Nannine Mining Area and Nannine Haul Road

Reconnaissance Flora and Vegetation Survey and Basic Terrestrial Fauna Survey

Final Report

Prepared for Westgold Resources Limited

February 2021

Limitations

Scope of services

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Report Version	Revision No.	Purpose	Author/reviewer	Submitted to Client	
				Form	Date
Draft Report	1	For client review	Western Ecological / Westgold Resources	Electronic	01/02/2021
Final Report	2	Client submission	Western Ecological / Westgold Resources	Electronic	18/02/2021

Executive Summary

Westgold Resources Limited commissioned Western Ecological to undertake a Reconnaissance Flora and Vegetation Survey and Basic Terrestrial Fauna Survey for the Nannine Gold Project in late 2020.

The survey area is located approximately 35 km south of Meekatharra, Western Australia (WA) and is approximately 104 ha in total, consisting of two areas, Nannine Mining Area (NMA) and an associated Nannine Haul Road (NHR).

The Reconnaissance Vegetation Survey and Basic Terrestrial Fauna Survey was requested to provide supporting information for the submission of a Native Vegetation Clearing Permit and Mining Proposal applications.

The flora and vegetation survey was undertaken of the proposed NMA and NHR on the 5th November 2020 by Botanist Jenny Borger in accordance with EPA recommended timing and rainfall. The conditions were dry due to below average rainfall in 2020 and 2019. The flora desktop assessment involved searches of NatureMap (30 km radius), Department of Biodiversity, Conservation and Attractions (DBCA) Priority and Threatened Flora Database (50 km) and survey reports from nearby mining projects. A total of 52 conservation significant flora were recorded in the searches, including two threatened species, one of which is very restricted, and the other is a recently renamed species which has a wide distribution and is common. One priority species – *Acacia sclerosperma* subsp. *glaucescens* P3 – was recorded near NMA. Five priority ecological communities (PEC) occur within 40 km – the Polelle Calcrete PEC P1 (NHR is within the buffer); Belele Calcrete P1 (41 km), Nowthanna Hill Calcrete P1 (30 km), Austin Land System (low halophytic shrublands with scattered mulga) P3 (NMA is within the buffer zone), Trillbar Land System P3 and Yagahong Land System P3. No landforms supporting calcrete groundwater assemblages (1 & 2) or Weld Range PEC are present within the survey areas.

A total of 44 vascular taxa from eleven families and twenty-three genera were recorded within the NMA survey area. The most represented families were Fabaceae (12 taxa including 7 *Acacia* and 5 *Senna species*); Chenopodiaceae (9 species from 6 genera); Poaceae (6 species from 6 genera) and Scrophulariaceae (6 *Eremophila* species). A total of 42 native vascular taxa from fourteen families and twenty-three genera were recorded within the NHR survey area, most of which is located within the road reserve, and narrow areas adjacent to the road. The most represented families were Scrophulariaceae (11 *Eremophila* species) and Fabaceae (10 taxa including 7 *Acacia* and 3 *Senna* species). No conservation significant flora were recorded in either area. One weed species was recorded at NHR - *Asphodelus fistulosus** (Onion weed). A total of 10 vegetation types were described from the field results, based on structural and floristic results – five in the NMA (VTs 1 – 5) and five in the NHR survey area (VTs 6 – 10).

The vegetation was moderately to severely impacted because of historic and current pastoral and mining activities and as a result of alterations to drainage from the proximity of the Great Northern Highway to NMA. Many areas had little or no groundcover present which is a result of the above impacts as well as the drier and warmer climate over recent months. Recruitment of perennial plants also appears to be low. The areas with the highest plant cover and species diversity are the drainage lines which are present in both survey areas.

The fauna desktop assessment involved searches of NatureMap, the Environmental Protection and Biodiversity Conservation (Act 1999) Protected Matters Search Tool (EPBC PMST) and DBCA Threatened Fauna Database. The results outlined a total of 230 vertebrate species from 72 families. These were comprised of five amphibian species from three families, 44 reptile species from nine families, 155 bird species from 47 families, and 26 mammal species from 13 families. A total of 29 conservation significant vertebrate species (including Priority species) from 15 families were identified during the desktop review of the database searches. These were comprised of one reptile species from one family, 26 bird species from 12 families and two mammal species from two families.

The DBCA Threatened Fauna Database returned a total of 100 conservation significant fauna records from within a 50 km radius of the survey area. No conservation significant fauna was recorded in the survey area and the closest records to the survey area is the West Coast Mulga Slider (*Lerista eupoda)* which was recorded 480 m to the west of the survey area.

A total of 16 fauna species, from 13 families were recorded during the field survey. No species of conservation significance were recorded during the field survey and all fauna species recorded are considered relatively common and widespread.

Two conservation significant species were given particular consideration during the field survey, the Malleefowl (*Leipoa ocellata*) and the Night Parrot (*Pezoporus occidentalis*). The survey area is considered unsuitable for both species, due to a lack of suitable habitat.

A total of 19 habitat assessments were undertaken during the field survey and two fauna habitats types were recorded, these were Stony Plain and Drainage Areas, the most widespread being Stony Plain. The fauna habitats represented in the survey area are also represented in the wider region as can be seen in the 5 km study area and also in a broader regional context.

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1 Introduction

1.1 Background

Westgold Resources Limited (Westgold) commissioned Western Ecological to undertake a Reconnaissance Flora and Vegetation Survey and Basic Terrestrial Fauna Survey for the Nannine Gold Project.

The survey area (Figure 1) is located 35 km south of Meekatharra, Western Australia (WA) and is approximately 104 ha in total. Two areas comprise the overall survey area:

- Nannine Mining Area (NMA)
- Nannine Haul Road (NHR).

It is understood the Reconnaissance Vegetation Survey and Basic Terrestrial Fauna Survey is required for supporting information in the submission of a Native Vegetation Clearing Permit and Mining Proposal applications.

1.2 Scope and Objective

The scope of work (SoW) to be undertaken is understood to be as follows:

- Reconnaissance Flora and Vegetation Survey
- Basic (formerly Level 1) Fauna Survey
- Document the above in a concise report.

The objectives of the survey were to define the flora, vegetation and fauna values in the survey area, to support future project planning, and inform environmental approvals.

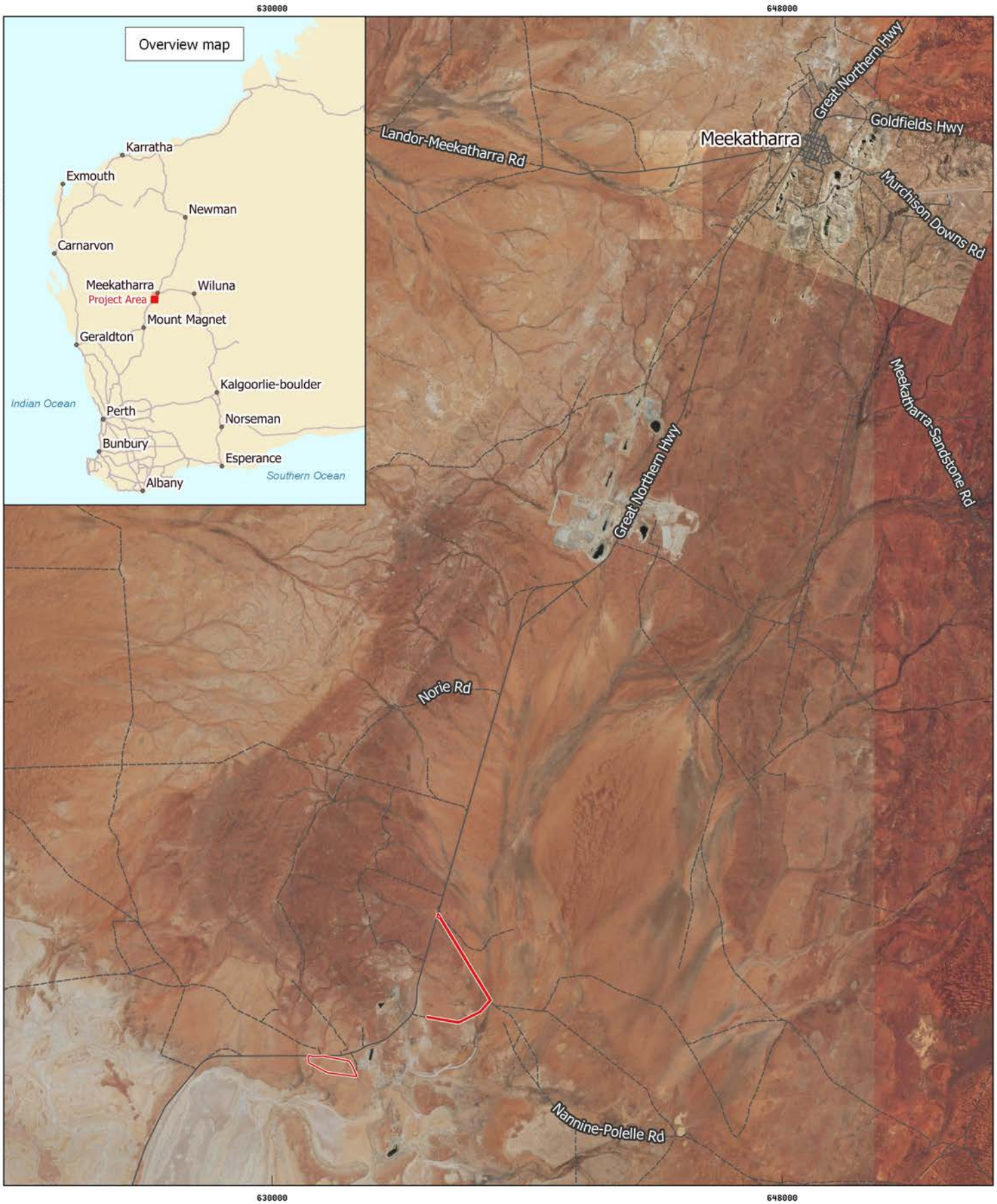


Figure 1: Site Location

0 2.5 5 km

Scale 1:180,000
GDA94 - MGA Zone 50

Legend

Survey Area

Ref: 085_G006_RevC.qgz

1.4 Legislative Context

Flora, fauna and ecological communities are protected formally and informally by various legislative and non-legislative measures, which are outlined below:

- Legislative Protection:
    - *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
    - *Western Australia* (WA*) Biodiversity Conservation Act* (2016) (BC Act)
    - *WA Environmental Protection Act* 1986 (EP Act).
- Non-Legislative Protection:
    - WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists.
    - Recognition of locally significant populations by DBCA.

A short description of each is given below. Other definitions, including species conservation categories, are provided in Appendix 1.

EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters of national environmental significance, which are detailed in Appendix 1. Under the EPBC Act, the Commonwealth Department of Agriculture, Water and the Environment (DAWE) lists protected species and Threatened Ecological Communities (TECs) by criteria set out in the Act. Species are conservation significant if they are listed as Threatened (i.e., Critically Endangered, Endangered and Vulnerable) or Migratory.

Bird species protected as Migratory under the EPBC Act include those listed under international migratory bird agreements relating to the protection of birds, which migrate between Australia and other countries, for which Australia has agreed. This includes the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA), the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Some marine fauna or terrestrial fauna that use marine habitats are listed as Marine under the EPBC Act. These species are only considered conservation significant when a proposed development occurs in a Commonwealth marine area (i.e., any Commonwealth Waters or Commonwealth Marine Protected Area). Outside of such areas, the EPBC Act does not consider these species to be matters of national environmental significance, so are not protected under the Act.

BC Act

The *Biodiversity Conservation Act 2016* (BC Act) replaced both the *Wildlife Conservation Act 1950* and the *Sandalwood Act 1929* and came into effect on 1 January 2019. The aim of the new Act is to conserve and protect biodiversity and to promote the ecologically sustainable use of biodiversity components in the State, and will bring more activities within the scope of biodiversity laws.

Taxa listed as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1a, 1b, and 1c), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act. Other categories include extinct or extinct in the wild and they are listed under section 23 (1) of the BC Act (Appendix 1).

If species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection, they are covered under section 13(1) of the BC Act and are called specially protected species. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act can't also be listed as Specially Protected species (see Appendix 1 for a more detailed description of each threat category).

Threatened Ecological Communities (TECs) are also covered under the BC Act and are placed into three categories of critically endangered, endangered or vulnerable under section 27(1a, 1b, and 1c) of the BC Act depending on their threat status.

DBCA Priority Species and Communities

DBCA lists species that are possibly threatened but that do not meet criteria for listing under the BC Act, or are otherwise data deficient, and adds them to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Consideration of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations (see Appendix 1 for more detail of the priority codes).

The DBCA also has a list of Priority Ecological Communities (PECs) that have scant information available to be considered a TEC, or which are rare but not currently threatened. Ecological communities that do not meet survey criteria or that are not sufficiently defined are added to the PEC list under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as a TEC. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list, are placed in priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in priority 5.

Informal Recognition of Threatened Flora and Fauna

Certain populations or communities of flora and fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, fauna may be locally significant because they are range extensions to the previously known distribution or are newly discovered species (and have the potential to be of conservation significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

1.5 Environmental Setting

1.5.1 Climate

The survey areas are located between 30 and 37 km SSW of Meekatharra and consequently the Meekatharra weather station is the closest Bureau of Meteorology (BoM) weather Station (Station No. 7045),. The climate is described as semi-arid, with a mean annual rainfall of 234.9 mm. Rainfall mostly occurs in in January – February and June (Figure 2). The driest months are from September to December. Rainfall in 2019 was very low with 85.6 mm recorded, with the highest rainfall occurring June. Total rainfall for January – November 2020 was 150.4 mm, which is well below the long-term average of 218.8 mm for the same period. The dry conditions have had an impact on the vegetation with very sparse to isolated groundcover present, and tree and shrub canopies were mostly sparse, and few species were in flower or fruit.

Table 1: Mean monthly temperature data recorded at Meekatharra (BoM 2020).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max	38.3	36.8	34.3	29.4	23.9	19.8	19.2	21.6	25.8	30	33.4	36.6	29.1
2020 Max	37.2	37.5	34.9	31.6	24.1	23.3	23.4	23.5	28.2	32.4	35.1		
2019 Max	41	41.6	37.1	30.7	25.9	20.3	21.9	23.5	29.6	34.3	36.7	40.2	31.9
Mean Min	24.4	23.8	21.4	17.1	12.1	8.8	7.4	8.6	11.6	15.3	18.9	22.2	16
2020 Min	23.5	24.9	21.9	19.3	10.8	10.1	8.7	10.8	13.7	16.8	20.1		
2019 Min	26.1	25.9	24.8	17.8	12.2	9.1	8.2	10.2	13.8	18.6	21.4	25.2	17.8

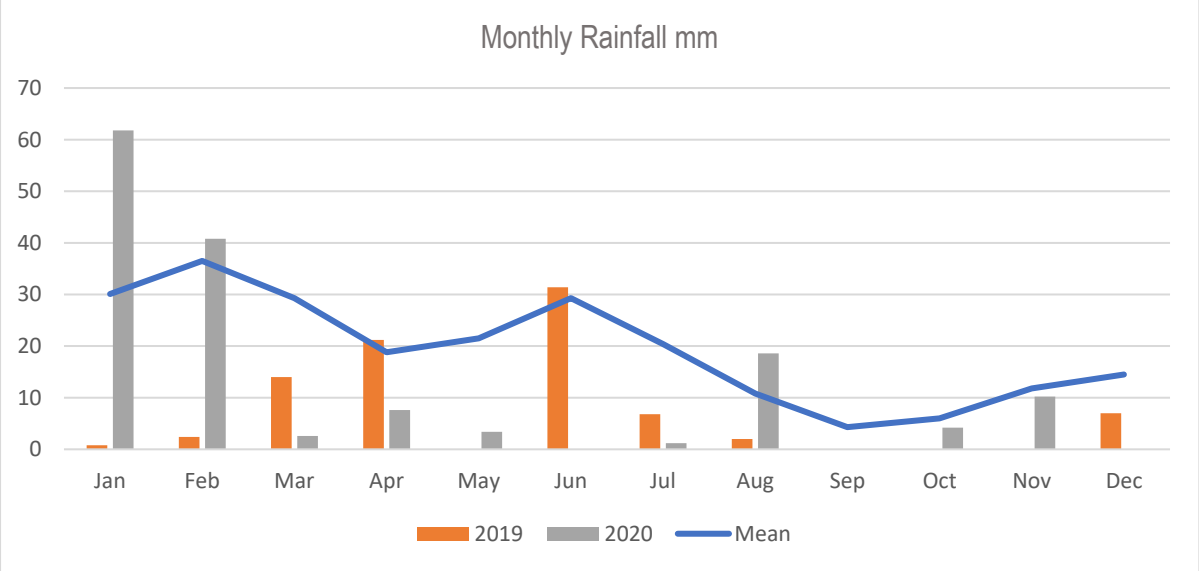


Figure 2: Mean and monthly rainfall recorded at Meekatharra in 2019 and 2020 up to the time of survey (BoM 2020).

Mean monthly maximum and minimum temperatures recorded at Meekatharra are presented in Table 1 and Figure 3. Temperature ranges from a winter mean maximum of 19.2°C recorded in July to a summer mean maximum of 38.3°C recorded in January, and mean minimum of 7.4°C (July) to 24.4°C (January). Maximum temperatures were mostly around average from January to May 2020, with above average temperatures recorded from June to November. Mean minimum temperatures during 2020 were close to average, with warmer than average temperatures recorded in February, April, and from June to October. Maximum and minimum temperatures in 2019 were much warmer than average, which, when combined with low rainfall in 2019, would have had a significant impact on the vegetation.

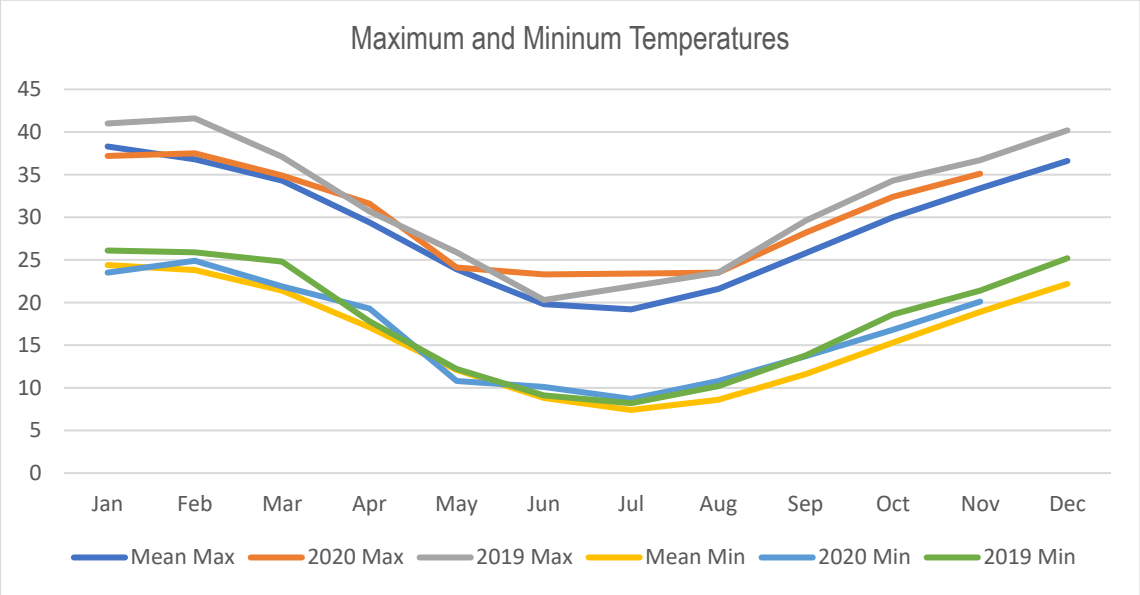


Figure 3: Mean monthly maximum and minimum temperatures recorded at Meekatharra (BoM 2020).

1.5.2 Geology and Land Systems

The survey areas are located within the upper Murchison catchment area on the northern flank of Lake Annean. Local drainage trends to the south into Lake Annean along ephemeral drainage lines. The NMA is located downslope from greenstone hills from which there is potential for significant flows during high intensity rainfall events which are concentrated through a culvert on the Great Northern Highway. NHR is located on a gently sloping plain with a low rise on the western side and intersected by a drainage line in the centre of the survey area.

1.5.2.1 Nannine Mining Area (NMA)

NMA is located within the Austin Land System (Figure 4) which is characterised by saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga underlain by Precambrian greenstone intrusions and Archaean granitic outcrops (Payne *et al.* 1998). Geological mapping of the area (DMIR 2019) has the survey area mapped as hornblende metatonalite (an intrusive igneous rock with felsic composition and phranitic texture) with a mapped occurrence of 16,821 ha. A few minor areas of outcropping granitic rock were noted on upper slopes of the survey area, with areas of shallow soil over granite on lower slopes, and stony plains also present. Two defined drainage lines were present, with drainage to the south into Lake Annean. A description of the vegetation associated with each of the landforms is presented in Table 2.

1.5.2.2 Nannine Haul Road (NRH)

The NRH is located within the Jundee (Hardpan plains with ironstone gravel mantles supporting mulga shrublands on cemented alluvium), Mileura (calcrete platforms and saline alluvial plains supporting halophytic shrublands on calcrete and alluvium) and Violet (undulating stony and gravelly plains and low rises supporting mulga shrublands on greenstone and basalt) Land Systems (Tables 2 & 3, Figure 4).

Table 2: Land systems occurring in the survey area and their extent.

Land System	Extent (ha)	Survey area (ha)	Survey area %
Austin	22,589	NMA 75.82	0.33
Jundee	664,968	NHR 3.88	0.000058
Mileura	261,213	NHR 10.24	0.004
Violet	548,626	NHR 14.28	0.002

1.5.3 Regional Vegetation

The survey area is in the arid Eremaean Botanical Province, within the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) Region and Western Murchison IBRA subregion MUR01, 20 km west of the boundary with the Eastern Murchison IBRA subregion (MUR02). IBRA mapping is based on the original work of Thackway and Cresswell (1995). The latest version is IBRA7 published in 2017 (Department of the Environment and Energy [DEE]). Pre-European broad scale vegetation mapping was undertaken by Beard (Figure 5) (DAFWA 2012). Pre-European and current extents are presented in the Vegetation Statistics Statewide analysis (DBCA/ DWER). The NMA is mapped entirely as vegetation association 18: *Acacia aneura* low woodland over *Eremophila fraseri* and *E. foliosissima* tall open shrubland

The NHR survey area is mapped as three pre-European vegetation associations – 18: *Acacia aneura* low woodland over *Eremophila fraseri* and *E. foliosissima* tall open shrubland; 204: Succulent steppe with open scrub; scattered mulga and *Acacia sclerosperma* over saltbush & bluebush; and 1128: Mosaic: Succulent steppe with open scrub; scattered *Acacia sclerosperma* & *A. ramulosa* over saltbush & bluebush/Succulent steppe; samphire (Figure 5).

Pre-European and current extents of the vegetation associations is presented in Table 3.

Table 3: Pre-European and current extents of Beard's vegetation associations in the Western Murchison MUR02.

Vegetation Association	Pre-European extent ha	Current Extent (ha)	% in conservation estate (current ex)	Survey area (ha)	% current extent in survey area
18	2133275.86	2128414.25	0	NMA 75.82	0.0035
				NRH 18.48	0.00087
204	110555.57	110555.57	37.6	NRH 5.48	0.0049
1128	18657.56	18349.24	0	NRH 4.46	0.0243

Table 4: Summary of land system descriptions (Payne *et al.* 1998) and Pre-European Vegetation Description (DBCA 2019).

Land System	Landform present in survey area	Land System Vegetation	Pre-European vegetation mapped for area
AUSTIN Nannine Mining Area	Low ridges and rises, with short footslopes with abundant mantles of cobbles and pebbles; shallow red earths or duplex soils on granite or greenstone	Scattered (10 – 20 % PFC) shrublands and woodlands usually dominated by mulga	18: *Acacia aneura* low woodland over *Eremophila fraseri* and *E. foliosissima* tall open shrubland
	Stony plains; occasionally granite outcrop; shallow red earths on granite	Very scattered to scattered (2.5 – 20 % PFC) low shrublands	
	Drainage lines – gently inclined linear drainage tracts; deep red earths	Very scattered (2.5 – 10 % PFC) mulga low woodland or tall shrubland or scattered Maireana spp. low shrubland	
JUNDEE Haul Road	Stony hardpan plain; mantles of ironstone and quartz pebbles; shallow red earths with a stony mantle on hardpan	Scattered (10 – 20 % PFC) Acacia – *Eremophila* shrubland in upper sectors and scattered (10 – 20 % PFC) mulga tall shrublands in lower areas	18: *Acacia aneura* low woodland over *Eremophila fraseri* and *E. foliosissima* tall open shrubland
MILEURA Haul Road	Calcrete platforms and plains – platforms (1 – 3 m relief) and plains with mantles of calcrete rubble	Variable: scattered to moderately close eucalypt woodlands; scattered *Acacia burkittii* tall shrublands or scattered *Atriplex bunburyana* low shrublands	204: Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush 1128: Mosaic: Succulent steppe with open scrub;

			scattered *Acacia sclerosperma* & *A. ramulosa* over saltbush & bluebush/Succulent steppe; samphire
VIOLET Haul Road	Stony plains/ saline stony plains – gently undulating to level plains with mantles of many to abundant ironstone and quartz pebbles or cobbles	Very scattered to scattered mulga tall shrublands or *Ptilotus* spp. low shrublands. Also very scattered to scattered *Acacia* tall shrublands with halophytic low shrubs	18: *Acacia aneura* low woodland over *Eremophila fraseri* and *E. foliosissima* tall open shrubland 1128: Mosaic: Succulent steppe with open scrub; scattered *Acacia sclerosperma* & *A. ramulosa* over saltbush & bluebush/Succulent steppe; samphire

1.5.4 Conservation significant flora

A desktop survey was undertaken from which fifty-two taxa were recorded within 50 km (FloraBase, NatureMap [DBCA 2020a] and DBCA threatened flora database search 28-1120FL [DBCA 2020b]) and presented in Table 5, with a description of habitat, and the potential to occur within the survey area. Due to the short notice of the survey request, pre-survey searches were restricted to FloraBase and NatureMap, and previous surveys completed by the botanist in the area (Borger 2020). The DBCA database search results were received after the survey had been completed. Mapped locations of conservation significant flora (CSF) previously recorded, within 50 km of the survey area, with a 30 km buffer, are presented in Figure 6 (DBCA 2020b). Two threatened species (T) are listed and further described (Table 6). One record (*Acacia sclerosperma* subsp. *glaucescens* P3; 1955) is located north of the Great Northern Highway near the Nannine Mining Area. A description of conservation codes is presented in Appendix 1. The potential of each species to occur in the survey area is based on the following criteria:

- Yes (Y) or possible (limited habitat information; or occurs in a wide range of habitats)
  - Nearby or previous record at site
  - Suitable landform / geology
  - Annual: wrong time of year/ unsuitable climatic conditions but potential habitat

- Unlikely (limited habitat information) or No (N) – restricted habitat not present in area
  - No suitable mapped habitat, occurs in broader area
  - Annual: wrong time of year/ unsuitable climatic conditions, unsuitable habitat

Table 5: Conservation significant flora recorded within 50 km of the survey areas (LTO = Likely to occur).

