

JUNDEE PROJECT

Flora, Vegetation and Fauna Desktop Assessment Invicta Waste Rock Landform



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Prepared by



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Cover Photo: Proposed Invicta WRL location-spatial image

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Contents

1 INTRODUCTION	1
2 EXISTING ENVIRONMENT	4
2.1 Regional Setting	4
2.2 Land Use	5
2.3 Soil Landscape Systems	5
2.4 Hydrology	7
2.5 Conservation Areas	9
3 Methodology	10
3.1 Literature Review	10
3.2 Database Searches	10
4 Results	12
4.1 Flora	12
4.1.1 Conservation Significant Flora	12
4.2 Vegetation	16
4.3 Fauna	18
4.3.1 Conservation Significant Fauna	19
4.4 Matters of National Environmental Significance	23
4.4.1 Environment Protection and Biodiversity Conservation Act 1999	23
4.5 Matters of State Environmental Significance	23
4.5.1 Environmental Protection Act WA 1986	23
4.5.2 Biodiversity Conservation Act 2016	24
5 Environmental Management Measures	25
6 Bibliography	26

Tables

Table 2-1: Soil landscape systems within the Assessment Area	5
Table 4-1: Likelihood of occurrence for conservation significant flora within the Assessment Area.....	13
Table 4-2: Pre-European Vegetation Associations with the Assessment Area.....	16
Table 4-3: Vegetation Types-M53/191 Survey (Botanica, 2020b)	17
Table 4-4: Fauna Habitats-M53/191 Survey (Botanica, 2020b).....	18
Table 4-5: Likelihood of occurrence for Threatened and Priority Fauna within the Assessment Area	21

Figures

Figure 1-1: Assessment Area	2
Figure 1-2: Regional map of the Assessment Area.....	3
Figure 2-1: Map of IBRA bioregions in relation to the Assessment Area	4
Figure 2-2: Soil Landscape Systems.....	6
Figure 2-3: Regional hydrology of the Assessment Area	8
Figure 2-4: Conservation areas in relation to the Assessment Area	9

APPENDICES

- Appendix A: Conservation Significant Species/ Communities Categories (BC Act and EPBC Act)
- Appendix B: Conservation significant flora records in relation to the Assessment Area
- Appendix C: Database Search Results

1 INTRODUCTION

Botanica Consulting Pty Ltd (Botanica) were commissioned by Northern Star Resources Limited (Northern Star) to conduct a desktop environmental assessment of the proposed Invicta Waste Rock Landform (WRL) (referred to as the 'Assessment Area') to provide supporting documentation for a Mining Proposal submission. The Invicta WRL is located within tenement M53/191. The assessment area covers an area of approximately 49 ha (Figure 1-1) and is located at the Jundee Mine Site approximately 47 km north-east of Wiluna, Western Australia (Figure 1-2).

The objectives of the desktop assessment were to:

1. Conduct a literature review, database and map-based searches of flora and fauna with the potential to occur within the Assessment Area;
2. Provide a summary of vegetation communities and fauna habitats potentially present within the Assessment Area (based on results of database information and existing surveys conducted in the local area);
3. Assess the potential for significant flora and fauna to occur within the Assessment Area;
4. Assess the State and Commonwealth legislative requirements relevant to the Assessment Area; and
5. Summarise management measures to be implemented to minimise impacts to flora/ fauna within the Assessment Area.



