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BGC Contracting Pty Ltd

Report for Great Northern Highway - Lay
Down Areas

Preliminary Environmental Impact Assessment
Broome Road SLK11.7 and Great Northern
Highway SLK2165 and SLK2185.5

May 2009



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1. Introduction

1.1 Background

BGC Contracting Pty Ltd (BGC) has been contracted by Main Roads Western Australia (Main Roads WA) to undertake a shoulder reconstruction on sections of the Broome Road and the Great Northern Highway.

BGC propose to create three lay down areas over a section of the highway between approximately 20 km and 60 km east of Broome (the Project Areas). The location of the proposed lay down areas is shown in Figures 1 and 2.

The lay down areas will be situated within the existing road reserve at:

- ▶ Broome Road SLK 11.7;
- ▶ Great Northern Highway SLK 2165; and
- ▶ Great Northern Highway SLK 2185.5.

Lay down areas will be used from July to October 2009 to store locally carted gravel during road works. A clearing area of approximately 150 m by 75 m will be required at each of the Project Areas.

1.2 Purpose of this Report

BGC has commissioned GHD Pty Ltd (GHD) to undertake a Preliminary Environmental Impact Assessment (PEIA) for the Project Areas.

This report details the findings of the PEIA undertaken for the Project Areas, and

- ▶ describes the significant aspects of the existing environment;
- ▶ details the primary environmental and social impacts of the proposed works;
- ▶ identifies any matters likely to warrant referral to the Environmental Protection Authority and/or the Commonwealth Department of the Environment, Water, Heritage and the Arts; and
- ▶ provides recommendations for additional investigations that may be required to clarify the expected environmental impacts of the proposed works.



2. Environmental Aspects

The key environmental aspects considered for the proposed Project are listed in Table 1. The potential impacts for the relevant environmental aspects are examined in more detail in Sections 4 and 5.

Note: Where issues were not considered relevant to the Project a justification for their exclusion has been included in Table 1.

Table 1 Environmental Aspects Considered for the Project

Environmental Aspect	Yes	No	Comments
Adjacent Land-uses	√		Addressed in Section 3.2
Surface waters / drainage (watercourses, stormwater disposal, water quality, proclaimed waterways)	√		Addressed in Section 3.4.1 and 3.4.2
Groundwater	√		Addressed in Section 3.4.3
Wetlands	√		Addressed in Section 3.4.1
Salinity		√	No salinity issues are known to occur within the Project Area.
Reserves and conservation areas; including Environmentally Sensitive Areas	√		Addressed in Section 3.5
Vegetation – clearing	√		Addressed in Section 4
Vegetation – associations, representativeness and clearing	√		Addressed in Section 3.7.1
Vegetation – threatened species and communities	√		Addressed in Section 3.8 and 3.9.1
Vegetation – dieback and other diseases or pathogens		√	No known dieback exists within the Kimberley Region. No other diseases or pathogens are considered relevant to the Project Area.
Vegetation – weeds	√		Addressed in Section 3.10
Fauna	√		Addressed in Section 3.11
Heritage (non-indigenous)	√		Addressed in Section 3.12
Aboriginal heritage	√		Addressed in Section 3.13



Environmental Aspect	Yes	No	Comments
Noise and Vibration	√		Addressed in Section 3.14
Air Quality		√	The Project is not expected to impact upon regional air quality.
Dust	√		Addressed in Section 3.15
Visual Amenity	√		Addressed in Section 3.16
Public safety and risk	√		Addressed in Section 3.17
Contaminated sites		√	<p>No known contaminated sites are located within the Study Area.</p> <p>Due to the historical and present land-use (cattle grazing), the risk of contaminated sites occurring within the Study Area is considered extremely low.</p> <p>A search of the Contaminated Site database (Department of Environment and Conservation, 2009a) did not identify any known sites within the vicinity of the project area.</p>
Acid Sulphate Soils		√	The probability of Acid Sulphate Soils occurring within the Study Area is extremely low (CSRIO, 2006).



3. Existing Environment

3.1 Climate

Broome has a tropical climate dominated by two seasons, referred to as the 'wet' and the 'dry', separated by short transitional periods. The wet season, lasting from November to April, is characterised by hot and humid conditions. The dry season occurs from May to October and is characterised by low humidity and cooler temperatures, particularly at night.

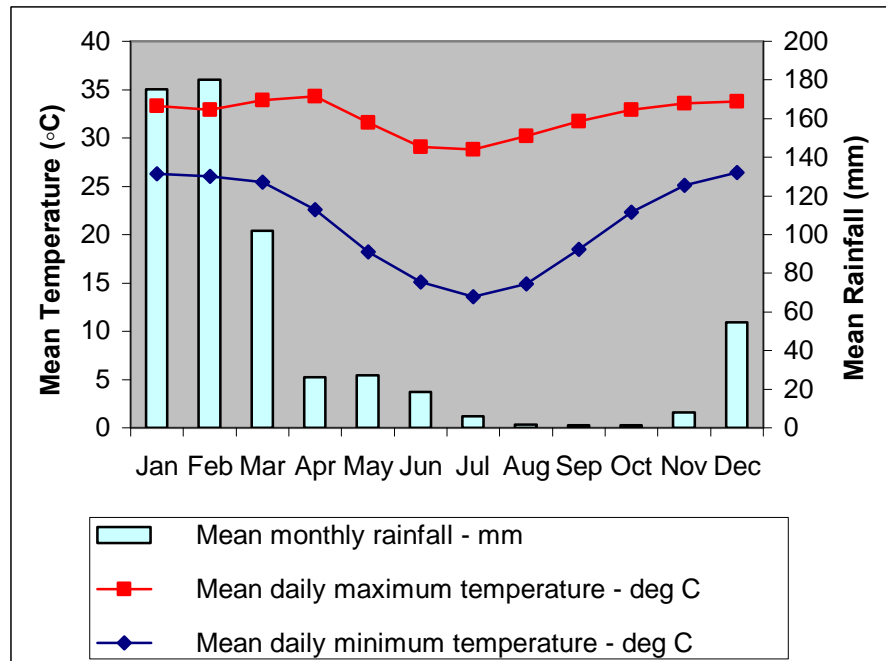
Rainfall in the region tends to occur in short, heavy downpours and is often associated with thunderstorms and intense tropical systems. The bulk of Broome's average annual rainfall (75 %) has been recorded over the period of January to March.

Tropical cyclones can be experienced during the wet season, but are most common in January and February (Bureau of Meteorology 2009a).

The closest Bureau of Meteorology weather station to the Project Area is at Broome Airport, located approximately 18 km west of the Project Areas. Recorded climatic data for this weather station is presented in Graph 1 and summarised as follows:

- ▶ Mean Daily Maximum Temperature: 34.3°C (April) to 28.8°C (July)
- ▶ Mean Daily Minimum Temperature: 26.4°C (December) to 13.6°C (July)
- ▶ Mean Annual Rainfall: 602.7 mm

Source: Bureau of Meteorology (2009b)



Graph 1 Broome Temperature and Rainfall



3.2 Landuse

The Study Areas are situated within the Shire of Broome. The landuse surrounding the Project Areas are described in table Table 2.

Table 2 Surrounding Landuse

Road	SLK	Landuse
Broome Road	11.7	North and South of Road – Pastoral Lease (Roebuck Plains) North of Road – Public Purposes (Water Supply)
Great Northern Highway	2165	Pastoral Lease (Roebuck Plains)
Great Northern Highway	2185.5	The Project Area is at the junction of the Great Northern Highway and an unused 1.5 km wide road reserve. Roebuck Plains pastoral lease is situated 600 m to the South and 900 m to the North of the site.

3.3 Topography and Soils

The Project Areas are located within the Dampier Tablelands Zone (Tille, 2006). This zone is characterised by partially lateritized low sandstone tablelands with extensive sandplain cover.

The Western Australian Geological Survey mapped soils in the region surrounding the project sites. Soil types likely to be found in the Project Areas are presented in Table 3.

Table 3 Soil Types

Road Number/Project SLK	Likely Soil Types in Project Area*
H042 / SLK 11.7	Sand, silt; minor gravel: mixed alluvial and aeolian
H006 / SLK 2165	Sand, silt; minor gravel: mixed alluvial and aeolian
H006 / SLK 2185.5	Red sand, fine to medium; minor silt: aeolian

*Source (Bureau of Mineral Resources, Geology and Geophysics (1998))

3.4 Hydrology

3.4.1 Surface Waters

The dominant drainage system in the Broome region is a series of lakes and intermittent creeks. These flow in a westerly direction along the path of an ancient river system, which drains into Roebuck Bay. Collins Creek, an intermittent channel which



drains towards Lake Eda, intersects Great Northern Highway approximately 1 km west of the Project Area at SLK 2185.5.

3.4.2 Drainage

Monsoonal rainfall causes extensive sheet flow flooding over the flat landscape and often creates ephemeral, dendritic drainage lines and rivers with extensive floodplain areas. The often sandy nature of these drainage lines makes them susceptible to erosion from channelised runoff and grazing livestock.

Surface water drains directly off road surfaces. A high frequency and high intensity rainfall event during the wet season often causes flooding of the road surface in floodway areas and at river crossings.

3.4.3 Water Management Areas

A search of the Department of Water (DoW) Geographic Data Atlas indicated that none of the Project Areas are located within any Gazetted Public Drinking Water Source Areas. A Priority 1 Drinking Water Source Area is situated approximately 2.5 km north of the eastern Project Area (Broome Road SLK 11.7). The project is highly unlikely to impact upon this area as water flow is in the opposite direction.

All three Project Areas are located within proclaimed groundwater management zones under the *Rights in Water and Irrigation Act* (1914) (Department of Water, 2009).

The Act gives the DoW the power to manage groundwater resources within the region. BGC will need relevant approvals where dewatering or abstraction of is required. The DoW will need to be consulted and the following approvals will be required.

- ▶ For dewatering – ‘Application for a 5C Licence to take Groundwater’ (Form A).

3.4.4 Wetlands

Australia is a Contracting Party to the Convention on Wetlands, signed in Ramsar, Iran in 1971 (the Ramsar Convention). This intergovernmental treaty is dedicated to the conservation and wise use of wetlands.

Sites containing representative, rare or unique wetland types, or that are important for conserving biological diversity are contained within a List of Wetlands of International Importance (Ramsar sites).

Roebuck Bay, which is situated approximately 11 km south of the western Project Area (Broome Road, SLK 11.7), is a Ramsar site.

The Department of Environment, Water, Heritage and the Arts maintains a database of wetlands which are significant at a national level. Three wetlands of national significance are listed in the Broome region:

- ▶ Roebuck Bay – 11 km south of the western Project Area;
- ▶ Willie Creek Wetlands – 18 km north-west of the western Project Area; and



- ▶ Roebuck Plains System – which runs to the south of all the Project Areas (see Figure 1)

(Source - Department of Environment, Water, Heritage and the Arts, 2009c)

Given the low impact nature of the proposed Project it is considered unlikely that impacts upon nationally or internationally significant wetlands will occur.

3.5 Reserves and Conservation Areas

No conservation reserves or areas occur within the Project Areas, however a small (19 ha) unnamed conservation area is situated approximately 3 km west of the western Project Area (Broome Road SLK 11.7). No conservation areas occur within the immediate vicinity of the two eastern Project Areas.

3.6 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are subject to definition under Section 51B of the *Environmental Protection Act* (1986). The Department of Environment and Conservation (2009b) does not identify any Environmentally Sensitive Area (ESA) within the Project Areas, however the surrounding region contains numerous ESAs.

These ESA's are associated with the system of lakes and intermittent creeks with drain the region. The distance from each of the Project Areas to the closes ESAs are:

- ▶ SLK 11.7 Broome Road ~ 5.5 km South;
- ▶ SLK 2165 Great Northern Highway SLK ~ 3 km south; and
- ▶ SLK 2185.5 Great Northern Highway ~ 3 km southwest.

The location of ESAs are shown on Figure 2.

3.7 Vegetation

3.7.1 Vegetation Types

The vegetation of the Project Area is identified by Beard (1979) as likely to contain the following vegetation associations:

- ▶ Vegetation Association 750: Shrublands, pindan; *Acacia tumida* shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly Spinifex;
- ▶ Vegetation Association 73: Grasslands, short bunch grass savanna, grass; salt water grassland (*Sporobolus virginicus*);
- ▶ Vegetation Association 67: Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks; and
- ▶ Vegetation Association 125: Bare areas; salt lakes.



3.7.2 Vegetation in a Regional Context

A vegetation type is considered under represented if there is less than 30% of its original distribution remaining. From a purely biodiversity perspective, and not taking into account any other land degradation issues, there are several key criteria now being applied to vegetation in States where clearing is still occurring (Environmental Protection Authority, 2000), namely:

- ▶ The “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at 30% of the pre-European / pre-1750 extent for the vegetation type;
- ▶ A level of 10% of the original extent is regarded as being a level representing *Endangered*; and
- ▶ Clearing which would put the threat level into the class below should be avoided.

Such status can be delineated into five classes (Table 4).