Scientific Name	DBCA Priority Code	Habitat	LTO
Acacia burrowsiana	3	Red-brown loams with ironstone rubble on surface, calcrete soils, laterite, quartz. Flats adjacent to watercourses, crests of low rises, breakaways.	y
Acacia dilloniorum	1	Red clay-loam or red-brown silty clay-loam on the middle and upper slopes and crests of low ranges mostly associated with outcropping basalt, but some plants occur on Banded Iron Formation.	N
Acacia sclerosperma subsp. glaucescens	3	Sand, sandy loam, stony soils.	Y
Acacia speckii	4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Y

Acacia subsessilis	3	Red sand or stony gravel over ironstone. Rocky hills.	N
Angianthus uniflorus	1	Herb; Margin of calcrete rise near gypseous salt lake.	Unlikely
Bergia auriculata	2	Clay soils. Mud flats.	Possible
Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	1	Herb; banded Ironstone Formation	N
Calytrix verruculosa	3	Shallow rocky soils of hills and plains, creeks	Y
Dicrastylis mitchellii	1	Sand or clay soils around dunes	Unlikely
Dicrastylis sp. Cue (A.A. Mitchell 764)	1	Drainage area, near granite	Y
Dodonaea amplisemina	4	rocky hills in red-brown sandy clay on basalt and gabbro, on banded ironstone or on dolerite and quartzite	Unlikely
Drosera eremaea	1	Herb; granite; several records in broader area	Possible
Drummondita miniata	3	Laterite. Breakaways.	N
Eragrostis sp. Erect spikelets (P.K. Latz 2122)	3	Grass, calcrete platform	Possible
Eremophila arachnoides subsp. *arachnoides*	3	Shallow loam over limestone	N
Eremophila fasciata	3	Summit and rocky slopes of hills	N
Eremophila retropila	1	Gravelly loam; stony flats	Y
Eremophila rhegos	1	Incorrect record; mapped as occurring in the Gascoyne	N
Eremophila rostrata subsp. *rostrata*	T	Saline quartzite loams. Hills and flats	N
Eremophila shonae subsp. *diffusa*	3	mulga woodland or open shrub on stony or shaly red brown clay loams	Y
Goodenia berringbinensis	4	Herb; Red sandy loam. Along watercourses.	Possible
Grevillea inconspicua	4	Drainage lines, on rocky outcrops, creeklines; often associated with basalt	Unlikely
Heliotropium mitchellii	1	Sandstone uplands and cliffs	N
Hemigenia exilis	4	Laterite. Breakaways, slopes.	N
Hemigenia tysonii	3	red sand, sandy clay, and lateritic sand on flats, sand dunes and hills	Unlikely
Hemigenia virescens	3	red sands and laterite	N
Hibiscus krichauffianus	3	Red sandy soils.	N
Homalocalyx echinulatus	3	Laterite, breakaways and sandstone hills	Unlikely
Jacksonia lanicarpa	1	Red sand	N
Lepidium xylodes	1	Gravelly loam; clayey sand	Possible
Maireana prosthecochaeta	3	Shrubland dominated by *Acacia* and *Eremophila* in brown to red sands, or rocky to gravelly soils, on plains or rocky hills	Y
Menkea draboides	3	Herb; red sand or clay; granite	Y
Micromyrtus placoides	3	Rocky hillslopes and footslopes; common on schist at Weld Range	Unlikely
Petrophile pauciflora	3	Decaying & dissected granite breakaways.	N
Philotheca coateana	3	Red sand	N
Prostanthera ferricola	3	Sparse *Acacia aneura* shrublands on gently inclined upper slopes and crests of laterite, basalt and banded ironstone formations	N
Prostanthera petrophila	3	Banded ironstone formation; lateritic soils	N
Ptilotus actinocladus	1	Flat, seasonally inundated plains	Possible
Ptilotus beardii	3	Clayey soils, saline flats and low breakaways	Possible
Ptilotus lazaridis	3	Clay loam; floodplains	Possible
Ptilotus luteolus	3	Red sandy soils, stony hills and screes	Unlikely
Ptilotus sp. Cue (P. Armstrong PA 16/362)	1		Possible
Rhodanthe sphaerocephala	1	Clayey loam on flats	Possible
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	3	Typically on red sand plains, but also on moderately rocky hill crests and slopes	Y

Seringia exastia	T	(Keraudrenia exastia) Relict desert dune swale in red sand (pindan). (See notes below)	Possible
Sida picklesiana	3	BIF and granite breakaways, stony plains and near creeklines	Possible
Stenanthemum mediale	1	red clayey sand, minor gully, mid and upper slopes of banded ironstone.	N
Stenanthemum patens	1	Rocky hillsides.	N
Tecticornia cymbiformis	3	Saline soils, along edges of creeklines	Possible
Tribulus adelacanthus	3	Gravelly hillslopes of banded ironstone formation, haematite and quartz; quartz flats	Unlikely
Verticordia jamiesonii	3	Sandy clay soils on lateritic breakaways	N

Table 6: Notes on Threatened flora recorded within the region.

Seringia exastia (T: Threatened under the EPBC and BC Acts) - A molecular study of the group suggested that *S. elliptica* was conspecific with *S. exastia* and because the latter is the older name, all specimens previously assigned to *S. elliptica* have been transferred to *S. exastia*. The species is no longer considered threatened; however, the status has not been updated.

Current distribution of *Seringia exastia*

Seringia exastia

Eremophila rostrata subsp. *rostrata* (T: Threatened under the EPBC and BC Acts) This species has a very restricted range and occurs near Cue. Plants were viewed prior to the survey. Due to timing and climatic conditions the shrubs were not in flower, however images were taken of the leaves and habit to assist with identifying any potential plants within the survey area. They are present on stony buff coloured saline clays near the base of quartzite hills. No habitat of this description was present within the survey area.

Eremophila rostrata foliage

1.6 Summary of Previous Surveys

A reconnaissance flora survey and Level 1 fauna survey was undertaken of 555 ha adjacent to the current survey areas in April 2020 for Westgold by Spectrum Ecology (Spectrum Ecology 2020). No threatened or priority flora were identified during the survey, however two range extensions (*Hakea leucoptera* subsp. *sericipes* and *Rhagodia drummondii*) and one potential new species (*Tecticornia* sp. nov) were recorded. One priority species – *Acacia sclerosperma* subsp. *glaucescens* P3, was previously recorded in the survey area, however this was not recorded during the 2020 survey. No Threatened Ecological Communities (TECs) were recorded within the vicinity of the survey area. Eleven Priority Ecological Communities (PECs) were recorded during the database searches. Two of these were recorded within the survey area: Austin System (Priority 3); and Polelle Calcrete (Priority 1). No vegetation in the survey area resembled any known PECs. The Spectrum survey identified five vegetation types, one of which was considered significant - D2; Tecticornia dominated salt pan. Due to the proximity of

the Spectrum survey to the current survey, a description of the vegetation types is presented in Table 8 for comparison with results from the current survey. Other surveys reviewed for information on flora and vegetation are listed in Table 8.

Table 7: A summary of five vegetation types recorded by Spectrum Ecology.

Code	Landform	Description	Associated species
D1	Drainage line	*Acacia aptaneura, Acacia caesaneura* and *Acacia macraneura* tall open shrubland, over ±*Eremophila pantonii*, ±*Eremophila youngii* subsp. *youngii* and *Acacia tetragonophylla* mid sparse shrubland, over ±*Aristida contorta* and ±*Setaria dielsii* low sparse tussock grassland.	*Acacia sclerosperma* subsp. *sclerosperma, Cleome viscosa Dactyloctenium radulans, Dichanthium sericeum subsp. Humilius, Melaleuca xerophila, Pittosporum angustifolium*
D2	Drainage; Salt pan	*Tecticornia peltata, Tecticornia* sp. 1 and *Tecticornia pergranulata* subsp. *pergranulata* low sparse shrubland, over *Eragrostis pergracilis* low sparse tussock grassland, over *Heliotropium curassavicum* and *Dysphania plantaginella* low isolated clumps of forbs.	*Eragrostis dielsii, Frankenia laxiflora, Tecticornia* sp. nov
F1	Flats	*Acacia aptaneura*, ±*Hakea preissii* and ±*Acacia ?demissa* tall sparse shrubland, over ±*Eremophila fraseri* subsp. *fraseri, Acacia tetragonophylla* and ±*Santalum lanceolatum* mid sparse shrubland, over ±*Enneapogon caerulescens* and ±*Aristida contorta* low sparse tussock grassland.	*Acacia grasbyi Eremophila lachnocalyx Eremophila spinescens* (corrected), *Ptilotus exaltatus, Ptilotus roei*
F2	Flats	*Senna glutinosa, Acacia synchronicia* and *Rhagodia drummondii* mid sparse shrubland, over *Ptilotus obovatus* and *Solanum lasiophyllum* low sparse shrubland, over *Aristida contorta* and *Enneapogon caerulescens* isolated tussock grasses.	*Euphorbia drummondii, Tribulus occidentalis*
S1	Slope	*Acacia aptaneura* tall sparse shrubland, over *Senna artemisioides* and *Eremophila macmillaniana* mid sparse shrubland, over *Ptilotus obovatus* low sparse shrubland	*Aristida contorta, Enneapogon caerulescens, Euphorbia australis* var. *subtomentosa, Ptilotus helipteroides*

Table 8: Surveys conducted in the broader area.

Date and author	Title
Spectrum Ecology (2020)	Nannine Mining Area Reconnaissance Flora & Level 1 Fauna Assessment, prepared for Westgold Resources Limited
SRK Consulting (2018)	Updated Mineral Resource, Burnakura Project, Western Australia, Australia, NI 43-101Technical Report prepared for Monument Mining Limited, Canada
Markey and Dillon (2008) Department of Environment and Conservation	Flora and Vegetation of the banded ironstone formations of the Yilgarn Craton: Weld Range
Jenny Borger Botanical Consulting (JBBC) 2020 Weld Range - Sinosteel Midwest Corporation Ltd	Targeted flora survey of proposed exploration disturbance to support Programs of Work applications PoW Reg. ID 84789, 64035 & 79321
JBBC (unpublished) – 2019 Weld Range, Jack Hills and Robinson Ranges - Sinosteel Midwest Corporation Ltd	Targeted flora survey of proposed exploration disturbance to support Programs of Work applications
Ecologia Environment 2020 For Fenix (Iron Ridge Project) Weld Range	Targeted survey for *Micromyrtus placoides* P3

1.7 Threatened and Priority Ecological Communities

No Threatened ecological communities (TEC) were recorded within 40 km of the survey area. Five priority ecological communities (PEC) occur within 40 km – the Polelle Calcrete PEC P1 (NHR is within the buffer); Belele Calcrete P1 (41 km), Nowthanna Hill Calcrete P1 (30 km), Austin Land System (low halophytic shrublands with scattered mulga) P3 (NMA is within the buffer zone), Trillbar Land System P3 and Yagahong Land System P3 (DBCA 2020c). No landforms supporting calcrete groundwater assemblages (1 & 2) or Weld Range PEC are present within the survey area.

Table 9: Priority Ecological Communities in the survey region.

Likelihood	Code	Name	Description	Proximity to survey areas
Recorded	P1	Polelle Calcrete	Polelle calcrete groundwater assemblage type on Murchison palaeodrainage on Polelle Station Unique assemblages of invertebrates in groundwater calcretes on Murchison palaeodrainage on Polelle Station	NHR is within the buffer zone
Recorded	P3	Austin Land System	Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean below greenstone hill systems.	NMA is within the buffer zone
Low	P3	Yagahong Land System	Rough greenstone ridges, hills and cobble-strewn footslopes supporting mulga shrublands with *Acacia xiphophylla.*	< 5 km of both sites
Low	P1	Belele Calcrete	Belele calcrete groundwater assemblage type on Murchison palaeodrainage on Belele Station (invertebrates)	> 40 km
Low	P1	Nowthanna Hill Calcrete	Nowthanna Hill calcrete groundwater assemblage type on Murchison palaeodrainage on Yarrabubba Station	30 km SE
Low	P3	Trillbar Land System	Gently sloping stony plains with low rises of metamorphic rocks and gilgaied drainage foci; supports more or less saline shrublands of *Acacia xiphophylla*, mulga, bluebush and samphire with patches of tussock grassland	20 km NE

1.8 Disturbance History

The dominant land use within the Murchison Bioregion is grazing of sheep and cattle on native pastures, and mining. Many pastoral leases were established towards the end of the 19th century. Gold prospecting and mining also started in the region in the late 1800's. Vegetation clearing has occurred over more than a century to support mining and pastoral activities and to harvest sandalwood (*Santalum spicatum*). Continual impacts on the environment through grazing, clearing, trampling, changes to fire regimes and the introduction of weeds, has resulted in loss of structure and species, loss of seed banks and erosion. Erosion can be exhibited through the accumulation of wind-blown soil around plant bases (hummocking), breaking of the surface crust with erosion faces, pedestalling with plant bases elevated above the surrounding land surface, rilling and gullying, and erosion of creek banks and deposition of sediments in other areas. Examples of most of these processes and features were noted in several locations within the survey area and used to determine the condition of the vegetation and surrounding area. The levels of disturbance influence the vegetation, its composition and and structure. The vegetation would have been significantly different prior to European impacts, and now the present and dominant vegetation are those that are least palatable to stock.

2 Methods

2.1 Requirements for Flora, Vegetation and Fauna Surveys

The flora, vegetation and fauna survey was completed in accordance with the following Environmental Protection Authority (EPA) and DAWE requirements for the environmental surveying and reporting of fauna surveys in WA, where relevant and practical, and as documented in:

- EPA Statement of Environmental Principles, Factors and Objectives (EPA 2018)
- EPA Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).
- EPA Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020)
- Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines 6.2 (2010) (DSEWPaC)
- Survey Guidelines for Australia's Threatened Mammals. EPBC Act survey guidelines 6.5 (2011) (DSEWPaC)
- Survey Guidelines for Australia's Threatened Reptiles. EPBC Act survey guidelines 6.6 (2011) (DSEWPaC)
- Interim Guideline for preliminary surveys of Night Parrot (*Pezoporus occidentalis*) in Western Australia (WA Department of Parks and Wildlife [DPaW] 2017).
- National Recovery Plan for Malleefowl *Leipoa ocellata* Department for Environment and Heritage (J. Benshemesh 2007).

2.2 Flora and Vegetation Desktop Assessment

Familiarisation of the survey area through geology, aerial imagery, land system, pre-European vegetation mapping, and database searches for CSF was undertaken prior to the survey. Through this assessment, potential conservation significant flora and communities, which may occur in the area were identified, as well as a range of habitat types (Sections 1.5 and 1.6).

2.3 Flora and Vegetation Field Survey

Westgold requested a reconnaissance flora and vegetation survey of the area. A reconnaissance survey is undertaken to provide context and gather broad information about a survey area. The reconnaissance survey should clarify whether the area may support any significant flora or vegetation. If significant flora or vegetation is located or considered likely to be present during a reconnaissance survey, a targeted or detailed survey may be required (EPA 2018).

The vegetation and flora survey was conducted over one day (5th November) by one botanist. A range of habitats were identified from the desktop study, particularly within NHR survey area. Drainage lines were distinctive, generally supporting denser vegetation. The final locations of relevés were chosen in the field and are described in Appendix 3. The locations of conservation significant flora would be recorded as individuals or as small groups where there are several plants close together. The following parameters were recorded at relevé sites:

- GPS location (GDA94)
- Landform, soil colour (Munsell 1992), soil type, surface rock type and cover
- Photograph
- Vegetation description – dominant species in each stratum, percentage cover and height
- Condition
- Disturbance/s

Vegetation condition rating is based on the descriptions for Eremaea Botanical Provinces in the EPA Technical Guidance – flora and vegetation surveys for Environmental Impact Assessment (Table 10). The condition ratings of poor and degraded were treated as one description (degraded) during the survey.

Table 10: Vegetation Condition Scale (EPA 2016).

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

Flora were identified in the field or collected and/ or photographed for confirmation from taxonomic keys Brown & Buirchell (2011), Greive (1998), Maslin & Reid (2012), Maslin (2018) and comparison against specimens at the WA Herbarium.

2.4 Fauna Desktop Assessment

Searches of the DBCA Threatened Fauna Database, NatureMap and the EPBC Protected Matters Search Tool (EPBC PMST) were undertaken to identify fauna species of conservation significance potentially occurring in the survey area (DBCA 2020d, DBCA 2020e, DAWE 2020a) (Appendix 4). These searches were centred on the following co-ordinates:

- 26° 52' 22" S and 118° 21' 51" E

The DBCA Threatened Fauna Database and EPBC PMST both has a search radius of 50 km applied and NatureMap had a 40 km radius applied (maximum possible).

2.5 Fauna Field Survey

A basic field survey was undertaken on 5th November 2020 (with a reconnaissance visit the day before) by one qualified Zoologist (Laura Stevens). As per the scope and proposal, the field survey consisted of habitat assessments, opportunistic fauna observations, searches and a targeted assessment of potential Malleefowl and Night Parrot habitat, in order to define the fauna values of the survey area.

2.5.1 Habitat Assessment

Habitat assessments were undertaken throughout the survey area. The fauna habitats were assessed for their potential to support species of conservation significance and the quality of habitat they provide to a wider suite of fauna. Fauna habitat assessments were undertaken to define and delineate the main broad fauna habitat types present. The habitat assessments were documented systematically for each habitat type on standardised field sheets. The habitat assessments consisted of the following:

- location of the broad habitat type within the survey area (GPS co-ordinate) and its relative percentage
- habitat condition was assessed at each assessment site as 'completely degraded' through to 'pristine', based on the scale given in Keighery (1994)
- landscape position
- dominant vegetation and structure (e.g., number of vegetation strata)

- hollow-bearing trees and dead stags (e.g., average size and abundance of hollows)
- description of any rock and rocky outcrops
- logs (e.g., abundance and size)
- substrate (e.g., leaf litter)
- wetlands, creeks, rivers, dams and other water bodies
- description of any observed nests and roosts (if present)
- subterranean roosts (e.g., caves, disused mineshafts and/or adits)
- associated fauna species observed using the habitat
- disturbance (e.g., cattle grazing, fire)
- photo showing a typical example of the broad habitat type.

Using the above information, fauna habitat in the survey area was mapped. As per the scope, fauna habitat with a 5 km buffer around the survey area (referred to as the study area) was requested. The study area fauna habitat was mapped at a broader scale, utilising the mapping from the fauna survey and also regional data.

2.5.2 Opportunistic Searches

Fauna were recorded opportunistically during the survey. The survey included looking through leaf litter, overturning rocks, and looking under decorticating bark (where present). Other recordings included visual sightings of active fauna such as reptiles and birds, signs of species presence such as burrows and scats of mammals and reptiles, and aural observations of amphibian (unlikely in this survey area) and bird species. Observation (visual or heard) of species considered of conservation significance were recorded by means of a hand-held GPS if present.

2.5.3 Conservation Significant Fauna Assessment

Two species of conservation significance were considered during the fauna field survey:

Malleefowl (*Leipoa ocellata)*

Areas with suitable habitat were assessed for evidence of Malleefowl activity, recorded as:

- Malleefowl tracks
- Malleefowl nesting mounds including status (inactive/ active) and activity according to the following criteria:
  - Nest in preparation – eggs not laid (evidence of litter trail)
  - Mound is in progress/ maintenance – eggs assumed to be laid
  - Evidence of chicks leaving nest – chicks fledging site / shell fragments
  - Decommissioned – spreading and returning of mound soil
- Malleefowl individual sightings and assessment of age (chick/ adult)
- Opportunistic observations of Malleefowl evidence (tracks, mounds and or individual sightings) within the survey area.

Night Parrot *(Pezoporus occidentalis)*

DBCA recommends that Night Parrot surveys should be undertaken if there is suitable Night Parrot habitat present in an area proposed to be disturbed. The survey area is close to the boundary that the DBCA considers a medium to high priority area for the species (DPaW 2017). However, based on our experience in the local region, it was highly unlikely that Night Parrot habitat (areas of old and unburnt spinifex) would occur in the survey area.

When traversing the survey area and undertaking habitat assessments suitable habitat in the way of old and unburnt spinifex was looked for and assessed if present.

2.5.4 Taxonomy

For species identified in the desktop assessment, where there is doubt to their true taxonomy (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. In some cases, old scientific names were presented where correct nomenclature could not be determined due to name changes. Some taxon names may be followed by 'sp.', meaning that the species name was not given in the data source or the identification is in

doubt. Where there are previously recorded taxa such as this that have the potential to be a conservation significant species, they are discussed specifically in the results and discussion sections.

Taxonomy and nomenclature in this report follows the accepted listing of published terrestrial vertebrate species, primarily the West Australian (WA) Museum (2020). In addition, the following are also considered; the listing for amphibians and reptiles is consistent with Chapple *et al.* (2019), Wilson & Swan (2017) and (to a lesser extent) Cogger (2014); bird listings are consistent with Christidis & Boles (2008) and mammal listings are consistent with Woinarski *et. al.* (2014).

3 Results

3.1 Survey Limitations

Survey constraints are often difficult to predict, as is the extent to which they influence survey effort. Survey limitations and constraints of the flora and fauna survey are outlined below in Table 11.

Table 11: Limitations and constraints associated with the survey.

Variable	Impact on Survey Outcome
Availability of contextual information at a local and regional scale	Information on a regional scale was readily available through Land Systems Mapping and supporting Technical Bulletin No. 90 (DAWA 1998, DAFWA 2018) and Pre-European vegetation mapping (DAFWA 2018). Local information was sourced from vegetation and flora surveys undertaken at nearby mine sites (SRK Consulting 2018; Spectrum Ecology 2020), and Weld Range (40 – 45 km west) (Borger 2019, 2020; Markey and Dillon 2008). Searches of DBCA Threatened and Priority flora and Threatened fauna were undertaken, as well as DBCA NatureMap search and EPBC PMST.
Access	The survey area was accessible and traversed by vehicle and foot.
Experience	The personnel who undertook the survey were practitioners suitably qualified in their respective fields with relevant experience as specified by: • EPA Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016). • EPA Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020). The personnel were as follows: • Jenny Borger (Principal Botanist) • Laura Stevens (Principal Zoologist).
Timing, weather, season	**Flora and Vegetation Survey** The survey was conducted towards the end of spring (5th November) following a very dry autumn, winter and spring. The only significant rainfall occurred in January 2020. Maximum and minimum temperatures were also warmer than usual during winter and spring, which, when combined with below average rainfall, has resulted in vegetation in a very stressed condition, as well as a lack of forbs and grasses. **Fauna Survey** The fauna survey was conducted as a Basic survey and therefore primarily about defining and describing habitats present, therefore timing, weather and season are not deemed a prime consideration. It is difficult to determine what the impacts of the low rainfall are on the fauna in the survey area and their detectability. However, there is likely to be an impact on food resources either directly or indirectly and this is likely to impact on their abundance and consequently their detectability, but this is not quantifiable from the work undertaken. The fauna survey was undertaken on 5th November 2020. There were therefore no limitations to the fauna survey due to timing, weather or season.
Scope	The SoW to be undertaken was as follows: • Reconnaissance Flora and Vegetation Survey

	• Basic (formerly Level 1) Fauna Survey
Proportion of flora recorded and/or collected; identification issues	Most vascular flora was identified in the field or was collected/ photographed for later identification and confirmation. Assistance was asked for confirmation on some *Eremophila* species from Dr. Andrew Brown *(Eremophila* specialist; ex-WA Herbarium research scientist). No specimens have been lodged with the WA Herbarium due to poor condition of material and the number of collections from the area already at the herbarium. There were some identification issues due to lack of reproductive structures due to a combination of climatic conditions, time of year and grazing impacts. Most grasses were heavily grazed, and present as small tussocks, with some plants with new shoots 1 – 2 cm long. Very few forbs were present, with large areas of the survey area having no groundcover species present.

Completeness	**Flora Survey:**
	A flora and vegetation reconnaissance survey and partial targeted flora survey was conducted over the Survey Area by one botanist over one day in November 2020. More than 80 % of the area was covered.
	
	Fauna Survey:
	A Basic fauna survey was conducted over the survey area by one Zoologist over one day in November 2020.
	
	• 19 habitat assessment were undertaken:
	  ○ 12 NMA
	  ○ 7 NHR
	• Approximately 104 ha was assessed for fauna habitat
	• 16 fauna species were recorded in the survey area
	• No conservation significant fauna were recorded during the survey

Disturbance	The site has been subjected to multiple disturbances over many decades. It is likely that some species are absent from the area due mainly to pastoral impacts and feral grazing.

3.2 Flora Results

3.2.1 Flora Composition

Nanine Mining Area

A total of 44 vascular taxa from eleven families and twenty-three genera were recorded within the survey area (Appendix 2A). The most represented families were Fabaceae (12 taxa including 7 *Acacia* and 5 *Senna*); Chenopodiaceae (9 species from 6 genera); Poaceae (6 species from 6 genera) and Scrophulariaceae (6 *Eremophila* species). Much of the area had moderate to high level of impacts from pastoral activities, as well as the effects of the long dry period. Five vegetation types were mapped (Figure 7). Vegetation condition was mapped for the survey area (Figure 8). Most of the survey area was in a degraded to good condition. Historic mining activities have also been undertaken in the area which has resulted in some clearing and disturbance to the land surface. Recent rainfall has resulted in a few of the *Eremophila* species coming into bud and some had sepals present which were used for identification. No weeds were recorded in the area. The species diversity is relatively low which is likely due to the above impacts and that the NMA is located within one Land System (Austin).

Nannine Haul Road

A total of 42 native vascular taxa from fourteen families and twenty-three genera were recorded within the survey area (Appendix 2B), most of which is located within the road reserve, and narrow areas adjacent to the road. The most represented families were Scrophulariaceae (11 *Eremophila* species) and Fabaceae (10 taxa including 7 *Acacia* and 3 *Senna*). One weed species - *Asphodelus fistulosus** (Onion weed) was recorded. The area had a high level of impact, particularly on the stony plains, with very few species remaining in the survey area. Grasses were present mainly as dried off or grazed tussocks;

however, there were occasional plants which had some reproductive material left for identification. Five vegetation types were described from the field results which will be further discussed in Section 3.2.3.

3.2.2 Conservation Significant Flora

No Conservation significant flora were recorded in either survey area. Both areas have been subjected to moderate to high levels of pastoral and mining activities.

3.2.3 Vegetation Types

A total of 10 vegetation types were described from the field results, based on structural and floristic results – five in the NMA (VTs 1 – 5) and five in the NHR survey area (VTs 6 – 10). These are described in Table 12. Vegetation mapping for the survey area is presented in Figures 7 and 8. Relevé descriptions and observation sites are presented in Appendix 3, and locations presented with the vegetation mapping.

All areas had been subjected to multiple disturbances which have impacted the species diversity and structure. The areas with the highest projected foliage cover were located within or adjacent to drainage lines. None of the vegetation types are representative of conservation significant vegetation types.

3.2.3.1 NMA Vegetation Types

Vegetation types within the NMA survey area are associated with landform, with two vegetation types on stony plains (VT1 and VT5), with VT1 supporting a dominant upper stratum of *Acacia aptaneura* tall sparse shrubland over a *Senna* dominated lower shrub stratum. VT5 had a higher cover of surface rock and much sparser vegetation with isolated *Acacia aptaneura* low trees and *Eremophila* dominant in the understorey. VT 2 is located on an alluvial plain with low surface rock cover and a dominant mid stratum of *Eremophila lachnocalyx*. VT2 graded into VT4 which has shallower soils with granitic rock close to the surface with *Acacia grasbyi* present in the upper stratum. *A. grasbyi* was not present in the other vegetation types. The site was dissected by two drainage systems which were dominated by taller and denser trees and shrubs including *Acacia fuscaneura* and *A. caesaneura* in the upper stratum over a shrubland dominated by *Acacia tetragonophylla* and *Eremophila* spp. with higher cover of grasses including *Cymbopogon ambiguus* than other vegetation types (VT3). VT3 is very similar to Spectrum Ecology (2020) Vegetation type D1 - *Acacia aptaneura, Acacia caesaneura* and *Acacia macraneura* tall open shrubland, over ±*Eremophila pantonii*, ±*Eremophila youngii* subsp. *youngii* and *Acacia tetragonophylla* mid sparse shrubland, over ±*Aristida contorta* and ±*Setaria dielsii* low sparse tussock grassland. Spectrum Ecology (2020) recorded no significant flora in D1 (Table 7).

