found on sandstone and steep rocky slopes, crevices, cliffs and ridges (DBCA 2017). Primarily occurs in sparse woodland and open woodland and rarely in scattered woodland (ALA 2017).
<i>Triodia triticoides</i>	Priority 1	Found on rocky sandstone and limestone hillslopes (DBCA 2017). Primarily occurs in open woodland and sparse woodland and occasionally in scattered woodland (ALA 2017).
<i>Utricularia stellaris</i>	Priority 1	Found in swamps and lagoons (DBCA 2017). Primarily occurs in sparse woodland (ALA 2017). Found in dense closed grassland with outer perimeter fringed with <i>Melaleuca viridiflora</i> and with <i>Eucalyptus microtheca</i> scattered in the wetter parts of the swamp (DPaW 2016b).
<i>Utricularia tubulata</i>	Priority 1	Ephemeral swamps (DBCA 2017). Suspended aquatic herb floating in a large swamp (ALA 2017), flooded grassland on edge of large swamp.
<i>Zornia areolata</i>	Priority 1	Primarily occurs in sparse woodland and often in open woodland (ALA 2017). Found in grey silt soil in woodland of <i>Corymbia</i> sp. <i>Melaleuca</i> sp. Over grassland of <i>Sorghum</i> sp., <i>Aristida holathera</i> var. <i>holathera</i> and <i>Fimbristylis cardiocarpa</i> .
<i>Eucalyptus ordiana</i>	Priority 2	Skeletal soils over sandstone or quartzite, steep rocky outcrops (DBCA 2017). Shrublands and low open woodlands on the upper slopes of sandstone ranges, associated species include <i>Terminalia canescens</i> , <i>Triodia</i> spp., <i>Eucalyptus brevifolia</i> and <i>E. confluens</i> (Hill & Johnson 1992).
<i>Fimbristylis laxiglumis</i>	Priority 2	Black clay (DBCA 2017). Ditch in raised banks beside road, red

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Conservation status	Habitat
		gravelly sand-clay, disturbed cultivated floodplain adjacent, vegetation dominated by <i>Sesbania</i> , remnant herbfield with <i>Mimosa</i> sp., <i>Fimbristylis</i> in ditch, Kununurra black clay in rice bays (ALA 2017).
<i>Hibiscus calcicola</i>	Priority 2	Occurs on red clay soils on limestone at the foot of limestone karst (Juswara & Craven 2005).
<i>Minuria macrorhiza</i>	Priority 2	Red clay or loam, laterite or bauxite in sandstone gullies, exposed sheets basalt or among tumbled boulders in grasslands (DBCA 2017).
<i>Nymphaea immutabilis</i>	Priority 2	Occurs in permanent or ephemeral waterholes (DBCA 2017). Found in herb field (DPaW 2016b).
<i>Platysace saxatilis</i>	Priority 2	Sand, sandstone, valleys and hills, in crevices in the rock face, on sides of gorges, on cliff sides (DBCA 2017). Ruiniform sandstone towers with occasional <i>Eucalyptus pyrophora</i> , on sandy bank beside permanent watercourse in sandstone gorge; <i>Syzygium angophoroides</i> open forest (ALA 2017).
<i>Tephrosia</i> sp. Kununurra (T. Handasyde TH00 250)	Priority 2	Collected from sandstone country associated with gorges and sandy creeklines, in open, <i>Corymbia</i> spp. Tall woodland (Butcher <i>et al.</i> no date).
<i>Utricularia aurea</i>	Priority 2	Found on river edges (DBCA 2017). Primarily occurs in sparse woodland and open woodland and rarely found in closed woodland (ALA 2017).
<i>Zeuxine oblonga</i>	Priority 2	Found in a bog near springs under a closed canopy rainforest (DBCA 2017). Also found in swampy areas adjacent to streams, in dark and moist areas or sheltered road embankments, gutters and tracks (Jones <i>et al.</i> 2010).
<i>Acacia jasperensis</i>	Priority 3	Found on rocky hillsides and sandstone outcrops (Maconochie 1983). Primarily occurs in sparse woodland, can also be found in scattered woodland and open woodland (ALA 2017).
<i>Acacia richardsii</i>	Priority 3	Found on rocky sandstone areas as well as hills and creek beds (DBCA 2017). Primarily occurs in sparse woodland (ALA 2017).
<i>Acacia</i> sp. Cockburn Range (R. Pullen 10. 763)	Priority 3	Red earth on erosion surface of plain above river or in rock outcrops and shrub grassland (DBCA 2017). Primarily occurs in sparse woodland with open tussock grasses (ALA 2017).
<i>Brachychiton incanus</i>	Priority 3	Sandy soils over sandstone or quartzite on rocky slopes, scarps and ridges (DBCA 2017). Primarily occurs in isolated shrubland and can also be found in scattered or sparse woodland with open tussock grasses and in non-vegetated water bodies. Rarely occurs in closed shrubland (ALA 2017).
<i>Brachychiton tuberculatus</i>	Priority 3	Red or yellow sand, undulating plains (DBCA 2017). Primarily occurs in sparse woodlands, can also be found in scattered and open woodlands and in non-vegetated water bodies. Rarely in closed woodlands (ALA 2017).
<i>Euphorbia stevenii</i>	Priority 3	Clay, sandy soils (DBCA 2017). Primarily occurs in sparse woodlands often with herbaceous graminoids hummock and tussock grasslands. Can be also found in scattered and open

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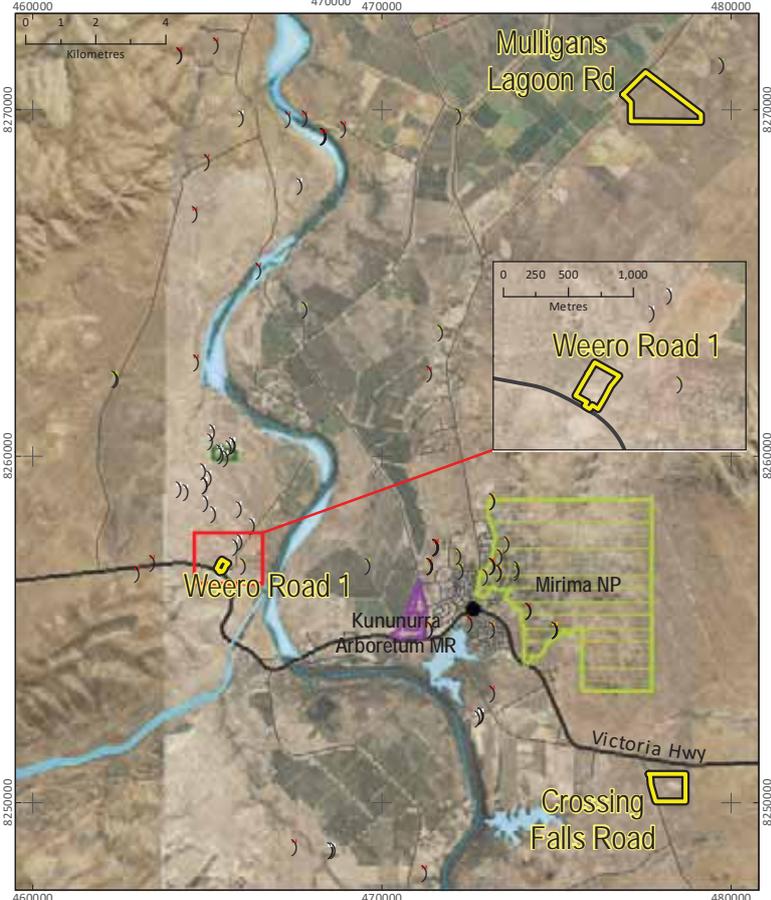
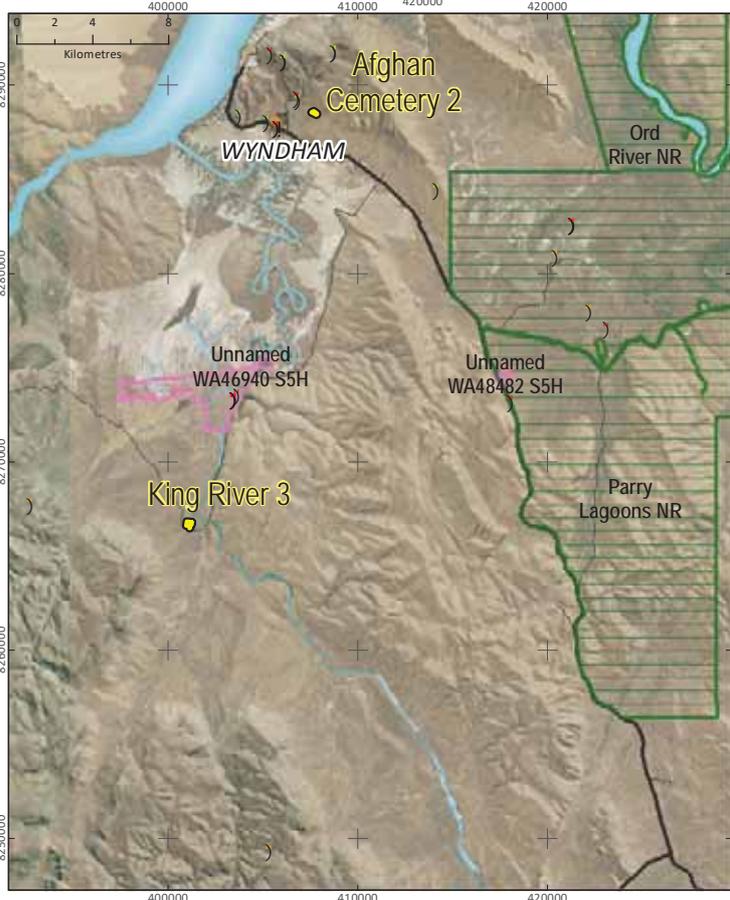
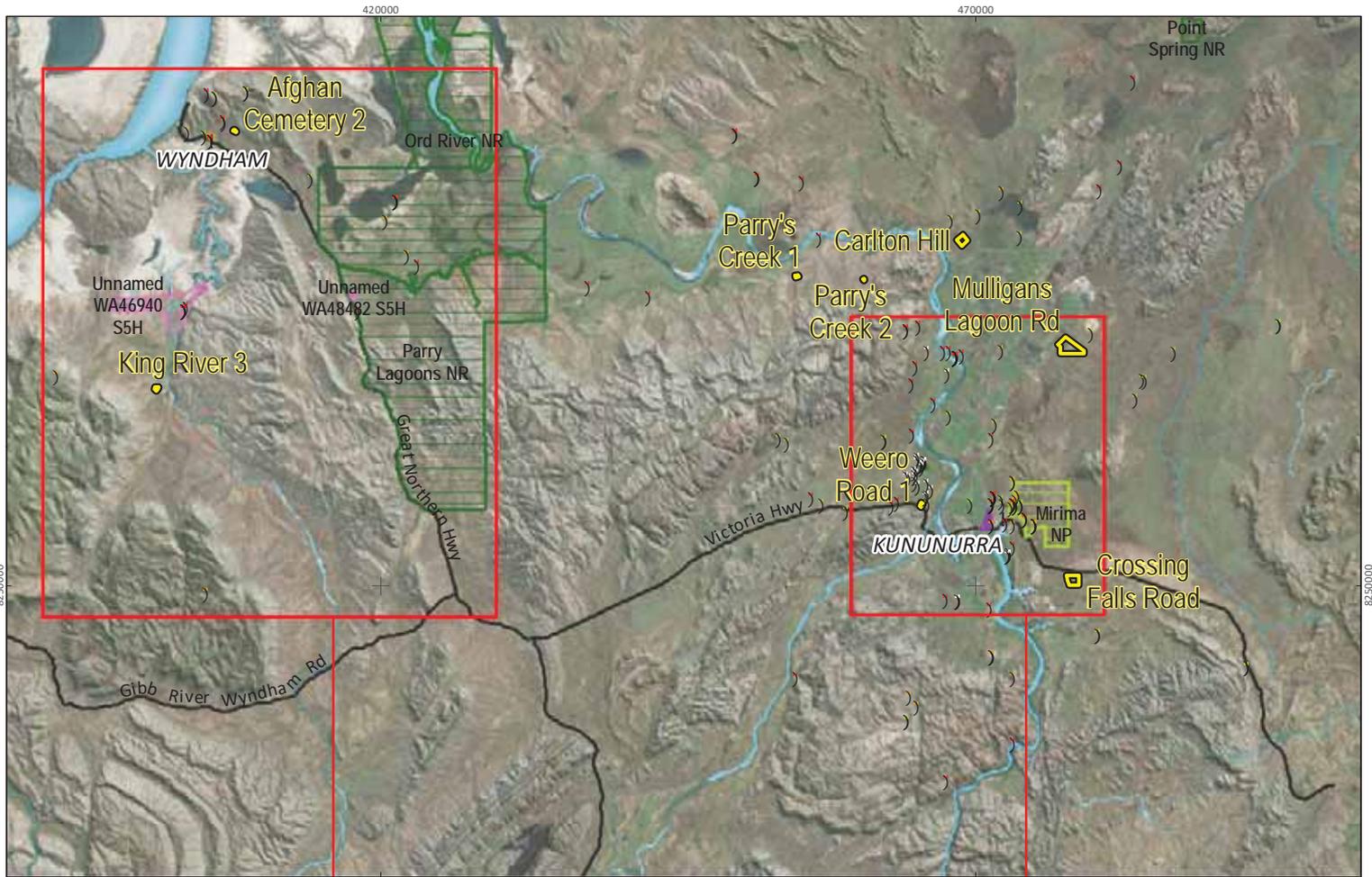
Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Conservation status	Habitat
		woodlands, shrublands, and non-vegetated waterbodies and rainfed areas (ALA 2017).
<i>Fuirena incrassata</i>	Priority 3	Found in sand or sandy clay in swamps and creek beds or on claypans in semi-saline lakes (DBCA 2017). Primarily occurs in sparse woodlands often with herbaceous sparse hummock grasslands. Can also be found in open woodlands (ALA 2017).
<i>Fuirena nudiflora</i>	Priority 3	Sand, swamps, creek beds (DBCA 2017). Primarily occurs in sparse woodlands often with herbaceous graminoids sparse hummock grasslands. Can be also found in scattered, open and woodlands (ALA 2017).
<i>Gardenia sericea</i>	Priority 3	Sandstone (DBCA 2017). Found in savannah woodland on sandy plains and scree slopes (Pattock 1997).
<i>Goodenia byrnesii</i>	Priority 3	Black soil plains in grassland or in sand on edge of creek (DBCA 2017). Primarily occurs in sparse woodland and can also be found in open tussock grassland (ALA 2017).
<i>Goodenia purpurascens</i>	Priority 3	Clay or mud in swamps and seasonally wet depressions (DBCA 2017). Primarily occurs in sparse woodland and can also be found in open woodland. Rarely occurs in closed woodland (ALA 2017).
<i>Hibiscus panduriformis</i>	Priority 3	Found on black basaltic soil, in swampy <i>Eucalyptus</i> woodland or in a floodway with <i>Acacia</i> , <i>Iseilema</i> and <i>Eragrostis</i> or on a river flood plain (Juswara & Craven 2005).
<i>Ipomoea gracilis</i>	Priority 3	Black cracking clay or black sand in irrigated areas (DBCA 2017). Primarily occurs in sparse, open or closed woodland (ALA 2017).
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Priority 3	Found in damp habitats e.g. swamps or seepages. Can also be found in low open woodland on sandy lateritic flats or around periodic water holes, sink holes or bores and is often associated with <i>Eucalyptus microtheca</i> (DBCA 2017).
<i>Paspalidium distans</i>	Priority 3	Loam on river banks (DBCA 2017). Primarily occurs in open or closed woodland or in scattered shrubland (ALA 2017).
<i>Pityrodia obliqua</i>	Priority 3	Sandstone or quartzite, rocky faces in mountain ranges (DBCA 2017). Primarily occurs in sparse woodlands sometimes with herbaceous graminoids sparse hummock grasslands and in rainfed herbaceous graminoids, can be also found in scattered woodlands (ALA 2017).
<i>Synostemon hubbardii</i>	Priority 3	Found in grasslands, usually with Mitchell grass (<i>Astrebla</i> spp.), on plains in black cracking clay (Telford <i>et al.</i> 2016).
<i>Schoenus punctatus</i>	Priority 3	Watercourses in red sand (DBCA 2017). Primarily found in sparse and open woodland (ALA 2017). On a plain in light grey and red silty sand (DPaW 2016b).
<i>Stylidium prophyllum</i>	Priority 3	Sandy, black silty or clayey sandy soils, loam, seasonally wet floodway depressions & seepage areas (DBCA 2017). In white sandy soils, black silty soils and sand and laterite soils on wet season seepage areas and floodways, growing long and lax up through dense grass in wetter areas, shortly erect and self supporting in open areas amongst open grass and herbs with <i>Stylidium fissilobium</i> ., <i>S. costulatum</i> , <i>Drosera derbyensis</i> D.