Table 4 Vegetation Extent and Status

Class	Classification
<i>Presumed Extinct</i>	Probably no longer present in the bioregion
<i>Endangered*</i>	< 10% of pre-European extent remains
<i>Vulnerable*</i>	10-30% of pre-European extent exists
<i>Depleted*</i>	< 30% and up to 50% of pre-European extent exists
<i>Least Concern</i>	< 50% pre-European extent exists and subject to little or no degradation over a majority of this area.

Note: * or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

The extent of the vegetation in the Project Areas is considered to be of *Least Concern*, with at least 98.3% of the pre-European extents considered to be remaining in the Dampierland Biogeographic Regionalisation for Australia (IBRA) region (Shepherd, 2005) (Table 5).



Table 5 Regional Assessment of Vegetation Extent (Shepherd, 2005)

Vegetation Association Number	Association Description	Pre-European Extent (Ha) in Dampierland IBRA region	Current Extent (Ha) in Dampierland IBRA region	% Remaining	% Current Extent in IUCN Class I-IV Reserves	Occurrence in Project Areas
750	Shrublands, pindan; <i>Acacia tumida</i> shrubland with grey box & cabbage gum medium woodland over ribbon grass & curly spinifex	1229175.941	1227005.040	99.8	2.3	<ul style="list-style-type: none"> ▶ Project Site Broome Rd SLK 11.7 ▶ Project Site Great Northern Highway SLK 2165 ▶ Project Site Great Northern Highway SLK 2185.5
73	Grasslands, short bunch grass savanna, grass; salt water grassland (<i>Sporobolus virginicus</i>)	240254.071	236188.682	98.3	0.0	<ul style="list-style-type: none"> ▶ ~2km SE of Project Site Great Northern Highway SLK 2165
67	Grasslands, tall bunch grass savanna, sparse low tree; ribbon grass & paperbarks	27285.405	27285.405	100.0	0.0	<ul style="list-style-type: none"> ▶ ~2km S Project Site Great Northern Highway SLK 2185.5
125	Bare areas; salt lakes	6640.598	6640.598	100.0	0.0	<ul style="list-style-type: none"> ▶ ~3km SE Project Site Great Northern Highway SLK 2185.5



3.8 Threatened Ecological Communities

No Threatened Ecological Communities (TEC) protected under the *Environment Protection and Biodiversity Conservation Act 1999* are known to be present within the Project Areas (Department of Environment, Water, Heritage and the Arts, 2009a).

A search of the DEC's TEC database was undertaken for the Study Area. No TECs are known to be located within the Project Areas, however a TEC is known to occur approximately 1.5 km west of the western Project Area (Broome Road, SLK 11.7):

- ▶ 'Vulnerable' TEC – 'Species-rich faunal community of the intertidal mudflats of Roebuck Bay'.

This TEC has a large buffer zone (30 km radius) which encompasses the western Project Area.

Given the low impact nature of the proposed Project it is considered unlikely that impacts upon this TEC will occur.

3.9 Flora

3.9.1 Threatened Flora

Flora species considered to be threatened are listed under the *Environment Protection and Biodiversity Conservation Act 1999* and the *Wildlife Conservation Act (1950)*. The DEC also keeps a list of Priority Flora species that are not listed under legislation but for which the DEC feels there is cause for concern, or for which not enough information is known (Table 9 and Table 10, Appendix A).

An *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Protected Matters Search was undertaken for the Project Area. No flora species of conservation significance are known to occur, or considered to have habitat, in the search area.

A search was also undertaken through the DEC's threatened flora databases (ref #: 35-0409) and NatureMap (Department of Environment and Conservation, 2009c) for species of Declared Rare and Priority Flora located within the vicinity of the Study Area. Descriptions of those species recorded from these searches are presented in Table 11, Appendix A. No Declared Rare Flora (DRF) and seven Priority Flora species were identified from the search area.

The DEC's threatened flora database search results and the Protected Matters Search results are presented in Appendix C.

The recorded locations of these species are presented in Figure 2. None of these identified species are located within the boundaries of the Study Area.

3.9.2 Priority Flora

It is possible that Priority Flora species will be present at the Project Area's or in their immediate vicinity. In particular *Glycine pindanica* is highly likely to occur on road



verges within the region. Suitable habitat for this species is widespread within the surrounding region and has been subjected to very little clearing (see Table 5). As such it is considered unlikely that significant impacts upon Priority Flora habitat will occur as a result the Project.

3.10 Weeds

The margins of roads are often excellent habitat for weed species as they respond well to disturbance and quickly colonise exposed areas. Runoff from the exposed road surface often pools in depressions adjacent to the road, aiding the growth of weeds.

Roads can also act as transport corridors for weeds, with vegetative parts and seeds of weeds “hitching rides” on vehicles. Other pests also can spread into an area in the same way.

A framework was endorsed by the Australian Government in 1998 under which Weeds of National Significance (WONS) are identified. Weeds considered as being significant within an agricultural, forestry or environmental context are included in a database of WONS. These species were determined through an assessment of the invasiveness, impacts, potential for spread and socio-economic and environmental values of each species (Australian Government, 2009).

In Western Australia invasive plants may also be declared under the *Agriculture and Related Resources Protection Act 1976*. The Act may stipulate specific control measures that must be undertaken for Declared Plant species (Department of Agriculture and Food Western Australia 2008).

The *Draft Kimberley Natural Resource Management Plan* (Rangelands NRM Coordinating Group, 2004) identified a number of weeds of significance in the Kimberley Region (Table 6).

The Department of Agriculture and Food Western Australia (2009) have recorded 84 Declared Plants as occurring within the Shire of Broome.

Table 6 Weeds Of National Significance (WONS), Declared Plants and Regionally significant weed species that may occur in the Study Area

Weed Species	WONS	Declared Plant	Regionally Significant
Mesquite – <i>Prosopis pallida</i>	X	X	
Parkinsonia – <i>Parkinsonia aculeata</i>	X	X	
Prickly Acacia – <i>Acacia nilotica</i>	X		
Rubber Vine – <i>Cryptostegia grandiflora</i> and <i>C. madagascariensis</i>	X	X	
Salvinia – <i>Salvinia molesta</i>	X	X	
Bellyache Bush – <i>Jatropha gossypifolia</i>		X	X



Weed Species	WONS	Declared Plant	Regionally Significant
Noogoora Burr – <i>Xanthium strumarium</i>		X	X
Lead Tree – <i>Leucaena leucocephala</i>			X
Calotrope – <i>Calotropis procera</i>			X

3.11 Fauna

3.11.1 Fauna Habitat

The dominant habitat types located at all the Project Areas are likely to be:

- ▶ Shrublands; and
- ▶ Open Woodlands.

These vegetation types are likely to provide shelter for a wide range of fauna species.

The dominant vegetation types located within the Project Area are common and widespread within the Dampierland IBRA bioregion.

It has been estimated that approximately 99.8% pre-European extent of the dominant vegetation type remains within the region (refer to Table 4). Given the small area of clearing required at each of the Project Areas (approximately 1.1 ha) it is considered unlikely that the Project will have significant impacts upon fauna within the region.

3.11.2 Threatened Fauna

The conservation of fauna species and their significance status is currently assessed under both State and Commonwealth Acts. The Acts include the *Western Australian Wildlife Conservation Act 1950*; *Wildlife Conservation (Specially Protected Fauna) Notice 2008*, and the *Environment Protection and Biodiversity Conservation Act 1999*. The DEC also produces a supplementary list of Priority Fauna, being species that are not considered “threatened” under the *Western Australian Wildlife Conservation Act 1950* but for which the Department feels there is a cause for concern. These species have no special protection, but their presence would normally be considered to determine any potential impacts on these species.

The classification schedules are provided in Table 12 and Table 13, Appendix B.

The DEC’s Threatened and Priority Fauna Database and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database (Department of the Environment, Water, Heritage and the Arts, 2009a) was conducted for the Project Area. The threatened fauna species listed from these searches and a comment on their likelihood of occurrence in the Project Area are presented in Table 14, Appendix B.

Due to the close proximity of the ocean many marine species were listed in the search results. All ray-finned fish listed in the search are marine species. Impacts on the



marine environment are not considered likely. As such these species are not included in Table 14.

The DEC's Threatened and Priority Fauna Database search results and the Protected Matters Search results are presented in Appendix C.

It should be noted that some species that appear in the *EPBC Act* Protected Matters Search Tool are often not likely to occur within the specified area, as the search provides an approximate guidance to matters of national significance that require further investigation. The records from the DEC searches of threatened fauna provide more accurate information for the general area; however some records of sightings or trappings can be dated and often misrepresent the current range of threatened species.

3.11.3 Migratory Species

The *EPBC Act* also protects migratory species that are listed under the following International Agreements:

- ▶ Appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a range state under the Convention;
- ▶ The Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA);
- ▶ The Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA);
- ▶ The Bilateral Agreement between the Republic of Korea and Government of Australia to protect migratory shorebirds and their habitat (ROKAMBA); and
- ▶ Listed migratory species also include species identified in other international agreements approved by the Commonwealth Environment Minister.

The Act also protects marine species on Commonwealth lands and waters.

The Protected Matters Search Tool lists 47 Migratory species, protected under the *EPBC Act*, which may occur in the Project Area. Most migratory species, if occurring in the area, will be present as foraging species during the wet season. Many of these migratory species are considered common in Western Australia and do not have special protection under the Western Australian *Wildlife Conservation Act 1950*. The likelihood of these species being impacted by the proposed Project is considered minimal. The Protected Matters Search results are presented in Appendix C.

3.11.4 Introduced Species

The following introduced species are known to occur in the Dampierlands IBRA regions:

- ▶ *Mus domesticus* (House Mouse)



- ▶ *Rattus rattus* (Black Rat, Ship Rat)
- ▶ *Canis lupus dingo* (Dingo);
- ▶ *Felis catus* (Cat);
- ▶ *Equus caballus* (Brumby, Horse);
- ▶ *Equus asinus* (Donkey); and
- ▶ *Bos taurus* (European Cattle).

Source: Australian Government (2007).

3.12 Heritage (non-Indigenous)

A search of the Australian Heritage Database, the Australian Heritage Inventory and the Heritage Council of Western Australia databases did not indicate any heritage sites within the immediate vicinity of the Study Areas however it did list one Ramsar listed wetland, Roebuck Bay, as being in the vicinity of the survey site.

The Roebuck Bay area, including Roebuck Plains and Lake Eda, are also listed in the Australian Heritage Database as an a place of significant environmental heritage (Place No. 17321). Given the distance of the Project Areas from this site and the low impact nature of the proposed works it is considered unlikely that the Project will impact upon the heritage value of this site.

3.13 Aboriginal Heritage

The Aboriginal Site Register is held under Section 38 of the *Aboriginal Heritage Act* (1972). It protects places and objects customarily used by, or traditional to, the original inhabitants of Australia.

Where an activity disturbs an Aboriginal site or object an application for permission to disturb will need to be submitted under Section 18 of the *Aboriginal Heritage Act 1972*. Where a site of previously unknown Aboriginal Heritage is to be disturbed, it is advised that a detailed anthropological and archaeological heritage survey is undertaken to find if there are any sites or objects of significance in that area, as it is an offence to disturb all Aboriginal Heritage sites, even those not contained on the Aboriginal Heritage Site Register. In the event that Aboriginal archaeological or ethnographic sites are discovered during construction, there will be a need to meet the requirements of the *Aboriginal Heritage Act (1972)*.

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Inquiry System identified a total of 2 registered Aboriginal Heritage sites within the vicinity of the Study Areas. The search results from the Aboriginal Heritage Inquiry System are provided in Appendix D (Department of Indigenous Affairs, 2009).

Both of the identified sites are listed as camps and water sources. The sites are situated approximately 3 km and 6 km to the West of the project site at SLK 2185.5 on the Great Northern Highway. The approximate location of the registered sites has been presented in Figure 2.



It should be noted that a search under the DIA database is not a valid full assessment under the *Aboriginal Heritage Act WA 1972*. This would require consultation with Aboriginal people with knowledge of the area (usually, but not necessarily Native Title Claimants), and an archaeological survey.

3.14 Noise and Vibration

There are no residents in close proximity of the proposed works who will be impacted by any noise or vibration.

3.15 Dust

There are no residents in close proximity of the proposed works who will be impacted by any dust.

3.16 Visual Amenity

The Project Sites will be used from July to October 2009, after which they will be rehabilitated. Given the small clearing area at each site the Project is unlikely to have significant impacts on the visual amenity of the region.

3.17 Public Safety and Risk

The construction of the lay down areas may create some public safety and risk issues. Applying traffic management and signage to Main Roads standards will be necessary to manage these risks throughout the implementation of the Project.



4. Vegetation Clearing

Any clearing of native vegetation requires a permit under Part V of the *Environmental Protection Act (1986)* except where exemptions apply under Schedule 6 of the Act or are prescribed in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. These exemptions do not apply in Environmentally Sensitive Areas (ESAs).