3.2.3.2 NRH Vegetation Types

Vegetation types within the NRH survey area are associated with VTs 6 (*Acacia aptaneura* isolated low trees over *Hakea preissii* isolated shrubs) and 7 (*Acacia aptaneura, A. tetragonophylla* low open woodland to low woodland) occurring on a low stony rise on the western side which is adjacent to a broad regional drainage line (VT8) with *Eucalyptus camaldulensis* trees present over mixed shrubland including *Acacia sclerosperma* subsp. *sclerosperma, Eremophila pterocarpa* subsp. *pterocarpa, E. longifolia, Cratystylis subspinescens and Melaleuca xerophila over Frankenia spp. and Tecticornia* low shrubs. VT9 – dominated by *Acacia fuscaneura tetragonophylla, A. sclerosperma* subsp. *sclerosperma, A. grasbyi* low trees/ tall sparse shrubland was present on alluvial plains adjacent to the drainage line with very minor surface rock cover which changed to stony plains supporting very isolated low shrubs.

VT6 aligns closely with Spectrum Ecology (2020) S1 Vegetation type: *Acacia aptaneura* tall sparse shrubland, over *Senna artemisioides* and *Eremophila macmillaniana* mid sparse shrubland, over *Ptilotus obovatus* low sparse shrubland, with S1 mapped as occurring just south of VT6 on a similar landform. Spectrum Ecology (2020) recorded no significant flora in S1 (Table 7).

Table 12: Vegetation types (VT) at NMA NHR.

VT	Vegetation type and associated information		Image
C NMA	Cleared 6.9 ha		
C NHR	Cleared 9.2 ha		
1 NMA 15.1 ha	Vegetation type *Acacia aptaneura* tall sparse shrubland over *Senna artemisioides* subsp. *helmsii, S.* sp. Meekatharra, *Senna glutinosa* subsp. *chatelainiana* isolated shrubs over *Maireana triptera, Ptilotus obovatus, Senna* sp. Meekatharra, *S. artemisioides* subsp. *helmsii* low sparse shrubland over low isolated grass tussocks (dried)	Associated species *Eremophila forrestii* subsp. *forrestii, Eremophila lachnocalyx, Maireana pyramidata, M.* sp., *Senna artemisioides* subsp. *oligophylla, Sida* sp. Golden calyces	
	Landform Stony plain – surface rock 30 – 50 % Washed sand on surface on yellowish red sandy clay loam over fine sandy clay loam; surface rock (rounded pebbles, quartz, chert)	Vegetation condition Degraded to good	
2 NMA 25.8 ha	Vegetation type *Acacia synchronicia, A. aptaneura* isolated low trees over *Eremophila lachnocalyx, Senna* sp. Meekatharra, *A. synchronicia* open shrubland over *Dactyloctenium radulans, Aristida contorta* low isolated grass tussocks	Associated species *Acacia caesaneura, A. tetragonophylla, Atriplex vesicaria, Eremophila forrestii* subsp. *forrestii, E. latrobei* subsp. *latrobei, E. longifolia, Hakea recurva* subsp. *arida, Maireana pyramidata, M. triptera, Ptilotus aervoides, P. obovatus, Solanum lasiophyllum, Senna artemisioides* subsp. *helmsii, Tribulus asterocarpa*	
	Landform Alluvial plain; minor areas of outcropping gneiss/ decomposed granitic rock; surface rock 5 – 10 % Washed sand over reddish yellow sandy clay loam	Vegetation condition Degraded to Good Sheetwash erosion, wind erosion; cattle present in area – grazing, surface disturbance	

VT	Vegetation type and associated information		Image
3 NMA 12.26 ha	Vegetation type *Acacia tetragonophylla, A. caesaneura, A. aptaneura, A. fuscaneura, Eremophila longifolia* tall shrubland to tall open shrubland over *Acacia tetragonophylla, Eremophila forrestii* subsp. *forrestii, Ptilotus obovatus, Eremophila fraseri* subsp. *fraseri, E. lachnocalyx* open shrubland over *Cymbopogon ambiguus* and *Eriachne flaccida* low open tussock grassland	Associated species *Acacia craspedocarpa, A. synchronicia, Dactyloctenium radulans, Eremophila latrobei* subsp. *latrobei, Euphorbia drummondii, Maireana pyramidata, M. triptera, Sclerolaena cuneata, Enchylaena tomentosa var. tomentosa,* Senna sp. Meekatharra	
	Landform Drainage lines Yellowish red sandy clay loam	Vegetation condition Good; some minor very good patches; heavy grazing on younger *Acacia* and *Senna* spp., land surface disturbances (cattle in area), erosion and sedimentation	
4 NMA 7.5 ha	Vegetation type *Acacia aptaneura, A. tetragonophylla, A. grasbyi* isolated tall shrubs or low trees over *Acacia grasbyi, Senna* sp. Meekatharra, *Senna artemisioides* subsp. *helmsii, Ptilotus obovatus, Maireana triptera, Sclerolaena cuneata* isolated low shrubs over *Dactyloctenium radulans, Aristida contorta, Ptilotus aervoides* dried grasses low open tussock grassland	Associated species *Eremophila longifolia*, *Eremophila fraseri subsp. fraseri, E. forrestii* subsp. *forrestii, Hakea preissii Rhagodia drummondii*	
	Landform Outwash slope with granite outcropping; gentle slope with mainly shallow reddish yellow shallow sandy loam; surface rock < 10 %	Vegetation condition Mostly degraded	

VT	Vegetation type and associated information		Image
5 NMA 8.2	Vegetation type *Acacia aptaneura* isolated low trees over *Eremophila galeata, Acacia synchronicia* isolated shrubs over *Eremophila galeata*, *Senna* sp. Meekatharra, *Senna artemisioides* subsp. *oligophylla* low sparse shrubland	Associated species *Ptilotus obovatus, Acacia caesaneura, Hakea preissii, Senna* sp. Meekatharra, *Maireana triptera, Sclerolaena diacantha, Salsola australis*	
	Landform Stony Plain on lower slopes of greenstone hill surface rock (2 – 10 cm; rounded quartz, blueish granite, ironstone, basalt) 50 – 70 %	Vegetation condition Degraded Pastoral and mining impacts	
6 NHR 3 ha	Vegetation type *Acacia aptaneura* isolated low trees over *Hakea preissii* isolated shrubs over *Tecticornia halocnemoides* subsp. *catenulata, Hakea preissii, Maireana triptera* isolated low shrubs over isolated *Enneapogon caerulescens* dried off, grazed grass tussocks	Associated species *Acacia, craspedocarpa, A. tetragonophylla, A. synchronicia, Eremophila lachnocalyx, E. forrestii* subsp. *forrestii, E. macmillaniana, Senna artemisioides* subsp. *helmsii, Solanum lasiophyllum*	
	Landform Stony low rise, broad ridge Yellowish red clay loam; surface rock (small, rounded pebbles) 40 – 50 %	Vegetation condition Degraded to good; pastoral impacts, stock in area	

VT	Vegetation type and associated information		Image
7 NHR 0.8 ha	Vegetation type *Acacia aptaneura, A. tetragonophylla* low open woodland to low woodland over *Eremophila forrestii* subsp. *forrestii, Acacia aptaneura, Senna artemisioides* subsp. *filifolia, Eremophila fraseri* subsp. *fraseri* isolated shrubs over *Ptilotus obovatus* low isolated shrubs	Associated species	
	Landform Low stony rise; mid slope	Vegetation condition Degraded to good	
8 NHR 5.2 ha	Vegetation type *Eucalyptus camaldulensis* subsp. *obtusa* low open woodland or isolated trees over *Eucalyptus camaldulensis, Acacia sclerosperma* subsp. *sclerosperma, Eremophila pterocarpa* subsp. *pterocarpa, E. longifolia, Cratystylis subspinescens* open shrubland over *Frankenia laxiflora, F. setosa* low isolated shrubs over *Sclerolaena cuneata* low sparse forbland	Associated species *Acacia aptaneura, A. caesaneura, A. synchronicia, A. tetragonophylla, Eremophila pantonii, E. maculata* subsp. *brevifolia, E. longifolia, Melaleuca xerophila, Pittosporum angustifolium, Santalum lanceolatum, Senna artemisioides* subsp. *filifolia, Tecticornia halocnemoides* subsp. *catenulata*	
	Habitat Floodplain and drainage channels Red clay loam; 10 – 20 % surface rock	Vegetation condition Poor to good; obvious land surface disturbances – pastoral, mining; erosion and sedimentation	

VT	Vegetation type and associated information		Image
9 NHR 3 ha	Vegetation type *Acacia fuscaneura* isolated low trees over *Acacia tetragonophylla, A. sclerosperma* subsp. *sclerosperma, A. grasbyi* tall sparse shrubland over *Senna artemisioides* subsp. x *artemisioides, Acacia tetragonophylla, A. sclerosperma* subsp. *sclerosperma, Eremophila compacta* subsp. *fecunda* sparse shrubland over grass (dried and grazed) low open tussock grassland	Associated species *Acacia aptaneura, A. synchronicia, Eremophila fraseri* subsp. *fraseri, E. ?galeata, E. longifolia E. galeata, Euphorbia boophthona* (in road gutter), *Hakea preissii, Acacia fuscaneura, Sida* sp., *Monachather paradoxus*	
	Landform Floodplain; Yellowish red sandy clay loam; surface rock (calcrete) < 1 %	Vegetation condition Mostly degraded adjacent to road; road maintenance, pastoral impacts	
10 NHR 7 ha	Vegetation type *Acacia synchronicia, Eremophila galeata, Acacia tetragonophylla* isolated shrubs	Associated species	
	Landform Stony plain Red clay loam; surface rock (fine ironstone gravel with a few small rocks) 40 – 60 %	Vegetation condition Degraded; Heavily impacted by pastoral activities; surface disturbed, grazing; sheet erosion	

3.3 Fauna Results

3.3.1 Fauna Database results

Results of the databases searches outlined a total of 230 vertebrate species from 72 families (Appendix 4). These were comprised of five amphibian species from three families, 44 reptile species from nine families, 155 bird species from 47 families, and 26 mammal species from 13 families.

A total of 29 conservation significant vertebrate species (including Priority species) from 15 families were identified during the desktop review of the database searches (Appendix 4). These were comprised of one reptile species from one family, 26 bird species from 12 families and two mammal species from two families.

The DBCA Threatened Fauna Database returned a total of 100 conservation significant fauna records from within a 50 km radius of the survey area. The results of this database search can be seen in Figure 9. No Conservation Significant fauna were recorded in the survey area and the closest records to the survey area is the West Coast Mulga Slider (*Lerista eupoda*) which was recorded 480 m to the west of the NHR (southern end).

Shorebirds, Migratory Marine birds and Waterbirds

A total of 20 conservation significant waterbird species were returned in the databases. These were a combination of waders/shorebirds, migratory marine birds and waterbirds. These wetland avifauna such as wading birds, including Plovers and Sandpipers inhabit estuaries, mudflats, saltmarshes, sandflats and beaches, with shallow water edges, where they feed on invertebrates such as worms, molluscs, insects and crustaceans (Garnett *et al.* 2011). Migratory marine birds such as Terns frequent freshwater waterways (Slater *et. al* 2009). Waterbirds such as various Duck species feed on the surface of the water, taking mainly seeds and insects as well as floating vegetation from on or just below the surface of the water (Slater *et. al* 2009).

The vast majority of these DBCA records are from Nallan Lake (and the vicinity), which is approximately 55 km to the south-west of the survey area, or Lake Anneen, which is approximately 1.5 km to the south of the NMA. These lakes are ephemeral and only fill after large rainfall events – typically those associated with ex tropical cyclones. Suitable habitat for these shorebird, migratory marine birds and waterbird species is present in the vicinity of the survey area, but is very limited in the survey area to just three small occasionally inundated drainage lines. In addition, records for these species returned less than five records (most have one or two records), none of which were from the nearby Lake Anneen. Therefore, these species have been omitted from any further discussion. The records of waterbirds from Lake Anneen, were all of the Gull-billed Tern (19 records), which will be considered in this report.

Now regionally extinct

A small number of species in the database searches were also known to be historical records of extinct and locally extinct species. For example, the Burrowing Bettong (inland)) (*Bettongia lesueur graii*) which was in the NatureMap search and is extinct. These species have therefore been omitted from any further discussion. In addition, those species with five or less records in the DBCA database have also been omitted from further discussion with a few exceptions. Particularly if these results are older than 2000, are classed as uncertain (with regard to identification of species), or are from named locations which provide habitat not present in the survey area, for example Meekatharra sewage ponds.

Database errors and anomalies

Occasionally there are errors and/or anomalies in the database searches that are sourced from the various government departments, for example, the Grey Wagtail (*Motacilla cinerea*), which is a rare visitor (Johnstone & Storr 1998). These species have been omitted from any further discussion.

It is important to note, that the EPBC PMST is not entirely based on point records, but also on broader information, including bioclimatic distribution models, whereas the DBCA threatened fauna database and NatureMap are. Consequently, the results of the EPBC PMST are in some cases less accurate, particularly at a local scale (e.g., the Grey Falcon [*Falco hypoleucos*]). As a result, the EPBC PMST can include species that do not occur in the survey area because, for example, there is no habitat available or they are now known to be locally extinct. These species have therefore been omitted from any further discussion.

In addition, many fauna are not distributed evenly across the landscape, are more abundant in some places than others, and consequently more detectable (Currie 2007). Furthermore, some small, common ground-dwelling reptile and mammal species

tend to be habitat specific, and many bird species can occur as regular migrants, occasional visitors or vagrants. Therefore, all these species have been excluded from any further discussion.

Conservation Significant Fauna

With the aforementioned shorebirds, migratory marine birds, waterbirds, locally/regionally extinct and database errors species removed, a total of seven conservation significant species retrieved from the database searches are considered as either likely, possibly or unlikely to occur. Of these seven conservation significant species, no species were recorded during the assessment, one species is considered Likely, no species are considered Possible and six species are considered Unlikely to occur in the survey area (Table 13). All species will be discussed in section 4.2 below.

The Likelihood of each species is based on the following criteria:

- Recorded: Recorded during the field survey or site reconnaissance
- Likely: Suitable habitat is present in the survey area and the survey area is in the species' known distribution
- Possible: Limited or no suitable habitat is present in survey area, but is nearby. The species has good dispersal abilities and is known from the general area
- Unlikely: No suitable habitat is present in survey area but is nearby, the species has poor dispersal abilities, but is known from the general area; or suitable habitat is present, however the survey area is outside of the species' known distribution.

Table 13: Conservation significant fauna potentially occurring in the survey area.
CR = Critically Endangered under the EBPC Act, EN = Listed as Endangered under the EBPC Act, VU = Listed as Vulnerable under the EBPC Act, MI = Listed as Migratory under the EBPC Act, CD = Conservation Dependent under the EBPC Act, OS = Other specially protected species under the EBPC Act, IA = Migratory birds protected under an International Agreement, IUCN Threat categories (BC Act). P = Listed as Priority by the DBCA.

Common name	Species name	Conservation Status (EPBC Act)	Conservation Status (WA BC Act)	Likelihood
Reptiles				
West Coast Mulga Slider	*Lerista eupoda*		P1	Likely
Birds				
Malleefowl	*Leipoa ocellata*	VU	VU	Unlikely
Peregrine Falcon	*Falco peregrinus*		OS	Unlikely
Gull-billed Tern	*Gelochelidon nilotica*	Mi	Mi	Unlikely
Common Greenshank	*Tringa nebularia*	Mi	Mi	Unlikely
Night Parrot	*Pezoporus occidentalis*	EN	CR	Unlikely
Mammals				
Long-tailed Dunnart	*Sminthopsis longicaudata*		P4	Unlikely

3.3.2 Field Assessment Results

A total of 16 fauna species from 13 families were recorded in the survey area (Appendix 5). All fauna species recorded are considered relatively common and widespread.

3.3.2.1 Fauna Assemblage

Amphibians

Wetland habitat was present in the survey area in the form of drainage areas, some of which had limited water present. During the survey, however, no amphibian species were recorded (Appendix 5).

Reptiles

During the field survey, two reptile species were recorded, the Western Netted Dragon (*Ctenophorus reticulatus*) and the tracks of a Monitor (*Varanus*) species, likely to be either Gould's Sand Monitor (*Varanus gouldii*) or the Yellow-spotted Monitor (*Varanus panoptes*), both of which occur in the vicinity of the survey area (Appendix 5).

Birds

During the field survey, 12 bird species from nine families were recorded (Appendix 5).

Mammals

During the field survey two mammal species were recorded, the Red Kangaroo (*Osphranter rufus*) and introduced European Cattle (*Bos taurus*) (Appendix 5).

3.4 Fauna Habitat

3.4.1 Fauna Habitat – survey area

A total of 19 habitat assessments were undertaken during the field survey, the details of which can be seen in Table 14, Figure 10, Appendix 6.

Table 14: Habitat Assessment Locations.

Habitat Assessment	Location	Easting	Northing
1	Nannine Mining Area	631549	7025172
2	Nannine Mining Area	631652	7025398
3	Nannine Mining Area	632019	7025370
4	Nannine Mining Area	632419	7025248
5	Nannine Mining Area	632604	7025350
6	Nannine Mining Area	632326	7025029
7	Nannine Mining Area	632480	7024942
8	Nannine Mining Area	632090	7024960
9	Nannine Mining Area	631821	7025058
10	Nannine Mining Area	632840	7024960
11	Nannine Mining Area	632842	7025081
12	Nannine Mining Area	631349	7025507
1	Nannine Haul Road	635491	7026902
2	Nannine Haul Road	636379	7026735
3	Nannine Haul Road	636726	7026774
4	Nannine Haul Road	637596	7027341
5	Nannine Haul Road	637469	7027853
6	Nannine Haul Road	637033	7028574
7	Nannine Haul Road	635975	7030375

A total of two fauna habitat types were recorded in the survey area. Fauna habitat type and extent in the survey area can be seen in Table 15 and Figure 10. Examples of the fauna habitat types can be seen in Plates 1 and 2.

Table 15: Fauna habitat type and size in the survey area.

Fauna Habitat	Size (Ha)	% of the Survey Area (%)
Nannine Mining Area (75.96 ha)		
Stony Plains	47.80	45.80
Drainage Areas	21.27	20.38
Cleared	6.89	6.6
Nannine Haul Road (28.41 ha)		
Stony Plains	10.80	10.35
Drainage Areas	8.32	8.00
Cleared	9.29	8.90
Total	104.37	100

Plate 1: Stony Plains.

Mixed *Acacia* sparse and isolated low shrubs, over isolated *Eremophila, Ptilotus* and *Senna* low shrubs on stony plains.

Plate 2: Drainage Area Habitat.

Scattered *Eucalyptus camaldulensis obtusa over mixed Acacia* tall open shrubland, over *Eremophila, Ptilotus* and *Cymbopogon* low open tussock grassland.

3.4.2 Fauna Habitat – study area

The fauna habitat types recorded in the survey area are generally considered common and widespread in the surrounding area, and more importantly in the wider region. This can be seen from Figure 11, in which the wider fauna habitat has been mapped within a 5 km buffer (study area).

A total of three fauna habitats are mapped in the study area. These are Stony Plain, Drainage Area and Salt Lake (Figure 11). Two of these fauna habitats are represented in the survey area by the Stony Plain fauna habitat type and Drainage Area fauna habitat type (Figure 10). There is approximately 8,143 ha of Stony Plain habitat, 5,911 ha of Drainage Area habitat and 4,085 ha of Salt Lake habitat in the study area.

The fauna habitat mapped in the study area as Stony Plain is represented by the Stony Plain habitat mapped in the survey area. This habitat consists of isolated *Acacia* shrubs, over isolated *Eremophila, Ptilotus* and *Senna* low shrubs on stony sand. As is the case in the survey area, these areas will likely have limited vegetation structure and so habitat for fauna will also be limited.

The fauna habitat mapped in the study area as Drainage Area is represented by the Drainage Area mapped in the survey area. These areas have an overstory of very sparse Eucalyptus *camaldulensis*, over a mid-storey of mixed shrubs including Acacia and Hakea and a ground story of low shrubs including Eremophila and Senna. The vegetation structure is sparse, often with limited mid-storey. This habitat will likely have limited vegetation structure and so habitat to fauna species will also be limited.

Salt Lake habitat was not present in the survey area, however it is present in the study area. A lack of vegetation in this habitat provides limited value to fauna species, however, when it is episodically or seasonally inundated, this habitat type will provide water and therefore habitat for wading species.

3.5 Malleefowl Assessment

The survey area was assessed for suitable Malleefowl habitat. The survey area was traversed by foot and by vehicle and is considered unsuitable for the species. The drainage areas and drainage lines, contained denser vegetation in the way of mixed acacia woodland and mulga shrubland, however it was considered to be too spare for Malleefowl mound construction. In addition, Malleefowl are unlikely to build mounds in areas of drainage due to the possibility of flooding.

No Malleefowl were sighted, nor were their mounds or tracks, when assessing habitat (primarily areas containing mulga) in the survey area. Further to this no Malleefowl or their mounds were seen while driving along tracks.

3.6 Night Parrot Assessment

The survey area was assessed for suitable Night Parrot habitat. The survey area was traversed by foot and by vehicle and is considered unsuitable for the species. The survey area does not contain spinifex, which the species has been recorded roosting and nesting in.

4 Discussion

4.1 Flora

Westgold requested a reconnaissance vegetation and flora assessment of the survey areas. A desktop survey was undertaken prior to the survey with one priority flora record occurring close to the NMA survey area – *Acacia sclerosperma* subsp. *glaucescens* P3. This record is from 1955 and is an outlier from all other records in the Carnarvon IBRA Region, so there is potential for it to be an incorrect record. One Threatened flora species – *Eremophila rostrata* subsp. *rostrata* – recorded in the database searches had a low potential to occur in either survey area as no suitable habitat was present. Spectrum Ecology (2020) recorded *Rhagodia drummondii* as a northerly range extension. This species was also recorded in the NMA survey area in VT 4, so there is potential for further occurrences in the region. No vegetation types were representative of any PEC communities occurring near the survey areas. VTs 3 and 8 (vegetation associated with drainage lines) provides more fauna habitat than the other VTs due to higher foliage cover, diversity and more complex structure. Litter and fallen timber cover were generally higher in these areas as well.

Disturbance in the NMA survey area may impact on the Austin Land System PEC (P3) which is located on the edge of Lake Annean adjacent to and downslope from the site. Lake Annean is a wetland of national significance and both projects have the potential to impact this area through excessive runoff and sedimentation if appropriate controls are not put in place.

The vegetation mapping aligns well with Land System mapping (Figure 4) and broadly with Pre-European vegetation mapping (Figure 5). No vegetation types have a restricted distribution. The condition of the vegetation was mostly degraded to good with moderate to high levels of historic pastoral and mining impacts (Figure 8). Climatic affects (warmer and drier than average) over the last two years have also had an impact through (assumed) low germination rates of forbs and grasses and low recruitment of perennial species. Ongoing pastoral impacts in the region may threaten the long-term viability of many vegetation associations, many of which are poorly represented in lands managed for conservation.

4.2 Fauna of Conservation Significance

A total of seven conservation significant species (and relevant Listed species) retrieved from the database searches are considered as either Likely, Possibly or Unlikely to occur in the survey area. These species and their likelihood to occur in the survey area are discussed below and in section 4.4.

4.2.1 Conservation Significant Fauna Recorded

No conservation significant species were recorded in the survey area.

4.2.2 Conservation Significant Fauna Considered Likely to Occur

A total of one conservation significant species is considered Likely to occur in the survey area, the West Coast Mulga Slider.

West Coast Mulga Slider (Lerista eupoda)

The West Coast Mulga Slider (*Lerista eupoda*) is listed as Priority 1 under the DBCA priority list and was returned from NatureMap and the DBCA threatened fauna database. A total of 21 records were returned, eight of which were from 2009 - 2011.

Most Lerista species are burrowing species, which are usually found in the loose soil or sand beneath stones, logs, termite mounds etc., where they feed on ants, termites and other small insects. At night they emerge to feed at the surface, immediately diving into the loose sandy substrate when disturbed (Cogger 2014). The West Coast Mulga Slider inhabits open Mulga areas on loamy soils in the arid southern interior of WA, between Meekatharra and Cue (Chapple *et. al* 2019).

Suitable habitat in the way of open Mulga areas on loamy soils was present throughout the survey area, which potentially provides shelter and substrate for the species to burrow in. In addition, the DBCA threatened fauna database returned 21 records in the vicinity of the survey area, the closest record being 480 m from the southern end of the NHR. A recent, close record and suitable habitat result in the West Coast Mulga Slider being considered Likely to occur in the survey area.

4.2.3 Conservation Significant Fauna Considered as Possibly Occurring

No conservation significant species are considered as Possibly occurring in the survey area.

4.2.4 Conservation Significant Fauna Considered as Unlikely to Occur

A total of six conservation significant species are considered Unlikely to occur in the survey area, the Malleefowl, Gull-billed Tern, Common Greenshank, Peregrine Falcon, Night Parrot and Long-tailed Dunnart.

Malleefowl (Leipoa ocellata)

The Malleefowl (*Leipoa ocellata)* will be discussed in section 4.4 below as part of the Malleefowl assessment.

Gull-billed Tern (Gelochelidon nilotica)

The Gull-billed Tern (*Gelochelidon nilotica*) is listed as Migratory under the EPBC Act and the BC Act and was present in the NatureMap database and the DBCA threatened fauna database. The Gull-billed Tern can frequent inland fresh waterways habitually, or visit them on a regular basis and are considered an uncommon nomad in fresh and salt wetlands, estuaries and mudflats throughout Australia (Slater *et al.* 2009). The Gull-billed Tern is a colonial nester, laying 2-3 blotched buff-white eggs in a lined scrape on islands and spits in lakes.

The DBCA threatened fauna database returned 28 records of the Gull-billed Tern in the vicinity of the survey area, the most recent being from 2001. Of these 28 records a total of 19 records are from Lake Anneen. The closest record of the Gull-billed Tern, is approximately 1km from the NHR. Although there are records from the vicinity of the survey area, the majority of the survey area does not contain suitable habitat for the species. A small amount of water was present in the most westerly section of Drainage Area habitat in the NMA, however, this is unlikely to contain permanent water.

Lake Anneen is shallow, with many islands and peninsulas. Some parts of the lake almost always hold water, but the entire lake fills only after flooding caused by tropical summer and autumn rains. This occurs only every five to ten years (DAWE 2020b). The catchment is moderately disturbed and the Great Northern Highway runs through the middle of the lake. It is one of the most important breeding sites in WA for the Gull-billed Tern and is also an important refuge for other waterbirds, with the nearest adjacent wetland, Wooleen Lake, being nearly 200 kilometres away (DAWE 2020b).

Although there is a small amount of (occasionally inundated) wetland habitat at the western edge of the NMA, due to a lack of recent records, a large degree of disturbance and a lack of suitable habitat being present in the majority of the survey area, it is considered Unlikely that the Gull-billed Tern will occur in the survey area.

Common Greenshank (Tringa nebularia)

The Common Greenshank (*Tringa nebularia*) is listed as Migratory under the EPBC Act and the BC Act and was present in the EPBC PMST database and the DBCA threatened fauna database. The Common Greenshank is a common to uncommon migrant from Asia to coastal mudflats, estuaries, salt marshes, mangroves, lakes and swamps throughout Australia (Slater *et al.* 2009).