Figure 1-1: Assessment Area

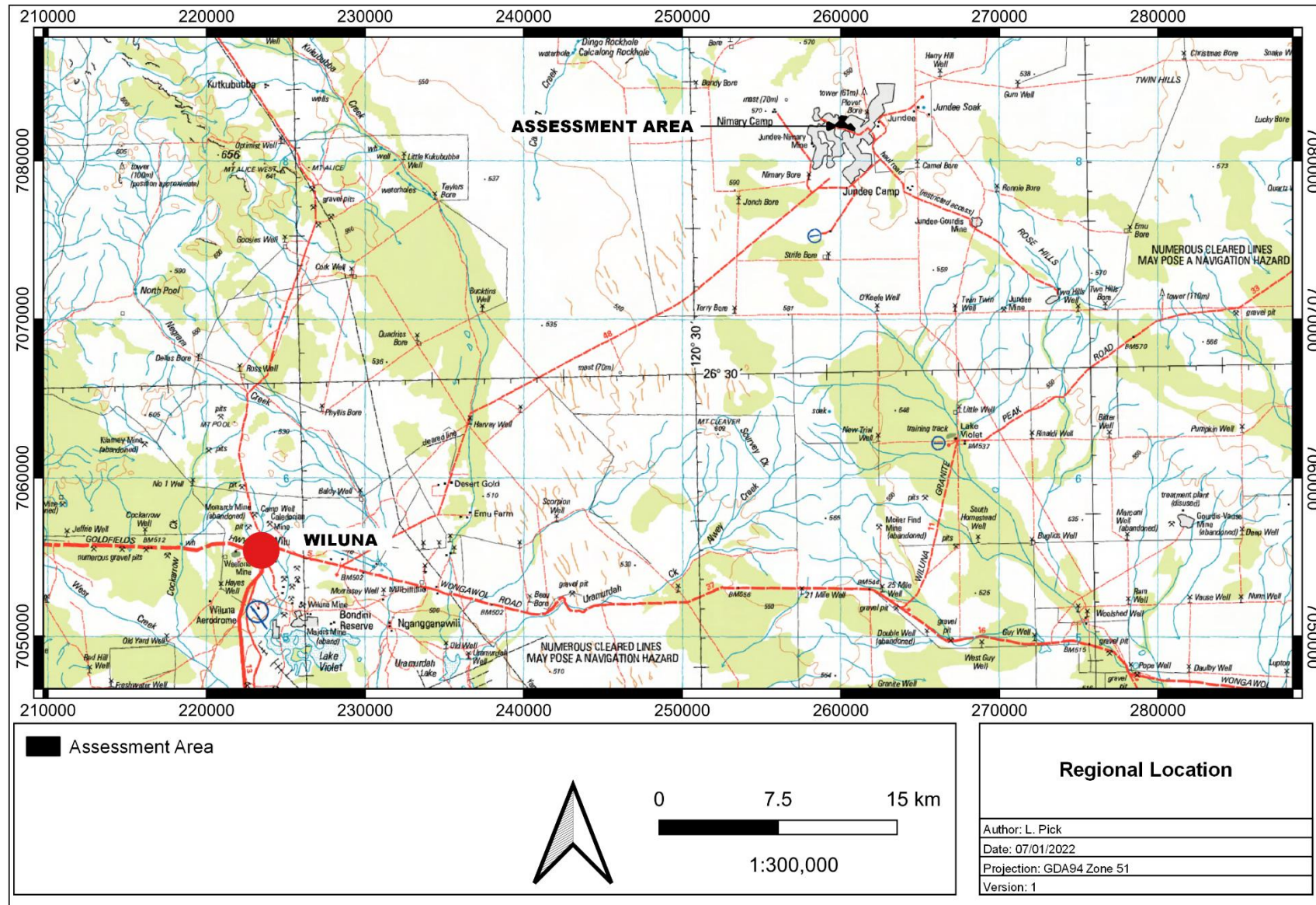


Figure 1-2: Regional map of the Assessment Area

2 EXISTING ENVIRONMENT

2.1 Regional Setting

The Assessment Area occurs in the Murchison Bioregion (Figure 1-2), as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) classification system (McKenzie, 2003). The Murchison Bioregion is further divided into two subregions; Eastern Murchison (MUR1), and Western Murchison (MUR2) subregions with the Assessment Area located within the Eastern Murchison subregion.

The Eastern Murchison comprises the northern parts of the craton's Southern Cross and Eastern Goldfields Terrains and is characterised by internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt Lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaways complexes as well as red sandplains are widespread. Vegetation is dominated by Mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and *Tecticornia* shrublands (Cowan, 2001).



Figure 2-1: Map of IBRA bioregions in relation to the Assessment Area

2.2 Land Use

The dominant land uses of the Eastern Murchison subregion have been defined as grazing – native pastures (85.47%), Unallocated Crown Land (UCL) and Crown Reserves (11.34%), mining (1.79%) and Conservation Reserves which account for 1.4% of the land use (Cowan, 2001).