Main Roads have been granted a Purpose Clearing Permit (CPS 818/4) under the provisions of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. This permit provides for Main Roads to conduct such clearing associated with roadworks projects where that clearing is:

- ▶ The clearing is not at variance with the Ten Clearing Principles; and
- ▶ Not within an Environmentally Sensitive Area.

4.1 Ten Clearing Principles

The clearing required for the proposed Project has been assessed against the Ten Clearing Principles (Appendix E).

Based on the findings of the desktop survey, the clearing is not considered likely to be at variance with the Ten Clearing Principles.

4.2 Clearing in Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are subject to definition under Section 51B of the *Environmental Protection Act (1986)* and may include areas such those requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes.

The Department of Environment and Conservation (2009b) does not identify any Environmentally Sensitive Area (ESA) within any of the Project Areas.



5. Potential Impacts

Table 7 identifies the potential impacts for those aspects considered relevant to the Project. This section includes references to recommendations where applicable.

Table 7 Assessment of Environmental and Social Aspects and Impacts

Aspect	Evaluation of Potential Impact
Land Use and acquisition	The lay down areas will be restricted to existing Main Roads WA road reserve and land acquisition is not an issue for this part of the Project.
Surface waters/ drainage	<p>No permanent wetlands occur within the Project Area. A minor ephemeral river/creek lines traverses the Great Northern Highway approximately 1 km west of the eastern Project Area (SLK 2185.5). However it is only likely to flow following major rainfall events.</p> <p>While some sedimentation risk / erosion may occur, the impact on surface waters and drainage lines is expected to be minimal.</p> <p>Refer to Section 6, Recommendation 2.</p>
Groundwater	<p>Proposed works are not expected to impact on groundwater resources.</p> <p>Refer to Section 6, Recommendation 3.</p>
Reserves and conservation areas	There were no National Parks or Conservation Reserves identified within or in close proximity to the Project Area.
Vegetation Clearing	<p>The extent of clearing required for this Project is relatively minor (~1.1 ha at each site) compared to the large areas of native vegetation adjacent to the Project Area and within the Dampierland IBRA region.</p> <p>Following assessment against the DEC's Ten Clearing Principles (refer to Appendix E) it is considered that clearing of native vegetation for the proposed Project is unlikely to be at variance with the Ten Clearing Principles.</p> <p>Rehabilitation of the lay down areas will be required after Project completion.</p> <p>Refer to Section 6, Recommendations 4 and 5.</p>



Aspect	Evaluation of Potential Impact
Flora	<p>The DEC database search recorded no known populations of Declared Rare Flora (DRF) or Priority Flora within the Project Area. However seven Priority Species have been recorded in the surrounding region, within the vicinity of the Project Area.</p> <p>Given the small amount of clearing required at each of the Project Areas (~1.1 ha) and large areas of similar vegetation in the surrounding region (at least 98% of vegetation types remaining within the IBRA bioregion) the project is unlikely to have a significant impact upon any DRF.</p>
Weeds	<p>A number of noxious species have been recorded within the vicinity of the Project Area, particularly in roadside areas.</p> <p>Weed spread will be an issue that will require management during the clearing and construction phase. It is necessary to reduce the risk of weed spread from disturbed areas to less disturbed areas via vehicles, machinery and soil movement.</p> <p>Weed control should be included in the Construction Environmental Management Plan (CEMP) for the Project.</p> <p>Refer to Section 6, Recommendation 6</p>
Fauna	<p>The area required for this Project is small relative to the area of good quality habitat surrounding the Project Area and the impacts on fauna species are expected to be minimal.</p> <p>Although the clearing of vegetation has the potential to have a direct impact on fauna, the Project is unlikely to have a significant impact on the biodiversity value at the species and ecosystem levels in the region.</p> <p>Refer to Section 6, Recommendation 7.</p>
Heritage (non-Indigenous)	<p>Roebuck Bay, Roebuck Plains and Lake Eda are listed on the Register of National Estate. The Project Areas are all at least 3 km from this heritage site and given the low impact nature of the proposed works no significant impacts on the heritage value of this site are likely.</p>
Aboriginal Heritage	<p>The Project will not impact upon any known Aboriginal Heritage sites. It is considered that potential impacts upon unrecorded Indigenous Heritage sites can be adequately managed under a project specific CEMP (refer to Section 6, Recommendation 6).</p>
Construction phase impacts – fire management, fuel and chemical storage, and waste disposal.	<p>During the construction phase of the proposed works, activities have the potential to cause adverse environmental/social impacts. It is considered that these can be adequately managed under a project specific Construction Environmental Management Plan (CEMP) (refer to Section 6, Recommendation 6).</p>
Noise and Vibration	<p>Given the remote location of the Project Areas the potential for construction noise and vibration to cause significant impacts is considered minimal.</p>



Aspect	Evaluation of Potential Impact
Dust	<p>Dust will be generated during the roadworks.</p> <p>BGC will control dust during construction via the implementation of a standard CEMP and areas that no longer require construction will be rehabilitated (refer to Section 6, Recommendations 5 and 6).</p>
Visual Amenity	<p>Whilst proposed works and clearing of vegetation will impact upon the visual amenity, this aspect is not considered to be significant given that much of the Project Area is unpopulated and the impact will be temporary.</p> <p>Rehabilitation after construction works will reduce the impacts on visual amenity.</p> <p>Refer to Section 6, Recommendation 5).</p>
Public safety and risk	<p>The construction of the lay down areas may create some public safety and risk issues. Applying traffic management and signage to Main Roads standards will be necessary to manage these risks throughout the implementation of the Project.</p>



6. Recommendations and Approvals Required

Table 8 indicates that it is unlikely that approvals from government agencies are required.

Table 8 Recommendations and Approvals required for the Project

Recommendation	Agency Required / Referral	Relevant Agency
1. BGC will need to liaise with the pastoral lease holders if works are to be undertaken on Roebuck Plains Pastoral Lease	No	Pastoral Lease Holders
2. BGC will need to apply for a Section 17 Permit to Interfere with Bed and Banks under the <i>Rights in Water Irrigation Act 1914</i> if the project will impact on the Bed and Banks of the perennial streams running through the Project Area. It is considered unlikely that any waterways will be impacted.	Yes	Department of Water (DoW)
3. If groundwater is required, BGC will need to apply for a 26D Licence under the <i>Rights in Water and Irrigation Act 1914</i> to construct bores in this area and/or apply for a 5C Licence for abstraction of water.	Yes	DoW
4. It is recommended that works be undertaken for this Project in the dry season, reducing the chance for weather to adversely impact construction activities.	No	N/A
5. Rehabilitation of the Project Areas as well as any access tracks will be required after Project works. It is suggested that rehabilitation be undertaken at the end of the dry season to ensure that native flora can take advantage of wet season rainfall.	No	N/A
6. Development of a Construction Environmental Management Plan.	No	Main Roads WA
7. BGC should protect fauna and fauna habitat during construction works in accordance with a Construction Environmental Management Plan.	No	DEC



7. Report Limitations

This report presents the results of a Preliminary Environmental Impact Assessment prepared for the purpose of this commission. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent scientist/botanist before being used for any other purpose. GHD accepts no responsibility for other use of the data.

Where previous reports, flora surveys and similar work have been performed and recorded by others the data is included and used in the form provided by others. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

An understanding of site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experience based. Hence, this report should not be altered, amended or abbreviated, issued in part or incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances that arise from the issue of the report that has been modified in any way as outlined above.



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Figures

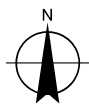
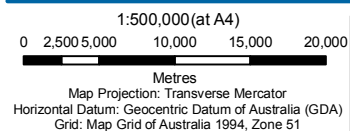
Figure 1 Locality Map

Figure 2 Project Area



LEGEND

 Study Areas - GHD - 20090418

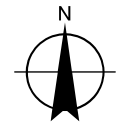
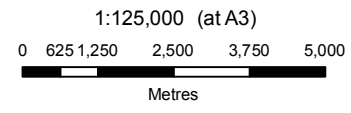
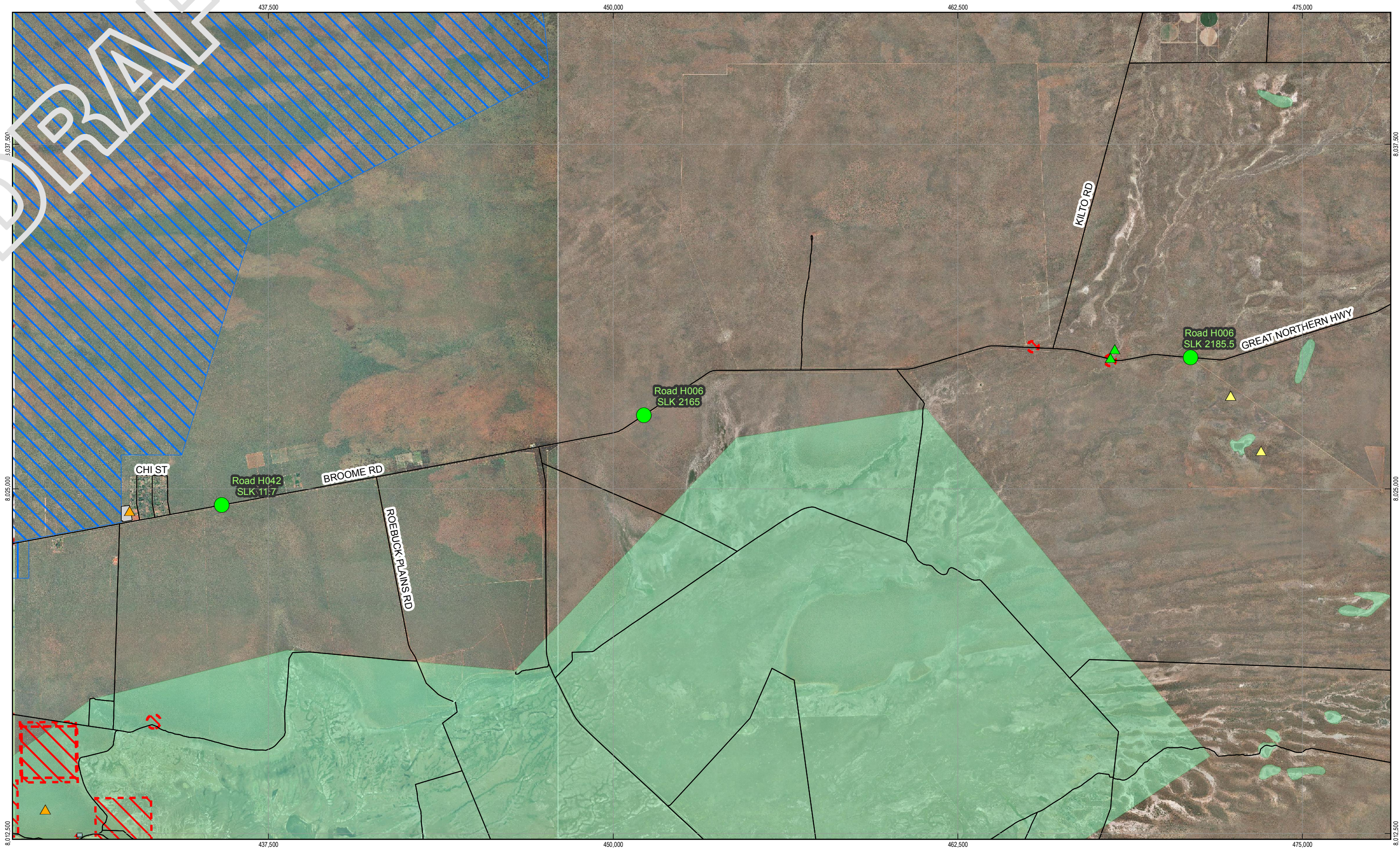


BGC
Broome Road and Great Northern Highway
Shoulder Upgrade

Job Number 61-23982
Revision A
Date 20 MAY 2009

Locality Map

Figure 1



LEGEND	
	Proposed Laydown Areas - GHD - 20090418
	Roads - Landgate - 20090423
	Indigenous Heritage - DIA - 20081112
	Drinking Water Source Areas - DOW - 20090430
	Environmentally Sensitive Areas - DEC - 20090423
Rare and Priority Flora* - DEC - 20090428	
	Rare
	P1
	P2
	P3
	P4

*Threatened Flora Database and WA Herbarium database Information Reference Number 35-0409



BGC Broome Road and Great Northern Highway Shoulder Upgrade	Job Number Revision Date	61-23982 A 15 MAY 2009
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Environmental Constraints **Figure 2**



Appendix A

Flora

Conservation Codes and Threatened Species



Table 9 Conservation Categories and Definitions for EPBC Act Listed Flora and Fauna Species.