The DBCA threatened fauna database returned 13 records of the Common Greenshank from the vicinity of the survey area. With the exception of four historic records (all from 1980), these records were from Lake Nallan, which is approximately 55 km to the south-west of the survey area. The closest record of the Common Greenshank is 7.6 km from the NMA. Given a lack of recent and nearby records and a lack of suitable habitat, the Common Greenshank is considered Unlikely to occur in the survey area.

Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon (*Falco peregrinus*) is listed as Specially Protected under the BC Act and it was present in the NatureMap database and the DBCA threatened fauna database. It is an uncommon but wide-ranging bird across Australia (Barrett *et al.* 2003). It occurs mainly along rivers and ranges as well as wooded watercourses and lakes and nests primarily on cliffs, granite outcrops and quarries. The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as Parrots, Pigeons and on the east coast European Starlings (*Sturnus vulgaris*) (Olsen & Fuentes 2008).

The DBCA threatened fauna database returned 13 records of the Peregrine Falcon, nine of which are from 2013 - 2018. Nine of the records are from Lake Nallan (approximately 55 km to the south-west), or Meekatharra (approximately 30 north). The closest record of the Peregrine Falcon is approximately 1.5 km from the NMA (Figure 12).

The survey area lacks suitable cliff, rock outcrop habitat and rivers (the drainage lines are likely too small and occasionally inundated) and so lacks any suitable nesting and foraging habitat. The Peregrine Falcon is therefore considered Unlikely to occur in the survey area.

Night Parrot (*Pezoporus occidentalis)*

Night Parrot (*Pezoporus occidentalis)* will be discussed in section 4.4 below as part of the Night Parrot assessment.

Long-tailed Dunnart (*Sminthopsis longicaudata)*

The Long-tailed Dunnart (*Sminthopsis longicaudata)* is listed as Priority 1 under the DBCA priority list and was present in the NatureMap and the DBCA threatened fauna database. Records of the Long-tailed Dunnart come from widely scattered localities in the arid zone where it inhabits rugged, rocky areas. Little is known of the life history of long-tailed dunnarts, but available evidence suggests that this widely scattered species is restricted to rugged, rocky areas (Burbidge *et al.* 2008). Habitat includes plateaus composed of boulders and stones, with fine red sand sparsely vegetated with Mulga and miniritchie (*Acacia sp.*) shrubs over spinifex and areas of open woodland of Mulga (Van Dyck & Strahan 2008). The striated foot-pad and long strongly muscular tail of the Long-tailed Dunnart suggest it is an active and capable climber.

The DBCA threatened fauna database returned six records of the Long-tailed Dunnart. With the exception of one historical record, the five remaining records were from surveys undertaken in 2017 and 2018. The two closest records of the Long-tailed Dunnart are 1.4 km from the NMA and 1.8 km from the NHR, these records appear to be rocky hills however, which are not present in the survey area. A lack of suitable habitat therefore results in the Long-tailed Dunnart being considered Unlikely to occur in the survey area.

4.3 Fauna Habitat

During the fauna survey two different broad fauna habitat types were identified in the survey area, with this based on vegetation structure (primarily the extent of vegetation cover in the various strata) and species composition (Figure 10).

Stony Plain

Stony Plain habitat consisted of 52 ha (50%) of the survey area. This habitat type consisted of an overstorey of *Acacia aptaneura* tall sparse shrubland over *Senna artemisioides* isolated shrubs over *Eremophila forrestii*, *Maireana triptera*, *Ptilotus obovatus* and Senna low sparse shrubland over low isolated grass tussocks (dried) on stony plains.

The vegetation was very sparse in all strata, with particularly limited overstorey and a near absent ground layer. The lack of vegetation and structure provided very limited shelter sites for fauna species, while the stoney substrate provided a lack of habitat for burrowing species. Evidence of heavy disturbance by cattle and previous exploration and clearing was recorded in many locations.

Drainage Area

Drainage Area habitat consisted of 34 ha (34%) of the survey area (the remaining 16 ha [16%] was cleared). This habitat type consisted of an overstorey of mixed Acacia, including *A. tetragonophylla, A. sclerosperma, A. caesaneura, A. aptaneura, A. fuscaneura, A. craspedocarpa, E. longifolia* tall shrubland to tall open shrubland over *E. forrestii, P. obovatus, E. fraseri, E. lachnocalyx* open shrubland over *Cymbopogon ambiguus* and *Eriachne flaccida* low open tussock grassland.

In some areas *E. camaldulensis* trees, were present, which did provide habitat for a number of bird species. The Drainage Area habitat did contain vegetation in a number of strata, however, in some areas, midstorey vegetation was often limited. The tall *E. camaldulensis and* Acacia trees provided habitat for fauna, for example bird species including the Yellow-throated Miner (*Manorina flavigula*) and Striated Pardalote (*Pardalotus striatus*). Sandy substrate was present in many areas which provided habitat for burrowing animals and some areas contained leaf litter (albeit limited) which may provide shelter to some fauna species such as small skinks. This was evidenced by burrows of dragon species and tracks of Goanna species, throughout this habitat type. Some areas contained stoney substrate which contained a lack of shelter and so provided less value to fauna species. Evidence of heavy disturbance by cattle and previous exploration and associated clearing was recorded in many locations.

4.4 Malleefowl Assessment

In the past century, the range of the Malleefowl has contracted, particularly in arid areas and at the periphery of its former range (Benshemesh 2007). In Australia, clearing for Agriculture has eliminated and fragmented much of the Malleefowl habitat, resulting in localised extinctions and fragmented populations (Garnett *et al.* 2011). In WA since 1981, the range of the Malleefowl has been estimated to have contracted by between 28 and 30% (Benshemesh 2007; Parsons *et al.* 2008).

Historically, the species was originally common and widespread in semiarid zones, mainly in scrubs of Mallee and other low Eucalypts on sandy and lateritic soils; also, Acacia scrubs on heavy red soils, especially north and east of the mulga-eucalypt line. The Malleefowl is now generally rare to uncommon and patchily distributed due to habitat loss.

Malleefowl prefer habitat with a dense canopy and an open ground layer in which they can construct their mounds (Benshemesh 2007). Benshemesh (1992) also found that dense canopy cover was the most important feature associated with high breeding densities at sites in Victoria. Fire history is also important with Malleefowl birds preferring old growth (i.e., long unburnt) mallee. Fire has a major influence on the structure and floristic composition of habitats that Malleefowl occupy.

Habitat in the way of Acacia scrubs on sandy soil is present in the survey area, however it is considered to be too open (vegetation density and cover are very sparse) to be suitable for Malleefowl, in addition, the denser Acacia is mainly present in the drainage area habitat, where Malleefowl are unlikely to build mounds due the potential risk of flooding.

The stony plain habitat mapped during this assessment is unsuitable for Malleefowl to construct their mounds because the canopy cover is too sparse or is absent and the substrate is too rocky.

The DBCA threatened fauna database returned two records of the Malleefowl in the vicinity of the survey area, both of which were secondary signs from 1981.

During the Malleefowl assessment, no suitable habitat was recorded and no Malleefowl, mounds or tracks were recorded. In addition, a lack of database records results in the Malleefowl being considered Unlikely to occur in the survey area.

4.5 Night Parrot Assessment

The Night Parrot is an enigmatic species thought possibly to be extinct until the recent recoveries of two dead specimens from Queensland (and new locations more recently). The type specimen and many early sightings, however, came from WA (Johnstone *et al.* 2013). Night Parrots are cryptic, nocturnal and endemic to Australia's arid interior. Until the late 19th century, they were widespread and relatively easily found at least at some locations. For instance, 14 of the 25 museum specimens in existence came from the Gawler Ranges in South Australia between 1871 and 1881 (Murphy *et al.* 2017). The last Night Parrot collected intentionally was in Western Australia in 1912 (Wilson 1937). Then followed 78 years of unconfirmed reports spanning all mainland states and the Northern Territory, until in 1990 a desiccated bird was found by a roadside in western Queensland (Boles et al. 1994, Murphy *et al.* 2017).

In 2006, another dead bird was discovered by a Ranger 200 km to the south-east of the 1990 specimen (McDougall et al. 2009, Murphy et al. 2017). In 2013, the first photographs of a living night parrot were captured close to the site of the 2006 specimen (Dooley 2013, Murphy et al. 2017). Their cryptic nature, remote distribution and apparently rapid decline means that there is scant ecological information about night parrots.

A more recent sighting of the Night Parrot in WA comes from the Pilbara (12 April 2005) at a well near the Fortescue Marshes (Davis & Metcalf 2008). There was also a sighting near Matuwa (Lorna Glen), which is about 400 km north-east of the survey area, in 2009 (Hamilton *et al.* 2017).

There is very limited ecological information available for this species such as its preferred habitat (only very broad information). However, with increasing conservation focus being given to this species, more information is likely to become available, e.g., the discovery of Night Parrot nests in large Spinifex hummocks in Queensland (Murphy *et al.* 2017) which is a common and widespread habitat type throughout much of south-east Queensland and WA.

The survey area lacks spinifex and so contains no suitable habitat for the Night Parrott. In addition, a lack of records (despite relatively limited survey effort in the local region) results in the likelihood of the Night Parrot nesting or roosting in the survey area being highly unlikely.

5 Conclusions

The dominant land use within the Murchison Bioregion is grazing of sheep and cattle on native pastures, with mining also important. Many pastoral leases were established towards the end of the 19th century and gold prospecting/mining started in the region in the late 1800's. These activities have therefore had an impact on the flora and fauna at a local and regional scale for over 125 years. The main threats to the vegetation in the local area are from stock and feral grazers, evidence of which was found throughout the survey area.

Continual impacts through grazing, clearing, trampling, changes to fire regimes and the introduction of weeds, has resulted in loss of vegetation structure and species, loss of seed banks and erosion. Little flora recruitment has occurred and impacts have occurred to all strata, particularly near Great Northern Highway. This lack of vegetation structure has had an impact on the suite of fauna species that would have originally occurred in the region. Erosion is active in much of the survey area which has resulted in loss of topsoil, seed banks and litter (for fauna to shelter in).

The high levels of disturbance in the local and regional area result in a loss of flora species and structure and the remaining vegetation is likely to be significantly different to those present prior to European impacts, which now support very similar vegetation on different substrates, with dominant species being those which are least palatable to stock.

5.1 Conservation Significant Flora

The results of the survey do not support the likelihood of any Threatened flora being present in the survey area, and it is unlikely that any priority species are present, including annuals which may not have been present at the time due to climatic conditions.

5.2 Vegetation

No vegetation types are representative of assemblages of priority ecological communities. Disturbance within the survey area may impact PECs and the Lake Annean ESA adjacent to the sites.

5.3 Fauna Summary

Results of the fauna databases searches outlined a total of 230 vertebrate species from 72 families and a total of 29 conservation significant vertebrate species (including Priority species) from 15 families in the vicinity of the survey area. A total of 100 conservation significant fauna records from within a 50 km radius of the survey area were returned from the DBCA threatened fauna database, however no conservation significant fauna were recorded in the survey area. The closest records to the survey area is the West Coast Mulga Slider (*Lerista eupoda)* which was recorded 480 km to the west of the survey area (Nannine Haul Road).

A total of 16 fauna species, from 13 families were recorded during the field survey. No species of conservation significance were recorded during the field survey and all fauna species recorded are considered relatively common and widespread.

Two conservation significant species were given particular consideration during the field survey, the Malleefowl and the Night Parrot. The survey area is considered unsuitable for both species, due to a lack of suitable habitat.

The survey area was considered to be in a degraded to good condition, with heavy disturbance from previous mining activities and cattle recorded throughout the survey area. A total of two fauna habitats types were recorded in the survey area, these were Stony Plain and Drainage Areas. The most widespread was Stony Plain, comprising 56% of the survey area, while Drainage Areas comprised 28% of the survey area and the remaining 16% of the survey area was cleared. The fauna habitats present in the survey area are not restricted to the survey area, but are well represented in the broader study area as can be seen in the study area (Figure 11) and are also likely to be well represented in a wider regional context.

6 References

Barrett, GW., Silcocks, A., Barry, S., Cunningham, R., Poulter, R. (2003). The New Atlas of Australian Birds. Birds Australia, Hawthorn East.

Benshemesh, J. (1992). The conservation ecology of Malleefowl, with particular regard to fire. Pages 1-224. Monash University, Clayton.

Benshemesh, J. (2007). National Recovery Plan for Malleefowl, Department for Environment and Heritage, South Australia.

Boles W. E., Longmore N. W. & Thompson M. C. (1994). A recent specimen of the Night Parrot *Geopsittacus occidentalis*. Emu 94, 37–40.

Borger, J. (Jenny Borger Botanical Consulting (JBBC)) (2019). Unpublished – 2019 targeted flora searches of proposed drill locations and access tracks at the Weld Range. For SinoSteel Midwest Corporation Pty Ltd.

Borger, J. (Jenny Borger Botanical Consulting (JBBC)) (2020) Targeted flora survey of proposed exploration disturbance to support Programs of Work applications PoW Reg. ID 84789, 64035 & 79321, Weld Range, March 2020 for Sinosteel Midwest Corporation Ltd.

Brown, A., & Buirchell, B. (2011). A Field Guide to the Eremophilas of Western Australia. Published by Simon Nevill Publications. snpub@bigpond.net.au.

Bureau of Meteorology (BOM) (2020). Climate Averages for Meekatharra viewed November - December 2020, www.bom.gov.au.

Chapple, D.G., Tingley, R., Mitchell, N.J., Macdonald, S.L., Keogh, J.S., Shea, G.M., Bowles, P., Cox, N.A. & Woinarski, J.C.Z. (2019). The Action Plan for Australia Lizards and Snakes 2017.

Cristidis, L., & Boles, W.E. (2008). Systematics and Taxonomy of Australian Birds. Victoria: CSIRO Publishing.

Cogger, H. (2014). Reptiles and Amphibians of Australia. CSIRO Publishing.

Currie, D. J. (2007). Disentangling the roles of environment and space in ecology. Journal of Biogeography 34, 2009–2011.

Davis, R., & Metcalf, B. (2008). The night parrot (*Pezoporus occidentalis*) in northern Western Australia: a recent sighting from the Pilbara region. Emu 108, 233-236.

Department of Biodiversity, Conservation and Attractions (DBCA) (2019). 2018 state-wide vegetation statistics (formerly the CAR Reserve Analysis): Full report. Remote Sensing and spatial analysis program; Biodiversity and Conservation Science.

Department of Biodiversity, Conservation and Attractions (DBCA) (2020a). *NatureMap,* accessed October – December 2020; naturemap.dbca.wa.gov.au.

Department of Biodiversity, Conservation and Attractions (DBCA) (2020b). Threatened Flora Search.

Department of Biodiversity, Conservation and Attractions (DBCA) (2020c). Priority ecological communities for Western Australia Version 30. Species and Communities Programme.

Department of Biodiversity, Conservation and Attractions (DBCA) (2020d). Threatened Fauna Search.

Department of Biodiversity, Conservation and Attractions (DBCA) (2020e). NatureMap fauna search - Mapping Western Australia's Biodiversity, [Online], Government of Western Australia.

Department of Agriculture, Water and the Environment (DAWE) (2020a). EPBC Act Protected Matters Search Tool, [Online], Australian Government.

Department of Agriculture, Water and the Environment (DAWE) (2020b). The Directory of Important Wetlands in Australia - Information sheet [Online] Australian Government.

Dooley S. (2013) Out of the shadows. Australian Birdlife 2, 26–30.

Environmental Protection Authority (EPA) (2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*.

Environmental Protection Authority (EPA) (2016). Technical Guidance Terrestrial Fauna Surveys.

Garnett, S.T., Szabo, J. K., & Dutson, G. (2011). The action plan for Australian birds 2010. CSIRO Publishing.

Grieve, B. J. (1998). How to know Western Australian Wildflowers. A key to the flora of the extratropical regions of Western Australia. Part II Dicotyledons (Amaranthaceae to Lythraceae). University of Western Australia Press.

Hamilton, N., A., Onus, M., Withnell, B. & Withnell K. (2017). Recent sightings of the Night Parrot *Pezoporus occidentalis* from Matuwa (Lorna Glen) and Millrose Station in Western Australia. Australian Field Ornithology 34, 71-75.

Johnstone, R. E., Burbidge, A. H., & Darnell, J. C. (2013). Birds of the Pilbara region, including seas and offshore islands, Western Australia: distribution, status and historical changes. Records of the Western Australian Museum Supplement 78, 343–441.

Johnstone, R.E. & Storr, G. M. (1998). Handbook of Western Australian Birds. Volume 1 - Non-Passerines (Emu to Dollarbird). Oxford University Press.

Markey, A. S., & Dillon, S. J. (2008). Flora and Vegetation of the banded ironstone formations of the Yilgarn Craton: Weld Range. Journal of Conservation Science Western Australia 7 (1), 153 – 178.

Maslin, B. R., & Reid, J. E. (2012). A taxonomic revision of Mulga (Acacia aneura and its close relatives: Fabaceae) in Western Australia. Nuytsia 22 (4): 129 – 267, the Journal of the Western Australian Herbarium; published online September 2012. Department of Environment and Conservation

Maslin, B. R. (coordinator) (2018). WATTLE, Interactive Identification of Australian Acacia. Version 3. (Australian Biological Resources Study, Canberra; Department of Biodiversity, Conservation and Attractions, Perth; Identic Pty. Ltd., Brisbane).

McDougall, A., Porter, G., Mostert, M., Cupitt, R., Joseph, L., Murphy, S., Janetzki, H., Gallagher, A. & Burbidge, A. (2009). Another piece in an Australian ornithological puzzle – a second Night Parrot is found dead in Queensland. Emu 109, 198–203.

Munsell Color Company (1992) Soil Color Charts. Macbeth Division of Kollmorgen Instruments Group, New York USA

Murphy, S.A., Silcock, J., Murphy, R., Reid, J., and Austin, J.J. (2017). Movements and habitat use of the night parrot *Pezoporus occidentalis* in south-western Queensland. Austral Ecology 42, 858-868.

Olsen, J., & Fuentes, E. (2008). Dietary shifts based upon prey availability in Peregrine Falcons and Australian Hobbies breeding near Canberra, Australia. Journal of Raptor Research 42, 125–137.

Parsons, B. C., Short, J. C., & Roberts, J. D. (2008). Contraction in the range of Malleefowl (*Leipoa ocellata*) in Western Australia: a comparative assessment using presence-only and presence-absence datasets. Emu108, 221-231.

Payne, A. L., Van Vreeswyk, A. M. E., Pringle, H. J. R., Leighton, K. A., & Hennig, P. (1998). An inventory and condition survey of the Sandstone-Yalgoo-Paynes Find area, Western Australia. Agriculture Western Australia Technical Bulletin No. 90.

Slater, P., Slater, P., & Slater, Raoul. (2009). The Slater Field Guide to Australian Birds. Second Edition.

SRK Consulting (2018). Updated Mineral Resource, Burnakura Project, Western Australia, Australia, NI 43-101Technical Report prepared for Monument Mining Limited, Canada.

Spectrum Ecology (2020). Nannine Mining Area Reconnaissance Flora & Level 1 Fauna Assessment, prepared for Westgold Resources Limited.

Thackway, R., & Cresswell, I. D. (2017). *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves, Version 7.0* Canberra: Australia Nature Conservation Agency.

Western Australian Herbarium (2020) *FloraBase – the Western Australian Flora*, accessed October - December 2020, URL http://florabase.dbca.wa.gov.au.

West Australian (WA) Museum. (2020). Checklist of the Terrestrial Fauna of Western Australia. Government of Western Australia.

Wilson, H. (1937) Notes on the Night Parrot, with references to recent occurrences. Emu 37, 79–87.

Wilson, S. & Swan, G. (2017). A Complete Guide to Reptiles of Australia. Fifth Edition. New Holland: Sydney, NSW.

Woinarski, J. C.Z. Burbidge, A. A., & Harrison, P. L. (2014). The action plan for Australian Mammals 2012. CSIRO Publishing.

FIGURES

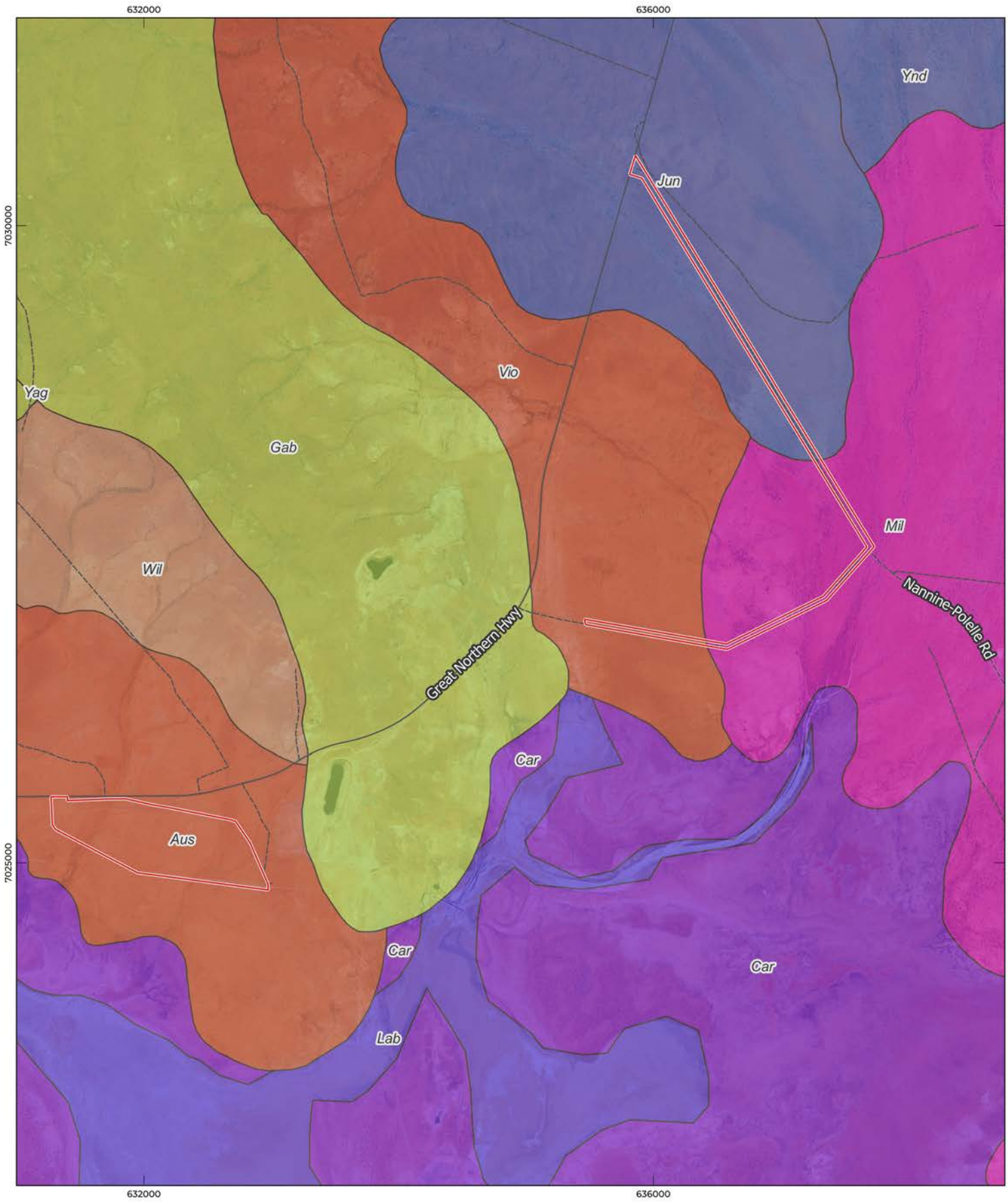


Figure 4: Land Systems

Legend

Survey Area

Land System

Alluvial plains; Halophytic shrublands

Hills and ranges; Acacia shrublands

Lake, river channel, bare lake bed or claypan; No vegetation (lake or river)