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Conservation status	Habitat
		<i>indica</i> , <i>Byblis liniflora</i> subsp. <i>occidentalis</i> and <i>Utricularia chrysantha</i> in Silent Grove region; with <i>Drosera ordensis</i> , <i>Byblis liniflora</i> subsp. <i>liniflora.</i> , <i>Byblis liniflora</i> subsp. <i>occidentalis</i> <i>D. indica</i> , <i>Utricularia tridactyla</i> and <i>Utricularia chrysantha</i> west of Kununurra (Lowrie & Keneally 1997).
<i>Utricularia muelleri</i>	Priority 3	Seasonal swamps (DBCA 2017). Primarily occurs in sparse and open woodlands sometimes in water bodies. can be also found in closed woodlands, rarely in sparse herbaceous graminoids tussock or hummock grasslands and shrublands (ALA 2017).
<i>Whiteochloa capillipes</i>	Priority 3	Found in tropical and subtropical sub-humid woodlands (Simon & Alfonso 2011). In disturbed cockatoo sand plain in <i>Aristida hygrometrica</i> grassland (DPaW 2016b).
<i>Ficus lilliputiana</i>	Priority 4	Sandstone, rocky sites (DBCA 2017). Primarily occurs in sparse and scattered woodlands on rock faces sometimes with sparse herbaceous graminoids hummock grasslands (ALA 2017).



Shire of Wyndham	
East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
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- Study area
- DBCA conservation significant flora
- T
- P1
- P2
- P3
- P4

- Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (S5H)
 - Nature Reserve (NR)
 - Miscellaneous Reserve (MR)
 - Indigenous Protected Area (IPA)
 - National Park (NP)

Figure 4-1
Location of conservation significant flora from DBCA database searches occurring within 20 km of the study area



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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

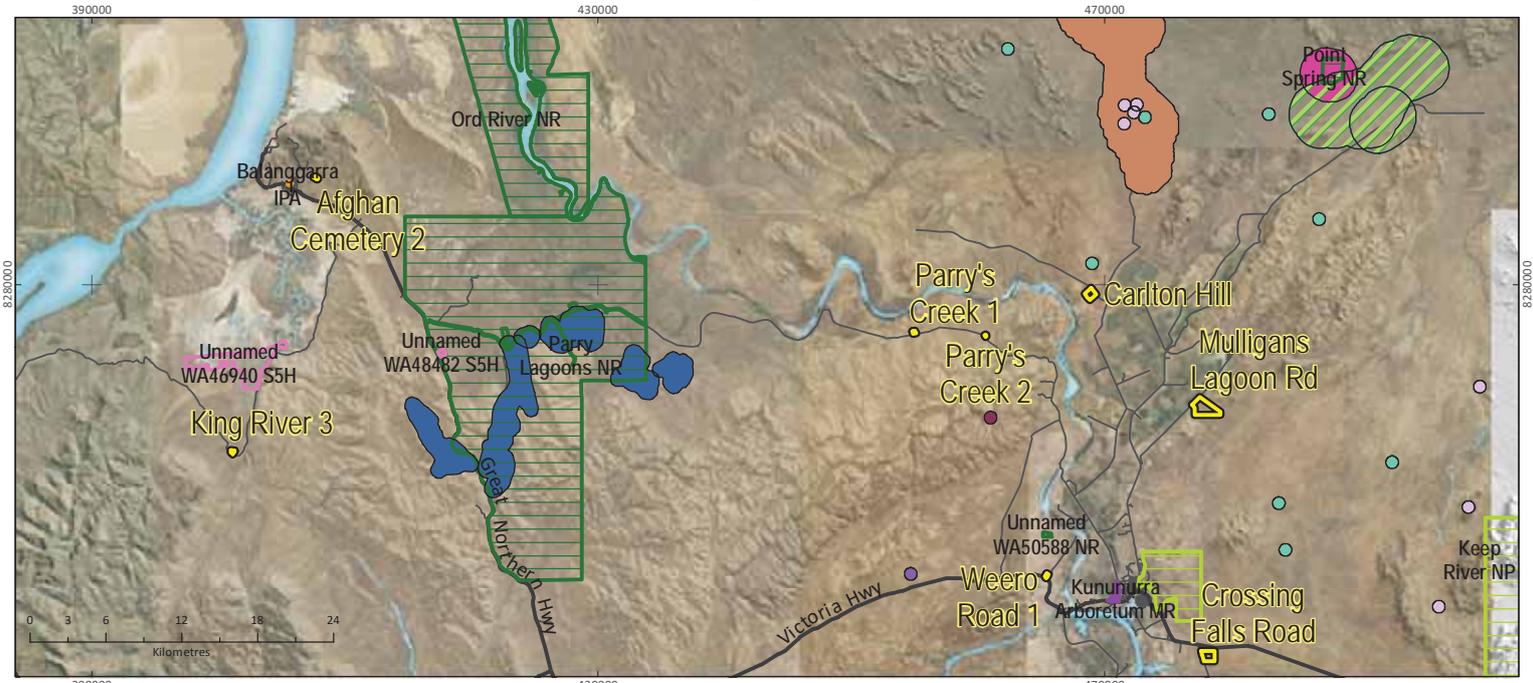
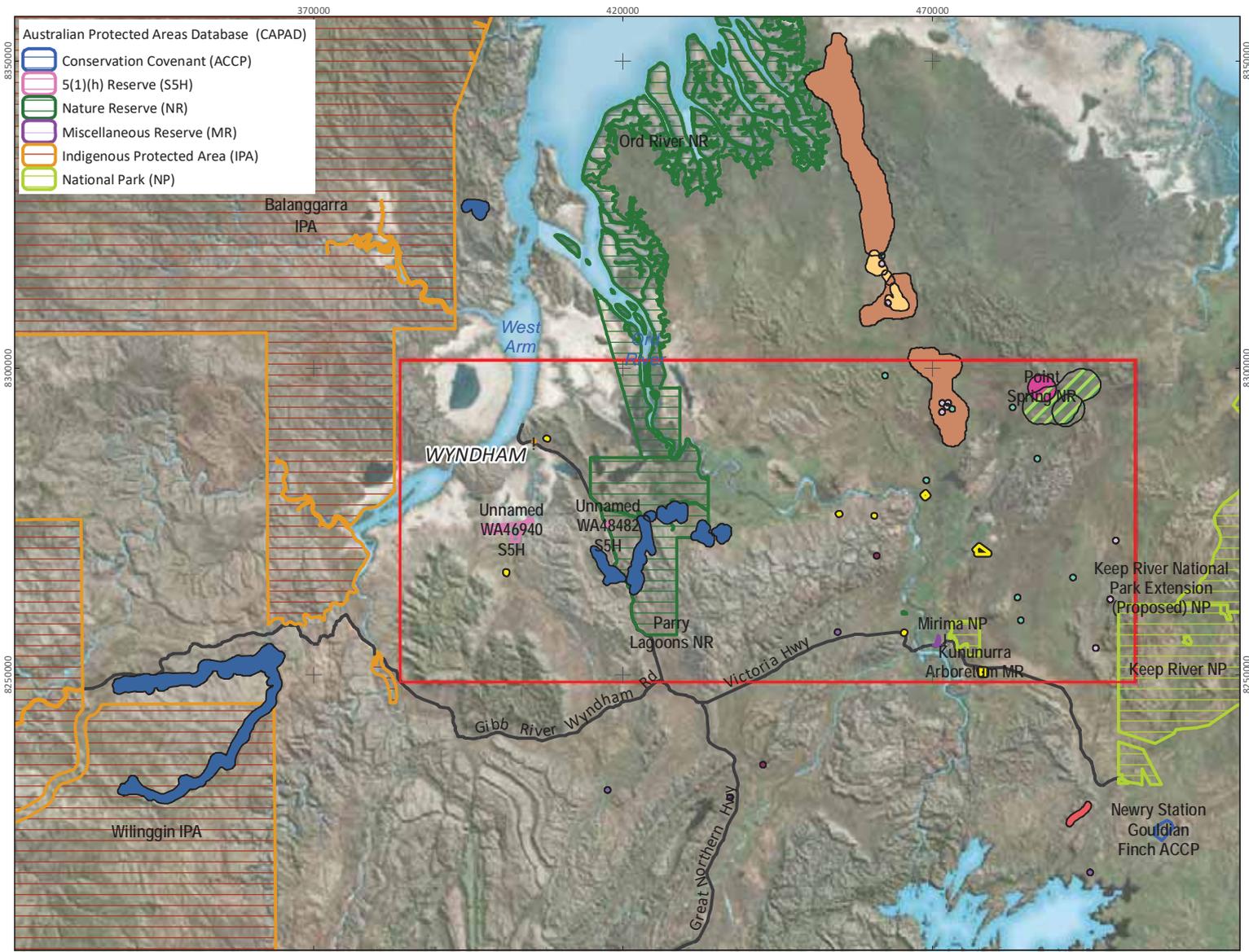
4.1.2 TEC/PECs

The DBCA threatened and priority ecological communities database search identified 10 PECs within a 40 km buffer of the study area (Table 4-2; Figure 4-2). The closest PEC, Dinnabung Land System (P3) occurs 1.09 km away from the study area. Other PECs are either Priority 1 or 3 and occur more than 5 km from the study area. No TECs were identified within 40 km of the study area in the desktop review.