Conservation Category	Definition
<i>Extinct</i>	Taxa not definitely located in the wild during the past 50 years
<i>Extinct in the Wild</i>	Taxa known to survive only in captivity
<i>Critically Endangered</i>	Taxa facing an extremely high risk of extinction in the wild in the immediate future
<i>Endangered</i>	Taxa facing a very high risk of extinction in the wild in the near future
<i>Vulnerable</i>	Taxa facing a high risk of extinction in the wild in the medium-term
<i>Near Threatened</i>	Taxa that risk becoming Vulnerable in the wild
<i>Conservation Dependent</i>	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened.
<i>Data Deficient (Insufficiently Known)</i>	Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.
<i>Least Concern</i>	Taxa that are not considered Threatened



Table 10 Conservation Codes and Descriptions for DEC Declared Rare and Priority Flora Species.

Conservation Code	Description
R: Declared Rare Flora – Extant Taxa	Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X: Declared Rare Flora – Presumed Extinct Taxa	Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
P1: Priority One – Poorly Known Taxa	Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two – Poorly Known Taxa	Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3: Priority Three – Poorly Known Taxa	Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4: Priority Four – Rare Taxa	Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years.



Table 11 Significant Flora Species identified in the Threatened Flora Database Search Results

Species	Conservation Code	Description ¹	Flowering Time ¹	Preferred Habitat ¹	Distribution ¹	Data Source	Likelihood of Occurrence
<i>Corymbia paractia</i>	Priority 1	Tree (often several-stemmed), 4–6(–12) m high, bark smooth, white, shedding in thin scales. Fl. white	Apr–May/Oct–Dec	Skeletal soils. In transition zone between coastal beach dunes & red pindan soils	Northern Botanical Province: Dampierland	WA Herb ²	Unlikely no habitat
<i>Fuirena incrassata</i>	Priority 3	Annual, grass-like or herb (sedge), 0.1–0.3 m high, perianth of 3 bristles and 3 clawed scales; scales 3-veined in basal part and thickened distally.	May–Aug	Sand, sandy clay. Swamps, creek beds, claypans, semi-saline lakes	Northern Botanical Province: Central Kimberley, Dampierland & Ord-Victoria Plains; and Eremaean Botanical Province: Great Sandy Desert & Pilbara	WA Herb ² DR&PF ³	Possible



Species	Conservation Code	Description ¹	Flowering Time ¹	Preferred Habitat ¹	Distribution ¹	Data Source	Likelihood of Occurrence
<i>Glycine pindanica</i>	Priority 1	Prostrate or scrambling perennial, herb or climber. Fl. pink, blue, purple	Feb–Mar/Jun	Pindan soils	Northern Botanical Province: Dampierland	WA Herb ² DR&PF ³	Likely
<i>Nymphoides beaglensis</i>	Priority 2	Aquatic annual, herb. Fl. white, pink, purple	Mar–Jun	In shallow freshwater. Edges of permanent waterholes or in seasonally inundated claypans & depressions	Northern Botanical Province: Dampierland	WA Herb ² DR&PF ³	Unlikely no habitat
<i>Pterocaulon</i> sp. A Kimberley Flora (B.J. Carter)	Priority 2	Compact shrub, to 0.5 m high. Fl. blue, purple,	Apr–Aug	Sand. Coastal areas, saline sandy flats, pindan sandplain	Northern Botanical Province: Dampierland	DR&PF ³	Possible
<i>Tetragonia coronata</i>	Priority 1	Decumbent annual, herb. Fl. yellow	Jul	Red clay loam. Calcrete outcrops	Northern Botanical Province: Dampierland; and Eremaean Botanical Province: Great Sandy Desert & Carnarvon	WA Herb ²	Unlikely no habitat



Species	Conservation Code	Description ¹	Flowering Time ¹	Preferred Habitat ¹	Distribution ¹	Data Source	Likelihood of Occurrence
<i>Triodia acutispicula</i>	Priority 3	Tussock-forming resinous perennial, grass-like or herb, 0.5–1.5 m high, lemma bi-textured, glabrous, with transverse demarcation, spikelet terete.	Jan–Apr	Sandy soils. River levees, pindan plains, rocky hillslopes & outcrops.	Northern Botanical Province: Dampierland & Northern Kimberly	WA Herb ²	Possible

¹ Data Source Department of Environment and Conservation (2009d) FloraBase accessed online at <http://florabase.calm.wa.gov.au/> on 14/05/2009

² WA Herbarium Database Search Reference 35-0409

³ DEC Declared Rare and Priority Flora Database Search Reference 35-0409

Refer to Appendix C for full details of the database search results



Appendix B

Fauna

Fauna Conservation Codes and Threatened Fauna Species



EPBC Act Fauna Conservation Categories

Listed threatened species and ecological communities

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- ▶ Extinct in the wild,
- ▶ Critically Endangered,
- ▶ Endangered, or
- ▶ Vulnerable.

See Table 9.

Critically endangered and endangered species

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered species if it does, will, or is likely to:

- ▶ lead to a long-term decrease in the size of a population, or
- ▶ reduce the area of occupancy of the species, or
- ▶ fragment an existing population into two or more populations, or
- ▶ adversely affect habitat critical to the survival of a species, or
- ▶ disrupt the breeding cycle of a population, or
- ▶ modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- ▶ result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*, or
- ▶ interfere with the recovery of the species.

**Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a critically endangered or endangered species by direct competition, modification of habitat, or predation.*

Vulnerable species

An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- ▶ lead to a long-term decrease in the size of an important population of a species, or
- ▶ reduce the area of occupancy of an important population, or
- ▶ fragment an existing important population into two or more populations, or
- ▶ adversely affect habitat critical to the survival of a species, or
- ▶ disrupt the breeding cycle of an important population, or
- ▶ modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or



- ▶ result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat*, or
- ▶ interferes substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

- ▶ key source populations either for breeding or dispersal,
- ▶ populations that are necessary for maintaining genetic diversity, and/or
- ▶ populations that are near the limit of the species range.

*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a vulnerable species by direct competition, modification of habitat, or predation.

Listed Migratory species

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The criteria below are relevant to migratory species that are not threatened.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- ▶ substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or
- ▶ result in invasive species that is harmful to the migratory species becoming established* in an area of important habitat of the migratory species, or
- ▶ seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

An area of important habitat is:

1. habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or
2. habitat utilised by a migratory species which is at the limit of the species range, or
3. habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an ecologically significant proportion of the population varies with the species (each circumstance will need to be evaluated).

*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a migratory species by direct competition, modification of habitat, or predation.



Table 12 Western Australia Wildlife Conservation Act (1950) Conservation Codes

Conservation Code	Description
Schedule 1	"...fauna that is rare or likely to become extinct, are declared to be fauna that is in need of special protection."
Schedule 2	"...fauna that is presumed to be extinct, are declared to be fauna that is in need of special protection."
Schedule 3	"...birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is in need of special protection."
Schedule 4	"...fauna that is in need of special protection, otherwise than for the reasons mentioned [in Schedule 1 – 3]"

Table 13 DEC Priority Fauna Codes

(Species not listed under the *Wildlife Conservation Act (1950)*, but for which there is some concern).

Conservation Code	Description
Priority 1	Taxa with few, poorly known populations on threatened lands.
Priority 2	Taxa with few, poorly known populations on conservation lands. Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown Land, water reserves, etc.
Priority 3	Taxa which are known from few specimens or sight records, some of which are on lands not under immediate threat of habitat destruction or degradation.
Priority 4	Rare taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years.
Priority 5	Taxa in need of monitoring. Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.



Table 14 Threatened fauna occurring, or likely to occur, in the Project Area as indicated by the EPBC Act Protected Matters Search Tool and the DEC's Threatened Fauna Database search

Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Birds					
Accipitridae	<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	Migratory Listed			This species is recorded as occurring in coastal regions all the way around Australia (Department of Environment, Water, Heritage and the Arts 2009b). It may occur in the Project Area as a transient visitor.
Anatidae	<i>Anseranas semipalmata</i> (Magpie Goose)	Migratory Marine			The Magpie Goose is distributed along the northern coast of Australia from Broome in Western Australia around to northern New South Wales, also along the Western Coast of Victoria (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Area.
Apodidae	<i>Apus pacificus</i> (Fork-tailed Swift)	Migratory Marine Listed – overfly marine area			This species has a wide distribution across Australia, excluding the arid interior. It is highly migratory with a widespread global population. Global population trends have not been quantified however it has recently been elevated to Least Concern on the IUCN Red List due to evidence that the population is increasing (Birdlife International 2009c). This species may occur in the Project Area.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Ardeidae	<i>Ardea alba</i> (Great Egret, White Egret)	Migratory Listed – overfly marine area			Also known as <i>Ardea modesta</i> (Eastern Great Egret) this species is widely distributed across southern and eastern Asia and Australasia. The main threats to the species are thought to be alteration of wetland habitat and bioaccumulation of persistent environmental contaminants (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Area as a transient visitor; however it is unlikely to use the area for extended periods as it favours a wetland habitat.
Ardeidae	<i>Ardea ibis</i> (Cattle Egret)	Migratory Listed – overfly marine area			The distribution of this species is considered to be Australia wide, excluding the arid interior regions (Department of Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Area as a transient visitor.
Ardeidae	<i>Ixobrychus flavicollis australis</i> (Black Bittern)			Priority 3	Black Bitterns are found in mangroves throughout south-western, northern and eastern Australia. Along the east coast they extend as far south as eastern Victoria (Australian Museum 2009). The species is unlikely to be found in the Project Area due to lack of suitable habitat.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Ardeidae	<i>Ixobrychus minutus</i> (Little Bittern)			Priority 4	<p>The global Extent of Occurrence of the Little Bittern is estimated at 10,000,000 km². It is estimated to have a large global population, however population trends have not been well quantified (Birdlife International 2008d).</p> <p>This species may be found in the Project Area.</p>
Burhinidae	<i>Burhinus grallarius</i> (Bush Stonecurlew)			Priority 4	<p>The Bush Stonecurlew is a nocturnal, ground-dwelling bird. During breeding season birds restrict feeding to the vicinity of the next site, while at other times individuals can travel over large distances (Australian Museum 2009).</p> <p>The species may occur in the Study Area.</p>
Charadriidae	<i>Charadrius leschenaultii</i> (Greater Sand Plover, Large Sand Plover)	Migratory Marine			<p>The Greater Sand Plover has an estimated global population of 190,000 to 360,000 birds. It is not considered to be globally threatened and numbers recorded in Australia have increased in counts since 1995.</p> <p>In Australia it occurs in coastal areas in all states, with the greatest numbers occurring in the north-west (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>The species is almost entirely coastal and is unlikely to be found in the Project Areas.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Charadriidae	<i>Charadrius mongolus</i> (Lesser Sand Plover, Mongolian Plover)	Migratory Marine			<p>This migratory species is widespread throughout coastal regions in Australia, where it has been recorded in all States.</p> <p>The species is seldom recorded away from the coast (Department of Environment, Water, Heritage and the Arts 2009b) and is unlikely to be found in the Project Areas.</p>
Charadriidae	<i>Charadrius veredus</i> (Oriental Plover, Oriental Dotterel)	Migratory Listed – overfly marine area			<p>This migratory waterbird breeds at scattered sites in Mongolia, Manchuria and south-eastern Siberia. Its migratory route includes visiting Australia where it usually spends a few weeks in coastal habitats along the North of Australia before dispersing inland. Thereafter they usually inhabit flat open arid or semi-arid grasslands, they can also be found in lightly wooded grasslands during the wet seasons (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>This species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Charadriidae	<i>Pluvialis squatarola</i> (Grey Plover)	Migratory Marine			<p>The Grey Plover has a broad global distribution, breeding in the Northern Hemisphere and migrating to widespread southern habitats during non-breeding season. In Australia the Grey Plover is almost entirely found in coastal areas (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>The species is unlikely to occur in the Project Area due to lack of suitable habitat.</p>
Columbidae	<i>Phaps histrionica</i> (Flock Bronzewing)			Priority 4	<p>This species has been recorded across the north of Western Australia, Northern Territory, north-east of South Australia, eastern Queensland and western New South Wales (Birdlife International 2009e).</p> <p>The species may be found in the Project Area.</p>
Falconidae	<i>Falco hypoleucos</i> (Grey Falcon)			Priority 4	<p>The Grey Falcon is sparsely distributed over a wide area of semi-arid Australia. The species is currently under pressure from clearance and degradation of its open woodland habitat (Birds Australia 2009).</p> <p>The species may be found in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Falconidae	<i>Falco peregrinus</i> (Peregrine Falcon)		Schedule 4		<p>The Peregrine Falcon has a large range, with an estimated global Extent of Occurrence of 10,000,000 km². Global population are thought to be stable and the species is considered to be of Least Concern in the ICUN Red List (Birdlife International 2008b).</p> <p>This species may occur in the Project Area.</p>
Glareolidae	<i>Glareola maldivarum</i> (Oriental Pratincole)	Migratory Listed – overfly marine area			<p>The Oriental Pratincole breeds in southern, south-eastern and eastern Asia. A majority of the population migrates to Australia for the non-breeding season.</p> <p>While in Australia the species usually inhabits open plains, floodplains or short grasslands, often near wetlands. Their distribution is widespread in northern areas especially in the Pilbara and Kimberley (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>This species may occur in the Project Area.</p>
Hirundinidae	<i>Hirundo rustica</i> (Barn Swallow)	Migratory Marine			<p>The Barn Swallow has been recorded in coastal areas around the northern half of Australia from Carnarvon in Western Australia to Bundaberg in Queensland.</p> <p>This species may occur in the Project Area</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Laridae	<i>Sternula albifrons</i> (Little Tern)	Migratory Marine			<p>There are two major breeding subpopulations of Little Tern found in Australia. The northern population breeds across northern Australia from Broome though to the Gulf of Carpentaria and eastern Cape York Peninsula.</p> <p>The species is most commonly found in sheltered coastal habitat and is not commonly found away from the coast (Department of Environment, Water, Heritage and the Arts 2009b); as such it is not likely to be found in the Project Area.</p>
Meropidae	<i>Merops ornatus</i> (Rainbow Bee-eater)	Migratory Listed – overfly marine area			<p>The range of the Rainbow Bee-eater extends throughout Australia in all regions except Tasmania. There are no published estimates of the global population size however it is estimated to be quite large due to its wide distribution (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>This species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Otididae	<i>Ardeotis australis</i> (Australian Bustard)			Priority 4	<p>The Australian Bustard has been recorded across continental Australia with a majority of specimens having been recorded in the north. It inhabits grasslands and generally nests on the boundary between grasslands and shrubland or woodland.</p> <p>The primary threat to the species is predation by foxes however it will also desert nests when disturbed by humans, sheep or cattle (Birdlife International 2008a).</p> <p>This species may occur in the Project Area.</p>
Passeridae	<i>Heteromunia pectoralis</i> (Pictorella Mannikin)			Priority 4	<p>This species is found across northern Australia between Fitzroy River in Western Australia and the central western Cape York Peninsula in Queensland. The species was downlisted from Near Threatened to Least Concern in the IUCN Red List in 2007 as it was found to be abundant at Mornington Station in the Central Kimberley and large flocks were observed in Nathan River National Park (Birdlife International 2008c).</p> <p>This species may be found in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Passeridae	<i>Erythrura gouldiae</i> (Gouldian Finch)	Endangered Migratory	Schedule 1		<p>This species is sparsely distributed across northern Australia from the Kimberley to north-central Queensland. It inhabits open woodlands that are dominated by <i>Eucalyptus</i> sp. and support a ground cover of <i>Sorghum</i> and other species (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>This species may occur in the Project Area as a transient visitor. The species is unlikely to sustain populations in the immediate area of the Project due to lack of suitable habitat.</p>
Psittacidae	<i>Polytelis alexandrae</i> (Princess Parrot)	Vulnerable		Priority 4	<p>The species distribution has generally been thought to be confined to arid regions of central Australia (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>A search of DEC's priority fauna databases indicates one "moderately certain" report of a single specimen being sited in Broome in 1999.</p> <p>It is unlikely that the species is present in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Rostratulidae	<i>Rostratula australis</i> (Australian Painted Snipe) <i>Rostratula benghalensis s. lat.</i> (Painted Snipe)	Vulnerable Migratory Listed – overfly marine area	Schedule 1		Classification of this species is currently under review. This species is recorded around the northern and eastern half of Australia including the Kimberley, Queensland, New South Wales, Australian Capital Territory and Victoria. Its predominant habitat is in shallow inland wetlands (Department of Environment, Water, Heritage and the Arts 2009b). The species is unlikely to occur in Project Area due to lack of suitable habitat.
Scolopacidae	<i>Actitis hypoleucos</i> (Common Sandpiper)	Migratory Marine			The Common Sandpiper breeds in Europe and Asia. While in Australia it can be found in coastal or inland wetlands (Department of Environment, Water, Heritage and the Arts 2009b). The species is unlikely to be found in the Project Areas due to lack of suitable habitat.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Arenaria interpres</i> (Ruddy Turnstone)	Migratory Marine			<p>The Ruddy Turnstone breeds on the northern coasts of Europe, Asia and North America. They visit Australia from September to May where they can be found as individuals and groups along the coastline and occasionally inland. They are mainly found on exposed rocks or reefs but can also be found around shallow pools, on beaches and in mudflats (Australian Museum 2006b).</p> <p>The species is unlikely to occur in the Project Area due to a lack of suitable habitat.</p>
Scolopacidae	<i>Calidris alba</i> (Sanderling)	Migratory Marine			<p>Sanderlings breed from north America to north Russia and the islands of the Arctic Ocean.</p> <p>They are a coastal species and are found on sandy beaches mudflats (Australian Museum 2006); as such they are unlikely to be found in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Calidris canutus</i> (Red Knot, Knot)	Migratory Marine			<p><i>C. canutus</i> is a migratory species breeding in the high Arctic and then migrating south. They arrive in the north west of Australia during August to September and leave from south east Australia from March to early April.</p> <p>They gather in large flocks on the coast in sandy estuaries with tidal mudflats (Australian Museum 2006).</p> <p>The species is unlikely to occur in the Project Area due to a lack of suitable habitat.</p>
Scolopacidae	<i>Calidris ferruginea</i> (Curlew Sandpiper)	Migratory Marine			<p>The Curlew Sandpiper is a highly migratory species which breeds in the Arctic of northern Siberia.</p> <p>In Australia it occurs around the coast but is also quite widespread inland, though in smaller numbers. They occur in large numbers (thousands to tens of thousands) at many locations in the north west of Western Australia, including Roebuck Bay. (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>The species may be found in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Calidris ruficollis</i> (Red-necked Stint)	Migratory Marine			The Red-necked Stint breeds in north-eastern Siberia and northern and western Alaska then migrates to Australia where it spends the southern summer months. It has been recorded widely in Australia, except in the arid inland (Australian Museum 2006). The species may be found in the Project Area.
Scolopacidae	<i>Calidris tenuirostris</i> (Great Knot)	Migratory Marine			The Great Knot is considered to be of least concern on the IUCN Red List due to its large population size and range. It is a long distance migratory species which winters in Australia. While in Australia it is found in sheltered coastal habitats such as inlets, bays, harbours, estuaries and lagoons and muddy shorelines (Birdlife International 2009a). The species is unlikely to be found in the Project Areas due to lack of suitable habitat.
Scolopacidae	<i>Heteroscelus brevipes</i> (Grey-tailed Tattler)	Migratory Marine			The Grey-tailed Tattler is a migratory species that is commonly seen in the north of Australia. They are usually seen in small flocks in sheltered coastal areas with reefs, rock platforms or intertidal mudflats, especially those fringed with mangroves (Australian Museum 2009). The species is unlikely to be found in the Project Areas due to lack of suitable habitat.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Limicola falcinellus</i> (Broad-billed Sandpiper)	Migratory Marine			<p>The Broad-billed Sandpiper is a migratory species which breeds in the north and north-east Soviet Union.</p> <p>In Australia it is distributed over the northern coasts, particularly the north-west, with occasional birds seen on the southern coasts.</p> <p>It favours estuarine mudflats, saltmarshes and reefs (NSW National Parks and Wildlife Services 1999); as such it is unlikely to reside in any of the Project Areas.</p>
Scolopacidae	<i>Limosa lapponica</i> (Bar-tailed Godwit)	Migratory Marine			<p>The Bar-tailed Godwit migrates to Australia each year from northern hemisphere breeding grounds. They are common in coastal areas around Australia, particularly estuarine mudflats, beaches and mangroves (Australian Museum 2009).</p> <p>The species is predominantly associated with coastal habitats and is unlikely to be found in the Project Areas.</p>
Scolopacidae	<i>Limosa limosa</i> (Black-tailed Godwit)	Migratory Marine			<p>The Black-tailed Godwit has a large discontinuous breeding range extending from Iceland to the far east of Russia. They can be found in Australia inhabiting a range of freshwater habitats, including swampy lake shores, pools and flooded grassland (Birdlife International 2009b).</p> <p>The species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Numenius madagascariensis</i> (Eastern Curlew)	Migratory Marine		Priority 4	<p>Within Australia, the Eastern Curlew can be found in coastal regions in all states (Department of Environment, Water, Heritage and the Arts 2009b).</p> <p>The species is unlikely to occur in the Project Area due to lack of suitable habitat.</p>
Scolopacidae	<i>Numenius minutus</i> (Little Curlew, Little Whimbrel)	Migratory Listed – overfly marine area			<p>This migratory marine species has a recorded distribution covering much of Northern Australia (Department of Environment, Water, Heritage and the Arts 2009b). The species breeds in Siberia and migrates south to non-breeding areas in northern Australia and southern New Guinea.</p> <p>The species disperse across a broad area after arriving in Australia during September, then leave again in April. They feed on coastal and inland grasslands and black soil plains near swamps and flooded areas (Australian Museum 2009).</p> <p>This species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Scolopacidae	<i>Numenius phaeopus</i> (Whimbrel)	Migratory Marine			Whimbrels migrate between northern Australia and breeding grounds in the Northern Hemisphere. While in Australia they are found mainly on the coast, on tidal and estuarine mudflats, especially near mangroves. They can also be found on beaches and rocky shores (Australian Museum 2009). The species is unlikely to occur in the Project Area due to lack of suitable habitat.
Scolopacidae	<i>Tringa nebularia</i> (Common Greenshank, Greenshank)	Migratory Marine			The Common Greenshank is common throughout Australia in the summer. They are found both in coastal and inland areas, particularly in estuaries, mudflats, mangroves, lagoons, billabongs and swamps (Australian Museum 2009). The species is unlikely to occur in the Project Area due to lack of suitable habitat.
Scolopacidae	<i>Xenus cinereus</i> (Terek Sandpiper)	Migratory Marine			The Terek Sandpiper has an extremely large global range. In Australia it can be found in coastal areas, especially intertidal estuaries and mudflats. It is occasionally found up to 10 km inland around brackish ponds and riverbeds (Birdlife International 2009c). It is unlikely to be found in the Project Areas due to lack of suitable habitat.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Turnicidae	<i>Turnix castanota magnifica</i> (Chestnut-backed Button-quail)			Priority 4	The Chestnut-backed Button-quail has been recorded in the north-west and north-central Australia. It may be found in the Project Areas.
Tytonidae	<i>Tyto novaehollandiae kimberli</i> (Masked Owl (northern))	Vulnerable		Priority 1	Too little is known about this species to fully characterise its habitat however, it is known to be dependent on Tree hollows (Woirnarski 2004). This species is unlikely to occur in the Project Area due to lack of suitable habitat.
Mammals					
Dasyuridae	<i>Dasyercus cristicauda</i> (Mulgara)	Vulnerable	Schedule 1		The Mulgara is found over a broad area, mainly in the arid interior of central Australia and extending to the west coast between Carnarvon and Broome. It is a nocturnal species that shelters in burrows during the day. It is thought to prefer sand dune habitats, especially those vegetated with canegrass (Department of the Environment, Water, Heritage and the Arts 2009b). This species may occur in the Project Area.



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Muridae	<i>Hydromys chrysogaster</i> (Water-rat, Rakali)			Priority 4	<p><i>H. chrysogaster</i> is found in Australia, New Guinea and a number of the surrounding islands. It is widely distributed in eastern Australia, occurring west to the Kimberleys along the northern coast and west to Eyre Peninsula on the southern coast.</p> <p>It generally occurs in permanent water bodies, generally in fresh or brackish water. It is more common in lakes and swamps than along river channels (CSIRO 2004).</p> <p>The species is unlikely to be found in the Project Area due to a lack of suitable habitat.</p>
Muridae	<i>Mesembriomys macrurus</i> (Golden-backed Tree-rat)	Vulnerable		Priority 4	<p>The Golden-backed Tree-rat can be found across a wide range of habitats in the Kimberley including rugged King Leopold and Warton sandstone with <i>Eucalyptus</i> sp., open woodland over hummock grassland and the ecotone between monsoon forest patches and some savanna woodland types.</p> <p>The species is currently in decline. The primary threats are thought to be predation by feral animals, such as cats. Opening up of the undergrowth, particularly by fires, is thought to make the species more susceptible to predation (Department of the Environment, Water, Heritage and the Arts 2009b).</p> <p>The species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Peramelidae	<i>Isoodon auratus auratus</i> (Golden Bandicoot, Wintarru)	Vulnerable	Schedule 1		<p>The Golden Bandicoot is under threat from predation by feral predators, particularly cats. In the Kimberley mainland the species is now only recorded in rocky sandstone habitats and vine thickets within the medium to high rainfall area (700 to 1200 mm) (Department of the Environment, Water, Heritage and the Arts 2009b).</p> <p>The species is unlikely to be found in the Project Area due to lack of suitable habitat.</p>
Thylacomyidae	<i>Macrotis lagotis</i> (Bilby, Dalgyte, Ninu)	Vulnerable	Schedule 1		<p>The Greater Bilby had a broad distribution across the Australian mainland prior to European settlement. Wild populations are now restricted predominantly to the Tanami Desert, Northern Territory, the Great Sandy and Gibson Deserts, Western Australia and an outlying population in south-west Queensland.</p> <p>The greatest threat to the Greater Bilby is thought to be predation by foxes and competition and disruption of habitat by rabbits and livestock (Department of the Environment, Water, Heritage and the Arts 2009b).</p> <p>The species may occur in the Project Area.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Fish					
Pristidae	<i>Pristis microdon</i> (Freshwater Sawfish)	Vulnerable			<p>The Freshwater Sawfish is actually a marine/estuarine species that is thought to occur in all large rivers of Northern Australia from the Fitzroy River to the western side of the Cape York Peninsular (Department of the Environment, Water, Heritage and the Arts 2009b).</p> <p>It is unlikely this species will occur within the vicinity of the Project Areas. Drainage of the area surrounding the project sites is either by sheet flow or small intermittent creeks unsuited to the Sawfish.</p>
Pristidae	<i>Pristis zijsron</i> (Green Sawfish, Dindagubba, Narrowsnout Sawfish)	Vulnerable	Schedule 1		<p>The Green Sawfish has been recorded around the north of Australia from Port Headland to central New South Wales.</p> <p>While it is more commonly found in tropical marine waters it also inhabits estuaries, lagoons and occasionally freshwater, especially during the wet season (Northern Territory Department of Natural Resources, Environment and the Arts 2009).</p> <p>It is unlikely to occur in the Project Area due to lack of suitable habitat.</p>