Low hills; Acacia or eucalypt woodlands with halophytic understorey

Salt lakes and fringing alluvial plains; Halophytic shrublands

Stony plains; Acacia shrublands and halophytic shrublands

Wash plains on hardpan; Mulga shrublands

0 400 800 1,200 m

Scale 1:40,000
GDA94 - MGA Zone 50

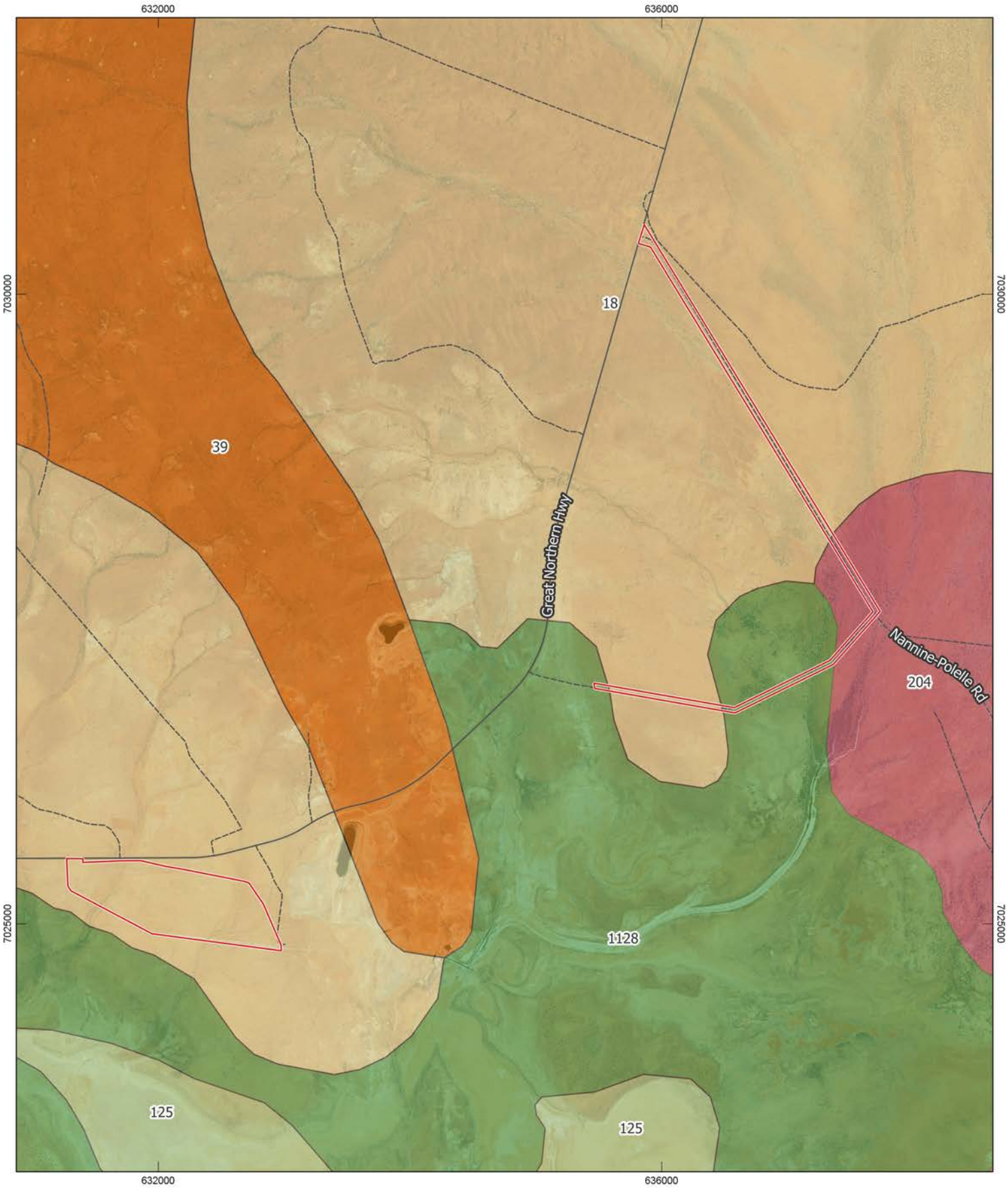


Figure 5: Pre-European Vegetation

0 400 800 1,200 m

Scale 1:40,000
GDA94 - MGA Zone 50

Legend

Survey Area

System Association

Upper Murchison-1128

Upper Murchison-125

Upper Murchison-18

Upper Murchison-204

Upper Murchison-39

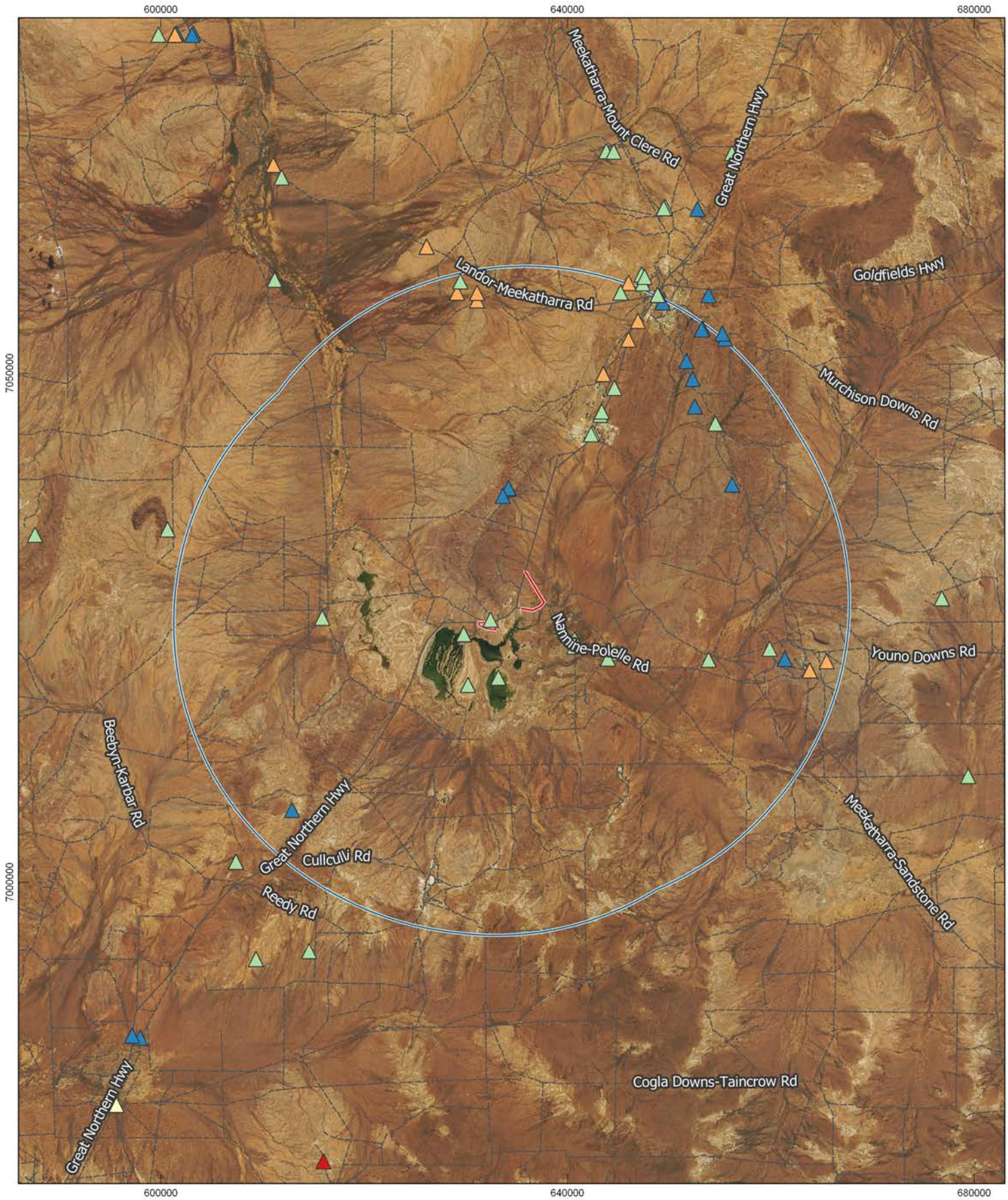


Figure 6: Threatened and Priority Flora (DBCA records)

0 7.5 15 km

Scale 1:500,000
GDA94 - MGA Zone 50

Legend

Threatened and Priority Flora
- Threatened
- Priority 1
- Priority 2
- Priority 3
- Priority 4

- Survey Area
- Survey Area 30km Buffer

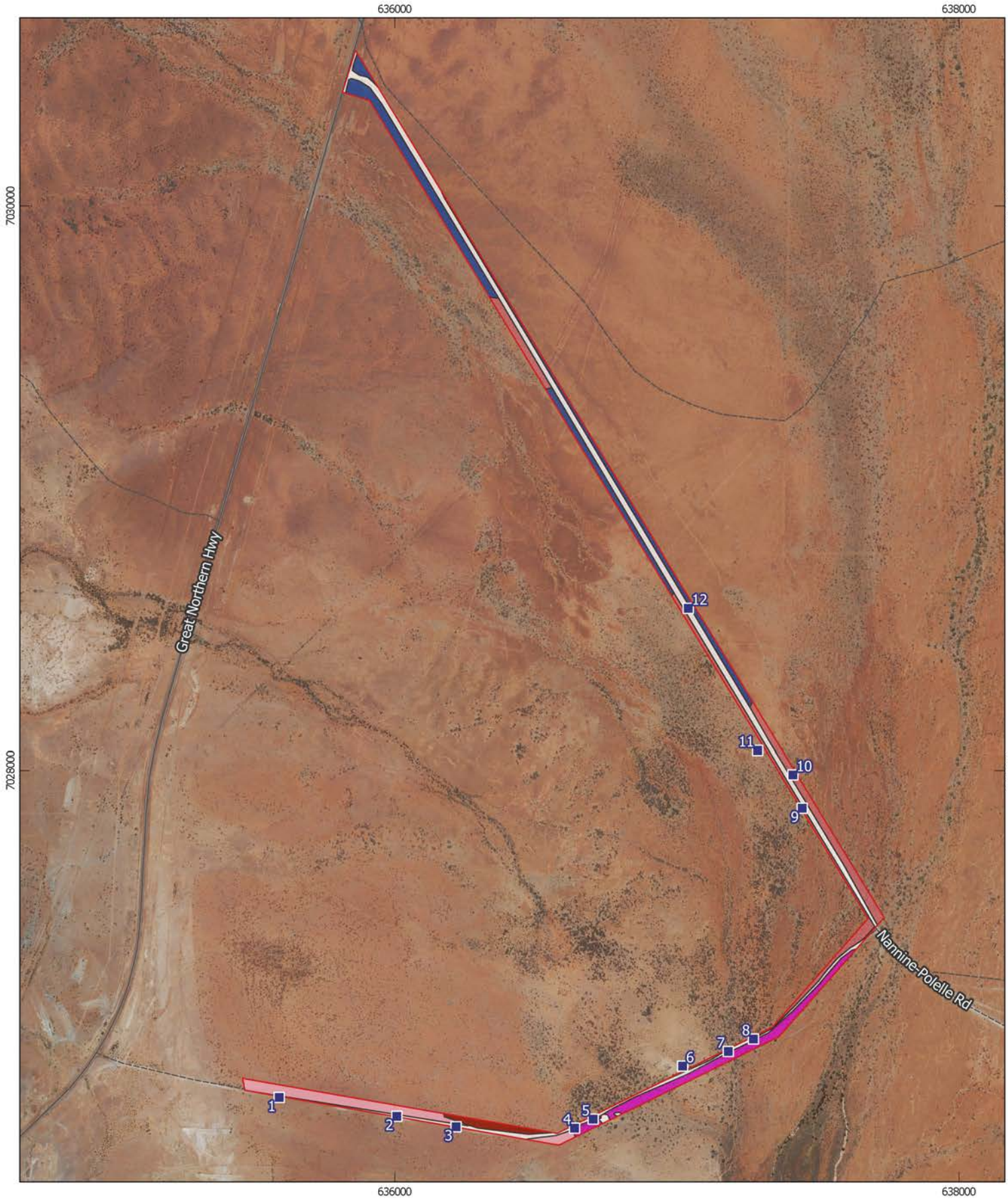


Figure 7: Vegetation Association

0 200 400 600 m

Scale 1:18,000
GDA94 - MGA Zone 50

Legend

- Releve
- Survey Area

Vegetation Association

- VT6
- VT7
- VT8
- VT9
- VT10
- Cleared

Figure 7: Vegetation Association

0 100 200 300 m

Scale 1:10,000
GDA94 - MGA Zone 50

Legend

- Releve
- Survey Area

Vegetation Association

- VT1
- VT2
- VT3
- VT4
- VT5
- Cleared

Figure 8: Vegetation Condition

0 200 400 600 m

Scale 1:20,000
GDA94 - MGA Zone 50

Legend

Survey Area

Degraded

Vegetation Condition

Good

Figure 8: Vegetation Condition

0 100 200 300 m

Scale 1:10,000
GDA94 - MGA Zone 50

Legend

- Survey Area
- Vegetation Condition
  - Very Good
  - Good
  - Degraded
  - Completely Degraded

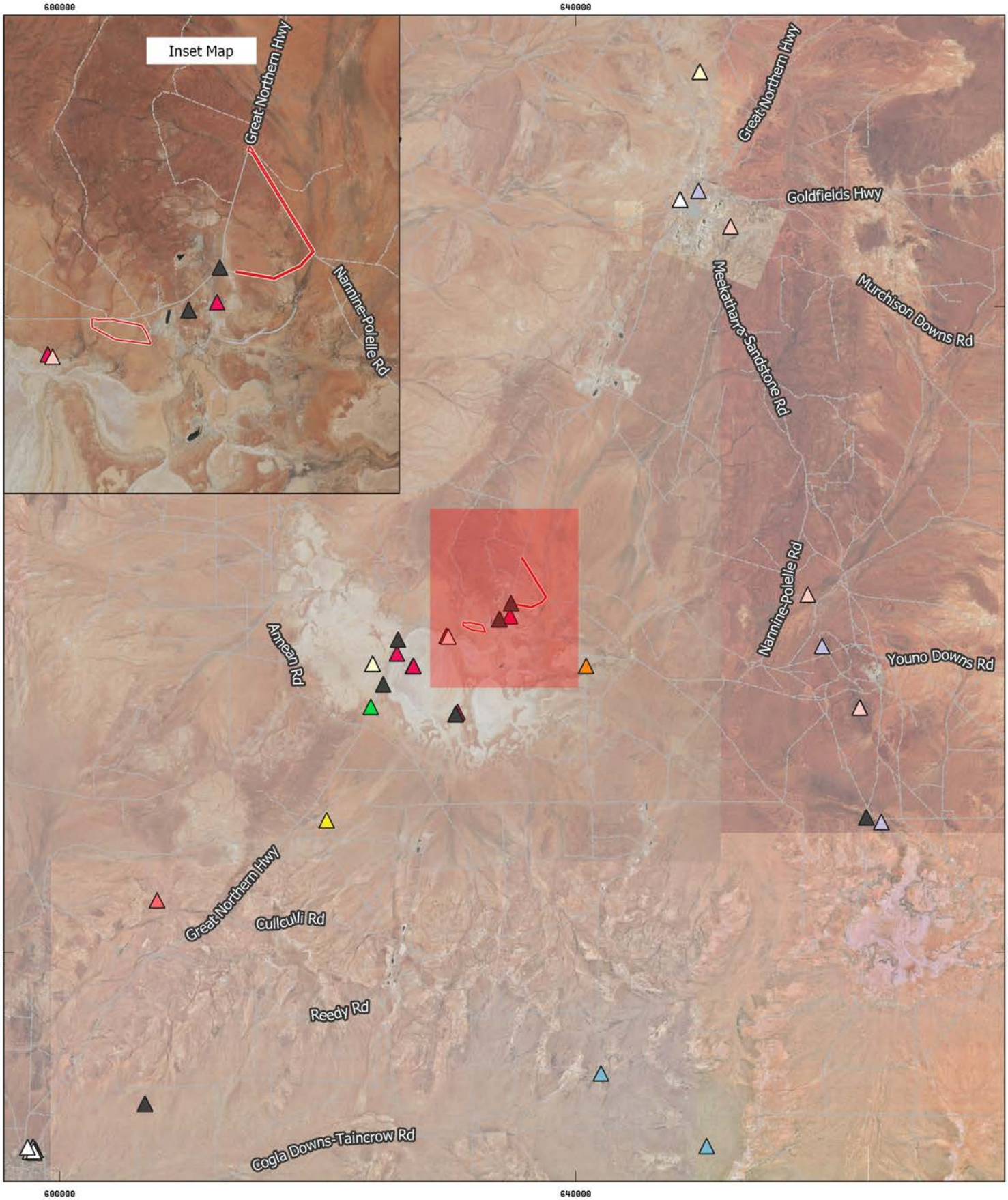


Figure 9: Threatened Fauna (DBCA records)

Legend

- Survey Area

Conservation Significant Fauna

- Blue-billed Duck
- Caspian Tern
- Common Greenshank
- Common Sandpiper
- Curlew Sandpiper
- Fork-tailed Swift
- Glossy Ibis
- Grey Falcon
- Gull-billed Tern
- long-tailed Dunnart
- Malleefowl
- Marsh Sandpiper
- Pectoral Sandpiper
- Peregrine Falcon
- Sharp-tailed Sandpiper
- West Coast Mulga Slider
- White-winged Black Tern,
- White-winged Tern
- Wood Sandpiper

0 6 12 km

Scale 1:400,000
GDA94 - MGA Zone 50

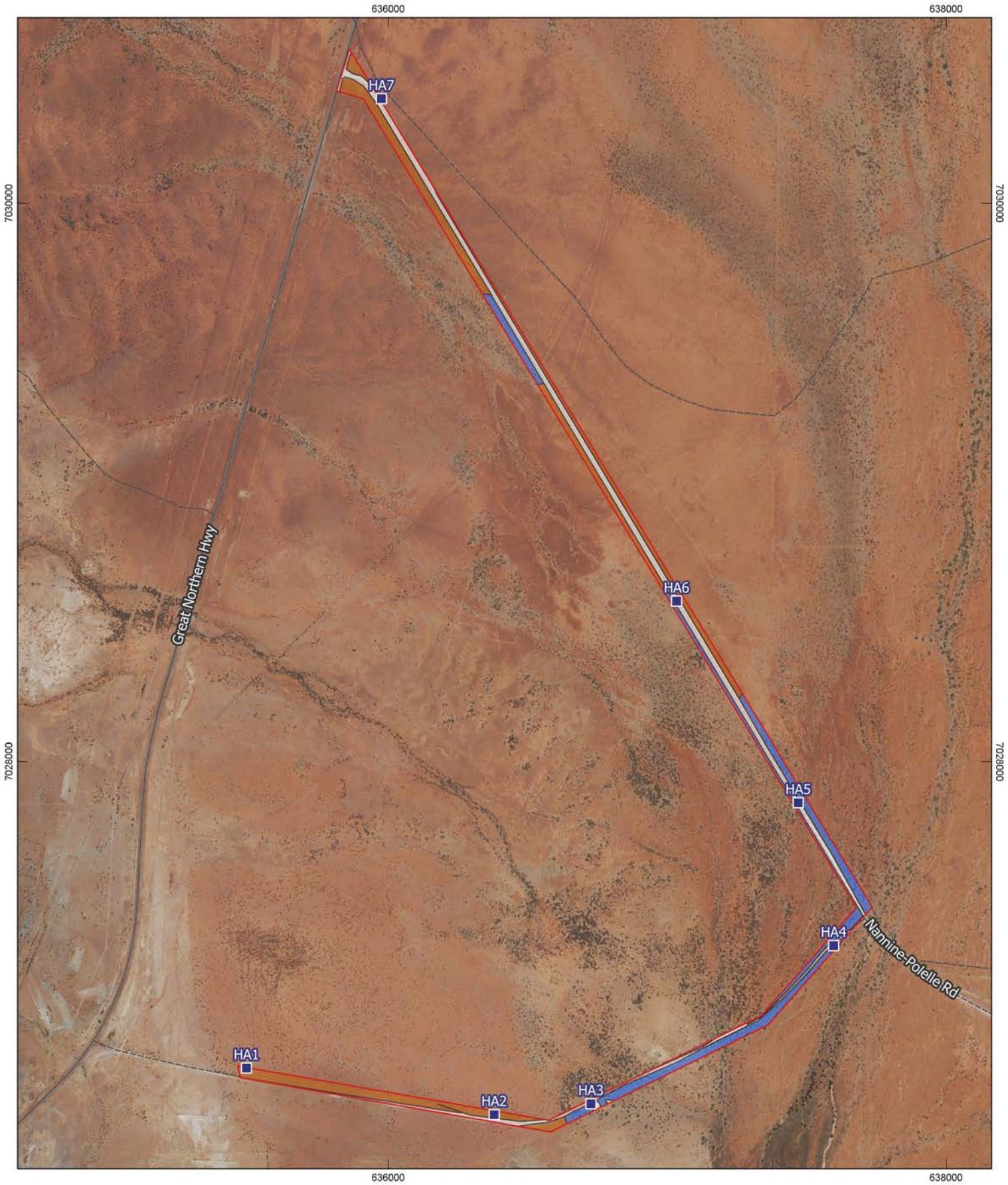


Figure 10: Fauna Habitat (survey area)

0 200 400 600 m

Scale 1:18,000
GDA94 - MGA Zone 50

Legend

- Habitat Assessment
- Survey Area
- Drainage Area
- Cleared

Fauna Habitat

- Stony Plain

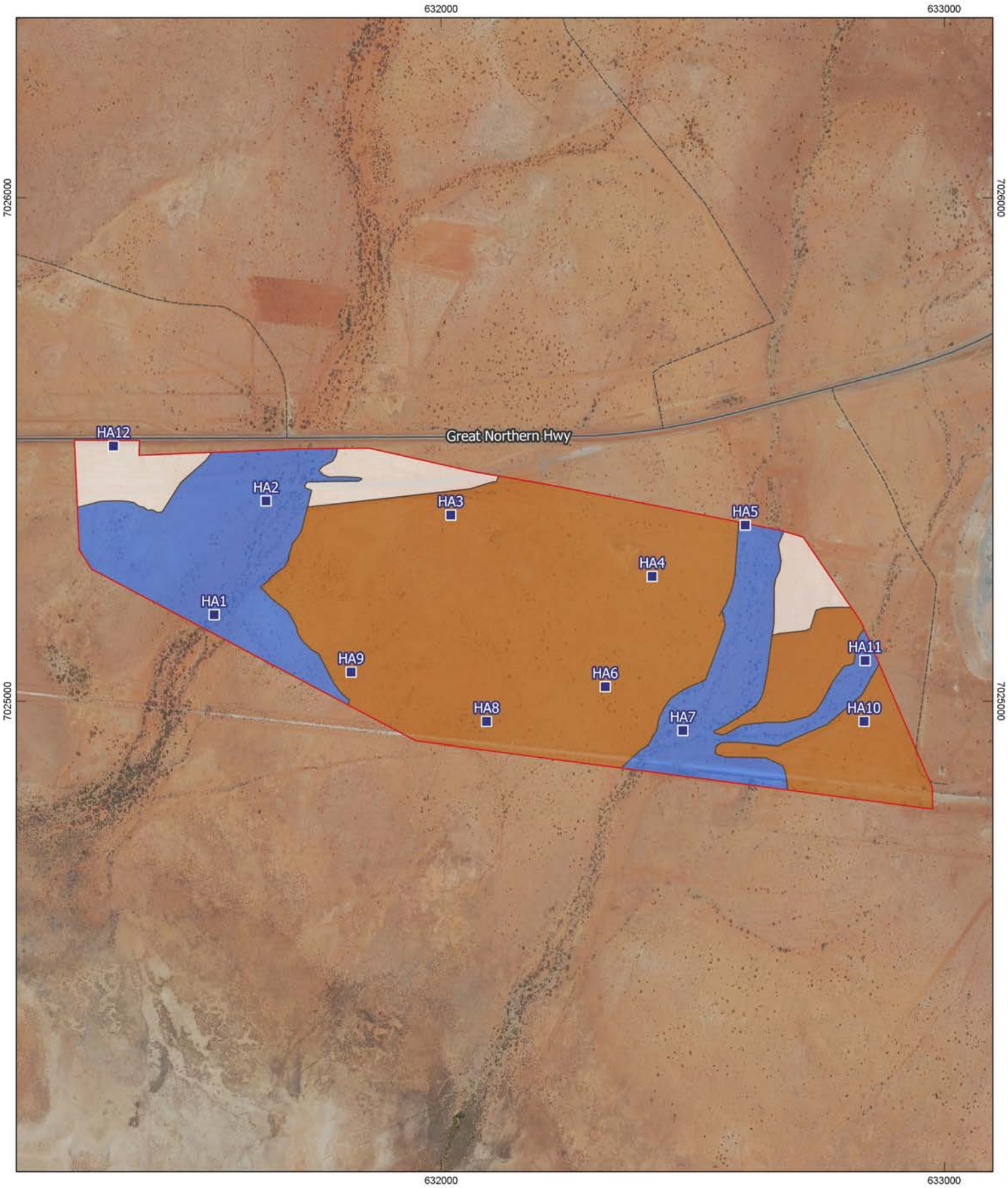


Figure 10: Fauna Habitat (survey area)

0 100 200 300 m

Scale 1:10,000
GDA94 - MGA Zone 50

Legend

- Habitat Assessment
- Survey Area
- Drainage Area
- Cleared

Fauna Habitat

- Stony Plain

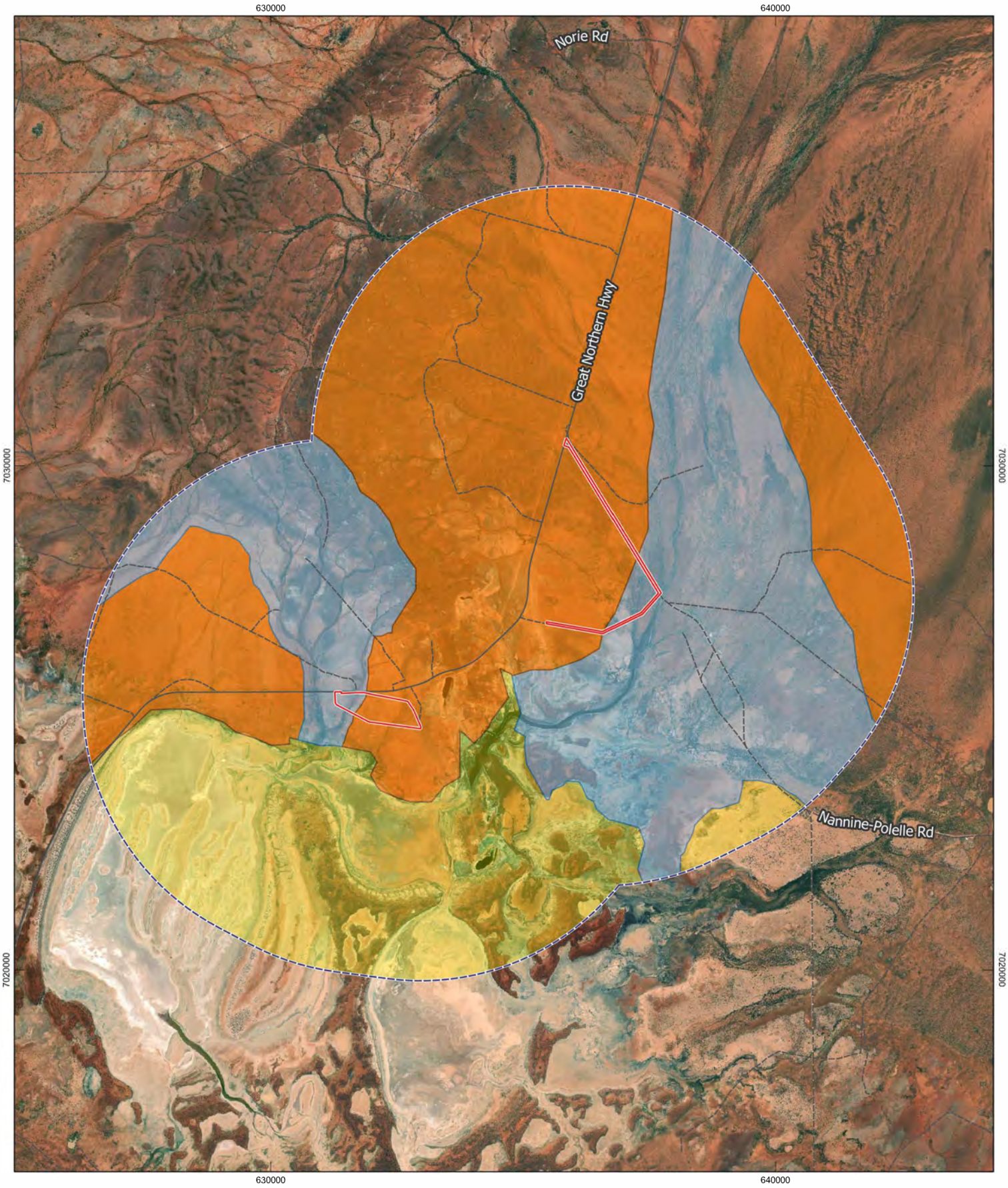


Figure 11: Fauna Habitat (Study Area)

0 1 2 3 km

Scale 1:100,000
GDA94 - MGA Zone 50

Legend

Study Area
Survey Area

Fauna Habitat
Salt Lake
Drainage Area
Stony Plain

APPENDICES

Appendix 1: Conservation Categories

Categories of Threatened Flora and Fauna Species under the EPBC Act

Conservation Code	Description
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	Critically Endangered Taxa which at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
En	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Vu	Vulnerable Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

Source: Environment Protection and Biodiversity Conservation Act 1999.