The Dinnabung land system frequently occurs as broad expanses of gentle slopes between the limestone hills of the Tanmurra land system (Schoknecht & Payne 2011). It is characterised by plains and gentle slopes often with shallow soils and frequent limestone outcrops that support low eucalypt woodlands.

Table 4-2 Priority ecological communities recorded within 40 km of the study area

Community identification	Community name	PEC code	Approximate nearest location to study area
Vertical sandstone surfaces	Plant assemblages on vertical sandstone surfaces	P1	26.14 km
<i>Oryza australiensis</i>	<i>Oryza australiensis</i> (wild rice) grasslands on alluvial flats of the Ord River	P1	19.88 km
Point Spring	Assemblages of Point Spring rainforest swamp	P1	22.75 km
Kimberley Land Snails	Camaenid land snail and vine thicket assemblage of limestone hills (Jeremiah Hills and Ningbing Ranges)	P1	8.60 km
Dinnabung	Dinnabung Land System	P3	1.09 km
Ivanhoe Land System	Ivanhoe Land System	P3	5.52 km
Vegetation Association 838	Kimberley Vegetation Association 838	P3	13.50 km
Vegetation Association 908	Kimberley Vegetation Association 908	P3	26.60 km
Tanmurra Land System	Tanmurra Land System	P3	12.80 km
Willeroo Land System	Willeroo Land System	P3	6.59 km



Shire of Wyndham
East Kimberley borrow pits

Project No	1149
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1:1,000,000(at A4) GDA 1994 MGA Zone 52

- Study area
- Assemblages of Point Spring rainforest swamp (P1)
- Camaenid land snail and vine thicket assemblage of limestone hills (Jeremiah Hills and Ningbing Ranges) (P1)
- Oryza australiensis* (wild rice) grasslands on alluvial flats of the Ord River (P1)

- Plant assemblages on vertical sandstone surfaces (P1)
- Dinnabung Land System (P3)
- Ivanhoe Land System (P3)
- Kimberley Vegetation Association 838 (P3)
- Kimberley Vegetation Association 908 (P3)
- Tanmurra Land System (P3)
- Willeroo Land System (P3)

Figure 4-2
Location of PECs within 40 km of the study area

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

4.1.3 Declared pests and WoNS

A total of 16 declared pest flora species were identified from the database searches as previously recorded within 40 km radius of the study area (Table 4-3). The species included one WoNS, **Vachellia nilotica* subsp. *indica*.

Table 4-3 Declared pests identified in the database searches

Species	Status
* <i>Andropogon gayanus</i>	Declared pest
* <i>Cryptostegia grandiflora</i>	Declared pest
* <i>Cryptostegia madagascariensis</i>	Declared pest
* <i>Datura innoxia</i>	Declared pest
* <i>Jatropha gossypifolia</i>	Declared pest
* <i>Lantana camara</i>	Declared pest
* <i>Mimosa pigra</i>	Declared pest
* <i>Parkinsonia aculeata</i>	Declared pest
* <i>Parthenium hysterophorus</i>	Declared pest
* <i>Salvinia molesta</i>	Declared pest
* <i>Senna alata</i>	Declared pest
* <i>Sida acuta</i> subsp. <i>acuta</i>	Declared pest
* <i>Sida cordifolia</i>	Declared pest
* <i>Vachellia nilotica</i> subsp. <i>indica</i>	Declared pest, WoNS
* <i>Xanthium occidentale</i>	Declared pest
* <i>Ziziphus mauritiana</i>	Declared pest

4.2 FIELD SURVEY

4.2.1 Vegetation descriptions and condition

Vegetation types were described at 12 relevés including at least one for each borrow pit (Table 4-4; Figure 4-3). The two relevés for the Weero Rd borrow pit are outside the current study area (which was revised); however, the vegetation sampled is representative of that within the study area. All borrow pits included areas previously cleared that were devoid of vegetation.

Vegetation in the Crossing Falls Road borrow pit comprised *Corymbia* spp. woodlands over sparse mid to tall shrubs over closed *Sorghum* and *Triodia* spp. grasslands in sandy clay soils (Table 4-4). Vegetation condition varied from completely degraded in previously cleared areas devoid of vegetation to excellent areas of uncleared natural vegetation.

Vegetation in the Gravel Reserve borrow pit (Table 4-4) varied from mid *Corymbia* spp. woodland frequently over a mid to tall open *Brachychiton tuberculatus* shrubland over *Calytrix extipulata* shrubland over *Sorghum* sp., and *Triodia* sp. grassland in undisturbed natural vegetation in excellent condition to shrubland of *Acacia holosericea*, *Calytrix extipulata* and *Grevillea agrifolia* over a

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Sorghum and *Eragrostis* grassland in disturbed natural vegetation in good condition. A section of the borrow pit was completely degraded due to prior clearing leaving areas completely devoid of vegetation.

Table 4-4 Habitat described in the study area

Relevé	Borrow pit	Habitat description	Vegetation	Photograph
BPR001	Crossing Falls Road	Flat plain with red-orange, whitish sandy clay soil.	Mid open <i>Corymbia</i> sp. woodland over isolated mid <i>Brachychiton tuberculatus</i> shrubs over mid closed <i>Sorghum</i> sp. <i>Aristida holathera</i> and <i>Triodia</i> sp. grassland.	
BPR002	Crossing Falls Road	Undulating plain with brown/whitish sandy clay soil.	Mid <i>Corymbia flavescens</i> and <i>C.</i> sp. woodland isolated tall <i>Grevillea refracta</i> shrubs over low closed <i>Sorghum</i> sp. and <i>Triodia ?bitextura</i> grassland.	
BPR003	Crossing Falls Road	Flat plain with red-brown, whitish sandy clay soil.	Mid <i>Corymbia</i> sp. woodland over mid closed <i>Sorghum</i> sp. and <i>Triodia ?bitextura</i> grassland.	

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Relevé	Borrow pit	Habitat description	Vegetation	Photograph
BP021	Gravel Reserve	Flat plain with grey/whitish sandy clay soil.	Mid <i>Corymbia</i> sp. woodland over tall open <i>Brachychiton tuberculatus</i> shrubland over mid <i>Calytrix exstipulata</i> shrubland over <i>Sorghum</i> sp. grassland.	
BP02R2	Gravel Reserve	Undulating plain with red-orange/whitish sandy clay soil with laterite pebbles.	Isolated tall <i>Acacia holosericea</i> shrubs over mid <i>Calytrix exstipulata</i> and <i>G. agrifolia</i> subsp. <i>macrocarpa</i> shrubland over <i>Sorghum plumosum</i> and <i>Eragrostis</i> sp. closed grassland.	
BP03R01	Carlton Hill	Undulating plain with red-orange/whitish sandy clay soil with laterite pebbles.	Mid <i>Corymbia</i> sp., <i>Owenia vernicosa</i> and <i>Bauhinia cunninghamii</i> woodland over tall sparse <i>Cochlospermum fraseri</i> shrubland over tall closed <i>Sorghum ?australiensis</i> grassland.	
BP0401	Weero Road	Hill slope with brown sandy clay soil and granite rocks.	Low <i>Terminalia canescens</i> woodland over low <i>Triodia</i> sp. and <i>Sorghum australiense</i> grassland.	

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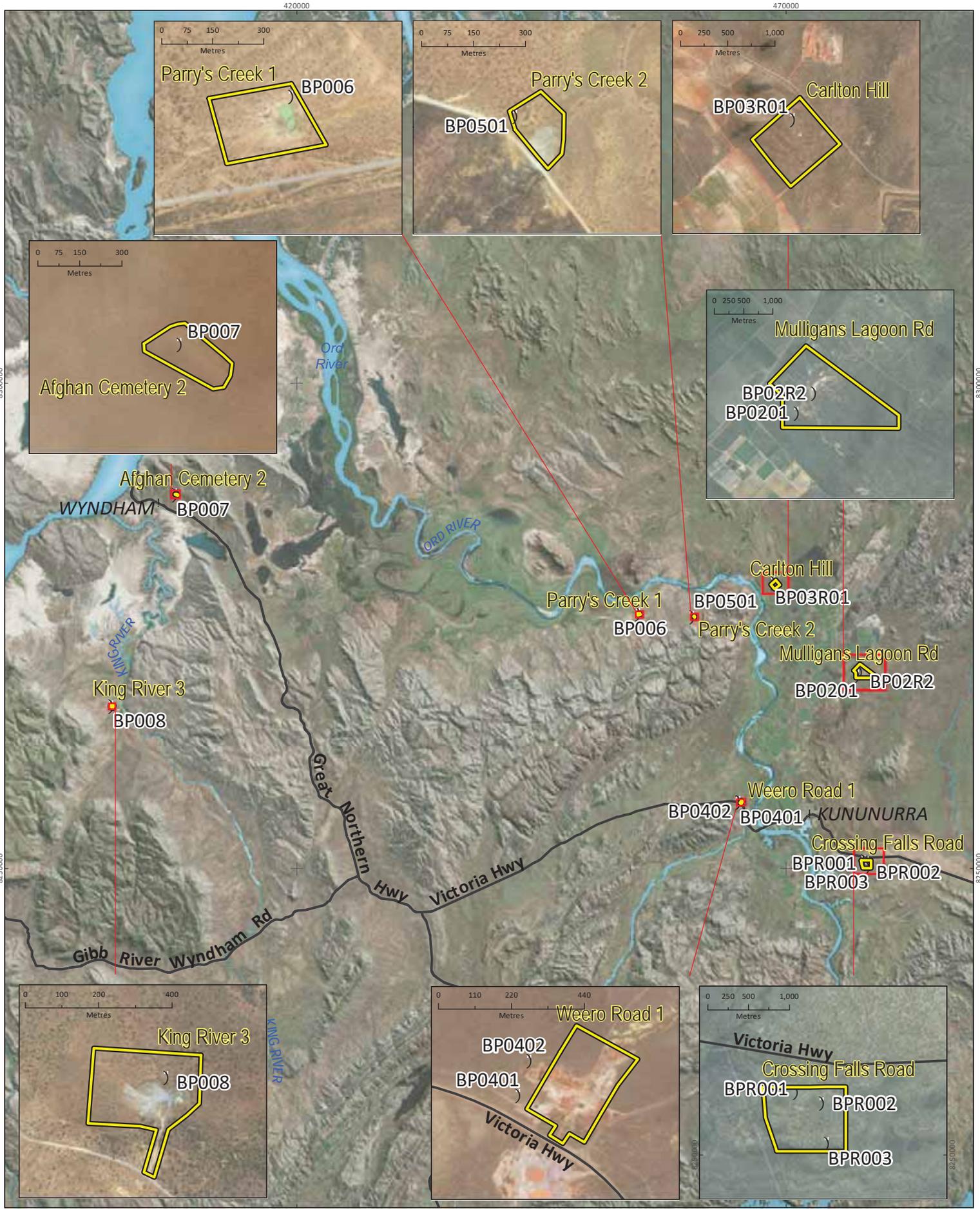
Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Relevé	Borrow pit	Habitat description	Vegetation	Photograph
BP0402	Weero Road	Flat plain with brown/whitish sandy clay soil and granite rocks.	Low <i>Corymbia</i> sp. and <i>Erythrina vespertilio</i> woodland over sparse low <i>Dodonaea hispidula</i> var. <i>arida</i> shrubland over <i>Triodia ?bitextura</i> and <i>Sorghum australiense</i> grassland.	
BP0501	Parry's Creek 1	Flat plain with yellow/whitish sandy clay soil.	Open low <i>Adansonia gregorii</i> woodland over tall open <i>Melaleuca minutifolia</i> over low <i>Schizachyrium fragile</i> and <i>Eragrostis</i> sp. grassland.	
BP006	Parry's Creek 2	Flat pain with grey/whitish sandy-clay/clay soil.	Sparse low <i>Adansonia gregorii</i> woodland over tall open <i>Melaleuca minutifolia</i> shrubland over sparse mid * <i>Vachellia farnesiana</i> shrubland over low mixed annual grass spp. grassland.	
BP007	Afghan Cemetery 2	Hill crest and slope with red-brown clay soil.	Low open <i>Erythrophleum chlorostachys</i> , <i>Terminalia canescens</i> and <i>Alstonia linearis</i> woodland over <i>Triodia bitextura</i> tussock grassland.	

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Relevé	Borrow pit	Habitat description	Vegetation	Photograph
BP008	King River	Flat plain with red-orange/whitish sandy clay/clay soil with sandstone rocks.	Isolated low <i>Adansonia gregorii</i> trees over tall <i>Melaleuca minutifolia</i> , <i>Terminalia canescens</i> and <i>Cochlospermum fraseri</i> shrubland over <i>Triodia bitextura</i> tussock grassland.	



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Project No	1149
Date	28-Aug-17
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- Study area
-) Relevé locations

Figure 4-3
Survey site locations in the study area



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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Vegetation at the Carlton Hill borrow pit (Table 4-4) comprised a mixed mid woodland over a tall sparse *Cochlospermum fraseri* shrubland over tall *Sorghum australiense* grassland. Much of the area showed evidence of historic clearing with multiple excavations and waste material 'dumps'. Vegetation condition ranged from completely degraded in areas devoid of vegetation to very good for vegetated areas.