Family	Scientific Name	EPBC Act 1999	WC Act 1950	DEC	Comment
Reptiles					
Crocodylidae	<i>Crocodylus johnstoni</i> (Freshwater Crocodile)	Marine	Schedule 4		<p>This species is distributed throughout northern Australia from the Kimberley to Cape York Peninsula and down through northern Queensland. In areas where they co-exist with <i>C. porosus</i> they tend to occupy the upstream freshwater areas and are common in freshwater creeks, rivers and billabongs (Wilkes 1999).</p> <p>It is unlikely to occur in the Project Area due to lack of suitable habitat.</p>
Crocodylidae	<i>Crocodylus porosus</i> (Estuarine Crocodile, Salt-water Crocodile)	Migratory Marine	Schedule 4		<p>This species is distributed along the northern coastal regions of Australia from Broome in Western Australia to Rockhampton in Queensland. It can be found in brackish water up to 200 km from the coast and freshwater up to 100 km from the coast (Britton 2009).</p> <p>It is unlikely to occur in the Project Area due to lack of suitable habitat.</p>
Scincidae	<i>Ctenotus angusticeps</i> (Airlie Island Ctenotus)	Vulnerable			<p>This small (7 cm long) lizard occurs on Airlie Island, 35 km north-north-east of Onslow. On the island it occurs across a range of habitat types but shows a preference for tussock grass on the western end of the island.</p> <p>The DEWHA Species Profile and Threats Database also makes a reference to the species, or suitable habitat, occurring somewhere in the Broome region (Department of the Environment, Water, Heritage and the Arts 2009b).</p> <p>The species may occur in the Project Area.</p>



Appendix C
Search Results

Environment Protection and Biodiversity Conservation Act
1999 Protected Matters Search Tool
DEC Database Search Results



Australian Government

Department of the Environment, Water, Heritage and the Arts

Protected Matters Search Tool

You are here: [Environment Home](#) > [EPBC Act](#) > [Search](#)

11 May 2009 16:55

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.

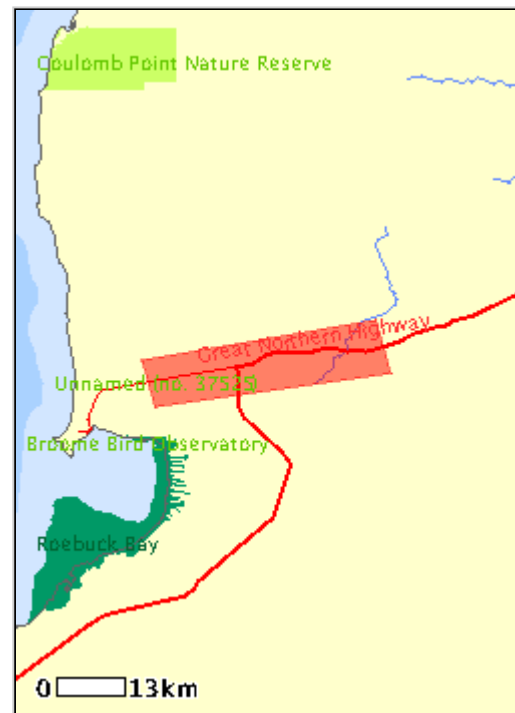
You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Search Type: Area
Buffer: 20 km
Coordinates: -17.836068,122.333759, -
 17.763876,122.752356, -
 17.859137,122.77863, -
 17.919533,122.356489



Report Contents: [Summary](#)
[Details](#)
 • [Matters of NES](#)
 • [Other matters protected by the EPBC Act](#)
 • [Extra Information](#)
[Caveat](#)
[Acknowledgments](#)



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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 - see

<http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties:	None
National Heritage Places:	None
<u>Wetlands of International Significance:</u> (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
<u>Threatened Species:</u>	16
<u>Migratory Species:</u>	47

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 and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

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. Information on EPBC Act permit requirements and application forms can be found at

<http://www.environment.gov.au/epbc/permits/index.html>.

<u>Commonwealth Lands:</u>	2
Commonwealth Heritage Places:	None
<u>Places on the RNE:</u>	20
<u>Listed Marine Species:</u>	80
<u>Whales and Other Cetaceans:</u>	12
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	2
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [[Dataset Information](#)]
(Ramsar Sites)

[ROEBUCK BAY](#)

Threatened Species [[Dataset Information](#)]

Status Type of Presence

Birds

[Erythrura gouldiae](#)
Gouldian Finch

Endangered Species or species habitat may occur within area

[Rostratula australis](#)
Australian Painted Snipe

Vulnerable Species or species habitat may occur within area

[Tyto novaehollandiae kimberli](#)
Masked Owl (northern)

Vulnerable Species or species habitat may occur within area

Mammals

[Balaenoptera musculus](#)
Blue Whale

Endangered Species or species habitat may occur within area

[Dasycercus cristicauda](#)
Mulgara

Vulnerable Species or species habitat likely to occur within area

[Macrotis lagotis](#)
Greater Bilby

Vulnerable Species or species habitat may occur within area

[Megaptera novaeangliae](#)
Humpback Whale

Vulnerable Species or species habitat known to occur within area

Reptiles

[Caretta caretta](#)
Loggerhead Turtle

Endangered Species or species habitat may occur within area

[Chelonia mydas](#)
Green Turtle

Vulnerable Species or species habitat may occur within area

[Ctenotus angusticeps](#)
Airlie Island Ctenotus

Vulnerable Species or species habitat likely to occur within area

[Dermochelys coriacea](#)
Leatherback Turtle, Leathery Turtle, Luth

Endangered Species or species habitat may occur within area

[Eretmochelys imbricata](#)
Hawksbill Turtle

Vulnerable Species or species habitat may occur within area

[Natator depressus](#)
Flatback Turtle

Vulnerable Species or species habitat may occur within area

Sharks

[Pristis microdon](#)

Vulnerable Species or species habitat likely to

Freshwater Sawfish		occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark	Vulnerable	Species or species habitat may occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Erythrura gouldiae Gouldian Finch	Migratory	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundo rustica Barn Swallow	Migratory	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Actitis hypoleucos Common Sandpiper	Migratory	Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret	Migratory	Breeding likely to occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone	Migratory	Species or species habitat likely to occur within area
Calidris alba Sanderling	Migratory	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot	Migratory	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper	Migratory	Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint	Migratory	Species or species habitat likely to occur within area
Calidris tenuirostris Great Knot	Migratory	Species or species habitat likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover	Migratory	Species or species habitat likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover	Migratory	Species or species habitat likely to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel	Migratory	Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole	Migratory	Species or species habitat may occur within area
Heteroscelus brevipes	Migratory	Species or species habitat likely to

Grey-tailed Tattler		occur within area
<i>Limicola falcinellus</i> Broad-billed Sandpiper	Migratory	Species or species habitat likely to occur within area
<i>Limosa lapponica</i> Bar-tailed Godwit	Migratory	Species or species habitat likely to occur within area
<i>Limosa limosa</i> Black-tailed Godwit	Migratory	Species or species habitat likely to occur within area
<i>Numenius madagascariensis</i> Eastern Curlew	Migratory	Species or species habitat likely to occur within area
<i>Numenius minutus</i> Little Curlew, Little Whimbrel	Migratory	Species or species habitat may occur within area
<i>Numenius phaeopus</i> Whimbrel	Migratory	Species or species habitat likely to occur within area
<i>Pluvialis squatarola</i> Grey Plover	Migratory	Species or species habitat likely to occur within area
<i>Rostratula benghalensis s. lat.</i> Painted Snipe	Migratory	Species or species habitat may occur within area
<i>Tringa nebularia</i> Common Greenshank, Greenshank	Migratory	Species or species habitat likely to occur within area
<i>Xenus cinereus</i> Terek Sandpiper	Migratory	Species or species habitat likely to occur within area
Migratory Marine Birds		
<i>Apus pacificus</i> Fork-tailed Swift	Migratory	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Breeding likely to occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
<i>Sterna albifrons</i> Little Tern	Migratory	Species or species habitat may occur within area
Migratory Marine Species		
Mammals		
<i>Balaenoptera edeni</i> Bryde's Whale	Migratory	Species or species habitat may occur within area
<i>Balaenoptera musculus</i> Blue Whale	Migratory	Species or species habitat may occur within area
<i>Dugong dugon</i> Dugong	Migratory	Species or species habitat likely to occur within area
<i>Megaptera novaeangliae</i> Humpback Whale	Migratory	Species or species habitat known to occur within area
<i>Orcaella brevirostris</i> Irrawaddy Dolphin	Migratory	Species or species habitat may occur within area
<i>Orcinus orca</i> Killer Whale, Orca	Migratory	Species or species habitat may occur within area
<i>Sousa chinensis</i> Indo-Pacific Humpback Dolphin	Migratory	Species or species habitat may occur within area

[Tursiops aduncus \(Arafura/Timor Sea populations\)](#)
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)

Migratory Species or species habitat likely to occur within area

Reptiles

[Caretta caretta](#)
Loggerhead Turtle

Migratory Species or species habitat may occur within area

[Chelonia mydas](#)
Green Turtle

Migratory Species or species habitat may occur within area

[Crocodylus porosus](#)
Estuarine Crocodile, Salt-water Crocodile

Migratory Species or species habitat likely to occur within area

[Dermochelys coriacea](#)
Leatherback Turtle, Leathery Turtle, Luth

Migratory Species or species habitat may occur within area

[Eretmochelys imbricata](#)
Hawksbill Turtle

Migratory Species or species habitat may occur within area

[Natator depressus](#)
Flatback Turtle

Migratory Species or species habitat may occur within area

Sharks

[Rhincodon typus](#)
Whale Shark

Migratory Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

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

Status Type of Presence

Birds

[Actitis hypoleucos](#)
Common Sandpiper

Listed Species or species habitat likely to occur within area

[Anseranas semipalmata](#)
Magpie Goose

Listed - overfly marine area Species or species habitat may occur within area

[Apus pacificus](#)
Fork-tailed Swift

Listed - overfly marine area Species or species habitat may occur within area

[Ardea alba](#)
Great Egret, White Egret

Listed - overfly marine area Breeding likely to occur within area

[Ardea ibis](#)
Cattle Egret

Listed - overfly marine area Species or species habitat may occur within area

[Arenaria interpres](#)
Ruddy Turnstone

Listed Species or species habitat likely to occur within area

[Calidris alba](#)
Sanderling

Listed Species or species habitat likely to occur within area

[Calidris canutus](#)
Red Knot, Knot

Listed - overfly marine area Species or species habitat likely to occur within area