2.3 Soil Landscape Systems

Based on geographic information provided by the Department of Primary Industries and Regional Development (DPIRD, 2014) the Assessment Area is located within the Murchison Province. The Murchison Province, which consists of hardpan wash plains and sandplains (with some stony plains, hills, mesas and salt lakes) on the granitic rocks and greenstone of the Yilgarn Craton. The Murchison Province is located in the inland Mid-west and northern Goldfields between Three Springs, the Gascoyne River, Wiluna, Cosmo Newberry and Menzies Soil types consist of red loamy earths, red sandy earths, red shallow loams, red deep sands and red-brown hardpan shallow loams with some red shallow sands and red shallow sandy duplexes present. Vegetation communities are predominately Mulga shrublands with spinifex grasslands, with areas of bowgada shrublands, Eucalypt woodlands and halophytic shrublands (Tille, 2006).

The Murchison Province is further divided into soil-landscape zones, with the Assessment Area located within the Salinaland Plains Zone (279). The Salinaland Plains Zone comprises of sandplains (with hardpan wash plains and some mesas, stony plains and salt lakes) on granitic rocks (and some greenstone) of the Yilgarn Craton. Soils include red sandy earths, red deep sands, red shallow loams and red loamy earths with some red-brown hardpan shallow loams, salt lake soils and red shallow sandy duplexes. Vegetation consists of mulga shrublands with spinifex grasslands (and some halophytic shrublands and eucalypt woodlands). This zone is located in the northern Goldfields from Lakes Barlee and Ballard to Wiluna and Laverton (Tille, 2006).

The Salinaland Plains Zone is further divided into soil landscape systems within the Assessment Area located within two soil landscape system as described in Table 2-1 and shown in Figure 2-2.

Table 2-1: Soil landscape systems within the Assessment Area

Landscape System/ Mapping Unit	Description
Violet System	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.
Wiluna System	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs.