Vegetation at the Weero Road borrow pit (Table 4-4) comprised a low *Terminalia canescens* woodland over low *Triodia* sp. and *Sorghum australiense* grassland on hill slopes in the study area to a low *Corymbia* sp. and *Erythrina vespertilio* woodland over sparse low *Dodonaea hispidula* var. *arida* shrubland over *Triodia ?bitextura* and *Sorghum australiense* grassland on flat plain. Vegetation condition ranged from completely degraded in cleared areas devoid of vegetation to very good for the vegetated areas which showed evidence of some historic clearing.

Vegetation at the Parry's Creek 1 borrow pit (Table 4-4) comprised open low *Adansonia gregorii* woodland over tall open *Melaleuca minutifolia* over low *Schizachyrium fragile* and *Eragrostis* sp. grassland. Vegetation condition ranged from completely degraded in cleared areas completely devoid of vegetation to very good in vegetated areas where a high level of grazing, livestock tracks and vehicle tracks were evident.

Vegetation at the Parry's Creek 2 borrow pit (Table 4-4) comprised sparse low *Adansonia gregorii* woodland over tall open *Melaleuca minutifolia* shrubland over sparse mid **Vachellia farnesiana* shrubland over low mixed annual grass spp. grassland. Vegetation condition ranged from completely degraded in cleared areas devoid of plants to good in vegetated areas that contained weed infestations, a high level of grazing, livestock tracks, excavation and vehicle tracks.

Vegetation at the Afghan Cemetery 2 borrow pit (Table 4-4) comprised low open *Erythrophleum chlorostachys*, *Terminalia canescens* and *Alstonia linearis* woodland over *Triodia bitextura* tussock grassland in undisturbed areas. Vegetation condition ranged from excellent in the undisturbed vegetation to completely degraded in cleared areas devoid of vegetation.

Vegetation at the King River borrow pit (Table 4-4) comprised isolated low *Adansonia gregorii* trees over tall *Melaleuca minutifolia*, *Terminalia canescens* and *Cochlospermum fraseri* shrubland over *Triodia bitextura* tussock grassland. Vegetation condition ranged from excellent in the undisturbed vegetation to completely degraded in cleared areas devoid of vegetation.

4.2.2 Conservation significant flora

No Commonwealth or State listed Threatened Flora were recorded in the survey. Targeted searches for the Threatened species *Typhonium* sp. Kununurra (A.N. Start ANS 1467) at four database records, two located in close proximity to the Weero Road borrow pit and two located near the Crossing Falls Road borrow pit, were conducted to familiarise field staff with habitat for the species, but no plants could be located.

One Priority Flora species was recorded in two borrow pits in the study area during the survey, *Brachychiton tuberculatus* (P3; Figure 4-4).

4.2.2.1 *Brachychiton tuberculatus*

Status: Priority 3 (DPaW)

Description: Shrub or tree 2-7 m high with cream-green or orange-red flowers. Recorded flowering in April or August to November (DBCA 2017).

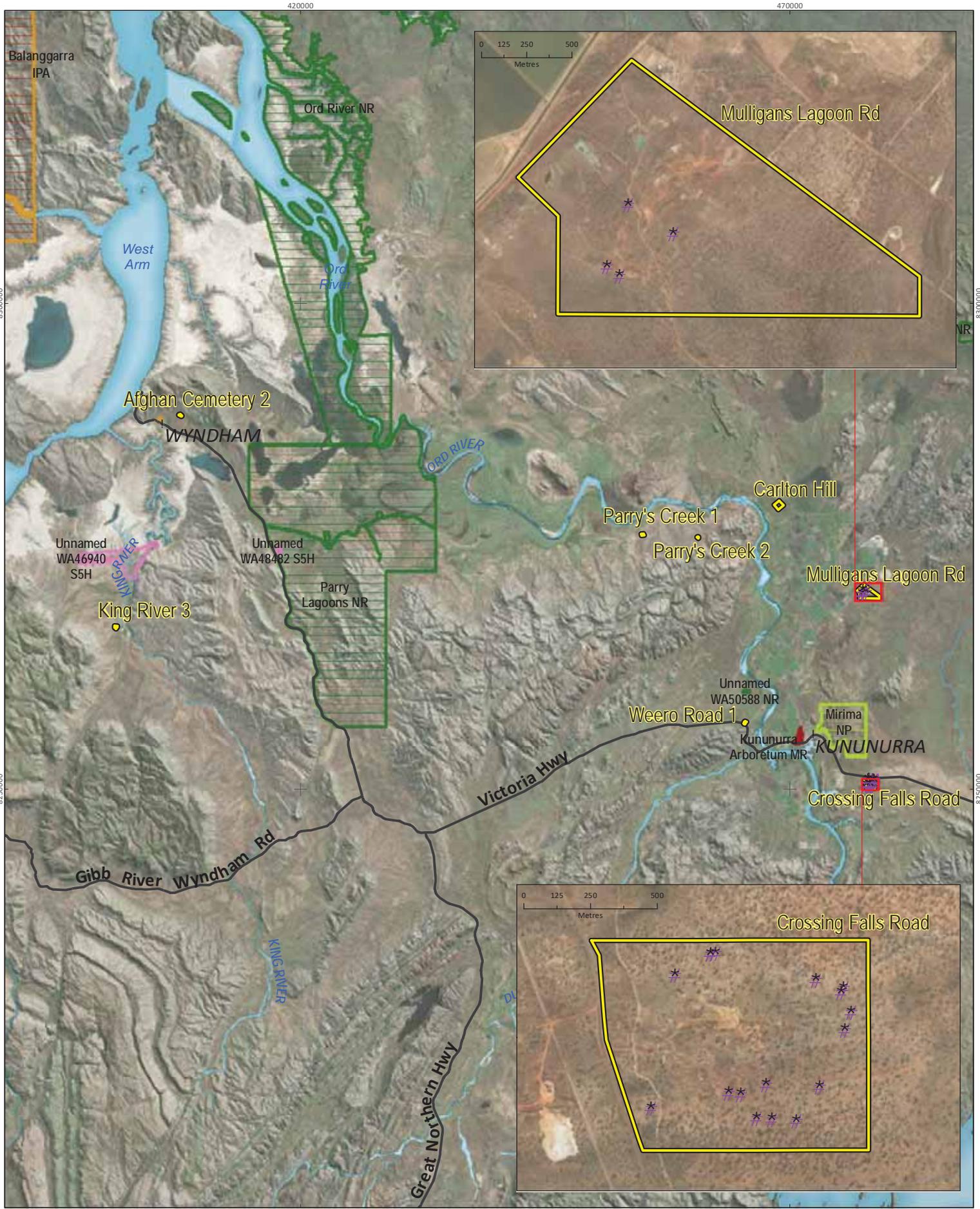
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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Distribution and ecology: *Brachychiton tuberculatus* is known from 51 locations, 41 in Western Australia and 10 in the Northern Territory (ALA 2017). All 41 records in Western Australia are located in the Victoria Bonaparte IBRA region (DBCA 2017). No population numbers are provided for any records of *B. tuberculatus* except for comments of 'common' and 'frequent as small shrubs' in the DBCA database. Habitat descriptions for the species include (DBCA 2017):

- Gently undulating plains with deep yellow or red sands in woodlands dominated by either *Eucalyptus tetradonta* or *E. grandifolia* over grasses (Guymer 1988).
- *Eucalyptus grandifolia* dominated woodlands also have *Lysiphyllum cunninghamii*, *Cochlospermum fraseri*, *Planchonia careya*, *Ficus opposita*, *Terminalia* spp. and *Gardenia* sp.
- Woodland communities dominated by *Adansonia gregorii*, *Melaleuca nervosa*, *M. argentea*, *Terminalia platyphylla* and occasionally *E. confertiflora*. The understory has *Brachychiton diversifolius*, *Grevillea pteridifolia*, *Lophostemon lactifluus* and *Acacia* spp.
- In grey, loamy sand on a hill with savannah woodlands with *Terminalia hadleyana*, *Eucalyptus microtheca*, *Adansonia gregorii*, *Lophostemon grandifloras* with an understorey of annual herbs and low shrubs.
- Orange grey sandy silt in woodland of *Corymbia flavescens*, *Eucalyptus tectifera*, *Melaleuca viridiflora* and *Brachychiton tuberculatus* over tussock grassland of *Abildgaardia schoenoides*, *Sorghum ?stipoideum*, *Triodia ?bitextura* and *Eriachne* sp.
- Red brown sand in open woodland of *Corymbia ?grandifolia* subsp. *Lamprocardia*, *Acacia coleii*, *Petalostigma pubescens* over tussock grassland of *Sorghum ?stipoideum*
- In open *Eucalyptus tectifera* over dense *Themeda triandra* grassland with *Eucalyptus bigalerita*, *E. greeniana*, *E. confertiflora*, *Sorghum timorense*, *Eriachne obtuse*, *Grewia* spp.
- On cockatoo sands in woodland with *Erythrophloeum*, *Bauhinia*, *Petalostigma*, *Cochlospermum* and *Acacia*

Records and distribution in the study area: Populations of the species were recorded in two borrow pit survey areas, Crossing Falls Road and Gravel Reserve (Figure 4-4; Figure 4-5). At Crossing Falls Road large groups of *Brachychiton tuberculatus* were scattered through the natural vegetation and a total of 1,433 plants were recorded. At Gravel Reserve a fewer number of plants (58) were recorded and the species comprised a notable mid to tall shrub layer.



Shire of Wyndham East Kimberley borrow pits	
Project No	1149
Date	28-Aug-17
Drawn by	KW
Map author	GW
1:500,000 (at A4) GDA 1994 MGA Zone 52	

- Study area
- # *Brachychiton tuberculatus* (P3) record
- Australian Protected Areas Database (CAPAD)
- 5(1)(h) Reserve (S5H)
- Nature Reserve (NR)
- Miscellaneous Reserve (MR)
- Indigenous Protected Area (IPA)
- National Park (NP)

Figure 4-4
Locations of Priority Flora recorded during the field survey

PHOENIX
 ENVIRONMENTAL SCIENCES

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits



Figure 4-5 *Brachychiton tuberculatus* in the study area

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Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Of the 65 conservation significant flora species identified in the desktop review, suitable habitat was identified in the study area for an additional three Priority Flora (Table 4-5). It is considered unlikely (limited suitable habitat that was thoroughly searched) or highly unlikely (no suitable habitat or soil type in study area) that any of the remaining species would occur in the study area.

The three Priority Flora that were considered to have potential to occur are all known from multiple records and most have distributions extending beyond WA:

- *Goodenia brachypoda* is known from 14 records in Western Australia, one in the Mitchell subregion of the Northern Kimberley bioregion the remaining 13 in the Victoria Bonaparte P1 subregion of the Victoria Bonaparte bioregion (DBCA 2017). The species is also known from 29 populations in the Northern territory (ALA 2017). A population size of 2-5 plants and a comment of occasional/sparse are the only descriptions of population size provided for the species in Western Australia.
- *Iseilema trichopus* is known from 2 records in Western Australia, one in the Hart subregion of the Central Kimberley bioregion the remaining record in the Victoria Bonaparte P1 subregion of the Victoria Bonaparte bioregion (DBCA 2017). The species is also known from 11 populations in the Northern territory (ALA 2017). There are no population sizes provided for the Western Australian records except for a comment of infrequent for one record.
- *Euphorbia stevenii* is known from 12 records in Western Australia, spread between the Chichester and Hamersley subregions of the Pilbara bioregions and the Victoria Bonaparte P1 subregion of the Victoria Bonaparte bioregion (DBCA 2017). The species has a broad distribution across much of Australia with hundreds of recorded spread across the northern Territory, South Australia, Queensland and New South Wales (ALA 2017). There are no population sites provided for the species in Western Australia.