<u><i>Calidris ferruginea</i></u> Curlew Sandpiper	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Calidris ruficollis</i></u> Red-necked Stint	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Calidris tenuirostris</i></u> Great Knot	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Charadrius leschenaultii</i></u> Greater Sand Plover, Large Sand Plover	Listed	Species or species habitat likely to occur within area
<u><i>Charadrius mongolus</i></u> Lesser Sand Plover, Mongolian Plover	Listed	Species or species habitat likely to occur within area
<u><i>Charadrius veredus</i></u> Oriental Plover, Oriental Dotterel	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Glareola maldivarum</i></u> Oriental Pratincole	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Haliaeetus leucogaster</i></u> White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
<u><i>Heteroscelus brevipes</i></u> Grey-tailed Tattler	Listed	Species or species habitat likely to occur within area
<u><i>Hirundo rustica</i></u> Barn Swallow	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Limicola falcinellus</i></u> Broad-billed Sandpiper	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Limosa lapponica</i></u> Bar-tailed Godwit	Listed	Species or species habitat likely to occur within area
<u><i>Limosa limosa</i></u> Black-tailed Godwit	Listed - overfly marine area	Species or species habitat likely to occur within area
<u><i>Merops ornatus</i></u> Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
<u><i>Numenius madagascariensis</i></u> Eastern Curlew	Listed	Species or species habitat likely to occur within area
<u><i>Numenius minutus</i></u> Little Curlew, Little Whimbrel	Listed - overfly marine	Species or species habitat may occur within area

	area	
Numenius phaeopus Whimbrel	Listed	Species or species habitat likely to occur within area
Pluvialis squatarola Grey Plover	Listed - overfly marine area	Species or species habitat likely to occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Sterna albifrons Little Tern	Listed	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank	Listed - overfly marine area	Species or species habitat likely to occur within area
Xenus cinereus Terek Sandpiper	Listed - overfly marine area	Species or species habitat likely to occur within area
Mammals		
Dugong dugon Dugong	Listed	Species or species habitat likely to occur within area
Ray-finned fishes		
Campichthys tricarinatus Three-keel Pipefish	Listed	Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish	Listed	Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish	Listed	Species or species habitat may occur within area
Corythoichthys flavofasciatus Yellow-banded Pipefish, Network Pipefish	Listed	Species or species habitat may occur within area
Cosmocampus banneri Roughridge Pipefish	Listed	Species or species habitat may occur within area
Doryrhamphus excisus Indian Blue-stripe Pipefish, Blue-stripe Pipefish	Listed	Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish	Listed	Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish	Listed	Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish	Listed	Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish	Listed	Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish	Listed	Species or species habitat may occur within area

<i>Halicampus spinostris</i> Spiny-snout Pipefish	Listed	Species or species habitat may occur within area
<i>Haliichthys taeniophorus</i> Ribbioned Seadragon, Ribbioned Pipefish	Listed	Species or species habitat may occur within area
<i>Hippichthys penicillus</i> Beady Pipefish, Steep-nosed Pipefish	Listed	Species or species habitat may occur within area
<i>Hippocampus histrix</i> Spiny Seahorse	Listed	Species or species habitat may occur within area
<i>Hippocampus kuda</i> Spotted Seahorse, Yellow Seahorse	Listed	Species or species habitat may occur within area
<i>Hippocampus planifrons</i> Flat-face Seahorse	Listed	Species or species habitat may occur within area
<i>Hippocampus spinosissimus</i> Hedgehog Seahorse	Listed	Species or species habitat may occur within area
<i>Micrognathus micronotopterus</i> Tidepool Pipefish	Listed	Species or species habitat may occur within area
<i>Solegnathus hardwickii</i> Pipehorse	Listed	Species or species habitat may occur within area
<i>Solegnathus lettiensis</i> Indonesian Pipefish, Gunther's Pipehorse	Listed	Species or species habitat may occur within area
<i>Solenostomus cyanopterus</i> Blue-finned Ghost Pipefish, Robust Ghost Pipefish	Listed	Species or species habitat may occur within area
<i>Syngnathoides biaculeatus</i> Double-ended Pipehorse, Alligator Pipefish	Listed	Species or species habitat may occur within area
<i>Trachyrhamphus bicoarctatus</i> Bend Stick Pipefish, Short-tailed Pipefish	Listed	Species or species habitat may occur within area
<i>Trachyrhamphus longirostris</i> Long-nosed Pipefish, Straight Stick Pipefish	Listed	Species or species habitat may occur within area
Reptiles		
<i>Acalyptophis peronii</i> Horned Seasnake	Listed	Species or species habitat may occur within area
<i>Aipysurus apraefrontalis</i> Short-nosed Seasnake	Listed	Species or species habitat may occur within area
<i>Aipysurus duboisii</i> Dubois' Seasnake	Listed	Species or species habitat may occur within area
<i>Aipysurus eydouxii</i> Spine-tailed Seasnake	Listed	Species or species habitat may occur within area
<i>Aipysurus laevis</i> Olive Seasnake	Listed	Species or species habitat may occur within area
<i>Aipysurus tenuis</i> Brown-lined Seasnake	Listed	Species or species habitat may occur within area
<i>Astrotia stokesii</i> Stokes' Seasnake	Listed	Species or species habitat may occur within area
<i>Caretta caretta</i> Loggerhead Turtle	Listed	Species or species habitat may occur within area
<i>Chelonia mydas</i>	Listed	Species or species habitat may occur

Green Turtle		within area
Crocodylus johnstoni Freshwater Crocodile	Listed	Species or species habitat may occur within area
Crocodylus porosus Estuarine Crocodile, Salt-water Crocodile	Listed	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth	Listed	Species or species habitat may occur within area
Disteira kingii Spectacled Seasnake	Listed	Species or species habitat may occur within area
Disteira major Olive-headed Seasnake	Listed	Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake	Listed	Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake	Listed	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle	Listed	Species or species habitat may occur within area
Hydrelaps darwiniensis Black-ringed Seasnake	Listed	Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake	Listed	Species or species habitat may occur within area
Hydrophis mcdowelli	Listed	Species or species habitat may occur within area
Hydrophis ornatus a seasnake	Listed	Species or species habitat may occur within area
Lapemis hardwickii Spine-bellied Seasnake	Listed	Species or species habitat may occur within area
Natator depressus Flatback Turtle	Listed	Species or species habitat may occur within area
Pelamis platurus Yellow-bellied Seasnake	Listed	Species or species habitat may occur within area
Whales and Other Cetaceans [Dataset Information]	Status	Type of Presence
Balaenoptera edeni Bryde's Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera musculus Blue Whale	Cetacean	Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin	Cetacean	Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus	Cetacean	Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale	Cetacean	Species or species habitat known to occur within area
Orcaella brevirostris Irrawaddy Dolphin	Cetacean	Species or species habitat may occur within area
Orcinus orca	Cetacean	Species or species habitat may occur

Killer Whale, Orca		within area
Sousa chinensis Indo-Pacific Humpback Dolphin	Cetacean	Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin	Cetacean	Species or species habitat may occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)	Cetacean	Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin	Cetacean	Species or species habitat may occur within area

Commonwealth Lands [[Dataset Information](#)]

Defence

Unknown

Places on the RNE [[Dataset Information](#)]
Note that not all Indigenous sites may be listed.

Historic

[Ah Fats Cottage WA](#)

[Anglican Church of the Annunciation including Belfry WA](#)

[Broome Cemetery Japanese Section WA](#)

[Broome Courthouse WA](#)

[Broome Pioneer Cemetery WA](#)

[Chinatown Conservation Area WA](#)

[Customs House \(former\) WA](#)

[Dampier Memorial WA](#)

[J Kennedy Family Home WA](#)

[Male Family Residence WA](#)

[Maurice Lyons House WA](#)

[McAlpine House WA](#)

[McDaniel Homestead WA](#)

[Napier Terrace Cottages WA](#)

[Old Police Lockup WA](#)

[Pa Normans House WA](#)

[Roebuck Bay Hotel WA](#)

[Streeter and Male Group of Stores WA](#)

[Sun Pictures Gardens WA](#)

Natural

[Roebuck Bay Area including Roebuck Plains and Lake Eda WA](#)

Extra Information

State and Territory Reserves [[Dataset Information](#)]

Un-named (No. 37525) Miscellaneous Conservation Reserve, WA

Un-named (No. 41066) Miscellaneous Conservation Reserve, 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 Heritage and Register of National Estate properties, Wetlands of International 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the [migratory](#) and [marine](#) provisions of the Act have been mapped.

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.

Acknowledgments

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

- [New South Wales National Parks and Wildlife Service](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)
- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [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, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUcliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated: Thursday, 20-Nov-2008 14:17:56 EST

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DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
6 October 2008

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
<i>Acacia richardsii</i>	3	K,*	Kununurra, Keep River N.P., Northern Carr Boyd Ranges, Gardner Plateau, N.T.	Mar-Aug
<i>Aphyllodium parvifolium</i>	1	K	Broome, McLarty Hills	
<i>Brachychiton tuberculatus</i>	3	K	Ord River, Kununurra	Aug-Nov
<i>Corymbia paratia</i>	1	K	Broome, Cable Beach, Cape Boileau	April-May, Oct-Dec
<i>Desmodium flagellare</i>	1	K	Kununurra, Ord River Basin	
<i>Echinochloa kimberleyensis</i>	1	K	Ord River, NT, Qld	Apr
<i>Eriochloa decumbens</i>	3	P,K	Cooyapooya, Derby, Wyndham	
<i>Eucalyptus ceracea</i>	R	K	NW of Wyndham, King George River	Aug-Nov
<i>Eucalyptus ordiana</i>	2	K	Kununurra	Jan,Jun,Ju l
<i>Euphorbia stevenii</i>	3	P,K	Karijini N.P., Kununurra	
<i>Ficus lilliputiana</i>	4	K,*	Ord River, Lake Argyle, Hidden Valley, Kununurra, Northern Territory	Apr-Oct
<i>Fuirena nudiflora</i>	1	GLD,K,*	Rawlinson Range, Kununurra, NT, Qld	Jun
<i>Glycine pindanica</i>	1	K	Broome, Beagle Bay	Feb-Apr
<i>Goodenia brachypoda</i>	1	K	Carlton Hill, Wyndham, Augustus Is	Sep
<i>Goodenia durackiana</i>	1	K	Ord River, Kununurra	Mar
<i>Goodenia strangfordii</i>	1	K	Kununurra, Sturt Creek	Sep
<i>Jacquemontia</i> sp. Keep River (J.L. Egan 5051)	1	K	Kununurra	-
<i>Keraudrenia exastia</i>	R	K	Broome	
<i>Keraudrenia katatona</i>	3	K	Broome, Edgar Range, Wallal Downs, Canning Stock Route	Mar-Aug
<i>Lepidium scandens</i>	3	MW	Sanford River, Murgoo Stn, Jingemarra Stn, Bush Bay, Wooramel	Aug,Sep
<i>Nicotiana heterantha</i>	1	K,P	Broome, Dampier Peninsula, Roy Hill, Mandora, Anna Plains	May-Jun
<i>Pandanus spiralis</i> var. <i>flammeus</i>	R	K	SE of Broome	Nov
<i>Pittosporum moluccanum</i>	4	K,P	Dampier Peninsula, N of Broome, Berthier Is., Maret Is., Northern Territory, SE Asia	Feb-Aug
<i>Platysace saxatilis</i>	2	K*	Hidden Valley, Kununurra, NT	Mar- May,Sep
<i>Pterocaulon</i> sp. A Kimberley Flora (B.J. Carter 599)	2	K	Broome, Anna Plains	Aug-Oct
<i>Schoenus punctatus</i>	3	P,K	Nurrup Peninsula, Broome, Mt Barnett Stn	Aug

**DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
6 October 2008**

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Stylidium prophyllum	3	K	Mt Hart Stn, Beverley Springs Stn, Kununurra	May-Jun
Tephrosia andrewii	1	P,K	Port Hedland-Broome	Apr,Oct
Trachymene oleracea subsp. sedimenta	1	K	Napier Range, Wyndham	May
Triumfetta rubiginosa	2	K	Prince Regent River Reserve, Wyndham	Aug
Typhonium sp. Kununurra (AN Start 1467)	1	K	Kununurra	
Vigna sp. Silver leaf (T.E.H. Aplin 6300)	3	P,K	Meentheena Stn, Yarraloola Stn, Kununurra	Aug-Sep
Whiteochloa capillipes	3	P,K	Kununurra, Madora Stn, Hamersley Stn, Lacrosse Island	