Categories of Threatened Flora and Fauna Species under the BC Act

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

CONSERVATION CODES

For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX **Extinct species**

Species where *"there is no reasonable doubt that the last member of the species has died"*, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW **Extinct in the wild species**

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form"*, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI **Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD **Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS **Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

Conservation codes for Western Australian flora and fauna

P **Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 **Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 **Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 **Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 **Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens
[2] Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Last updated 3 January 2019

Appendix 2A: Nannine Mining Area Vascular Flora List

Family	Scientific Name
Amaranthaceae	*Ptilotus obovatus*
Amaranthaceae	*Ptilotus aervoides*
Chenopodiaceae	*Atriplex vesicaria*
Chenopodiaceae	*Enchylaena tomentosa* var. *tomentosa*
Chenopodiaceae	*Maireana pyramidata*
Chenopodiaceae	*Maireana triptera*
Chenopodiaceae	*Rhagodia drummondii*
Chenopodiaceae	*Salsola australis*
Chenopodiaceae	*Sclerolaena cuneata*
Chenopodiaceae	*Sclerolaena diacantha*
Chenopodiaceae	*Sclerolaena eriacantha*
Euphorbiaceae	*Euphorbia drummondii*
Fabaceae	*Acacia aptaneura*
Fabaceae	*Acacia caesaneura*
Fabaceae	*Acacia craspedocarpa*
Fabaceae	*Acacia fuscaneura*
Fabaceae	*Acacia grasbyi*
Fabaceae	*Acacia synchronicia*
Fabaceae	*Acacia tetragonophylla*
Fabaceae	*Senna artemisioides* subsp. *helmsii*
Fabaceae	*Senna artemisioides* subsp. *oligophylla*
Fabaceae	*Senna artemisioides* (DC.) Randell subsp. ×*artemisioides*
Fabaceae	*Senna glutinosa subsp. chatelainiana*
Fabaceae	*Senna* sp. Meekatharra (E. Bailey 1-26)
Loranthaceae	*Amyema nestor*
Malvaceae	*Sida calyxhymenia*
Malvaceae	*Sida* sp. Golden calyces (tentative; sterile)
Malvaceae	*Androcalva luteiflora* (tentative; new growth on root stock)
Poaceae	*Aristida contorta*
Poaceae	*Cymbopogon ambiguus*
Poaceae	*Dactyloctenium radulans*
Poaceae	*Eragrostis xerophila*
Poaceae	*Eriachne flaccida*
Poaceae	*Monachather paradoxus*
Proteaceae	*Hakea preissii*
Proteaceae	*Hakea recurva subsp. arida*
Scrophulariaceae	*Eremophila forrestii subsp. forrestii*
Scrophulariaceae	*Eremophila fraseri subsp. fraseri*
Scrophulariaceae	*Eremophila galeata*
Scrophulariaceae	*Eremophila lachnocalyx*
Scrophulariaceae	*Eremophila latrobei subsp. latrobei*
Scrophulariaceae	*Eremophila longifolia*
Solanaceae	*Solanum lasiophyllum*

Appendix 2B: Nannine Haul Road Vascular Flora List

Family	Scientific Name
Amaranthaceae	*Ptilotus obovatus*
Asphodelaceae	*Asphodelus fistulosus* (Alien; Onion weed)*
Asteraceae	*Cratystylis subspinescens*
Chenopodiaceae	*Atriplex vesicaria*
Chenopodiaceae	*Maireana triptera*
Chenopodiaceae	*Sclerolaena cuneata*
Chenopodiaceae	*Tecticornia disarticulata*
Chenopodiaceae	*Tecticornia halocnemoides subsp. catenulata*
Euphorbiaceae	*Euphorbia boophthona*
Fabaceae	*Acacia aptaneura*
Fabaceae	*Acacia craspedocarpa*
Fabaceae	*Acacia fuscaneura*
Fabaceae	*Acacia grasbyi*
Fabaceae	*Acacia sclerosperma subsp. sclerosperma*
Fabaceae	*Acacia synchronicia*
Fabaceae	*Acacia tetragonophylla*
Fabaceae	*Senna artemisioides subsp. filifolia*
Fabaceae	*Senna artemisioides subsp. helmsii*
Fabaceae	*Senna artemisioides (DC.) Randell subsp. ×artemisioides*
Frankeniaceae	*Frankenia laxiflora*
Frankeniaceae	*Frankenia setosa*
Malvaceae	*Sida sp. (Sterile)*
Myrtaceae	*Melaleuca xerophila*
Myrtaceae	*Eucalyptus camaldulensis subsp. obtusa*
Pittosporaceae	*Pittosporum angustifolium*
Poaceae	*Monachather paradoxus*
Poaceae	*Enneapogon caerulescens*
Poaceae	*Dactyloctenium radulans*
Proteaceae	*Hakea preissii*
Proteaceae	*Hakea lorea subsp. lorea*
Santalaceae	*Santalum lanceolatum*
Scrophulariaceae	*Eremophila compacta subsp. fecunda*
Scrophulariaceae	*Eremophila forrestii subsp. forrestii*
Scrophulariaceae	*Eremophila galeata*
Scrophulariaceae	*Eremophila lachnocalyx*
Scrophulariaceae	*Eremophila linearis*
Scrophulariaceae	*Eremophila longifolia*
Scrophulariaceae	*Eremophila macmillaniana*
Scrophulariaceae	*Eremophila maculata* subsp. *brevifolia*
Scrophulariaceae	*Eremophila oppositifolia* subsp. *angustifolia*
Scrophulariaceae	*Eremophila pantonii*
Scrophulariaceae	*Eremophila pterocarpa* subsp. *pterocarpa*
Solanaceae	*Solanum lasiophyllum*

Appendix 3: Relevé Descriptions

Appendix 3A Nannine Mining Area Relevé Descriptions 5/11/2020

Relevé	Description	GPS & Condition	Image
1 VT3	Drainage line Yellowish red sandy clay loam Heavy grazing on younger Acacia and Senna spp., land surface disturbances (cattle in area), erosion and sedimentation *Acacia tetragonophylla, A. caesaneura, A. aptaneura, A. fuscaneura, Eremophila longifolia* tall shrubland to tall open shrubland over *Acacia tetragonophylla, Eremophila forrestii* subsp*. forrestii, Ptilotus obovatus, Eremophila fraseri* subsp. *fraseri, E. lachnocalyx* open shrubland over *Cymbopogon ambiguus* and *Eriachne flaccida* low open tussock grassland Other species: *Acacia craspedocarpa, A. synchronicia, Eremophila latrobei* subsp*. latrobei, Maireana pyramidata, M. triptera, Sclerolaena cuneata, Enchylaena tomentosa var. tomentosa,* Senna sp. Meekatharra	631564 E/ 7025163 N Good; some very good patches	
2 VT1	Stony plain Washed sand on surface on yellowish red (5YR 5/8) sandy clay loam over fine sandy clay loam; surface rock (rounded pebbles, quartz, chert) 30 – 40 %; litter < 1 %; fallen timber < 1 % *Acacia aptaneura* tall sparse shrubland over *Senna artemisioides* subsp. *helmsii, S*. sp. Meekatharra isolated shrubs over *Maireana triptera, Ptilotus obovatus, Senna* sp. Meekatharra, S. artemisioides subsp. helmsii low sparse shrubland over low isolated grass tussocks (dried) Other species: *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *oligophylla, Sida* sp. Golden calyces	631503 E/ 7025314 N Good; some degraded areas closer to road	

Relevé	Description	GPS & Condition	Image
3 VT2	Alluvial plain; minor areas of outcropping gneiss/ decomposed granitic rock Yellowish red sandy loam over yellowish red sandy clay loam; surface rock (quartz, decomposed granite) 5 – 10 %; litter 2 – 3 %; fallen timber < 1 % Sheetwash erosion, wind erosion; cattle present in area – grazing, surface disturbance *Acacia synchronicia, A. aptaneura* isolated low trees over *Eremophila lachnocalyx, Senna* sp. Meekatharra, *A. synchronicia* open shrubland over *Dactyloctenium radulans* low isolated grass tussocks Other species: *Atriplex vesicaria, Maireana pyramidata, M. triptera, Ptilotus obovatus, Solanum lasiophyllum*	631733 E/ 7025322 N Good	
4 VT2	Alluvial plain Washed sand over reddish yellow sandy clay loam; surface rock < 10 %; litter 1 – 2 %; fallen timber < 1 % *Acacia aptaneura* isolated low trees over *Eremophila lachnocalyx, Acacia synchronicia* open shrubland over low isolated grass tussocks Other species: *Maireana triptera, M. pyramidata, Senna* sp. Meekatharra	631888 E/ 7025151 N Good	

Relevé	Description	GPS & Condition	Image
5 VT1	Stony plain *Acacia aptaneura* isolated low trees over *Eremophila lachnocalyx, Senna glutinosa* subsp. *chatelainiana, Sclerolaena eriacantha, Maireana pyramidata, Maireana* sp. low sparse shrubland over low sparse grassland	632029 E/ 7025249 N Degraded	
6 VT3	Drainage line; possibly man made drain Patch of vegetation in middle of sparse low vegetation *Eremophila longifolia, Acacia tetragonophylla* tall shrubs over Acacia tetragonophylla, Senna sp. Meekatharra, *Eremophila galeata, Maireana pyramidata* shrubland over *Cymbopogon ambiguus* grass tussocks over *Euphorbia drummondii, Dactyloctenium radulans* low sparse forbland with low grass tussocks Other species: *Eremophila lachnocalyx, Sclerolaena* sp.	632109 E/ 7025321 N Good	
7 VT4	Low rise; granite near surface; high level of disturbance Yellowish red sandy clay loam, mostly shallow soils; surface rock (granite, quartz) 15 – 20 %; litter < 2 %; fallen timber 0 % *Senna glutinosa* subsp. *chatelainiana, S. artemisioides* subsp. *helmsii, Salsola* australis isolated shrubs; *Androcalva luteiflora* resprouts	632200 E/ 7025375 N Degraded	

Relevé	Description	GPS & Condition	Image
8 VT4	Granite outcrop Reddish yellow shallow sandy loam; surface rock (quartz, granite ^ 20 cm) 25 – 30 %; litter < 2 %; fallen timber < 1 % *Acacia aptaneura, A. tetragonophylla, A. grasbyi* isolated tall shrubs or low trees over *Senna artemisioides* subsp. *helmsii, Ptilotus obovatus, Maireana triptera, Sclerolaena cuneata* isolated low shrubs over *Dactyloctenium radulans,* dried grasses low open tussock grassland Other species: *Rhagodia drummondii*	632433 E/ 7025415 N Degraded	
9 VT4	Granite outcrop Shallow sandy soils; surface rock (quartz) 5 – 10 %; litter < 2 %; fallen timber < 1 % *Acacia grasbyi* and *Senna* sp. Meekatharra isolated shrubs over *Senna* sp. Meekatharra, *Eremophila forrestii* subsp. *forrestii, Ptilotus obovatus* low open shrubland over *Aristida contorta, Ptilotus aervoides* low isolated grass tussocks and forbs Other species: *Eremophila longifolia* (grazed, broken), *Eremophila galeata, Acacia tetragonophylla, Hakea preissii*	632408 E/ 7025231 N Mostly degraded	

Relevé	Description	GPS & Condition	Image
10 VT3	Drainage line Erosion and sedimentation; moderate to high levels of cattle disturbances – grazing, trampling *Acacia tetragonophylla, A. aptaneura* tall open shrubland over *Senna artemisioides* subsp. *helmsii, E. forrestii* subsp. *forrestii, Acacia tetragonophylla, Ptilotus obovatus* low sparse shrubland over *Cymbopogon ambiguus, Eriachne flaccida* and *Acacia fuscaneura* low sparse tussock grassland Other species: Patches of tall *Acacia fuscaneura* shrubs – Bird nests (Martin) present	632620 E/ 7025200 N Mostly degraded; some good patches	
11 VT5	Stony plain 2 Yellowish red clay loam; surface rock (2 – 10 cm; rounded quartz, blueish granite, ironstone, basalt?) 50 – 70 %; litter < 2 %; fallen timber 0 % *Acacia aptaneura* isolated low trees over *Eremophila galeata* isolated shrubs over *Eremophila galeata*, *Senna* sp. Meekatharra, *Senna artemisioides* subsp. *oligophylla* low sparse shrubland Other species: *Ptilotus obovatus, Acacia synchronicia, A. caesaneura;* grasses (sterile – recent resprouts) in drains	632672 E/ 7025086 N Degraded	

Relevé	Description	GPS & Condition	Image
12 VT3	Drainage line Damp areas, few small pools of water remaining from recent rain; cattle in area, tracks, trampling and grazing Yellowish red clay; surface rock (ironstone gravel) 5 – 10 %; litter 20 – 30 %; fallen timber < 5 % *Acacia tetragonophylla, A. aptaneura, A. synchronicia, A. fuscaneura* shrubland over *Senna artemisioides* subsp. *helmsii, S.* sp. Meekatharra sparse shrubland over *Cymbopogon ambiguus, Sida calyxhymenia, Sida* sp. sparse tussock grassland with sparse forbs Other species: *Amyema nestor* in *Acacia tetragonophylla*	632570 E/ 7024935 N Good to very good	
13 VT2	Stony plain Yellowish red sandy clay loam; litter < 5 %; fallen timber 1 – 2 % High level of disturbance in area – piles of broken glass, old rabbit scats; several small dead shrubs (drought/ grazing impacts) *Acacia caesaneura* isolated tall shrubs over *Eremophila forrestii* subsp. *forrestii, E. lachnocalyx, Senna artemisioides* subsp. *helmsii, S*. sp. Meekatharra, *Acacia tetragonophylla* sparse shrubland	632064 E/ 7024961 N Mostly degraded	

Relevé	Description	GPS & Condition	Image
14 VT2	Alluvial plain; red sand over yellowish red clay loam; surface rock (quartz, ironstone) 10 – 20 % Highly disturbed area – old cricket pitch *Senna* sp. Meekatharra, *Ptilotus obovatus, Acacia synchronicia, Maireana triptera* sparse low shrubland over *Aristida contorta, Dactyloctenium radulans* low isolated grass tussocks Other species: *Ptilotus aervoides, Eremophila longifolia* (grazed), *E. latrobei* subsp. *latrobei, Tribulus asterocarpa* (along edges of track), *Solanum lasiophyllum, Hakea recurva* subsp. *arida*	632062 E/ 7025003 N Degraded	
15 VT5	Stony low rise Yellowish red sandy clay loam; surface rock (quartz, basalt) 50 – 60 % Historic mining and pastoral disturbances; plant cover is < 1 % *Hakea preissii, Senna* sp. Meekatharra, *Acacia synchronicia* isolated shrubs over *Maireana triptera, Sclerolaena diacantha, Salsola australis*, grasses, low isolated shrubs and grass tussocks	632872 E/ 7024996 N Degraded	

Appendix 3B: Relevé Descriptions Nannine Haul Road 5/11/2020

Relevé	Description	GPS & Condition	Image
1 VT6	Stony low rise, broad ridge Yellowish red clay loam; surface rock (small, rounded pebbles) 40 – 50 %; litter < 1%; fallen timber 1 – 2 % *Acacia aptaneura* isolated low trees over *Hakea preissii* isolated shrubs over *Tecticornia halocnemoides* subsp. *catenulata, Hakea preissii, Maireana triptera* isolated low shrubs over isolated dried off, grazed *Enneapogon caerulescens* grass tussocks Other species: *Acacia tetragonophylla, A. synchronicia, Eremophila lachnocalyx, E. forrestii* subsp. *forrestii, E. macmillaniana, Senna artemisioides* subsp. *helmsii, Solanum lasiophyllum*	635590 E/ 7026842 N Degraded to good	
2 VT6	Stony low rise, broad ridge Confined depression: clayey soils (dried out); recent cattle tracks *Acacia craspedocarpa, Hakea preissii, Acacia aptaneura* tall shrubland patch. Weeds: *Asphodelus fistulosus** (Onion weed) at edges of road (GPS: 636007 E/ 7026801 N) 15 m x 2 m	636007 E/ 7026775 N Degraded; historic and recent disturbances	

Relevé	Description	GPS & Condition	Image
3 VT7	Low stony rise; mid slope Yellowish red clay loam with washed sand on surface; surface rock (quartz, ironstone) 20 – 30 %; litter < 1 %; fallen timber 1 – 2 %; possible worked rocks *Acacia aptaneura, A. tetragonophylla* low open woodland to low woodland over *Eremophila forrestii* subsp. *forrestii, Acacia aptaneura, Senna artemisioides* subsp. *filifolia, Eremophila galeata* isolated shrubs over *Ptilotus obovatus* low isolated shrubs Several deaths due to dry conditions; wind erosion, sheet wash; grazing	636217 E/ 7026738 N Degraded to good	
4 VT8	Floodplain Red clay loam; surface rock 10 – 20 %; litter < 5 %; fallen timber < 1%; recent and historic pastoral impacts; old clearing; erosion *Acacia synchronicia, A. aptaneura, A. tetragonophylla, Santalum lanceolatum, Melaleuca xerophila* tall sparse shrubland over *Eremophila longifolia*, *E. pterocarpa* subsp. *pterocarpa, Senna artemisioides* subsp. *filifolia* open shrubland over *Frankenia setosa, Sclerolaena cuneata* low sparse shrubland Other species: *Acacia tetragonophylla, Pittosporum angustifolium, Hakea lorea, Tecticornia halocnemoides* subsp. *catenulata*	636637 E/ 7026733 N Degraded to good	

Relevé	Description	GPS & Condition	Image
5 VT8	Floodplain Obvious land surface disturbance with regrowth; grazing *Eucalyptus camaldulensis* subsp. *obtusa* low open woodland over *Eucalyptus camaldulensis, Acacia sclerosperma* subsp. *sclerosperma, Eremophila pterocarpa* subsp. *pterocarpa, E. longifolia, Cratystylis subspinescens* open shrubland over *Frankenia laxiflora* low isolated shrubs over *Sclerolaena cuneata* low sparse forbland Other species: *Acacia tetragonophylla, Eremophila pantonii, E. maculata* subsp. *brevifolia, Santalum lanceolatum*	636703 E/ 7026765 N Degraded to good	
6 VT8	Floodplain; drainage channel, (outside survey area), heavy grazing on *Cratystylis;* land surface disturbance, erosion. *Cratystylis subspinescens, Eremophila pantonii, E. longifolia, E. maculata* subsp. *brevifolia* open shrubland	637020 E/ 7026953 N Good	

Relevé	Description	GPS & Condition	Image
7 VT8	Floodplain; yellowish red clay loam; surface rock < 2%; litter 2 – 5 %; fallen timber < 1 % Sheet erosion; grazing and other pastoral impacts *Eucalyptus camaldulensis* subsp. *obtusa, Acacia caesaneura* open woodland over *Acacia caesaneura, Eremophila longifolia, Acacia sclerosperma* subsp. *sclerosperma, A. tetragonophylla* tall open shrubland over *Eremophila longifolia, Acacia tetragonophylla, Senna artemisioides* subsp. *filifolia, Eremophila pterocarpa* subsp. *pterocarpa* sparse shrubland	637182 E/ 7027005 N Good	
8 VT9	Floodplain; low rise; banks with drainage channels to north Yellowish red sandy clay loam; surface rock – scattered rocks at edges of road; litter 10 – 20 %; fallen timber 1 – 2 % Moderate to severe erosion – rilling, sheet erosion; some sedimentation; pastoral impacts *Eucalyptus camaldulensis* subsp. *obtusa* isolated trees over *Acacia aptaneura* tall open shrubland over *Acacia sclerosperma* subsp. *sclerosperma* open shrubland over dried grass tussocks (grazed) Other species: *Acacia tetragonophylla, Eremophila pterocarpa* subsp. *pterocarpa, Santalum lanceolatum*	637271 E/ 7027049 N Good	

Relevé	Description	GPS & Condition	Image
9 VT9	Floodplain; broad almost flat Yellowish red sandy clay loam; surface rock (calcrete) < 1 %; litter 5 – 10 %; fallen timber < 2% Sheet wash, pedestalling, pastoral impacts – grazing, broken trees and shrubs, land surface disturbances; climatic impacts – several dead trees and shrubs *Acacia fuscaneura* isolated low trees over *Acacia tetragonophylla, A. sclerosperma* subsp. *sclerosperma, A. grasbyi* tall sparse shrubland over *Senna artemisioides* subsp. x *artemisioides, Acacia tetragonophylla, A. sclerosperma* subsp. *sclerosperma, Eremophila compacta* subsp. *fecunda* sparse shrubland over grass (dried and grazed) low open tussock grassland Other species: *Hakea preissii, Eremophila galeata, E. longifolia*	637444 E/ 7027867 N Degraded to good (further from road)	
10 VT9	Floodplain; gently sloping Yellowish red sandy clay loam; surface rock < 1 %; litter 5 – 10 %; fallen timber < 2% near road > 15 – 20 (30) % under trees Sheet erosion, pedestalling, pastoral impacts; climatic impacts – many dead trees Denser patch *Acacia fuscaneura* low open woodland over *Eremophila galeata, Acacia synchronicia* open shrubland over *Hakea preissii, Acacia fuscaneura, Eremophila longifolia* low isolated shrubs Other species: *Acacia aptaneura, Sida* sp., *Euphorbia boophthona* (in road gutter), *Monachather paradoxus* and other dried grass tussocks	637411 E/ 7027985 N Degraded to good	

Relevé	Description	GPS & Condition	Image
11 VT9	Plain; west of road (slightly west of survey area) Shallow yellowish red sandy loam with small areas of outcropping granite in broader area; litter 20 – 25 % (mostly dried off grasses and herbs), surface rock < 1 %; fallen timber 0 % Moderate to severe erosion – sheet erosion and pedestalling; pastoral impacts; climatic impacts – several dead shrubs, or shrubs with sparse foliage *Acacia synchronicia, A. aptaneura* isolated shrubs over *Eremophila galeata, Atriplex vesicaria, Acacia tetragonophylla, A. fuscaneura* low sparse shrubland	637286 E/ 7028071 N Degraded at edges to good	
12 VT10	Stony plain Red clay loam; surface rock (fine ironstone gravel with a few small rocks) 40 – 60 %; litter < 1 %; fallen timber 0 % Heavily impacted by pastoral activities; surface disturbed, grazing; sheet erosion *Acacia synchronicia, Eremophila galeata, Acacia tetragonophylla* isolated shrubs	637040 E/ 7028574 N Degraded	

Appendix 4: Fauna Database Results

SCI NAME	COM NAME	CLASS	WA LISTING	WA status	EPBC status	Date	SOURCE	CERTAINTY	OBS METHOD	OBS TYPE	COUNT	LOCALITY	ACCURACY_M	LONG_GDA	LAT_GDA
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		30/01/2013	BIRDATA					Meekatharra Sewage Ponds	0	118.48720000000	-26.58830000000
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	18/02/2013	BIRDATA					Meekatharra Sewage Ponds	0	118.48720000000	-26.58830000000
Tringa stagnatilis	Marsh sandpiper, little greenshank	BIRD	Specially Protected - migratory	MI	MI	11/01/2013	BIRDATA					Lake Nallan	0	117.98690000000	-27.25860000000
Hydroprogne caspia	Caspian Tern	BIRD	Specially Protected - migratory	MI	MI	24/01/2013	BIRDATA					Lake Nallan	0	117.98690000000	-27.25860000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	14/02/2013	BIRDATA					Lake Nallan	0	117.98690000000	-27.25860000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		14/02/2013	BIRDATA					Lake Nallan	0	117.98690000000	-27.25860000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		18/01/2013	BIRDATA					Meekatharra Airport Rd	0	118.52670000000	-26.60670000000
Calidris melanotos	Pectoral Sandpiper	BIRD	Specially Protected - migratory	MI	MI	2/01/2013	BIRDATA					Great Northern Hwy at 26 56 44S 118 15 01E	100	118.25030000000	-26.94560000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	2/09/1980	BIRDATLAS1						18000	118.25140000000	-26.91540000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1980	BIRDATLAS1						18000	118.25140000000	-26.91540000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	5/09/1980	BIRDATLAS1						18000	118.25140000000	-26.91540000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	5/09/1980	BIRDATLAS1					MEEKATHARRA	18000	118.25140000000	-26.91540000000
Apus pacificus	Fork-tailed swift	BIRD	Specially Protected - migratory	MI	MI	2/09/1980	BIRDATLAS1					MEEKATHARRA	18000	118.41810000000	-26.91540000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1						108000	118.50140000000	-26.49870000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1					MEEKATHARRA	108000	118.50140000000	-26.49870000000
Calidris ferruginea	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	15/09/1980	BIRDATLAS1					MEEKATHARRA	108000	118.50140000000	-26.49870000000
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1					MEEKATHARRA	108000	118.50140000000	-26.49870000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1						18000	118.25140000000	-26.91540000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1					MEEKATHARRA	18000	118.25140000000	-26.91540000000
Calidris ferruginea	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	15/09/1980	BIRDATLAS1					MEEKATHARRA	18000	118.25140000000	-26.91540000000
Calidris acuminata	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	15/09/1980	BIRDATLAS1					MEEKATHARRA	18000	118.25140000000	-26.91540000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	2/09/1980	BIRDATLAS1						108000	118.50140000000	-26.49870000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	24/08/1980	BIRDATLAS1					REEDY	18000	118.08470000000	-27.08200000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	9/08/2000	BIRDATLAS2					Lake Annean	5000	118.31810000000	-26.94870000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	4/08/2000	BIRDATLAS2					Lake Nallan	100	117.98920000000	-27.25510000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		14/09/2000	BIRDATLAS2					Lake Annean	100	118.31030000000	-26.89590000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	5/05/2000	BIRDATLAS2					Lake Annean, Great Northern Hwy	100	118.30890000000	-26.89530000000
Oxyura australis	Blue-billed duck	BIRD	Priority	P4		23/06/2000	BIRDATLAS2					Nallan Dam	100	117.98750000000	-27.25790000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	2/08/2001	BIRDATLAS2					Lake Annean, Great Northern Hwy	100	118.27030000000	-26.90810000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	21/09/2001	BIRDATLAS2					Lake Nallan, Great Northern Hwy	100	117.98720000000	-27.25820000000
Actitis hypoleucos	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	15/09/2001	BIRDATLAS2					Nallan Lake, Great Northern Hwy	100	117.98890000000	-27.25700000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	9/09/1999	BIRDATLAS2					Nannine Lake	100	118.35830000000	-26.88110000000
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	30/09/1999	BIRDATLAS2					Nallan Station	100	117.98940000000	-27.25590000000
Falco hypoleucos	Grey falcon	BIRD	Threatened - Vulnerable	VU		17/07/2003	BIRDATLAS2					Stake Well	5000	118.21670000000	-27.02500000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	18/09/2004	BIRDATLAS2					Nallan Dam	100	117.98860000000	-27.25760000000
Plegadis falcinellus	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	18/09/2004	BIRDATLAS2					Nallan Dam	100	117.98860000000	-27.25760000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		15/05/2003	BIRDATLAS2					Nallan Railway dam	100	117.99030000000	-27.25940000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	28/07/2005	BIRDATLAS2					Nallan Dam	100	117.98890000000	-27.25870000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	11/06/2005	BIRDATLAS2					Nallan Dam	100	117.98890000000	-27.25900000000
Actitis hypoleucos	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	22/08/2005	BIRDATLAS2					Nallan Dam	100	117.99110000000	-27.25730000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	22/08/2005	BIRDATLAS2					Nallan Dam	100	117.99110000000	-27.25730000000
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	6/11/2005	BIRDATLAS2					Nallan Lake	100	117.98970000000	-27.25830000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	6/11/2005	BIRDATLAS2					Nallan Lake	100	117.98970000000	-27.25830000000
Tringa stagnatilis	Marsh sandpiper, little greenshank	BIRD	Specially Protected - migratory	MI	MI	11/01/2013	BIRDATLAS2					Lake Nallan	100	117.98690000000	-27.25860000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		18/01/2013	BIRDATLAS2					Meekatharra Airport Rd	100	118.52670000000	-26.60670000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	14/02/2013	BIRDATLAS2					Lake Nallan	100	117.98690000000	-27.25860000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		14/02/2013	BIRDATLAS2					Lake Nallan	100	117.98690000000	-27.25860000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		30/01/2013	BIRDATLAS2					Meekatharra Sewage Ponds	100	118.48720000000	-26.58830000000
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	18/02/2013	BIRDATLAS2					Meekatharra Sewage Ponds	100	118.48720000000	-26.58830000000
Plegadis falcinellus	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	14/10/1999	BIRDATLAS2					Nallan Lake	100	117.98920000000	-27.25650000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		31/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Chlidonias leucopterus	White-winged black tern, white-winged tern	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Tringa glareola	Wood sandpiper	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Tringa stagnatilis	Marsh sandpiper, little greenshank	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		5/04/2011	FAUNASURVEY	Certain	Survey	Unknown	1	REEDY	10000	118.07660000000	-27.22440000000
Tringa nebularia	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Tringa stagnatilis	Marsh sandpiper, little greenshank	BIRD	Specially Protected - migratory	MI	MI	29/12/1999	BIRDATLAS2					Nallan Lake	500	117.98500000000	-27.25570000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		5/04/2011	FAUNASURVEY	Certain	Survey	Unknown	1	REEDY	10000	118.07660000000	-27.22440000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		5/04/2011	FAUNASURVEY	Certain	Survey	Unknown	1	REEDY	10000	118.07660000000	-27.22440000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		5/08/2014	FAUNASURVEY	Certain	Survey	Unknown	8	MEEKATHARRA	100	118.25980000000	-26.92980000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		21/10/2017	FAUNASURVEY_WLS	Not Sure		Bird Census	1	Meekathara: Gabanintha	50	118.63210000000	-26.94220000000
Sminthopsis longicaudata	Long-tailed dunnart	MAMMAL	Priority	P4		29/04/2017	FAUNASURVEY_WLS	Not Sure		Camera Trap	1	Meekathara: Gabanintha	50000	118.65010000000	-27.02180000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		27/04/2017	FAUNASURVEY_WLS	Not Sure		Foraging	1	Meekathara: Gabanintha	10	118.63830000000	-27.01860000000
Sminthopsis longicaudata	Long-tailed dunnart	MAMMAL	Priority	P4		26/04/2017	FAUNASURVEY_WLS	Not Sure		Pitfall Trap	1	Meekathara: Gabanintha	50000	118.63230000000	-26.94210000000
Sminthopsis longicaudata	long-tailed dunnart	MAMMAL	Priority	P4		15/07/1981	TFAUNA	Moderately certain	Opportunistic sighting	Day sighting	1	Meekatharra	50000	118.50139680000	-26.58204342000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1			TFAUNA	Certain	Historical (written)	Caught or trapped	2	Nannine	10000	118.35900200000	-26.87199818000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1			TFAUNA	Certain	Historical (written)	Caught or trapped	3	Nannine	10000	118.27099750000	-26.89840068000
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/11/1981	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign		REEDY	10000	118.51670000000	-27.25000000000
Leipoa ocellata	malleefowl	BIRD	Threatened - Vulnerable	VU	VU	1/11/1981	TFAUNA	Moderately certain	Opportunistic sighting	Secondary sign		REEDY	10000	118.43330000000	-27.20000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	25/08/1992	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Anneen	0	118.31670000000	-26.95000000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	3/04/1999	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Annean, Lake; Anneen	0	118.28280000000	-26.91690000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	3/04/1999	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Annean, Lake; Annean Station	0	118.28280000000	-26.91690000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	12/04/1999	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Annean	10000	118.28330000000	-26.91670000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	10/04/1999	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	LAKE ANNEAN	50	118.35000000000	-26.88330000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	10/04/1999	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	LAKE ANNEAN	50	118.35000000000	-26.88330000000
Gelochelidon nilotica	Gull-billed tern	BIRD	Specially Protected - migratory	MI	MI	20/03/1965	WAM_BIRDS	WAM Vouchered	Collection	Specimen	1	Lake Annean	10000	118.28330000000	-26.91670000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		27/03/1990	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	50000	118.35000000000	-26.88330000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		7/09/1991	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.31670000000	-26.95000000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		7/09/1991	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.31670000000	-26.95000000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		20/08/1994	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.35000000000	-26.88330000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		20/08/1994	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.35000000000	-26.88330000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		27/03/1990	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	NANNINE	50000	118.35000000000	-26.88330000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		7/09/1991	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.31670000000	-26.95000000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		7/09/1991	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	MEEKATHARRA	10000	118.31670000000	-26.95000000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		20/08/1994	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	CUE	10000	118.35000000000	-26.88330000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		20/08/1994	WAM_REPTILES	WAM Vouchered	Collection	Specimen	1	CUE	10000	118.35000000000	-26.88330000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		30/10/2018	WL_REG17		Survey				50000	118.59040000000	-26.86360000000
Falco peregrinus	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		21/10/2017	WL_REG17		Survey				50	118.63210000000	-26.94220000000
Lerista eupoda	West Coast mulga slider	REPTILE	Priority	P1		27/04/2017	WL_REG17		Survey				10	118.63830000000	-27.01860000000
Sminthopsis longicaudata	Long-tailed dunnart	MAMMAL	Priority	P4		19/10/2018	WL_REG17		Survey				50000	118.60210000000	-26.89940000000
Sminthopsis longicaudata	Long-tailed dunnart	MAMMAL	Priority	P4		26/04/2017	WL_REG17		Survey				50000	118.63230000000	-26.94210000000
Sminthopsis longicaudata	Long-tailed dunnart	MAMMAL	Priority	P4		29/04/2017	WL_REG17		Survey				50000	118.65010000000	-27.02180000000