Table 4-5 Likelihood of conservation significant flora species to occur in the study area

Species	Likelihood of presence	Reason
<i>Typhonium</i> sp. Kununurra (A.N. Start ANS 1467)	Highly unlikely	No suitable habitat or soil type in the study area.
<i>Acacia hypermeces</i>	Highly unlikely	Restricted to a single location over 10 km away from study area; no suitable habitat or soil type in the study area.
<i>Clerodendrum inerme</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Croton arnhemicus</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Cyperus digitatus</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Desmodium flagellare</i>	Highly unlikely	No suitable soil type for the species in the study area.
<i>Echinochloa kimberleyensis</i>	Highly unlikely	No suitable habitat or soil type in the study area.
<i>Fimbristylis pachyptera</i>	Highly unlikely	No suitable habitat or soil type in the study area.
<i>Goodenia brachypoda</i>	Possible	All areas of suitable habitat for the species in the study area was searched but due to the dense grasslands in some areas, individuals of this small annual herb may have been missed. Notably, several <i>Goodenia</i> specimens were collected during the survey indicating that survey effort was sufficient to detect small annual species.
<i>Goodenia durackiana</i>	Highly unlikely	No suitable habitat or soil type in the study area.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

<i>Species</i>	Likelihood of presence	Reason
<i>Goodenia malvina</i>	Highly unlikely	No suitable habitat or soil type in the study area.
<i>Heliotropium alcyonium</i>	Unlikely	Species only recorded from one population well outside the study areas, limited suitable habitat for the species in the study area, however, survey was conducted outside of the recorded flowering period for this annual species.
<i>Heliotropium cupressinum</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Heliotropium tachyglossoides</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Hullisia argillicola</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Hydrolea zeylanica</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Iseilema trichopus</i>	Possible	Suitable habitat for the species in the study area and as numerous Poaceae species were sterile or lacked sufficient reproductive features for definitive identification it is possible that the species may not have been detected.
<i>Jacquemontia</i> sp. Keep River (J.L. Egan 5051)	Unlikely	Limited suitable habitat for the species in the study area all of which was thoroughly searched.
<i>Lepturus copeanus</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Marsdenia glandulifera</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Polygala crassitesta</i>	Highly unlikely	No suitable habitat or soil type in the study area.
<i>Scaevola</i> sp. Cockburn Range (G.W. Carr 3369 & A.C. Beauglehole 47147)	Highly unlikely	No suitable habitat for the species in the study area.
<i>Scleria annularis</i>	Highly unlikely	No prior records in close proximity to the study area; no suitable habitat for the species in the study area.
<i>Solanum pugiunculiferum</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Sphaeranthus africanus</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Sphenoclea zeylanica</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Tephrosia</i> sp. Saw Ranges (D. Kabay s.n. PERTH 06720544)	Highly unlikely	All areas of suitable habitat for the species in the study area was searched.
<i>Trachymene oleracea</i> subsp. <i>sedimenta</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Triodia fitzgeraldii</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Triodia racemigera</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Triodia triticoides</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Utricularia stellaris</i>	Unlikely	Limited suitable habitat for the species in the study area all of which was thoroughly searched.
<i>Utricularia tubulata</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Zornia areolata</i>	Unlikely	Limited suitable habitat for the species in the study area all of which was thoroughly searched.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

<i>Species</i>	Likelihood of presence	Reason
<i>Eucalyptus ordiana</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Fimbristylis laxiglumis</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Hibiscus calcicola</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Minuria macrorhiza</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Nymphaea immutabilis</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Platysace saxatilis</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Tephrosia</i> sp. Kununurra (T. Handasyde TH00 250)	Highly unlikely	No suitable habitat for the species in the study area.
<i>Utricularia aurea</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Zeuxine oblonga</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Acacia jasperensis</i>	Highly unlikely	Limited suitable habitat for the species in the study area, all of which was thoroughly searched.
<i>Acacia richardsii</i>	Highly unlikely	All areas of suitable habitat for the species in the study area were thoroughly searched.
<i>Acacia</i> sp. Cockburn Range (R. Pullen 10. 763)	Highly unlikely	No prior records in close proximity to the study area; limited suitable habitat for the species in the study area, all of which was thoroughly searched.
<i>Brachychiton incanus</i>	Highly unlikely	Limited suitable habitat for the species in the study area, all of which was thoroughly searched.
<i>Brachychiton tuberculatus</i>	Definite	Populations found
<i>Euphorbia stevenii</i>	Possible	All areas of suitable habitat for the species in the study area was searched but due to the dense grassland, individuals may have been missed.
<i>Fuirena incrassata</i>	Highly unlikely	No suitable natural habitat for the species in the study area. Several specimens of <i>Fuirena ciliaris</i> were collected adjacent 'wetlands' formed in disturbed areas of borrow pits.
<i>Fuirena nudiflora</i>	Highly unlikely	No suitable natural habitat for the species in the study area. Several specimens of <i>Fuirena ciliaris</i> were collected adjacent 'wetlands' formed in disturbed areas of borrow pits.
<i>Gardenia sericea</i>	Highly unlikely	No prior records in close proximity to the study area; limited suitable habitat for the species in the study area, all of which was searched.
<i>Goodenia byrnesii</i>	Highly unlikely	No suitable habitat for the species in the study area
<i>Goodenia purpurascens</i>	Highly unlikely	Limited suitable habitat for the species in the study area, all of which was thoroughly searched.
<i>Hibiscus panduriformis</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Ipomoea gracilis</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	Highly unlikely	No prior records in close proximity to the study area; all areas of suitable habitat for the species in the study area were thoroughly searched.
<i>Paspalidium distans</i>	Highly unlikely	No suitable habitat for the species in the study area.

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Species	Likelihood of presence	Reason
<i>Pityrodia obliqua</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Synostemon hubbardii</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Schoenus punctatus</i>	Highly unlikely	No suitable habitat for the species in the study area due to lack of suitable soil type.
<i>Stylidium prophyllum</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Utricularia muelleri</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Whiteochloa capillipes</i>	Highly unlikely	No suitable habitat for the species in the study area.
<i>Ficus lilliputiana</i>	Highly unlikely	No suitable habitat for the species in the study area.

4.2.3 TECs/PECs

None of the vegetation in the study area was considered to represent a TEC or PEC. The P3 PEC, The Dinnabung land system, is the closest known conservation significant ecological community to the study area located just over 1 km from the Carlton Hill borrow pit. However, none of the habitat described in the study area appeared representative of this PEC lacking the outcropping limestone prevalent in the Priority community.

4.2.4 Declared pests and WoNS

No declared pest or WoNS was recorded in the study area.

5 DISCUSSION

It is considered unlikely that any Threatened Flora listed under the EPBC Act or the WC Act is present in the study area. No suitable habitat for *Typhonium* sp. Kununurra was recorded in the study area and no plants were observed during the transect searches of each borrow pit.

The population of the Priority 3 *Brachychiton tuberculatus* in the Crossing Falls Road borrow pit represents a new record for the species as the nearest record identified from the database searches occurs in excess of 10 km from the borrow pit. The population in the Gravel Reserve borrow pit also represents a new population for the species as the nearest record occurs approximately of 5 km from the borrow pit survey area. Notably, the vegetation description for the database record, woodland of *Corymbia flavescens*, *Eucalyptus tectifica*, *Melaleuca viridiflora* and *Brachychiton tuberculatus* over tussock grassland of *Abildgaardia schoenoides*, *Sorghum ?stipoideum*, *Triodia ?bitextura* and *Eriachne* sp., closely resembles the habitat in the borrow pit and indicates that the Priority Flora represents a conspicuous shrub layer as it does in the borrow pit survey area.

The presence of plants in these borrow pit survey areas indicates the potential for some plants of this species to be removed for the proposed works. However, the plant is readily identifiable from its characteristic round leaves and large woody fruit and as such may be easily detected at all times of year providing an opportunity to minimise impacts by avoiding disturbance wherever possible.

The two *Brachychiton tuberculatus* populations within the study area represent 4.65% of the now 43 records for the species in Western Australia. Population numbers for previous records of

Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

Brachychiton tuberculatus were not available from Florabase, therefore it was not possible to determine the proportion of the total known population recorded within the study area.

The potential for three additional Priority Flora to occur in the study area could not be completely ruled out. The three species comprising two Priority 1 taxa (*Goodenia brachypoda* and *Iseilema trichopus*) and one Priority 3 taxa (*Euphorbia stevenii*) are all known from multiple locations and have broad distributions. Suitable habitat is likely to be present for all of these species in the broader landscape. All other conservation significant flora identified in the desktop review were considered unlikely to be present in the study area either due to a lack of suitable habitat or, for species for which there was suitable habitat present, it was considered that this habitat was satisfactorily searched to detect any plants of these species.

The vegetation of the study area was not considered to resemble any federal or state listed TEC or PEC, including the Priority 3 PEC, Dinnabung land system located in close proximity. The study area lacked outcropping limestone characteristic of this PEC.

As no declared pests or WoNS were recorded in the study area, there are no specific management requirements for weeds. However, a small number of weed species were recorded in borrow pit areas and as the surrounding vegetation in the majority of the borrow pits appeared to be largely in excellent condition, it is recommended that due care be taken to minimise the potential spread of weeds during material extraction activities.

Yours Sincerely,

Grant Wells

Director

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Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

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Memo

Targeted flora and vegetation survey for proposed Wyndham and Kununurra borrow pits

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APPENDIX 2

PMST AND NATUREMAP REPORTS





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: 07/08/17 18:11:13

[Summary](#)

[Details](#)

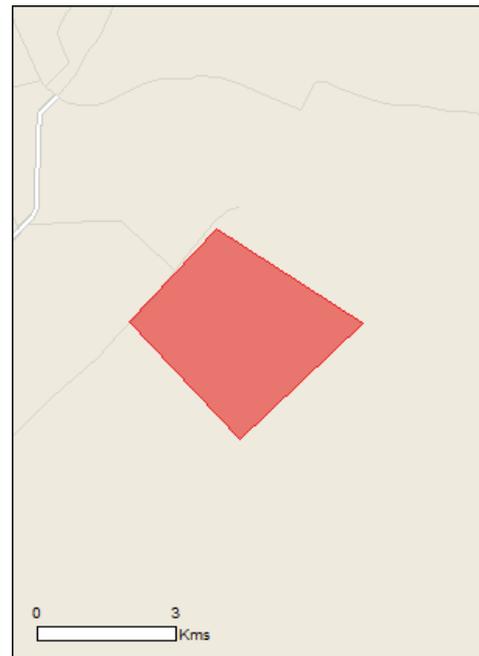
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

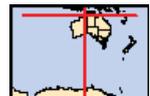
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Ord river floodplain		40 - 50km upstream

Listed Threatened Species			[Resource Information]
Name	Status	Type of Presence	
Birds			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	
Erythroriorchis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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	
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	
Mammals			
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area	
Macrotis lagotis			
Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area	
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	
Reptiles			
Acanthophs hawkei			
Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within	

Name	Status	Type of Presence area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
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 may occur within area
Hirundo rustica		
Barn Swallow [662]		Species or species habitat likely 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
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
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Other Matters Protected by the EPBC Act

Listed Marine Species [\[Resource Information \]](#)

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
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
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat may occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Caveat

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- 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

-15.647911 128.781206,-15.647911 128.781206,-15.630223 128.7982,-15.648241 128.826782,-15.670142 128.802663,-15.647911 128.781206

Acknowledgements

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- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
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- [-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.



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: 07/08/17 18:07:43

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

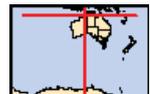
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 1.0Km



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:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	16
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Lakes argyle and kununurra	Within 10km of Ramsar
Ord river floodplain	40 - 50km upstream

Listed Threatened Species	[Resource Information]	
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Tyto novaehollandiae kimberli		
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area
Macrotis lagotis		
Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus		
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat may occur within area
Reptiles		

Name	Status	Type of Presence
Acanthophis hawkei Plains Death Adder [83821]	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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Marine Species

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area
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Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
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Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
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Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
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Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
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Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
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Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
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Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
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Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
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Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
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Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
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Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
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Name	Threatened	Type of Presence
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat may occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black		Species or species

Name	Status	Type of Presence
Piquant, Babul [84351]		habitat likely to occur within area

Reptiles

Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
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Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area
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Nationally Important Wetlands

[Resource Information]

Name	State
Lake Kununurra	WA

Caveat

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-15.818395 128.788691,-15.819428 128.80105,-15.829089 128.803153,-15.82942 128.792939,-15.818437 128.788691,-15.818395 128.788691

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- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
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- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

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EPBC Act Protected Matters Report

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

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

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

Report created: 07/08/17 17:34:58

[Summary](#)

[Details](#)

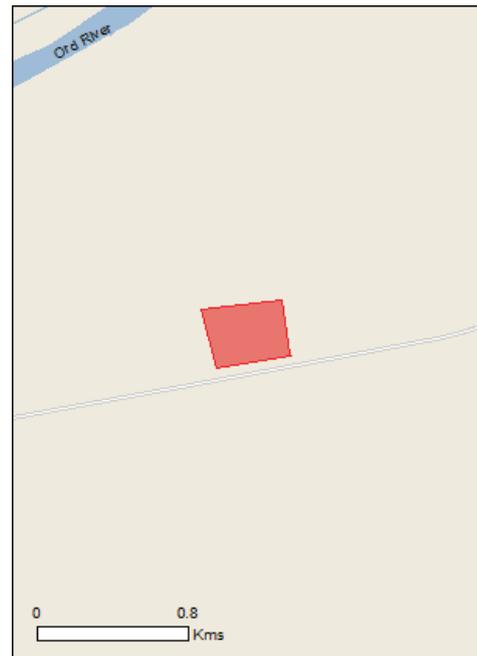
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	13
Listed Migratory Species:	17

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Ord river floodplain		20 - 30km upstream

Listed Threatened Species			[Resource Information]
Name	Status		Type of Presence
Birds			
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered		Species or species habitat may occur within area
Erythrorichis radiatus Red Goshawk [942]	Vulnerable		Species or species habitat likely to occur within area
Erythrura gouldiae Gouldian Finch [413]	Endangered		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered		Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered		Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered		Species or species habitat likely to occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable		Species or species habitat may occur within area
Mammals			
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered		Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable		Breeding likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable		Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable		Species or species habitat likely to occur within area
Reptiles			
Acanthophs hawkei Plains Death Adder [83821]	Vulnerable		Species or species habitat may occur within