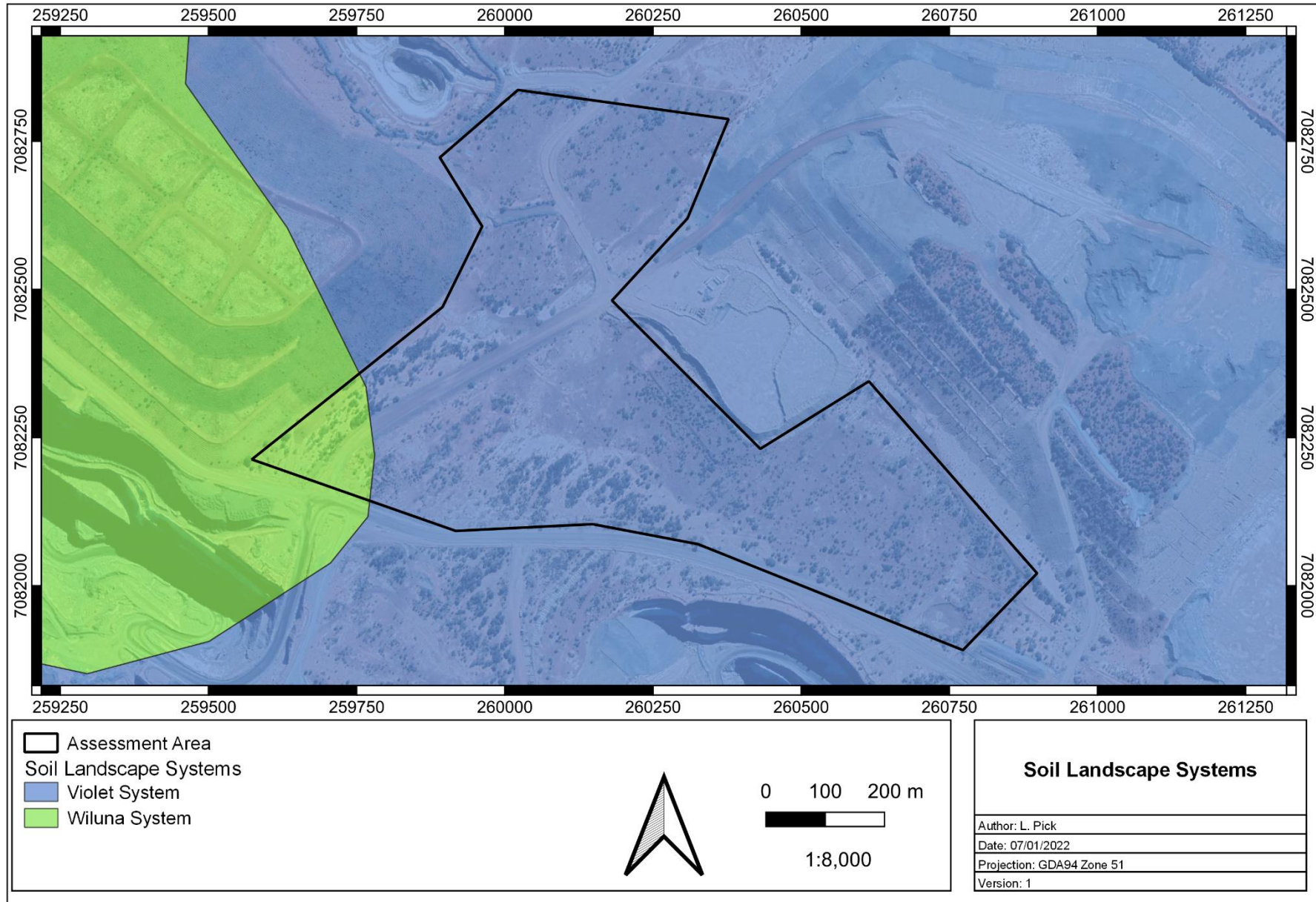


Figure 2-2: Soil Landscape Systems

2.4 Hydrology

According to the Geoscience Australia database (2015) there are no inland waters or drainage lines (perennial or ephemeral) that intersect the Assessment Area (Figure 2-3).

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. According to the BoM *Atlas of Groundwater Dependent Ecosystems* database (BoM, 2021), there are no known or potential GDEs located within the Assessment Area.