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 31/12/2020

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 118° 21' 51" E,26° 52' 22" S
Buffer 40km
Group By Family

Family	Species	Records
Acanthizidae	8	121
Accipitridae	10	112
Aegothelidae	1	9
Agamidae	11	79
Anatidae	10	102
Ardeidae	4	18
Artamidae	4	62
Boidae	2	3
Bovidae	2	51
Bufonidae	1	1
Cacatuidae	1	13
Campephagidae	4	37
Canidae	1	1
Caprimulgidae	1	7
Carphodactylidae	2	4
Casuariidae	1	25
Charadriidae	5	32
Cheluidae	1	5
Cinclosomatidae	4	17
Columbidae	5	109
Corvidae	2	166
Cracticidae	4	118
Cuculidae	2	12
Dasyuridae	6	157
Dicaeidae	1	10
Dicruridae	3	248
Diplodactylidae	5	34
Elapidae	6	9
Emballonuridae	1	3
Estrilidae	2	118
Falconidae	5	77
Felidae	1	2
Gekkonidae	2	46
Halcyonidae	2	8
Hirundinidae	4	78
Hylidae	3	14
Lamponidae	2	2
Laridae	3	8
Leporidae	1	7
Limnodynastidae	1	2
Lycosidae	1	1
Macropodidae	2	113
Maluridae	4	66
Megapodiidae	1	1
Meliphagidae	8	262
Meropidae	1	1
Motacillidae	1	11
Muridae	3	87
Nemesiidae	1	1
Neosittidae	1	2
Otididae	1	2
Pachycephalidae	3	205
Pardalotidae	2	3
Pelecanidae	1	2
Petroicidae	3	72
Phalacrocoracidae	1	1
Pholcidae	1	1
Podargidae	2	5
Podicipedidae	2	29
Pomatostomidae	3	47
Potoroidae	1	1
Prodidomidae	1	1
Psittacidae	11	86
Ptilonorhynchidae	3	52
Rallidae	3	15
Recurvirostridae	4	40
Scincidae	15	86
Scolopacidae	2	2
Scolopendridae	1	1
Scutigeridae	1	1
Sparassidae	1	1
Sturnidae	1	4
Tachyglossidae	1	7
Thamnocephalidae	1	1
Threskiornithidae	2	6

Turnicidae	2	3
Urodacidae	2	14
Varanidae	4	49
Vespertilionidae	4	49
Zodariidae	1	2
TOTAL	**237**	**3260**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24264	*Acanthiza robustirostris (Slaty-backed Thornbill)*			
4.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
5.	25528	*Aphelocephala leucopsis (Southern Whiteface)*			
6.	24268	*Aphelocephala nigricincta (Banded Whiteface)*			
7.	25530	*Gerygone fusca (Western Gerygone)*			
8.	24278	*Pyrrholaemus brunneus (Redthroat)*			
Accipitridae					
9.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
10.	25536	*Accipiter fasciatus (Brown Goshawk)*			
11.	24285	*Aquila audax (Wedge-tailed Eagle)*			
12.	24288	*Circus approximans (Swamp Harrier)*			
13.	24289	*Circus assimilis (Spotted Harrier)*			
14.		*Elanus axillaris*			
15.	24295	*Haliastur sphenurus (Whistling Kite)*			
16.	24297	*Hamirostra melanosternon (Black-breasted Buzzard)*			
17.	47965	*Hieraaetus morphnoides (Little Eagle)*			
18.	25542	*Milvus migrans (Black Kite)*			
Aegothelidae					
19.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Agamidae					
20.	25458	*Ctenophorus caudicinctus (Ring-tailed Dragon)*			
21.	24865	*Ctenophorus caudicinctus subsp. caudicinctus (Ring-tailed Dragon)*			
22.	24869	*Ctenophorus caudicinctus subsp. mensarum (Ring-tailed Dragon)*			
23.	25459	*Ctenophorus isolepis (Crested Dragon, Military Dragon)*			
24.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
25.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
26.	24888	*Ctenophorus salinarum (Salt Pan Dragon)*			
27.	24889	*Ctenophorus scutulatus (Lozenge-marked Dragon)*			
28.	30909	*Diporiphora amphiboluroides (Mulga Dragon)*			
29.	30814	*Tympanocryptis cephalus (Pebble Dragon)*			
30.		*Tympanocryptis pseudopsephos*			Y
Anatidae					
31.	24312	*Anas gracilis (Grey Teal)*			
32.	24315	*Anas rhynchotis (Australasian Shoveler)*			
33.	24316	*Anas superciliosa (Pacific Black Duck)*			
34.	24318	*Aythya australis (Hardhead)*			
35.	24319	*Biziura lobata (Musk Duck)*			
36.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
37.	24322	*Cygnus atratus (Black Swan)*			
38.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
39.	24329	*Stictonetta naevosa (Freckled Duck)*			
40.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Ardeidae					
41.	41324	*Ardea modesta (great egret, white egret)*			
42.	24340	*Ardea novaehollandiae (White-faced Heron)*			
43.	24341	*Ardea pacifica (White-necked Heron)*			
44.		*Egretta novaehollandiae*			
Artamidae					
45.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
46.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
47.	24355	*Artamus minor (Little Woodswallow)*			
48.	24356	*Artamus personatus (Masked Woodswallow)*			
Boidae					
49.	25318	*Antaresia perthensis (Pygmy Python)*			
50.	25241	*Antaresia stimsoni subsp. stimsoni (Stimson's Python)*			
Bovidae					
51.	24251	*Bos taurus (European Cattle)*	Y		
52.	24253	*Capra hircus (Goat)*	Y		
Bufonidae					
53.	42306	*Platyplectrum spenceri (Centralian Burrowing Frog)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Cacatuidae					
54.		*Eolophus roseicapillus*			
Campephagidae					
55.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
56.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
57.	24362	*Coracina novaehollandiae subsp. novaehollandiae (Black-faced Cuckoo-shrike)*			
58.	24367	*Lalage tricolor (White-winged Triller)*			
Canidae					
59.	24040	*Vulpes vulpes (Red Fox)*	Y		
Caprimulgidae					
60.	24368	*Eurostopodus argus (Spotted Nightjar)*			
Carphodactylidae					
61.	24971	*Nephrurus vertebralis*			
62.	24973	*Nephrurus wheeleri subsp. wheeleri*			
Casuariidae					
63.	24470	*Dromaius novaehollandiae (Emu)*			
Charadriidae					
64.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
65.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
66.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
67.	24380	*Peltohyas australis (Inland Dotterel)*			
68.	24386	*Vanellus tricolor (Banded Lapwing)*			
Cheluidae					
69.	25339	*Chelodina steindachneri (Flat-shelled Turtle)*			
Cinclosomatidae					
70.	25580	*Cinclosoma castaneothorax (Chestnut-breasted Quail-thrush)*			
71.	47910	*Cinclosoma clarum (Western Chestnut Quail-thrush, Copperback Quail-thrush)*			
72.	42311	*Cinclosoma marginatum (Western Quail-thrush)*			
73.	24390	*Psophodes occidentalis (Western Wedgebill, Chiming Wedgebill)*			
Columbidae					
74.	24399	*Columba livia (Domestic Pigeon)*	Y		
75.	24401	*Geopelia cuneata (Diamond Dove)*			
76.	25585	*Geopelia striata (Zebra Dove)*			
77.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
78.	24409	*Phaps chalcoptera (Common Bronzewing)*			
Corvidae					
79.	24416	*Corvus bennetti (Little Crow)*			
80.	25593	*Corvus orru (Torresian Crow)*			
Cracticidae					
81.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
82.	25595	*Cracticus tibicen (Australian Magpie)*			
83.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
84.	25596	*Cracticus torquatus (Grey Butcherbird)*			
Cuculidae					
85.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
86.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
Dasyuridae					
87.	24087	*Antechinomys laniger (Kultarr)*			
88.	24091	*Dasykaluta rosamondae (Little Red Kaluta)*			
89.	24106	*Pseudantechinus woolleyae (Woolley's Pseudantechinus)*			
90.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
91.	24115	*Sminthopsis longicaudata (Long-tailed Dunnart)*		P4	
92.	24116	*Sminthopsis macroura (Stripe-faced Dunnart)*			
Dicaeidae					
93.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
Dicruridae					
94.	24443	*Grallina cyanoleuca (Magpie-lark)*			
95.	48096	*Rhipidura albiscapa (Grey Fantail)*			
96.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Diplodactylidae					
97.	24940	*Diplodactylus pulcher*			
98.	42415	*Lucasium squarrosum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
99.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			
100.	24946	*Strophurus strophurus*			
101.	24949	*Strophurus wellingtonae*			
Elapidae					
102.	25254	*Parasuta monachus*			
103.	25262	*Pseudechis butleri (Spotted Mulga Snake)*			
104.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
105.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
106.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
107.	25269	*Suta fasciata (Rosen's Snake)*			
Emballonuridae					
108.	24176	*Taphozous hilli (Hill's Sheathtail-bat)*			
Estrilidae					
109.	30870	*Taeniopygia guttata (Zebra Finch)*			
110.	30871	*Taeniopygia guttata subsp. castanotis (Zebra Finch)*			
Falconidae					
111.	25621	*Falco berigora (Brown Falcon)*			
112.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
113.	24473	*Falco hypoleucos (Grey Falcon)*		T	
114.	25623	*Falco longipennis (Australian Hobby)*			
115.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
Felidae					
116.	24041	*Felis catus (Cat)*	Y		
Gekkonidae					
117.	24959	*Gehyra variegata*			
118.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
Halcyonidae					
119.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
120.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
Hirundinidae					
121.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
122.	24491	*Hirundo neoxena (Welcome Swallow)*			
123.	48060	*Petrochelidon ariel (Fairy Martin)*			
124.	48061	*Petrochelidon nigricans (Tree Martin)*			
Hylidae					
125.	25375	*Cyclorana maini (Sheep Frog)*			
126.	25376	*Cyclorana platycephala (Water-holding Frog)*			
127.	25392	*Litoria rubella (Little Red Tree Frog)*			
Lamponidae					
128.		*Lampona cylindrata*			
129.		*Notsodipus meedo*			
Laridae					
130.		*Chroicocephalus novaehollandiae*			
131.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
132.	24528	*Sterna hybrida subsp. javanica (Whiskered Tern)*			
Leporidae					
133.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
Limnodynastidae					
134.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
Lycosidae					
135.		*Hoggicosa bicolor*			
Macropodidae					
136.	25489	*Macropus robustus (Euro, Biggada)*			
137.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
Maluridae					
138.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
139.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
140.	24549	*Malurus leucopterus subsp. leuconotus (White-winged Fairy-wren)*			
141.	25654	*Malurus splendens (Splendid Fairy-wren)*			
Megapodiidae					
142.	24557	*Leipoa ocellata (Malleefowl)*		T	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Meliphagidae					
143.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
144.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
145.	24568	*Epthianura aurifrons (Orange Chat)*			
146.	24570	*Epthianura tricolor (Crimson Chat)*			
147.	42314	*Gavicalis virescens (Singing Honeyeater)*			
148.	25661	*Lichmera indistincta (Brown Honeyeater)*			
149.	24583	*Manorina flavigula (Yellow-throated Miner)*			
150.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
Meropidae					
151.	24598	*Merops ornatus (Rainbow Bee-eater)*			
Motacillidae					
152.	25670	*Anthus australis (Australian Pipit)*			
Muridae					
153.	24224	*Notomys alexis (Spinifex Hopping-mouse)*			
154.	24235	*Pseudomys desertor (Desert Mouse)*			
155.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
Nemesiidae					
156.		*Aname mainae*			
Neosittidae					
157.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
Otididae					
158.	24610	*Ardeotis australis (Australian Bustard)*			
Pachycephalidae					
159.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
160.	24618	*Oreoica gutturalis (Crested Bellbird)*			
161.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
Pardalotidae					
162.	24627	*Pardalotus rubricatus (Red-browed Pardalote)*			
163.	25682	*Pardalotus striatus (Striated Pardalote)*			
Pelecanidae					
164.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Petroicidae					
165.	47997	*Melanodryas cucullata (Hooded Robin)*			
166.	25693	*Microeca fascinans (Jacky Winter)*			
167.	24659	*Petroica goodenovii (Red-capped Robin)*			
Phalacrocoracidae					
168.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
Pholcidae					
169.		*Trichocyclus nigropunctatus*			
Podargidae					
170.	25703	*Podargus strigoides (Tawny Frogmouth)*			
171.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
Podicipedidae					
172.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
173.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Pomatostomidae					
174.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
175.	25706	*Pomatostomus temporalis (Grey-crowned Babbler)*			
176.	24684	*Pomatostomus temporalis subsp. rubeculus (Grey-crowned Babbler)*			
Potoroidae					
177.	24161	*Bettongia lesueur subsp. graii (Boodie (inland), Burrowing Bettong (inland))*		X	
Prodidomidae					
178.		*Nomindra leeuweni*			
Psittacidae					
179.		*Barnardius zonarius*			
180.	25715	*Cacatua roseicapilla (Galah)*			
181.	25716	*Cacatua sanguinea (Little Corella)*			
182.	24727	*Cacatua sanguinea subsp. westralensis (Little Corella)*			
183.	24736	*Melopsittacus undulatus (Budgerigar)*			
184.	24737	*Neophema bourkii (Bourke's Parrot)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
185.	24738	*Neophema elegans (Elegant Parrot)*			
186.	24742	*Nymphicus hollandicus (Cockatiel)*			
187.	24748	*Platycercus varius (Mulga Parrot)*			
188.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
189.	24751	*Platycercus zonarius subsp. zonarius (Port Lincoln Parrot)*			
Ptilonorhynchidae					
190.		*Ptilonorhynchus guttatus*			
191.	25724	*Ptilonorhynchus maculatus (Spotted Bowerbird)*			
192.	24757	*Ptilonorhynchus maculatus subsp. guttatus (Western Bowerbird)*			
Rallidae					
193.	25727	*Fulica atra (Eurasian Coot)*			
194.	24769	*Porzana fluminea (Australian Spotted Crake)*			
195.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
Recurvirostridae					
196.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
197.	25734	*Himantopus himantopus (Black-winged Stilt)*			
198.	24775	*Himantopus himantopus subsp. leucocephalus (Black-winged Stilt)*			
199.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
Scincidae					
200.	30893	*Cryptoblepharus buchananii*			
201.	25045	*Ctenotus helenae*			
202.	25052	*Ctenotus leonhardii*			
203.	25074	*Ctenotus schomburgkii*			
204.	25075	*Ctenotus severus*			
205.	25465	*Ctenotus uber (Spotted Ctenotus)*			
206.	25092	*Egernia depressa (Southern Pygmy Spiny-tailed Skink)*			
207.	25109	*Eremiascincus richardsonii (Broad-banded Sand Swimmer)*			
208.	25125	*Lerista bipes*			
209.	25130	*Lerista desertorum*			
210.	25134	*Lerista eupoda (West Coast mulga slider, Good-legged Lerista)*		P1	
211.	25482	*Lerista macropisthopus*			
212.	25151	*Lerista macropisthopus subsp. fusciceps*			
213.	42411	*Lerista timida*			
214.	25184	*Menetia greyii*			
Scolopacidae					
215.	24786	*Calidris melanotos (Pectoral Sandpiper)*		IA	
216.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
Scolopendridae					
217.		*Scolopendra morsitans*			
Scutigeridae					
218.		*Thereuopoda lesueurii*			
Sparassidae					
219.		*Pediana tenuis*			
Sturnidae					
220.	47954	*Gelochelidon nilotica (Gull-billed Tern)*		IA	
Tachyglossidae					
221.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
Thamnocephalidae					
222.	33935	*Branchinella simplex (fairy shrimp (inland WA))*		P1	
Threskiornithidae					
223.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
224.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Turnicidae					
225.	34149	*Turnix castanota (Chestnut-backed Button-quail)*			
226.	24851	*Turnix velox (Little Button-quail)*			
Urodacidae					
227.		*Urodacus armatus*			
228.		*Urodacus hoplurus*			
Varanidae					
229.	25211	*Varanus caudolineatus*			
230.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
231.	25524	*Varanus panoptes (Yellow-spotted Monitor)*			
232.	25223	*Varanus panoptes subsp. rubidus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Vespertilionidae					
233.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
234.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
235.	24199	*Scotorepens balstoni (Inland Broad-nosed Bat)*			
236.	24205	*Vespadelus finlaysoni (Finlayson's Cave Bat)*			
Zodariidae					
237.		*Storena sinuosa*			

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

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

Australian Government

Department of Agriculture, Water and the Environment

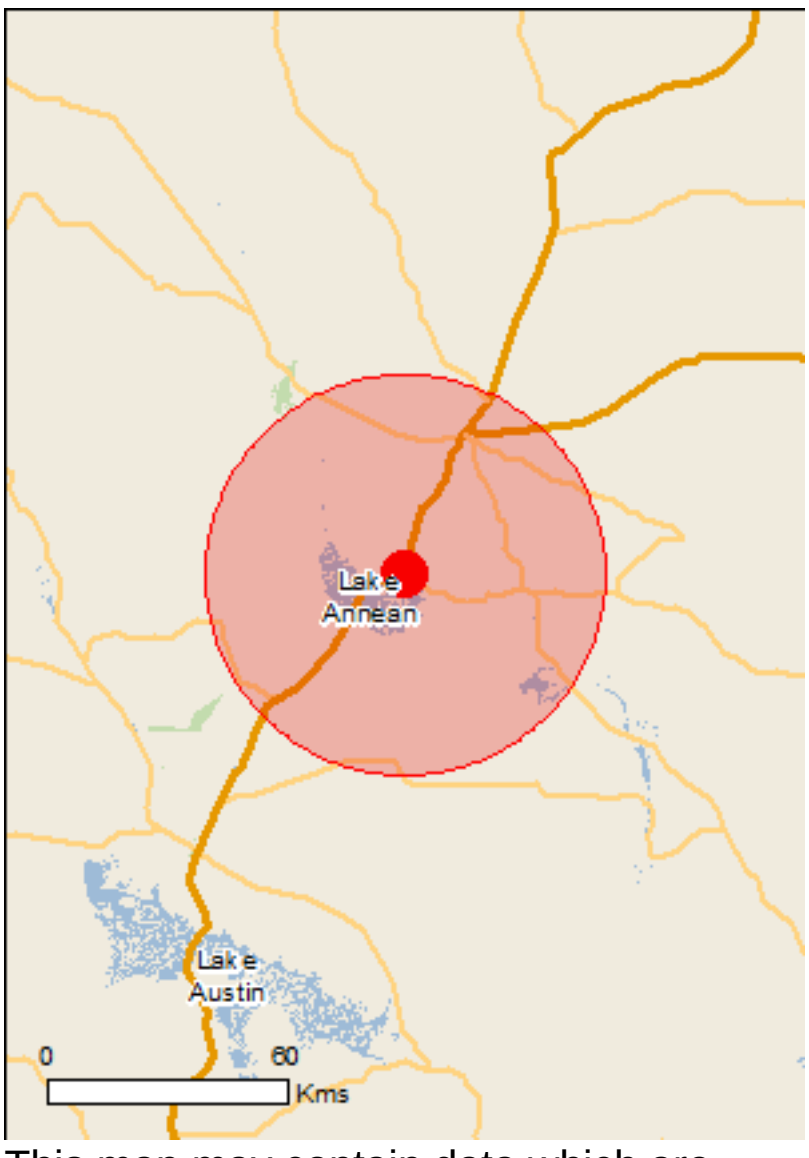
EPBC Act Protected Matters Report

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

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

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

Report created: 31/12/20 13:52:38



Coordinates

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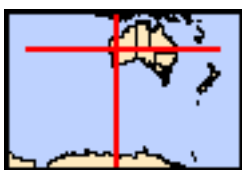

Summary

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.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	5
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Indigenous		
Wilgie Mia Aboriginal Ochre Mine	WA	Listed place

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Falco hypoleucos		
Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis		
Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Other		
Idiosoma nigrum		
Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area

Nationally Important Wetlands

[Resource Information]

Name	State
Lake Annean (Lake Nannine)	WA

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-26.87251 118.36424

Acknowledgements

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

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

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

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

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Appendix 5: Fauna Species List

Key: EPBC = Environmental Protection and Biodiversity Conservation Act 1999, BC = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey

Note: For Definitions of Conservation Codes see Appendix 1.

AMPHIBIANS		**Conservation Codes**			**A**	**B**	**C**	**D**
Scientific Name	**Common Name**	**EPBC**	**BC**	**DBCA**				
LIMNODYNASTIDAE								
Neobatrachus sutor	Shoemaker Frog					X		
HYLIDAE								
Cyclorana maini	Sheep Frog					X		
Cyclorana platycephala	Water-holding Frog					X		
Litoria rubella	Little Red Tree Frog					X		
BUFONIDAE								
Platyplectrum spenceri	Centralian Burrowing Frog					X		

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Note: For Definitions of Conservation Codes see Appendix 1.

REPTILES		Conservation Codes			A	B	C	D
Scientific Name	**Common Name**	**EPBC**	**BC**	**DBCA**				
CHELUIDAE								
Chelodina steindachneri	Flat-shelled Turtle					X		
CARPHADACTYLIDAE								
Nephrurus vertebralis	Mid-line Knob-tailed Gecko					X		
Nephrurus wheeleri	Banded Knob-tailed Gecko					X		
DIPLODACTYLIDAE								
Diplodactylus pulcher	Fine-faced Gecko					X		
Lucasium squarrosum	Mottled Ground Gecko					X		
Rhynchoedura ornata	Western Beaked Gecko					X		
Strophurus strophurus	Western Spiny-tailed Gecko					X		
Strophurus wellingtonae	Western-shield Spiny-tailed Gecko					X		
GEKKONIDAE								
Gehyra variegata	Tree Dtella					X		
Heteronotia benoei	Bynoe's Gecko					X		
SCINCIDAE								
Cryptoblepharus buchananii	Buchanans Snake-eyed Skink					X		
Ctenotus helenae	Clay-soil Ctenotus					X		
Ctenotus leonhardii	Common Desert Ctenotus					X		
Ctenotus schomburgkii	Barred Wedge-snouted Ctenotus					X		
Ctenotus severus	Stern Rock Ctenotus					X		
Ctenotus uber	Spotted Ctenotus					X		
Egernia depressa	Southern Pygmy Spiny-tailed Skink					X		
Eremiascincus richardsonii	Broad-banded Sand Swimmer					X		
Lerista bipes	Western Two-toed Slider					X		
Lerista desertorum	Central Deserts Robust Slider					X		
Lerista eupoda	West Coast Mulga Slider			P1		X	X	
Lerista macropisthopus	Unpatterned Robust Slider					X		
Lerista timida	Dwarf Three-toed Slider					X		
Menetia greyii	Common Dwarf Skink					X		
AGAMIDAE								

REPTILES		Conservation Codes			A	B	C	D
Scientific Name	**Common Name**	**EPBC**	**BC**	**DBCA**				
Ctenophorus caudicinctus	Ring-tailed Dragon					X		
Ctenophorus isolepis	Crested Dragon					X		
Ctenophorus nuchalis	Central Netted Dragon					X		
Ctenophorus reticulatus	Western Netted Dragon					X		X
Ctenophorus salinarum	Salt Pan Dragon					X		
Ctenophorus scutulatus	Lozenge-marked Dragon					X		
Diporiphora amphiboluroides	Mulga Dragon					X		
Tympanocryptis cephalus	Coastal Pebble-mimic Dragon					X		
Tympanocryptis pseudopsephos	Goldfields Pebble-mimic Dragon					X		
VARANIDAE								
Varanus sp.	*Varanus sp.*							X
Varanus caudolineatus	Stripe-tailed Monitor					X		
Varanus gouldii	Goulds Sand Monitor					X		
Varanus panoptes	Yellow-spotted Monitor					X		
BOIDAE								
Antaresia perthensis	Pygmy Python					X		
Antaresia stimsoni	Stimson's Python					X		
ELAPIDAE								
Parasuta monachus	Monk Snake					X		
Pseudechis butleri	Spotted Mulga Snake					X		
Pseudonaja mengdeni	Western Brown Snake					X		
Pseudonaja modesta	Ringed Brown Snake					X		
Simoselaps bertholdi	Jan's Banded Snake					X		
Suta fasciata	Rosen's Snake					X		

[X] fauna species recorded.
[*] denotes introduced species.