Name	Status	Type of Presence area
Sharks		
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cecropis daurica		
Red-rumped Swallow [80610]		Species or species habitat may 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 likely 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 likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	habitat may occur within area Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
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
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat may occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

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

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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](#)
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[Summary](#)

[Details](#)

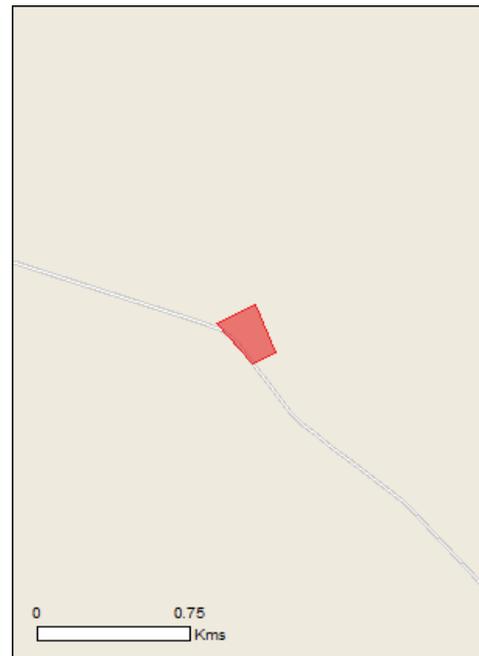
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

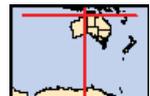
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 1.0Km



Summary

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World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	13
Listed Migratory Species:	16

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Ord river floodplain		20 - 30km upstream

Listed Threatened Species			[Resource Information]
Name	Status	Type of Presence	
Birds			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	
Erythrotriorchis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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	
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	
Pezoporus occidentalis			
Night Parrot [59350]	Endangered	Species or species habitat may occur within area	
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	
Mammals			
Dasyurus hallucatus			
Northern Quoll, Digu [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area	
Macrotis lagotis			
Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area	
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	

Name	Status	Type of Presence
Reptiles		
Acanthophis hawkei Plains Death Adder [83821]	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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Marine Species

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area
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Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
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Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
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Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
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Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
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Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
---	--	--

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
--	--	--

Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
--	--	--

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
--	--	--

Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
--	--	--

Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
--	--	--

Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within
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Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		area Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Reptiles		
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

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Ngamoowalem	WA

Invasive Species [\[Resource Information \]](#)

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
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
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat may occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Caveat

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

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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.

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

Coordinates

-15.592898 128.632871,-15.594913 128.633793,-15.595358 128.632763,-15.593694 128.631133,-15.592898 128.632871,-15.592898 128.632871

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

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[Summary](#)

[Details](#)

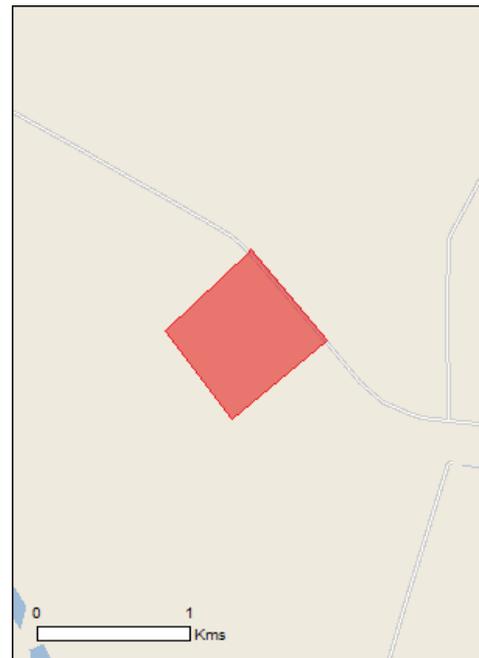
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

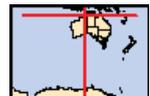
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	17

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Ord river floodplain		30 - 40km upstream

Listed Threatened Species			[Resource Information]
Name	Status	Type of Presence	
Birds			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	
Erythroriorchis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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	
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	
Mammals			
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijjingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area	
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	
Reptiles			
Acanthophis hawkei			
Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area	
Sharks			

Name	Status	Type of Presence
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Marine Species

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area
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Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
--	--	--

Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
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Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
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Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
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Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
---	--	--

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
--	--	--

Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
--	--	--

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
---	-----------------------	--

Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
--	--	--

Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
--	--	--

Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
--	--	--

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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Birds		
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Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat may occur within area
Vachellia nilotica		
Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
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-15.55921 128.71012,-15.564502 128.714626,-15.569008 128.709004,-15.563923 128.705056,-15.559458 128.710034,-15.55921 128.71012

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[Summary](#)

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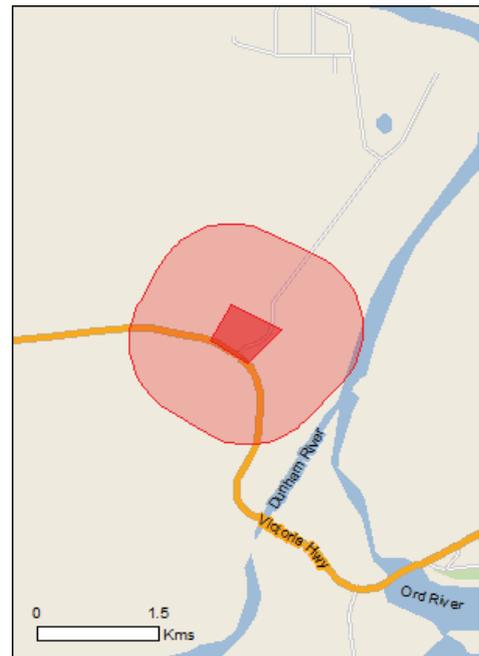
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

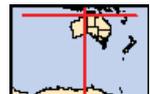
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Buffer: 1.0Km



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:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	15
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Lakes argyle and kununurra		Within 10km of Ramsar
Ord river floodplain		30 - 40km upstream

Listed Threatened Species			[Resource Information]
Name	Status	Type of Presence	
Birds			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	
Erythrorichis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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	
Malurus coronatus coronatus			
Purple-crowned Fairy-wren (western) [64442]	Endangered	Extinct within area	
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	
Pezoporus occidentalis			
Night Parrot [59350]	Endangered	Species or species habitat may occur within area	
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	
Mammals			
Dasyurus hallucatus			
Northern Quoll, Digu [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Breeding likely to occur within area	
Macrotis lagotis			
Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area	

Name	Status	Type of Presence
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area
Sharks		
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	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 may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species

Name	Threatened	Type of Presence
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		habitat may occur within area Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known 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]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		within area Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
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
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat may occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Reptiles

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

Nationally Important Wetlands

[[Resource Information](#)]

Name	State
Lake Kununurra	WA

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

-15.76334 128.676423,-15.765901 128.681981,-15.769618 128.678204,-15.767222 128.674192,-15.763423 128.676423,-15.76334 128.676423

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.



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: 16/08/17 12:34:00

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

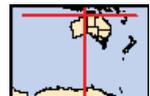
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
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[Coordinates](#)

Buffer: 1.0Km



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:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	14
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
The West Kimberley	WA	Listed place

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely 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
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digu [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped	Vulnerable	Species or species

Name	Status	Type of Presence
Sheath-tail Bat [66889]		habitat likely to occur within area

Reptiles

Acanthopis hawkei		
Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area

Sharks

Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species

[Resource Information]

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

Name	Threatened	Type of Presence
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Migratory Marine Birds

Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Marine Species

Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

[Pristis pristis](#)

Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
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Migratory Terrestrial Species

[Cecropis daurica](#)

Red-rumped Swallow [80610]		Species or species habitat may occur within area
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[Cuculus optatus](#)

Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
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[Hirundo rustica](#)

Barn Swallow [662]		Species or species habitat likely to occur within area
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[Motacilla cinerea](#)

Grey Wagtail [642]		Species or species habitat may occur within area
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[Motacilla flava](#)

Yellow Wagtail [644]		Species or species habitat likely to occur within area
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[Rhipidura rufifrons](#)

Rufous Fantail [592]		Species or species habitat likely to occur within area
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Migratory Wetlands Species

[Actitis hypoleucos](#)

Common Sandpiper [59309]		Species or species habitat known to occur within area
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[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
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[Calidris ferruginea](#)

Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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[Calidris melanotos](#)

Pectoral Sandpiper [858]		Species or species habitat may occur within area
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Name	Threatened	Type of Presence
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [[Resource Information](#)]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known 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]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
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Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
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Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
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Sus scrofa Pig [6]		Species or species habitat likely to occur within area
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Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
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Coordinates

-15.674209 128.076062,-15.674984 128.080643,-15.678372 128.079624,-15.678041 128.077704,-15.676616 128.075633,-15.674209 128.076062,-15.674209 128.076062

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- [-Other groups and individuals](#)

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Please feel free to provide feedback via the [Contact Us](#) page.



EPBC Act Protected Matters Report

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

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

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

Report created: 16/08/17 12:29:45

[Summary](#)

[Details](#)

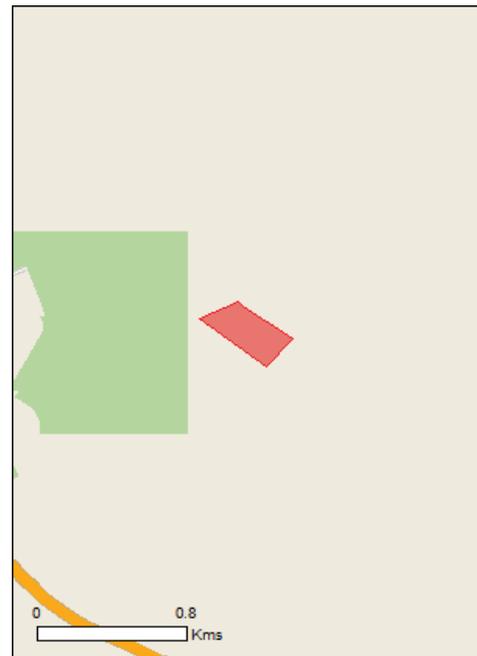
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

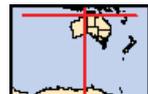
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	12
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Ord river floodplain		Within 10km of Ramsar

Listed Threatened Species			[Resource Information]
Name	Status	Type of Presence	
Birds			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	
Erythroriorchis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat likely 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	
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	
Mammals			
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijjingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	
Reptiles			
Acanthophis hawkei			
Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area	
Sharks			

Name	Status	Type of Presence
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Marine Species

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area
--	--	--

Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may 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 may occur within area
---	--	--

Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
---	--	--

Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
---	--	--

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
--	--	--

Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
--	--	--

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
---	-----------------------	--

Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
--	--	--

Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
--	--	--

Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
--	--	--

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
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Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
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

Extra Information

Invasive Species

[[Resource Information](#)]

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

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Birds		
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Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
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-15.477628 128.139363,-15.477856 128.139599,-15.479345 128.141959,-15.480648 128.140758,-15.478435 128.13756,-15.477628 128.139363

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Wyndham NatureMap Species Report2

Created By Guest user on 16/08/2017

Current Names Only Yes

Core Datasets Only Yes

Method 'By Line'