COMMON	SCIENTIFIC	DECLIST	RANKING	YEAR	CERTAINTY	NUMSEEN	LOCNAME	METHOD
Bush Stonecurlew	Burhinus grallarius	PRIORITY FAUNA	P4	1999	1	0	BILINGURR	
Bush Stonecurlew	Burhinus grallarius	PRIORITY FAUNA	P4	1999	1	0	ROEBUCK	
Bush Stonecurlew	Burhinus grallarius	PRIORITY FAUNA	P4	1999	1	5	ROEBUCK	
Bush Stonecurlew	Burhinus grallarius	PRIORITY FAUNA	P4	2000	1	0	ROEBUCK	
Bush Stonecurlew	Burhinus grallarius	PRIORITY FAUNA	P4	1999	1	0	WATERBANK	
Grey Falcon	Falco hypoleucos	PRIORITY FAUNA	P4	1901	1	1	Broome	Day sighting
Grey Falcon	Falco hypoleucos	PRIORITY FAUNA	P4	1997	1	1	Broome	Day sighting
Grey Falcon	Falco hypoleucos	PRIORITY FAUNA	P4	1999	1	1	Broome	Day sighting
Grey Falcon	Falco hypoleucos	PRIORITY FAUNA	P4	2002	1	1	Roebuck	Day sighting
Grey Falcon	Falco hypoleucos	PRIORITY FAUNA	P4	1997	1	3	Roebuck Bay	Day sighting
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		1909	1	1	Broome	Day sighting
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		1995	1	1	Roebuck Plains	Day sighting
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		1996	1	1	Roebuck Plains	Day sighting
Peregrine Falcon	Falco peregrinus	OTHER SPECIALLY PROTECTED FAUNA		1996	1	1	Roebuck Plains	Day sighting
Pictorella Mannikin	Heteromunia pectoralis	PRIORITY FAUNA	P4	2005	1	0	Broome	Day sighting
Pictorella Mannikin	Heteromunia pectoralis	PRIORITY FAUNA	P4	2005	1	9	Broome	Day sighting
Water-rat, Rakali	Hydromys chrysogaster	PRIORITY FAUNA	P4	1971	1	1	Broome	Day sighting
Golden Bandicoot, Wintarru	Isodon auratus auratus	DECLARED THREATENED FAUNA	VU		1	12	Broome	
Black Bittern	Ixobrychus flavicollis australis	PRIORITY FAUNA	P3		1	1	Broome	Dead
Little Bittern	Ixobrychus minutus	PRIORITY FAUNA	P4	2001	1	1	Waterbank	Day sighting
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1963	1	1	Dampier Peninsula	
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1965	1	1	Dampier Peninsula	
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1970	0	1	Roebuck	
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1970	2	1	Roebuck	Night sighting
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1996	1	1	Roebuck	Night sighting
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	1998	1	1	Roebuck	Dead
Bilby, Dalgyte, Ninu	Macrotis lagotis	DECLARED THREATENED FAUNA	VU	2001	1	0	Roebuck	Definite signs
Golden-backed Tree-rat	Mesembriomys macrurus	PRIORITY FAUNA	P4		1	3	Waterbank	Caught or trapped
Eastern Curlew	Numenius madagascariensis	PRIORITY FAUNA	P4	1998	1	13	Broome	Day sighting
Eastern Curlew	Numenius madagascariensis	PRIORITY FAUNA	P4	1998	1	167	Broome	Day sighting
Eastern Curlew	Numenius madagascariensis	PRIORITY FAUNA	P4	1999	1	53	Roebuck Bay	Day sighting
Eastern Curlew	Numenius madagascariensis	PRIORITY FAUNA	P4	2001	1	20	Roebuck Bay	
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	1985	1	0	Broome	Day sighting
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	1965	1	1	Cable Beach	Day sighting
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	1965	1	2	Crab Creek	Day sighting
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	2006	1	14	Crab Creek	Day sighting
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	2004	1	6	Roebuck Bay	Day sighting
Australian Snubfin Dolphin	Orcaella heinsohni	PRIORITY FAUNA	P4	2006	1	2	Roebuck Bay	Day sighting
Flock Bronzewing	Phaps histrionica	PRIORITY FAUNA	P4	1986	1	1	Roebuck	Day sighting
Flock Bronzewing	Phaps histrionica	PRIORITY FAUNA	P4	1988	1	1	Roebuck Plains	Day sighting
Princess Parrot	Polytelis alexandrae	PRIORITY FAUNA	P4	1999	2	1	Broome	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1986	1	1	Lake Eda	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1994	1	2	Roebuck	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	2	Roebuck	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	2	Roebuck Plains	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	2	Roebuck Plains	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	1	Roebuck Plains	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	1	Roebuck Plains	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	1999	1	1	Roebuck Plains	Day sighting
Australian Painted Snipe	Rostratula benghalensis australis	DECLARED THREATENED FAUNA	VU	2002	1	7	Roebuck Plains	Caught or trapped
Chestnut-backed Button-quail	Turnix castanota magnifica	PRIORITY FAUNA	P4	2000	1	8	Roebuck Plains	

Threatened and Priority Fauna Database Explanations

DECList	Ranking	StatusExpand
DECLARED THREATENED FAUNA	CR	Schedule 1 - Fauna that is rare or is likely to become extinct
DECLARED THREATENED FAUNA	EN	Schedule 1 - Fauna that is rare or is likely to become extinct
DECLARED THREATENED FAUNA	EX	Schedule 2 - Presumed extinct
DECLARED THREATENED FAUNA	VU	Schedule 1 - Fauna that is rare or is likely to become extinct
OTHER SPECIALLY PROTECTED FAUNA		Schedule 4 - Other specially protected fauna
PRIORITY FAUNA	P1	Priority One: Taxa with few, poorly known populations on threatened lands
PRIORITY FAUNA	P2	Priority Two: Taxa with few, poorly known populations on conservation lands
PRIORITY FAUNA	P3	Priority Three: Taxa with several, poorly known populations, some on conservation lands
PRIORITY FAUNA	P4	Priority Four: Taxa in need of monitoring
PRIORITY FAUNA	P5	Priority Five: Taxa in need of monitoring (conservation dependent)

Certainty Code	Certainty
0	Not defined
1	Very certain
2	Moderately certain
3	Not sure



Appendix D
Aboriginal Heritage

DIA Database Search Results



Search Criteria

2 sites in a search polygon. The polygon is formed by these points (in order):

MGA Zone 51	
Northing	Easting
8027765	429284
8018777	431665
8025444	476546
8035861	473689

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

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Legend

Restriction	Access	Coordinate Accuracy
N No restriction	C Closed	Accuracy is shown as a code in brackets following the site coordinates.
M Male access only	O Open	[Reliable] The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
F Female access	V Vulnerable	[Unreliable] The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

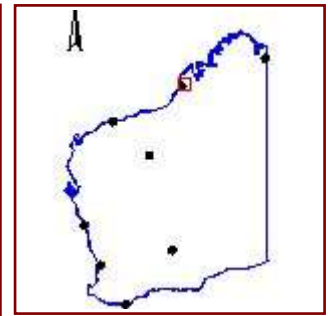
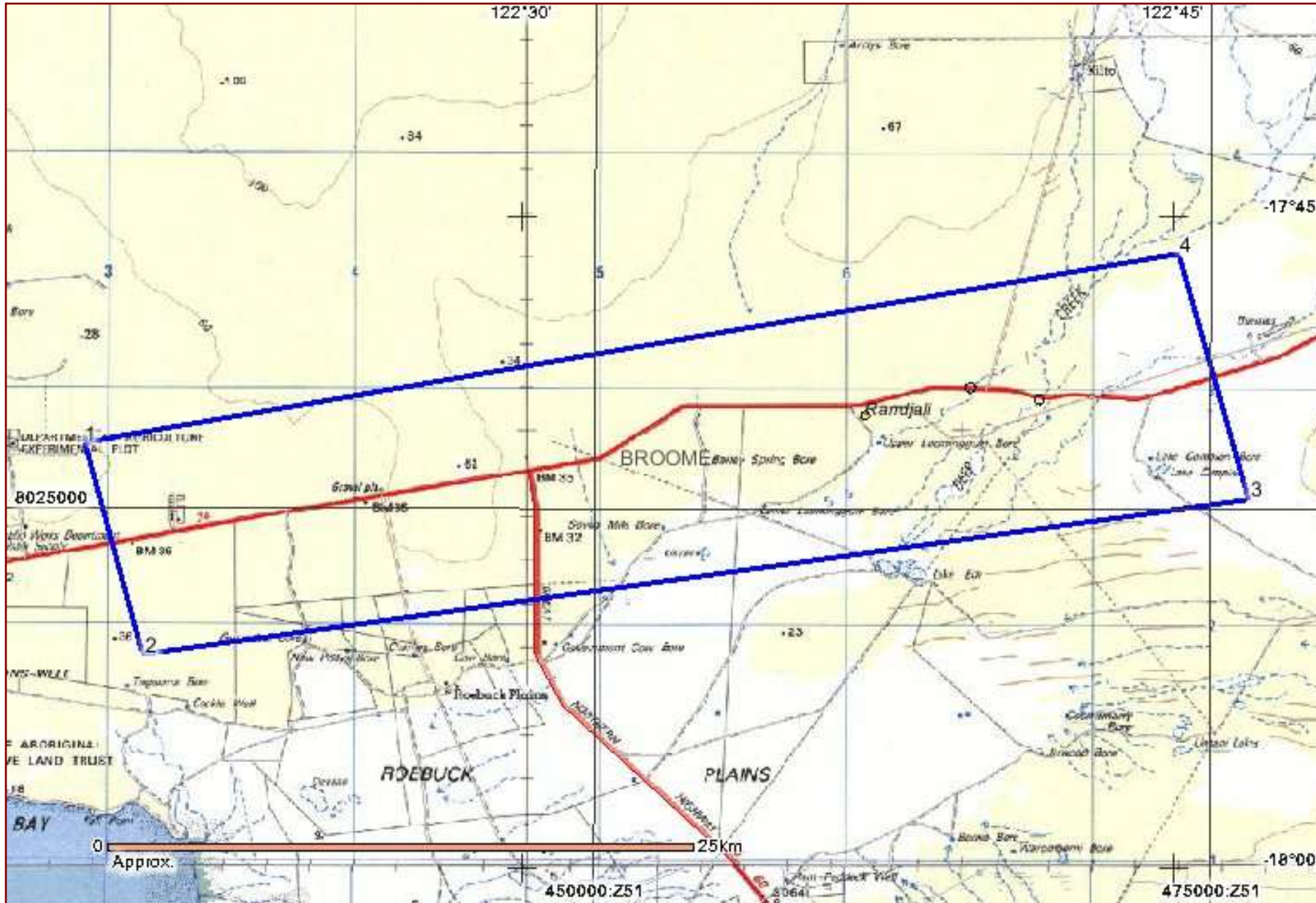
L Lodged	IR	Insufficient Information (as assessed by Site Assessment Group)	Site Assessment Group (SAG)
I Insufficient Information	PR	Permanent register (as assessed by Site Assessment Group)	Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not to be considered the final assessment.
P Permanent register	SR	Stored data (as assessed by Site Assessment Group)	
S Stored data			Final assessment will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code "closed" or "vulnerable". Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
12679	L	O	N	Irrbinkalin Creek.		Camp, Water Source		465237mE 8030161mN Zone 51 [Reliable]	K02568
12680	L	O	N	Jarruru Creek.		Camp, Water Source		468037mE 8029661mN Zone 51 [Reliable]	K02569



Legend

- Highlighted Area
- Town
- Map Area
- Search Area

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Appendix E
DEC's Ten Clearing Principles



(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments This Project is not considered to be at variance with this clearing principle given the desktop information to hand, particularly given the extent of the vegetation in the IBRA region (refer to Table 4).

Methodology Desktop assessment of available information

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments This Project is not considered to be potentially at variance with this clearing principle given the desktop information to hand.

Although the vegetation in the Survey Area is likely to provide shelter for a large variety of fauna species, the dominant vegetation type located within the Study Area, is a common and widespread vegetation type, with an estimated 100% remaining (refer to Table 4).

The clearing area required for the project is very low and this area is in proximity to large areas of similar vegetation, as such it is unlikely to be necessary for the maintenance of a significant habitat for indigenous fauna, including several threatened and priority fauna species known to exist in the general vicinity. It is considered that the proposed works will not significantly impact the resident individual species and species distributions levels.

Methodology Desktop assessment of available information



(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments This Project is not considered to be potentially at variance with this clearing principle given the desktop information to hand.

The desktop assessment did not indicate the presence of any DRF within the project area. Given the low area of required it is unlikely that the project will impact upon any DRF.

Methodology Desktop assessment of available information including the *EPBC Act 1999* Protected Matters Search Tool and DEC database search within the vicinity of the Study Area.

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments This Project is not considered to be at variance with this clearing principle given the desktop information to hand, including the remaining extent of the regional vegetation associations.

The results of a search of the DEC's Threatened Ecological Community (TEC) database, and the *EPBC Act* Protected Matters Search Tool, concluded that no TECs have been previously recorded in the Study Area.

Methodology Desktop assessment of available information, including DEC database search within the vicinity of the Study Area.



(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments This Project is not considered to be potentially at variance with this clearing principle, given the remaining extent of the regional vegetation associations.

Shepherd (2005) identifies that none of the vegetation associations located within the Study Area are lower than the EPA's threshold level of 30% and in fact all are recorded at over 98% of the Pre-European vegetation extent.

Methodology Desktop assessment of available information, including review of Shepherd (2005) vegetation extents.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments This Project is not considered to be potentially at variance with this clearing principle.

The proposed lay down areas will not require clearing within a watercourse or wetland. No creeks, wetlands or rivers occur adjacent to the two western Study Areas. The closest creek to the eastern Study Area (SLK 2185.5) crosses Great Northern Highway approximately 1 km west of the project site.

Methodology Desktop assessment of available information

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments This Project is not considered to be potentially at variance with this clearing principle.

Only a nominal amount of vegetation clearing will be undertaken as part of the proposed project and is unlikely to be of sufficient scale to result in significant land degradation.

Methodology Desktop assessment and review of available information



(h) 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.

Comments This Project is not considered to be potentially at variance with this clearing principle.

No conservation areas or reserves are located in the Study Area.

Methodology Desktop assessment of available information.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments This Project is not considered to be potentially at variance with this clearing principle.

Vegetation clearing is unlikely to be of sufficient scale to cause the deterioration in the quality of surface or underground water.

Methodology Desktop assessment of available information

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments This Project is not considered to be potentially at variance with this clearing principle.

The minimal clearing of native vegetation required for the Project is not considered likely to cause any alternation to the incidence or intensity of flooding within the region.

Methodology Desktop assessment of available information.





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