Key: EPBC = Environmental Protection and Biodiversity Conservation Act 1999, BC = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey

Note: For Definitions of Conservation Codes see Appendix 1.

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	**Common Name**	**EPBC**	**BC**	**DBCA**				
MEGAPODIIDAE								
Leipoa ocellata	Malleefowl	Vu	Vu		X	X	X	
CASUARIIDAE								
Dromaius novaehollandiae	Emu					X		
ANATIDAE								
Anas gracilis	Grey Teal					X		
Anas rhynchotis	Australasian Shoveler					X		
Anas superciliosa	Pacific Black Duck					X		
Aythya australis	Hardhead					X		
Biziura lobata	Musk Duck					X		
Chenonetta jubata	Australian Wood Duck					X		
Cygnus atratus	Black Swan					X		
Malacorhynchus membranaceus	Pink-eared Duck					X		
Oxyura australis	Blue-billed Duck			P4			X	
Stictonetta naevosa	Freckled Duck					X		
Tadorna tadornoides	Australian Shelduck					X		
COLUMBIDAE								
Columba livia	Rock Pigeon				X	X		
Geopelia cuneata	Diamond Dove					X		
Geopelia striata	Zebra Dove					X		
Ocyphaps lophotes	Crested Pigeon					X		
Phaps chalcoptera	Common Bronzewing					X		
Streptopelia senegalensis	Laughing Turtle-Dove				X			
PODICIPEDIDAE								
Poliocephalus poliocephalus	Hoary-headed Grebe					X		
Tachybaptus novaehollandiae	Australasian Grebe					X		
PODARGIDAE								
Podargus strigoides	Tawny Frogmouth					X		
CAPRIMULGIDAE								
Eurostopodus argus	Spotted Nightjar					X		
AEGOTHELIDAE								

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
Aegotheles cristatus	Australian Owlet-nightjar					X		
APODIDAE								
Apus pacificus	Fork-tailed Swift	Mi	Mi		X		X	
PHALACROCORACIDAE								
Phalacrocorax sulcirostris	Little Black Cormorant					X		
PELECANIDAE								
Pelecanus conspicillatus	Australian Pelican					X		
ARDEIDAE								
Ardea modesta	Great Egret	Mi	Mi		X	X		
Ardea pacifica	White-necked Heron					X		
Egretta novaehollandiae	White-faced Heron					X		
THRESKIORNITHIDAE								
Platalea flavipes	Yellow-billed Spoonbill					X		
Plegadis falcinellus	Glossy Ibis	Mi	Mi				X	
Threskiornis spinicollis	Straw-necked Ibis					X		
ACCIPITRIDAE								
Elanus axillaris	Black-shouldered Kite					X		
Hamirostra melanosternon	Black-breasted Buzzard					X		
Haliastur sphenurus	Whistling Kite					X		
Hieraaetus morphnoides	Little Eagle					X		
Milvus migrans	Black Kite					X		
Aquila audax	Wedge-tailed Eagle					X		
Accipiter cirrocephalus	Collared Sparrowhawk					X		
Accipiter fasciatus	Brown Goshawk					X		
Circus assimilis	Spotted Harrier					X		
Circus approximans	Swamp Harrier					X		
FALCONIDAE								
Falco berigora	Brown Falcon					X		
Falco cenchroides	Nankeen Kestrel					X		
Falco hypoleucos	Grey Falcon	Vu			X	X	X	
Falco longipennis	Australian Hobby					X		
Falco peregrinus	Peregrine Falcon		OS			X	X	
RALLIDAE								
Fulica atra	Eurasian Coot					X		
Porzana fluminea	Australian Spotted Crake					X		
Tribonyx ventralis	Black-tailed Native-hen					X		
OTDIDDAE								
Ardeotis australis	Australian Bustard					X		

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
RECURVIROSTRIDAE								
Cladorhynchus leucocephalus	Banded Stilt					X		
Himantopus himantopus	Black-winged Stilt					X		
Recurvirostra novaehollandiae	Red-necked Avocet					X		
CHARADRIIDAE								
Charadrius ruficapillus	Red-capped Plover	Mi	Mi			X		
Charadrius veredus	Oriental Plover	Mi			X			
Peltohyas australis	Inland Dotterel					X		
Thinornis rubricollis	Hooded Plover	Mi	Mi	P4	X			
Elseyornis melanops	Black-fronted Dotterel					X		
Erythrogonys cinctus	Red-kneed Dotterel					X		
Vanellus tricolor	Banded Lapwing					X		
LARIDAE								
Chroicocephalus novaehollandiae	Silver Gull					X		
Gelochelidon nilotica	Gull-billed Tern	Mi	Mi			X	X	
Hydroprogne caspia	Caspian Tern	Mi	Mi				X	
Sterna hybrida javanica	Whiskered Tern					X		
Sterna leucoptera	White-winged Black Tern	Mi	Mi				X	
SCOLOPACIDAE								
Actitis hypoleucos	Common Sandpiper	Mi	Mi		X		X	
Calidris acuminata	Sharp-tailed Sandpiper	Mi	Mi		X		X	
Calidris ferruginea	Curlew Sandpiper	CR	Mi		X		X	
Calidris melanotos	Pectoral Sandpiper	Mi	Mi		X	X	X	
Caliris ruficollis	Red-necked Stint	Mi	Mi				X	
Limosa lapponica	Bar-tailed Godwit	Mi	Mi				X	
Tringa glareola	Wood Sandpiper	Mi	Mi			X	X	
Tringa nebularia	Common Greenshank	Mi	Mi		X		X	
Tringa stagnatilis	Little Greenshank	Mi	Mi				X	
TURNICADAE								
Turnix castanota	Chestnut-backed Button-quail					X		
Turnix velox	Little Button-quail					X		
BURHINIDAE								
Burhinus grallarius	Bush Stone-curlew					X		
PSITTACIDAE								
Platycercus zonarius	Australian Ringneck					X		X
Eolophus roseicapillus	Galah					X		
Cacatua sanguinea	Little Corella					X		
Melopsittacus undulatus	Budgerigar					X		

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
Neophema bourkii	Bourke's Parrot					X		
Neophema elegans	Elegant Parrot					X		
Nymphicus hollandicus	Cockatiel					X		
Platycercus varius	Mulga Parrot					X		
Pezoporus occidentalis	Night Parrot	En	CR		X			
CUCULIDAE								
Cacomantis pallidus	Pallid Cuckoo					X		
Chalcites osculans	Black-eared Cuckoo				X	X		
Chrysococcyx basalis	Horsfield's Bronze Cuckoo					X		
HALCYONIDAE								
Todiramphus pyrrhopygius	Red-backed Kingfisher					X		
Todiramphus sanctus	Sacred Kingfisher					X		
MEROPIDAE								
Merops ornatus	Rainbow Bee-eater	Ma			X	X		
PTILONORHYNCHIDAE								
Ptilonorhynchus guttatus	Western Bowerbird					X		
Ptilonorhynchus maculatus	Spotted Bowerbird					X		
MALURIDAE								
Malurus lamberti	Variegated Fairy-wren					X		
Malurus leucopterus	White-winged Fairy-wren					X		X
Malurus splendens	Splendid Fairy-wren					X		
MELIPHAGIDAE								
Acanthagenys rufogularis	Spiny-cheeked Honeyeater					X		
Certhionyx variegatus	Pied Honeyeater					X		
Epthianura aurifrons	Orange Chat					X		
Epthianura tricolor	Crimson Chat					X		
Gavicalis virescens	Singing Honeyeater					X		X
Lichmera indistincta	Brown Honeyeater					X		X
Manorina flavigula	Yellow-throated Miner					X		X
Purnella albifrons	White-fronted Honeyeater					X		
PARDALOTIDAE								
Pardalotus rubricatus	Red-browed Pardalote					X		
Pardalotus striatus	Striated Pardalote					X		
ACANTHIZIDAE								
Acanthiza apicalis	Inland Thornbill					X		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill					X		
Acanthiza robustirostris	Slaty-backed Thornbill					X		
Acanthiza uropygialis	Chestnut-rumped Thornbill					X		X

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
Aphelocephala leucopsis	Southern Whiteface					X		
Aphelocephala nigricincta	Banded White-face					X		
Gerygone fusca	Western Gerygone					X		
Pyrrholaemus brunneus	Redthroat					X		
POMATOSTOMIDAE								
Pomatostomus superciliosus	White-browed Babbler					X		
Pomatostomus temporalis	Grey-crowned Babbler					X		
PAOPHODIDAE								
Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush					X		
Cinclosoma clarum	Western Chestnut Quail-thrush					X		
Cinclosoma marginatum	Western Quail-thrush					X		
Psophodes occidentalis	Chiming Wedgebill					X		
CAMPEPHAGIDAE								
Coracina maxima	Ground Cuckoo-shrike					X		
Coracina novaehollandiae	Black-faced Cuckoo-shrike					X		
Lalage tricolor	White-winged Triller					X		
NEOSITTIDAE								
Daphoenositta chrysoptera	Varied Sittella					X		
PACHYCEPHALIDAE								
Colluricincla harmonica	Grey Shrike-thrush					X		X
Oreoica gutturalis	Crested Bellbird					X		X
Pachycephala rufiventris	Rufous Whistler					X		
CRACTICIDAE								
Cracticus nigrogularis	Pied Butcherbird					X		
Cracticus tibicen	Australian Magpie					X		
Cracticus tibicen dorsalis	White-backed Magpie					X		
Cracticus torquatus	Grey Butcherbird					X		
RHIPIDURIDAE								
Rhipidura albiscapa	Grey Fantail					X		
Rhipidura leucophrys	Willie Wagtail					X		
MONARCHIDAE								
Grallina cyanoleuca	Magpie-Lark					X		
CORVIDAE								
Corvus bennetti	Little Crow					X		
Corvus coronoides	Australian Raven							X
Corvus orru	Torresian Crow					X		
PETROICIDAE								
Melanodryas cucullata	Hooded Robin					X		

BIRDS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
Microeca fascinans	Jacky Winter					X		
Petroica goodenovii	Red-capped Robin					X		X
ARTAMIDAE								
Artamus cinereus	Black-faced Woodswallow					X		X
Artamus cyanopterus	Dusky Woodswallow					X		
Artamus minor	Little Woodswallow					X		
Artamus personatus	Masked Woodswallow					X		
HIRUNDINIDAE								
Cheramoeca leucosterna	White-backed Swallow					X		
Hirundo neoxena	Welcome Swallow					X		
Petrochelidon ariel	Fairy Martin					X		
Petrochelidon nigricans	Tree Martin					X		
DICAEIDAE								
Dicaeum hirundinaceum	Mistletoebird					X		
ESTRILDIDAE								
Taeniopygia guttata	Zebra Finch					X		X
MOTACILLIDAE								
Anthus novaeseelandiae	Australasian Pipit					X		
Motacilla cinerea	Grey Wagtail	Mi	Mi		X			
Motacilla flava	Yellow Wagtail	Mi	Mi		X			

[X] fauna species recorded.
[*] denotes introduced species.

Key: EPBC = Environmental Protection and Biodiversity Conservation Act 1999, BC = Biodiversity Conservation Act 2016 (IUCN Threat categories), DBCA = Department of Biodiversity, Conservation and Attractions Priority Code, A = EPBC Protected Matters search, B = Listed in Naturemap, C = DBCA Threatened Fauna Database, D = Current Field Survey

Note: For Definitions of Conservation Codes see Appendix 1.

MAMMALS		Conservation Codes			A	B	C	D
Scientific Name	**Common Name**	**EPBC**	**BC**	**DBCA**				
TACHYGLOSSIDAE								
Tachyglossus aculeatus	Short-beaked Echidna					X		
DASYURIDAE								
Pseudantechinus woolleyae	Woolley's Pseudantechinus					X		
Antechinomys laniger	Kultarr					X		
Dasykaluta rosamondae	Little Red Kaluta					X		
Sminthopsis crassicaudata	Fat-tailed Dunnart					X		
Sminthopsis longicaudata	Long-tailed Dunnart			P4		X	X	
Sminthopsis macroura	Stripe-faced Dunnart					X		
POTOROIDAE								
Bettongia lesueur graii	Burrowing Bettong (inland))	Ex	Ex			X		
MACROPODIDAE								
Osphranter robustus	Euro					X		
Osphranter rufus	Red Kangaroo					X		X
EMBALLONURIDAE								
Taphozous hilli	Hill's Sheathtail-bat					X		
VESPERTILIONIDAE								
Chalinolobus gouldii	Gould's Wattled Bat					X		
Nyctophilus geoffroyi	Lesser Long-eared Bat					X		
Scotorepens balstoni	Inland Broad-nosed Bat					X		
Vespadelus finlaysoni	Finlayson's Cave Bat					X		
MURIDAE								
Notomys alexis	Spinifex Hopping-mouse					X		
Pseudomys desertor	Desert Mouse					X		
Pseudomys hermannsburgensis	Sandy Inland Mouse					X		
CANIDAE								
Canis lupus familiaris	Domestic Dog				X			
**Vulpes vulpes*	Red Fox				X	X		
FELIDAE								
**Felis catus*	Feral Cat				X	X		
LEPORIDAE								

MAMMALS		Conservation Codes			A	B	C	D
Scientific Name	Common Name	EPBC	BC	DBCA				
**Oryctolagus cuniculus*	European Rabbit				X	X		
EQUIDAE								
**Equus asinus*	Donkey				X			
CAMELIDAE								
**Camelus dromedarius*	Camel				X			
BOVIDAE								
**Bos taurus*	European Cattle					X		X
**Capra hircus*	Goat				X	X		

[X] fauna species recorded.
[*] denotes introduced species.

Appendix 6: Fauna Habitat Assessments

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra, Nannine Road		**Site Number: HA1**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 635491**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing: 7026902**		E	W	**N/A**	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*Acacia aptaneura*	3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*	1.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila sp., Senna sp.*	0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)			**DISTURBANCE**		**(cattle)**				
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes	**Notes**

GROUND COVER

Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	0 none	1 0-30%	2 30-70%	**3 70-100%**	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra, Nannine Road		**Site Number: HA2**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 636379**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing: 7026735**		E	W	**N/A**	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*Acacia aptaneura*	3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*	1.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila sp., Senna sp.*	0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)				**DISTURBANCE**	**(cattle)**				
	0 heavy	1 medium	2 mild	3 none	**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	1 0-30%	2 30-70%	**3 70-100%**	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra, Nannine Road		**Site Number: HA3**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 636726**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing: 7026774**		E	W	**N/A**	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Drainage Area							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*E. cameldulensis*	10	**0 <5%**	**1 <20%**	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*A. aptaneura*	5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*weedy grass*	0.25	0 <5%	**1 <20%**	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes						**Notes**				

(general)			**DISTURBANCE**			**(cattle)**				
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes					Notes					
Tracks and exploration evidence										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	0 <5%	**1 <20%**	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	**1 0-30%**	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Brown Honeyeater	Cattle scats	Varanid tracks

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra, Nannine Road		**Site Number: HA4**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 637596**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing: 7027341**		E	W	**N/A**	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Drainage Area							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*E. cameldulensis*	10	0 <5%	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*A. aptaneura, A. tetragonophylla*	5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*weedy grass*	0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes					**Notes**					

(general)				**DISTURBANCE**		**(cattle)**			
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none

Notes					Notes					
Tracks and exploration evidence										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	**1 <20%**	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	0 none	**1 0-30%**	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Brown Honeyeater	Cattle scats	Goanna tracks

FAUNA HABITAT ASSESSMENT SHEET										
(Mid-West)										
Location: Meekatharra, Nannine Road					**Site Number: HA5**					
Project Number: GWR 001					**Aspect**	N	NE	NW		
Date: 5 November 2020		**Easting: 637469**				S	SE	SW		
Quadrat Size: 50 x 50		**Northing: 7027853**				E	W	**N/A**		

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION										
Vegetation	Hummock Grassland	Other: Drainage Area		**Average Height (M)**	**Cover**				
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura*	10	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*A. synchronicia*	5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila*	0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						LAST FIRE				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	Notes

(general)			DISTURBANCE			(cattle)				
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes					Notes					
Tracks and exploration evidence										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	0 <5%	**1 <20%**	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Grey Shrike-thrush	Cattle scats	
Crested Bellbird		

FAUNA HABITAT ASSESSMENT SHEET										
(Mid-West)										
Location: Meekatharra, Nannine Road					**Site Number: HA6**					
Project Number: GWR 001					**Aspect**	N	NE	NW		
Date: 5 November 2020	**Easting: 637033**					S	SE	SW		
Quadrat Size: 50 x 50	**Northing: 7028574**					E	W	**N/A**		

Soil Texture	**sand**		sandy-loam		loam		cracking clay		clay	
VEGETATION										
Vegetation	Hummock Grassland	Other: Stony Plain			**Average Height (M)**	**Cover**				
	Acacia Shrubland	**Stratum**				**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*Acacia aptaneura*		3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**				0 <5%	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila sp., Senna sp.*		0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes					**Notes**					
(general)					**DISTURBANCE**				**(cattle)**	
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	0 none	1 0-30%	2 30-70%	**3 70-100%**	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra, Nannine Road		**Site Number: HA7**			
Project Number: GWR 001		**Aspect**	N	NE	NW
Date: 5 November 2020	**Easting: 636036**		S	SE	SW
Quadrat Size: 50 x 50	**Northing: 7030250**		E	W	**N/A**

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*Acacia aptaneura*	3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**			0 <5%	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila sp., Senna sp.*	0.25	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)				**DISTURBANCE**	**(cattle)**				
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	0 none	1 0-30%	2 30-70%	**3 70-100%**	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	0 none	**1 rare**	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA1**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 631549**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025172**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
Hummock Grassland	Other: Drainage Area								
Acacia Shrubland	**Stratum**				**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
Riverine Woodland	**Overstorey**	*A. aptaneura, A. synchronicia, A. caesaneura*		6	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
Other Grassland	**Midstorey**	*A. tetragonophylla, Eremophila sp.*		2	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
Euc Woodland	**Ground Cover**	*Mixed grasses*		<0.5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)				**DISTURBANCE**		**(cattle)**			
	0 heavy	1 medium	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes	**Notes**
Cattle, mining, rubbish, erosion	

GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	0 <5%	**1 <20%**	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	0 none	**1 rare**	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Red-capped Robin	Cattle tracks and scats	*V. gouldii* tracks and burrows
Grey-Shrike-thrush		
Chestnut-rumped Thornbill		
Australian Raven		
Australia Ringneck		

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA2**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 631652**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025398**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation					**Cover**				
Hummock Grassland	Other: Drainage Area		**Average Height (M)**					
Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
Riverine Woodland	**Overstorey**	*A. aptaneura, A. synchronicia, A. caesaneura*	6	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Other Grassland	**Midstorey**	*A. tetragonophylla, Eremophila sp.*	2	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
Euc Woodland	**Ground Cover**	*Mixed grasses*	<0.5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes						**Notes**				

(general)					**DISTURBANCE**			**(cattle)**		
	0 heavy	1 medium	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	0 <5%	**1 <20%**	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	0 none	**1 rare**	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Australian Raven	Cattle tracks and scats	V. gouldii tracks and burrows
		Ctenophorus sp.

FAUNA HABITAT ASSESSMENT SHEET										
(Mid-West)										
Location: Meekatharra - Nannine					**Site Number: HA3**					
Project Number: GWR 001					**Aspect**	N	NE	NW		
Date: 5 November 2020		**Easting: 632019**				S	SE	SW		
Quadrat Size: 50 x 50		**Northing:7025370**				E	W	N/A		

Soil Texture	**sand**		sandy-loam		loam		cracking clay		clay	
VEGETATION										
Vegetation	Hummock Grassland	Other: Stony Plain			**Average Height (M)**	**Cover**				
	Acacia Shrubland	**Stratum**				**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	***A. aptaneura***		2	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*		<0.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**				0 <5%	1 <20%	2 20-60%	3 60-100%	
CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes					**Notes**					
(general)					**DISTURBANCE**				**(cattle)**	
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	0 none	**1 rare**	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA4**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632419**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025248**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other:Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura*	2	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**			0 <5%	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila*	0.3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes						**Notes**				

(general)				**DISTURBANCE**		**(cattle)**			
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none
Notes					**Notes**				

Cattle, mining, rubbish, erosion									
GROUND COVER									
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%					

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	0 none	**1 rare**	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA5**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632604**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025350**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Drainage Area							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura, A. tetragonophylla*	6	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Eremophila sp. Acacia sp.*	2	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Mixed grasses*	<0.5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes		**Notes**

(general)			**DISTURBANCE**			**(cattle)**				
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes	Notes
Cattle, mining, rubbish, erosion	

GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	0 <5%	**1 <20%**	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	V. gouldii tracks and burrows

FAUNA HABITAT ASSESSMENT SHEET										
(Mid-West)										
Location: Meekatharra - Nannine					Site Number: HA6					
Project Number: GWR 001					Aspect	N	NE	NW		
Date: 5 November 2020	Easting: 632326					S	SE	SW		
Quadrat Size: 50 x 50	Northing:7025029					E	W	N/A		

Soil Texture	sand	sandy-loam	loam	cracking clay	clay

VEGETATION									
Vegetation	Hummock Grassland	Other: Stony Plain		Average Height (M)	Cover				
	Acacia Shrubland	Stratum			Scattered Plants	Sparse	Moderate	Thick	
	Riverine Woodland	Overstorey	*A. aptaneura*	4	0 <5%	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	Midstorey	*Acacia sp.*	<0.5	0 <5%	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	Ground Cover	*Eremophila*	0.3	0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION						LAST FIRE				
5 Pristine	4 Excellent	3 Very Good	2 Good	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	3 >5 Yr
Notes					Notes					

(general) DISTURBANCE (cattle)										
	0 heavy	1 medium	2 mild	3 none		0 heavy	1 medium	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	0 none	**1 rare**	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA7**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632480**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7024942**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Drainage Area							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura, A synchronicia*	5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Eremophila sp. A. tetragonophylla*	2	0 <5%	**1 <20%**	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Mixed grasses*	<0.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**
Notes					**Notes**					

(general)					**DISTURBANCE**	**(cattle)**				
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	V. gouldii tracks and burrows

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA8**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632090**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7024960**		E	W	**N/A**	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura*	4	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*	<0.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Eremophila*	0.3	**0 <5%**	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes		**Notes**

(general)			**DISTURBANCE**		**(cattle)**				
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes	Notes
Cattle, mining, rubbish, erosion	

GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
Yellow-throated Miner	Cattle tracks and scats	
Black-faced Woodswallow		
Zebra Finch		
White-winged Fairy-wren		

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA9**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 631821**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025058**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony Plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura*	2.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Eremophila*	1	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**			0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)				**DISTURBANCE**		**(cattle)**				
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes	Notes
Cattle, mining, rubbish	

GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
White-winged Fairy-wren	Cattle tracks and scats	
	Kangaroo scats	

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA10**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632840**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7024960**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stony plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**			0 <5%	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*	<0.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**			0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes					**Notes**				

(general)				**DISTURBANCE**				**(cattle)**	
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA11**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 632842**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025081**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Drainage Area							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**	*A. aptaneura*	6	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Eremophila sp. Acacia sp.*	2	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**	*Mixed grasses*	<0.5	0 <5%	**1 <20%**	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	**2 Good**	1 Degraded		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)			**DISTURBANCE**			**(cattle)**				
	0 heavy	**1 medium**	2 mild	3 none		0 heavy	**1 medium**	2 mild	3 none	

Notes	Notes
Cattle, mining, rubbish, erosion	

GROUND COVER										
Bare Ground	0 <5%	1 <20%	**2 20-60%**	3 60-100%	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	0 <5%	**1 <20%**	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						

MICROHABITATS									
Burrowing Suitability	0 Rock	1 Stony	2 Sandy Loam	**3 Sand**	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	0 none	**1 rare**	2 moderate	3 common
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**
	Cattle tracks and scats	V. gouldii tracks and burrows

FAUNA HABITAT ASSESSMENT SHEET

(Mid-West)

Location: Meekatharra - Nannine		**Site Number: HA12**				
Project Number: GWR 001		**Aspect**	N	NE	NW	
Date: 5 November 2020	**Easting: 631349**		S	SE	SW	
Quadrat Size: 50 x 50	**Northing:7025507**		E	W	N/A	

Soil Texture	**sand**	sandy-loam	loam	cracking clay	clay

VEGETATION

Vegetation				**Average Height (M)**	**Cover**				
	Hummock Grassland	Other: Stoney plain							
	Acacia Shrubland	**Stratum**			**Scattered Plants**	**Sparse**	**Moderate**	**Thick**	
	Riverine Woodland	**Overstorey**			0 <5%	1 <20%	2 20-60%	3 60-100%	
	Other Grassland	**Midstorey**	*Acacia sp.*	<0.5	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
	Euc Woodland	**Ground Cover**			0 <5%	1 <20%	2 20-60%	3 60-100%	

CONDITION						**LAST FIRE**				
5 Pristine	4 Excellent	3 Very Good	2 Good	**1 Degraded**		0 Completely Degraded	0 <1 year	1 1 -3 Yr	2 4-5 Yr	**3 >5 Yr**

Notes	**Notes**

(general)				**DISTURBANCE**	**(cattle)**				
	0 heavy	1 medium	2 mild	3 none		**0 heavy**	1 medium	2 mild	3 none	

Notes					Notes					
Cattle, mining, rubbish, erosion										
GROUND COVER										
Bare Ground	0 <5%	1 <20%	2 20-60%	**3 60-100%**	**Hummock Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Rock	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Other Grass**	**0 <5%**	1 <20%	2 20-60%	3 60-100% *	
Leaf Litter	**0 <5%**	1 <20%	2 20-60%	3 60-100%	**Herbs**	**0 <5%**	1 <20%	2 20-60%	3 60-100%	
Logs >10cm	**0 <5%**	1 <20%	2 20-60%	3 60-100%						
MICROHABITATS										
Burrowing Suitability	0 Rock	**1 Stony**	2 Sandy Loam	3 Sand	**Peeling Bark**	**0 none**	1 rare	2 moderate	3 common	
Pebbles Stones	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Large Hollows**	**0 none**	1 rare	2 moderate	3 common	
Exfoliating Slabs	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Small Hollows**	**0 none**	1 rare	2 moderate	3 common	
Rock Crevices	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Water Prescence**	**0 none**	1 rare	2 moderate	3 common	
Boulders	**0 none**	1 0-30%	2 30-70%	3 70-100%	**Distance to Water**	**0 >5km**	1 2-5km	2 500m - 2km	3 <500m	
Suitability for Bats	YES		**NO**		**Termite Mounds**	**0 none**	1 rare	2 moderate	3 common	
Caves	**Absent**	Present			**Woody Debris**	**0 none**	1 rare	2 moderate	3 common	

CONSERVATION SIGNIFICANT FAUNA	
Species	**Notes**

FAUNA RECORDED		
Birds	**Mammals**	**Reptiles**