Vertices 15° 28' 11" S, 128° 07' 48" E 15° 40' 28" S, 128° 04' 53" E

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
1.	16919 <i>Abutilon hannii</i>			
2.	3313 <i>Acacia dunnii</i> (Elephant Ear Wattle, Lolord)			
3.	3352 <i>Acacia gonoclada</i>			
4.	3372 <i>Acacia holosericea</i> (Candelbra Wattle, Liringgin)			
5.	18225 <i>Acacia lamprocarpa</i>			
6.	3429 <i>Acacia lycopodiifolia</i>			
7.	3430 <i>Acacia lysiphloia</i> (Turpentine Wattle)			
8.	13401 <i>Acacia neurocarpa</i>			
9.	3491 <i>Acacia platycarpa</i> (Pindan Wattle)			
10.	14977 <i>Acacia plectocarpa</i> subsp. <i>plectocarpa</i>			
11.	3580 <i>Acacia translucens</i> (Poverty Bush, Banmung)			
12.	3585 <i>Acacia tumida</i> (Pindan Wattle, Walgali)			
13.	19641 <i>Acacia tumida</i> var. <i>tumida</i>			
14.	13706 <i>Acanthus ebracteatus</i> subsp. <i>ebarbatus</i>			
15.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
16.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
17.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
18.	4995 <i>Adansonia gregorii</i> (Boab, Djungeri)			
19.	6486 <i>Aegialitis annulata</i> (Club Mangrove)			
20.	6478 <i>Aegiceras corniculatum</i> (River Mangrove)			
21.	5278 <i>Ammannia multiflora</i>			
22.	35308 <i>Ampelocissus</i> sp. <i>Kununurra</i> (M.D. Barrett MDB 1525)			
23.	2369 <i>Amyema benthamii</i>			
24.	2371 <i>Amyema dolichopoda</i>			
25.	24312 <i>Anas gracilis</i> (Grey Teal)			
26.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
27.	17651 <i>Andropogon gayanus</i>	Y		
28.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
29.	43105 <i>Apowollastonia cylindrica</i>			
30.	24719 <i>Aprosmictus erythropterus</i> (Red-winged Parrot)			
31.	25554 <i>Apus pacificus</i> (Fork-tailed Swift, Pacific Swift)		IA	
32.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
33.	25559 <i>Ardea intermedia</i> (Intermediate Egret)			
34.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
35.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
36.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
37.	25567 <i>Artamus leucorhynchus</i> (White-breasted Woodswallow)			
38.	24355 <i>Artamus minor</i> (Little Woodswallow)			
39.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
40.	4740 <i>Atalaya hemiglauca</i> (Whitewood)			
41.	6828 <i>Avicennia marina</i> (White Mangrove)			
42.	5289 <i>Barringtonia acutangula</i> (Freshwater Mangrove, Danba)			
43.	12061 <i>Barringtonia acutangula</i> subsp. <i>acutangula</i>			
44.	1743 <i>Batis argillicola</i>			
45.	12757 <i>Bauhinia cunninghamii</i>			
46.	157 <i>Blyxa aubertii</i>			
47.	18500 <i>Blyxa echinosperma</i>			
48.	6608 <i>Bonamia pannosa</i>			
49.	12715 <i>Brachychiton fitzgeraldianus</i>			
50.	5000 <i>Brachychiton incanus</i>		P3	
51.	12477 <i>Brachystelma glabriflorum</i>			
52.	5291 <i>Bruguiera exaristata</i> (Ribbed Mangrove)			
53.	29703 <i>Buchanania oblongifolia</i>			
54.	13682 <i>Buchnera asperata</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
55.	7047 <i>Buchnera linearis</i> (Blackrod)			
56.	750 <i>Bulbostylis barbata</i>			
57.	47897 <i>Butorides striata</i> (Striated Heron, Mangrove Heron)			
58.	25713 <i>Cacatua galerita</i> (Sulphur-crested Cockatoo)			
59.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
60.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
61.	25599 <i>Cacomantis variolosus</i> (Brush Cuckoo)			
62.	10972 <i>Cajanus marmoratus</i>			
63.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
64.	5445 <i>Calytrix brownii</i>			
65.	5457 <i>Calytrix exstipulata</i> (Kimberley Heather)			
66.	<i>Capparis</i> sp.			
67.	6567 <i>Carissa lanceolata</i> (Conkerberry, Marnuwiji)			
68.	25012 <i>Carlia amax</i> (Two-spined Rainbow Skink)			
69.	11328 <i>Cathormion umbellatum</i> subsp. <i>moniliforme</i>			
70.	1744 <i>Celtis philippensis</i>			
71.	25600 <i>Centropus phasianinus</i> (Pheasant Coucal)			
72.	39680 <i>Cerriops australis</i>			
73.	47905 <i>Ceyx azureus</i> (Azure Kingfisher)			
74.	42382 <i>Chelodina burrungandjii</i> (Northern Long-necked Turtle)			
75.	<i>Chroicocephalus novaehollandiae</i>			
76.	24288 <i>Circus approximans</i> (Swamp Harrier)			
77.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
78.	24565 <i>Cissomela pectoralis</i> (Banded Honeyeater)			
79.	4852 <i>Cissus adnata</i>			
80.	25756 <i>Cisticola exilis</i> (Golden-headed Cisticola)			
81.	2983 <i>Cleome cleomoides</i> (Justago)			
82.	2988 <i>Cleome viscosa</i> (Tickweed, Tjinduwadhu)			
83.	5214 <i>Cochlospermum fraseri</i> (Kapok Bush, Malindjarr)			
84.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
85.	24615 <i>Colluricincla woodwardi</i> (Sandstone Shrike-thrush)			
86.	1165 <i>Commelina ensifolia</i> (Wandering Jew, Buargu)			
87.	24566 <i>Conopophila rufogularis</i> (Rufous-throated Honeyeater)			
88.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
89.	25569 <i>Coracina papuensis</i> (White-bellied Cuckoo-shrike, Little Cuckoo-shrike)			
90.	4863 <i>Corchorus pumilio</i>			
91.	4865 <i>Corchorus tridens</i>			
92.	25593 <i>Corvus orru</i> (Torresian Crow)			
93.	17080 <i>Corymbia confertiflora</i>			
94.	17074 <i>Corymbia grandifolia</i>			
95.	17076 <i>Corymbia grandifolia</i> subsp. <i>longa</i>			
96.	17092 <i>Corymbia opaca</i>			
97.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
98.	24672 <i>Coturnix ypsilophora</i> subsp. <i>cervina</i> (Brown Quail)			
99.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
100.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
101.	19565 <i>Cressa australis</i>			
102.	48175 <i>Crinum arenarium</i>			
103.	3774 <i>Crotalaria cunninghamii</i> (Green Birdflower, Bilbun)			
104.	13746 <i>Croton amhemicus</i>		P1	
105.	7371 <i>Cucumis melo</i> (Ulcardo Melon)			
106.	17433 <i>Cullen badocanum</i>			
107.	17118 <i>Cullen leucanthum</i>			
108.	25371 <i>Cyclorana australis</i> (Giant Frog)			
109.	12665 <i>Cymbopogon dependens</i>			
110.	6583 <i>Cynanchum carnosum</i>			
111.	6585 <i>Cynanchum pedunculatum</i>			
112.	781 <i>Cyperus compressus</i>	Y		
113.	12811 <i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>			
114.	789 <i>Cyperus difformis</i> (Rice Sedge)			
115.	797 <i>Cyperus holoschoenus</i>			
116.	11024 <i>Cyperus latzii</i>			
117.	802 <i>Cyperus macrostachyos</i>			
118.	12807 <i>Cyperus microcephalus</i> subsp. <i>microcephalus</i>			
119.	805 <i>Cyperus oxycarpus</i>			
120.	807 <i>Cyperus pulchellus</i>			
121.	820 <i>Cyperus viscidulus</i>			
122.	821 <i>Cyperus zollingeri</i>			
123.	25547 <i>Dacelo leachii</i> (Blue-winged Kookaburra)			
124.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
125.	18230 <i>Desmodium triflorum</i>	Y		
126.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
127.	19085 <i>Diospyros rugosula</i>			
128.	38461 <i>Dodonaea hispidula</i> var. <i>arida</i>			
129.	4774 <i>Dodonaea physocarpa</i>			
130.	14919 <i>Drosera ordensis</i>			
131.	328 <i>Echinochloa colona</i> (Awnless Barnyard Grass)	Y		
132.	11453 <i>Ectrosia schultzi</i> var. <i>schultzi</i>			
133.	<i>Egretta garzetta</i>			
134.	<i>Egretta novaehollandiae</i>			
135.	<i>Egretta picata</i>			
136.	14301 <i>Ehretia saligna</i> var. <i>saligna</i>			
137.	826 <i>Eleocharis dulcis</i> (Chinese Water Chestnut)			
138.	831 <i>Eleocharis sphacelata</i> (Tall Spikerush, Djabren)			
139.	353 <i>Eleusine indica</i> (Crowsfoot Grass)	Y		
140.	47937 <i>Elseya melanops</i> (Black-fronted Dotterel)			
141.	25341 <i>Emydura victoriae</i> (Northern Red-faced Turtle)			
142.	357 <i>Enneapogon caeruleus</i> (Limestone Grass)			
143.	<i>Entomyzon cyanotis</i>			
144.	<i>Eolophus roseicapillus</i>			
145.	25578 <i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)			
146.	36158 <i>Eragrostis amabilis</i> var. <i>amabilis</i>	Y		
147.	15733 <i>Eragrostis fallax</i>			
148.	404 <i>Eriachne ciliata</i> (Slender Wandrarrie Grass)			
149.	420 <i>Eriachne sulcata</i>			
150.	1154 <i>Eriocaulon cinereum</i>			
151.	3662 <i>Erythrophleum chlorostachys</i> (Ironwood, Dyundyu)			
152.	24632 <i>Erythrura gouldiae</i> (Gouldian Finch)		P4	
153.	5561 <i>Eucalyptus bigalerita</i> (Northern Salmon Gum)			
154.	5564 <i>Eucalyptus brachyandra</i> (Tropical Red Box)			
155.	35345 <i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> (Blunt-budded River Red Gum)			
156.	5715 <i>Eucalyptus miniata</i> (Woollybutt, Manawan)			
157.	<i>Eucalyptus</i> sp.			
158.	42849 <i>Euphorbia hassallii</i>			
159.	4629 <i>Euphorbia hirta</i> (Asthma Plant)	Y		
160.	25591 <i>Eurystomus orientalis</i> (Dollarbird)			
161.	11063 <i>Excoecaria parvifolia</i> (Guttapercha Tree)			
162.	25621 <i>Falco berigora</i> (Brown Falcon)			
163.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
164.	25623 <i>Falco longipennis</i> (Australian Hobby)			
165.	1753 <i>Ficus platypoda</i> (Native Fig, Makartu)			
166.	842 <i>Fimbristylis cardiocarpa</i>			
167.	851 <i>Fimbristylis dichotoma</i> (Eight Day Grass)			
168.	862 <i>Fimbristylis microcarya</i>			
169.	867 <i>Fimbristylis nutans</i>			
170.	875 <i>Fimbristylis polytrichoides</i>			
171.	878 <i>Fimbristylis rara</i>			
172.	885 <i>Fimbristylis solidifolia</i>			
173.	15240 <i>Gardenia dacryoides</i>			
174.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
175.	24402 <i>Geopelia humeralis</i> (Bar-shouldered Dove)			
176.	25585 <i>Geopelia striata</i> (Zebra Dove)			
177.	24404 <i>Geophaps plumifera</i> (Spinifex Pigeon)			
178.	42315 <i>Gerygone chloronota</i> (Green-backed Gerygone)			
179.	25531 <i>Gerygone levigaster</i> (Mangrove Gerygone)			
180.	24273 <i>Gerygone levigaster</i> subsp. <i>levigaster</i> (Mangrove Gerygone)			
181.	2836 <i>Glinus oppositifolius</i>			
182.	2675 <i>Gomphrena brachystylis</i>			
183.	2676 <i>Gomphrena canescens</i> (Batchelors Buttons)			
184.	18363 <i>Gomphrena canescens</i> subsp. <i>canescens</i>			
185.	2680 <i>Gomphrena cunninghamii</i>			
186.	2682 <i>Gomphrena flaccida</i> (Gomphrena Weed)			
187.	2683 <i>Gomphrena leptoclada</i>			
188.	7521 <i>Goodenia lamprosperma</i>			
189.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
190.	1950 <i>Grevillea agrifolia</i> (Blue Grevillea)			
191.	2003 <i>Grevillea erythroclada</i> (Needle-leaf Grevillea)			
192.	2016 <i>Grevillea heliosperma</i> (Rock Grevillea)			
193.	2076 <i>Grevillea pteridifolia</i> (Silky Grevillea)			
194.	19570 <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>			