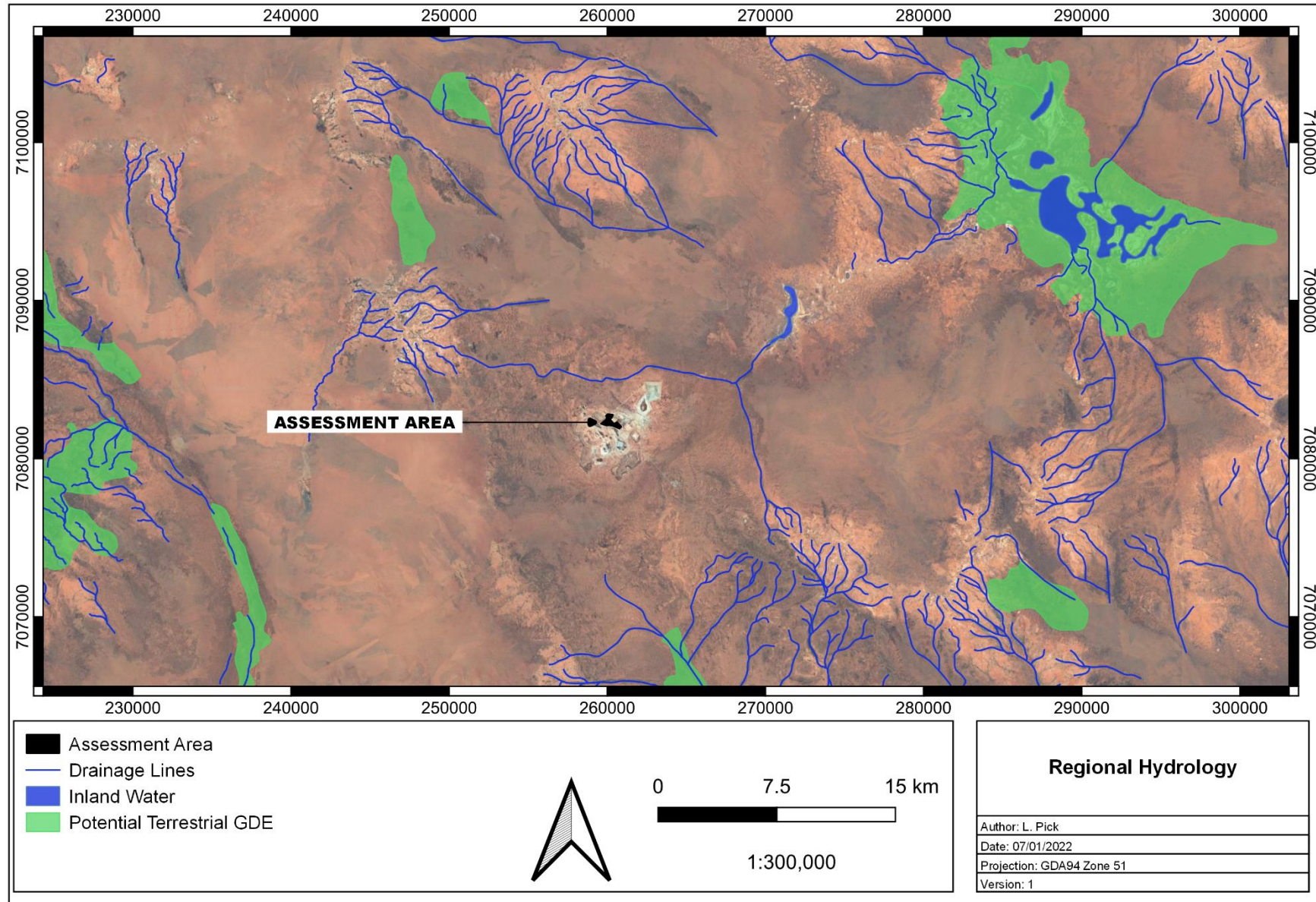


Figure 2-3: Regional hydrology of the Assessment Area

2.5 Conservation Areas

The Assessment Area is not located within an Environmentally Sensitive Area (ESA), Threatened Ecological Communities, Priority Ecological Communities or any proposed or vested Conservation Reserves.

The closest conservation area is the ex. Lorna Glenn UCL, located approximately 43 km east of the Assessment Area (Figure 2-4). Given the distance from the Assessment Area to any conservation reserves, impacts to the environmental values of conservation areas are unlikely.