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195.	2081 <i>Grevillea refracta</i> (Silver-leaf Grevillea, Jamooda)			
196.	2099 <i>Grevillea striata</i> (Beefwood)			
197.	2118 <i>Grevillea velutinella</i>			
198.	24484 <i>Grus rubicunda</i> (Brolga)			
199.	13748 <i>Gyrocarpus americanus</i> subsp. <i>pachyphyllus</i>			
200.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)			
201.	25541 <i>Haliastur indus</i> (Brahminy Kite)			
202.	24295 <i>Haliastur spheurnus</i> (Whistling Kite)			
203.	24297 <i>Hamirostra melanosternon</i> (Black-breasted Buzzard)			
204.	17302 <i>Heliotropium cupressinum</i>		P1	
205.	6709 <i>Heliotropium epacrideum</i>			
206.	10992 <i>Heliotropium glabellum</i>			
207.	4933 <i>Hibiscus leptocladus</i>			
208.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
209.	25476 <i>Hipposideros ater</i> (Dusky Leafnosed-bat)			
210.	3980 <i>Indigofera linifolia</i>			
211.	6623 <i>Ipomoea coptica</i>			
212.	47973 <i>Irediparra gallinacea</i> (Comb-crested Jacana)			
213.	13012 <i>Jacksonia forrestii</i>			
214.	11315 <i>Jasminum didymum</i> subsp. <i>didymum</i>			
215.	4656 <i>Jatropha gossypifolia</i> (Bellyache Bush)	Y		
216.	25571 <i>Lalage leucomela</i> (Varied Triller)			
217.	19124 <i>Leptochloa fusca</i> subsp. <i>fusca</i>			
218.	18351 <i>Leucaena leucocephala</i> subsp. <i>leucocephala</i>	Y		
219.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
220.	13684 <i>Lindernia crustacea</i>	Y		
221.	952 <i>Lipocarpa microcephala</i>			
222.	25381 <i>Litoria coplandi</i> (Rock Frog)			
223.	25683 <i>Lonchura castaneothorax</i> (Chestnut-breasted Mannikin)			
224.	11567 <i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>			
225.	6135 <i>Ludwigia octovalvis</i> (Willow Primrose)			
226.	6136 <i>Ludwigia perennis</i>			
227.	<i>Ludwigia</i> sp.			
228.	25653 <i>Malurus melanocephalus</i> (Red-backed Fairy-wren)			
229.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
230.	73 <i>Marsilea angustifolia</i> (Narrow-leaf Nardoo)			
231.	77 <i>Marsilea mutica</i>			
232.	<i>Marsilea</i> sp.			
233.	9178 <i>Melaleuca alsophila</i>			
234.	5875 <i>Melaleuca argentea</i> (Silver Cadjeput, Bandaran)			
235.	5932 <i>Melaleuca leucadendra</i>			
236.	5989 <i>Melaleuca viridiflora</i> (Broadleaf Paperbark)			
237.	24585 <i>Melithreptus albogularis</i> (White-throated Honeyeater)			
238.	25665 <i>Melithreptus gularis</i> (Black-chinned Honeyeater)			
239.	5052 <i>Melochia corchorifolia</i>			
240.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
241.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
242.	38200 <i>Merremia incisa</i>			
243.	48283 <i>Mesosphaerum suaveolens</i>	Y		
244.	<i>Microcarbo melanoleucos</i>			
245.	25693 <i>Microeca fascinans</i> (Jacky Winter)			
246.	25694 <i>Microeca flavigaster</i> (Lemon-breasted Flycatcher)			
247.	25542 <i>Milvus migrans</i> (Black Kite)			
248.	25545 <i>Mirafra javanica</i> (Horsfield's Bushlark, Singing Bushlark)			
249.	6525 <i>Mitrasacme hispida</i>			
250.	487 <i>Mnesithea formosa</i>			
251.	1170 <i>Monochoria cyanea</i>			
252.	19717 <i>Moringa oleifera</i>	Y		
253.	25609 <i>Myiagra alecto</i> (Shining Flycatcher)			
254.	25610 <i>Myiagra inquieta</i> (Restless Flycatcher)			
255.	25666 <i>Myzomela erythrocephala</i> (Red-headed Honeyeater)			
256.	7337 <i>Nauclea orientalis</i> (Leichardt Pine)			
257.	25684 <i>Neochmia phaeton</i> (Crimson Finch)			
258.	25685 <i>Neochmia ruficauda</i> (Star Finch)			
259.	24639 <i>Neochmia ruficauda</i> subsp. <i>clarescens</i> (Star Finch)			
260.	3614 <i>Neptunia dimorphantha</i> (Sensitive Plant)			
261.	25747 <i>Ninox connivens</i> (Barking Owl)			
262.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
263.	24799 <i>Numenius minutus</i> (Little Curlew)		IA	
264.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
265.	13916 <i>Nymphaea violacea</i>			
266.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
267.	6552 <i>Nymphoides quadriloba</i>			
268.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
269.	24607 <i>Oriolus flavocinctus</i> (Yellow Oriole)			
270.	24608 <i>Oriolus sagittatus</i> (Olive-backed Oriole)			
271.	4519 <i>Owenia vernicosa</i> (Emu Apple)			
272.	25678 <i>Pachycephala melanura</i> (Mangrove Golden Whistler)			
273.	24621 <i>Pachycephala melanura</i> subsp. <i>melanura</i> (Mangrove Golden Whistler)			
274.	24622 <i>Pachycephala melanura</i> subsp. <i>spinicauda</i> (Mangrove Golden Whistler)			
275.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
276.	24627 <i>Pardalotus rubricatus</i> (Red-browed Pardalote)			
277.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
278.	523 <i>Paspalidium rarum</i> (Rare Paspalidium)			
279.	14096 <i>Passiflora foetida</i> var. <i>hispidula</i>	Y		
280.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
281.	7091 <i>Peplidium maritimum</i>			
282.	13928 <i>Persicaria attenuata</i> subsp. <i>attenuata</i>			
283.	2263 <i>Persoonia falcata</i> (Wild Pear, Gandala)			
284.	4671 <i>Petalostigma pubescens</i>			
285.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
286.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
287.	25507 <i>Petrophassa albipennis</i> (White-quilled Rock Pigeon)			
288.	24408 <i>Petrophassa albipennis</i> subsp. <i>albipennis</i> (White-quilled Rock Pigeon)			
289.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
290.	25667 <i>Philemon argenticeps</i> (Silver-crowned Friarbird)			
291.	25668 <i>Philemon citreogularis</i> (Little Friarbird)			
292.	1174 <i>Philydrum lanuginosum</i> (Frogsmouth)			
293.	4680 <i>Phyllanthus maderaspatensis</i>			
294.	24198 <i>Pipistrellus westralis</i> (Northern Pipistrelle)			
295.	24842 <i>Platalea regia</i> (Royal Spoonbill)			
296.	24749 <i>Platycercus venustus</i> (Northern Rosella)			
297.	42305 <i>Platyplectrum ornatum</i> (Ornate Burrowing Frog)			
298.	8168 <i>Pluchea rubelliflora</i>			
299.	6491 <i>Plumbago zeylanica</i> (Native Plumbago)			
300.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
301.	48076 <i>Poecilodryas cerviniventris</i> (Buff-sided Robin)			
302.	24643 <i>Poephila acuticauda</i> (Long-tailed Finch)			
303.	25688 <i>Poephila personata</i> (Masked Finch)			
304.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
305.	2903 <i>Polycarpha longiflora</i>			
306.	25706 <i>Pomatostomus temporalis</i> (Grey-crowned Babbler)			
307.	2884 <i>Portulaca oleracea</i> (Purslane, Wakati)			
308.	<i>Portulaca</i> sp.			
309.	<i>Psittuteles versicolor</i>			
310.	25725 <i>Ptilonorhynchus nuchalis</i> (Great Bowerbird)			
311.	2713 <i>Ptilotus corymbosus</i>			
312.	41001 <i>Ptilotus nobilis</i> subsp. <i>nobilis</i> (Yellow Tails)			
313.	24597 <i>Ramsayornis fasciatus</i> (Bar-breasted Honeyeater)			
314.	24246 <i>Rattus tunneyi</i> (Pale Field-rat)			
315.	24247 <i>Rattus villosissimus</i> (Long-haired Rat)			
316.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
317.	25615 <i>Rhipidura dryas</i> (Wood Fantail, Arafura Fantail)			
318.	24455 <i>Rhipidura dryas</i> subsp. <i>dryas</i> (Wood Fantail)			
319.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
320.	25616 <i>Rhipidura rufiventris</i> (Northern Fantail)			
321.	963 <i>Schoenoplectus laevis</i>			
322.	7095 <i>Scoparia dulcis</i> (Scoparia)	Y		
323.	24200 <i>Scotorepens greyii</i> (Little Broad-nosed Bat)			
324.	24201 <i>Scotorepens sanborni</i> (Northern Broad-nosed Bat)			
325.	12319 <i>Senna venusta</i>			
326.	<i>Sesbania</i> sp.			
327.	2818 <i>Sesuvium portulacastrum</i>			
328.	30948 <i>Smicronis brevirostris</i> (Weebill)			
329.	7021 <i>Solanum lucani</i>			
330.	620 <i>Sorghum stipoideum</i> (Annual Sorghum)			
331.	<i>Spermococe</i> sp.			
332.	8457 <i>Sphaeranthus africanus</i>		P1	
333.	19984 <i>Sphenoclea zeylanica</i>		P1	
334.	629 <i>Sporobolus australasicus</i> (Fairy Grass)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
335.	635			
336.	7101			
337.	24482			
338.	6536			
339.	17445			
340.	12353	Y		
341.	2638			
342.	6042			
343.	6044			
344.	25552			
345.	30872			
346.	30870			
347.	33238			
348.	33356			
349.	33357			
350.	2642			
351.	4281			
352.	34716			
353.	39421		P1	
354.	5299			
355.	5307			
356.	5310			
357.	5311			
358.	5314			
359.	24845			
360.	42351			
361.	25549			
362.	19046		P1	
363.	2830	Y		
364.	47242			
365.	8252	Y		
366.	24808		IA	
367.				
368.	17539			
369.	16235			
370.	4881			
371.	25437			
372.	720			
373.	17793			
374.	25577			
375.	6075			
376.	6122			
377.	24203			
378.	6742			
379.	5106			
380.	6578			
381.	8286	Y		
382.	6124			
383.	730			
384.	1142			
385.	24857			

Conservation Codes

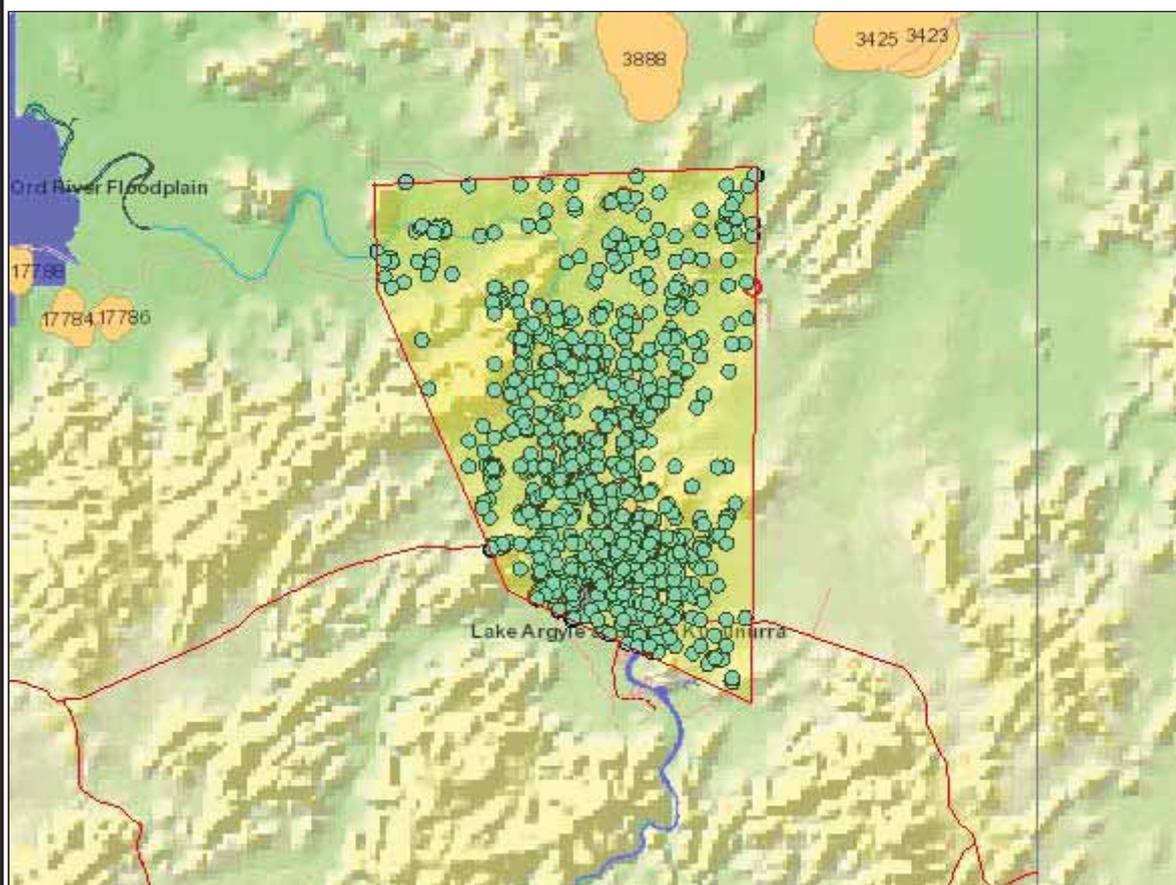
- T - Rare or likely to become extinct
- X - Presumed extinct
- IA - Protected under international agreement
- S - Other specially protected fauna
- 1 - Priority 1
- 2 - Priority 2
- 3 - Priority 3
- 4 - Priority 4
- 5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Kununurra Borrow Pits NatureMap

Printed by Guest user on 9/8/2017

Query details : Current Names Only=Yes; Core Datasets Only=Yes; Method="By Polygon"; Vertices=15° 31' 51" S,128° 34' 18" E 15° 31' 56" S,128° 34' 13" E 15° 31' 15" S,128° 49' 10" E 15° 52' 14" S,128° 48' 55" E 15° 47' 51" S,128° 39' 27" E 15° 35' 59" S,128° 34' 23" E 15° 31' 51" S,128° 34' 18" E ;



Search Results

Selected

- Selected Species

All Results

- Default
- Confirmed
- Corrected
- Reported
- Unverifiable

Reference Layers

Major WA Towns

-

Railways

- +—

Roads

- Sealed
- Unsealed
- Other

RAMSAR Wetlands

- DRAFT Proposed Area
- Existing

State Borders

-

Drainage

-

Wyndham Borrow Pits NatureMap Map2

Printed by Guest user on 16/8/2017

Query details : Current Names Only=Yes; Core Datasets Only=Yes; Method='By Line'; Vertices=15° 28' 11" S, 128° 07' 48" E 15° 40' 28" S, 128° 04' 53" E ;