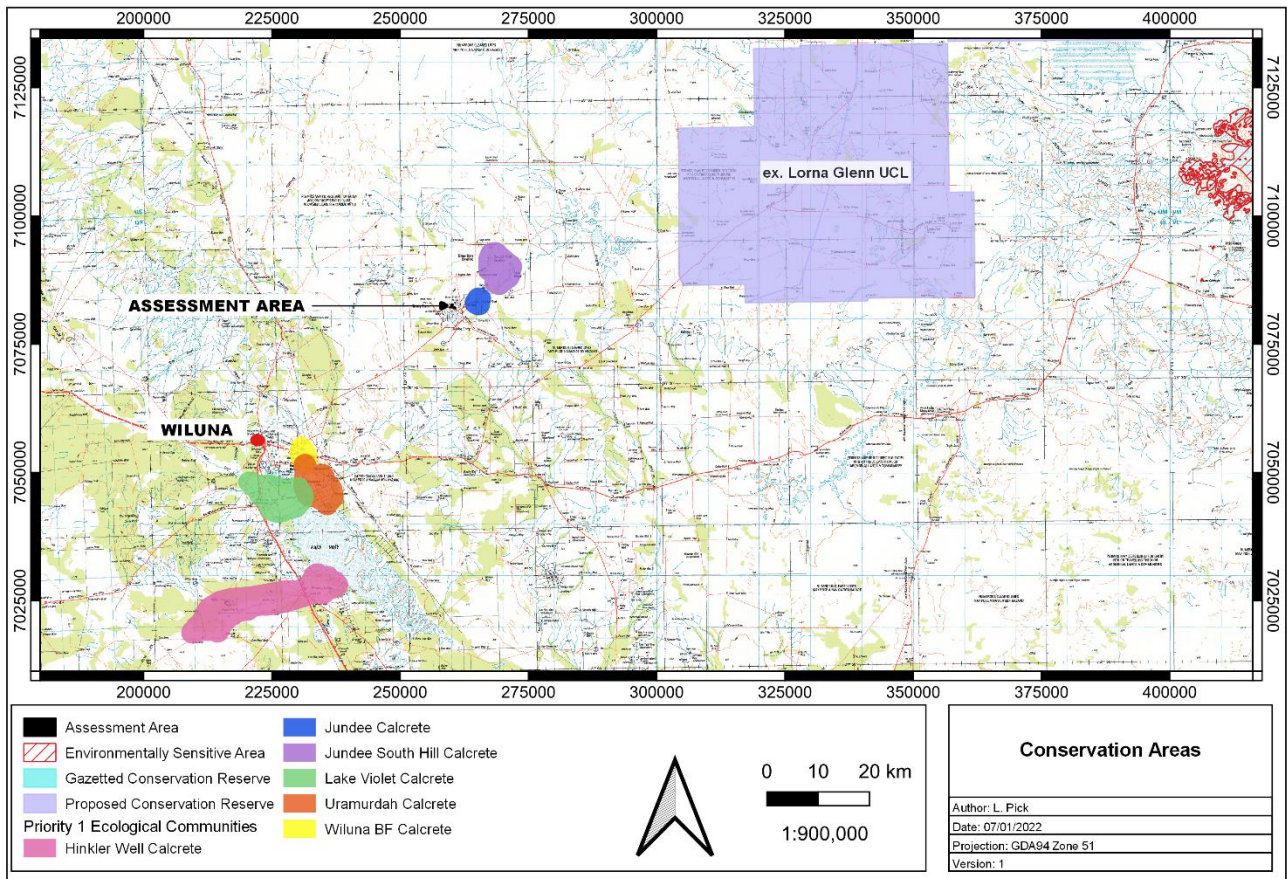


Figure 2-4: Conservation areas in relation to the Assessment Area

3 METHODOLOGY

3.1 Literature Review

A literature review was undertaken of previous flora and vegetation assessments conducted within the local area for the Jundee Project. Documents reviewed included:

- Botanica Consulting (2020a). Reconnaissance Flora/ Vegetation & Fauna Survey Jundee TSF alternative locations. Prepared for Northern Star Resources Limited.
- Botanica Consulting (2020b). Reconnaissance Flora/ Vegetation & Fauna Survey within M53/191. Prepared for Northern Star Resources Limited.
- Ecologia (1995). Jundee Gold Project Environmental Assessment.
- Hall, N.J., Newbey, K.R., McKenzie, N.L., Keighery, G.J., Rolfe, J.K & Youngson, W. K., (1993). *The Biological survey of the Eastern Goldfields of Western Australia Part 7: Sandstone-Sir Samuel. Laverton-Leonora study area*, West. Aust. Mus. Suppl. 47.

3.2 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of flora and fauna within the Assessment Area:

- DBCA Priority/ Threatened Flora Database Search (DBCA, 2019a);
- DBCA Priority/ Threatened Ecological Communities Database Search (DBCA, 2019b);
- DBCA NatureMap Database (DBCA, 2021); and
- DAWE Protected Matters search tool (DAWE, 2021).

The NatureMap and Protected Matters Search were conducted for an area encompassing a 40km radius of the Assessment Area. It should be noted that these lists are based on observations from a broader area than the assessment area (40km radius) and therefore may include taxa not present. The databases also often include very old records that may be incorrect or in some cases the taxa in question have become locally or regionally extinct. Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

The conservation significance of flora and fauna taxa was assessed using data from the following sources:

- *Environment Protection and Biodiversity and Conservation (EPBC) Act 1999*. Administered by the Australian Government (DAWE);
- *Biodiversity Conservation (BC) Act 2016*. Administered by the WA Government (DBCA);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List – the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- Priority Flora/ Fauna list. A non-legislative list maintained by DBCA for management purposes (fauna list released April 2019; flora list released December 2018).

The EPBC Act also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA)¹;
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

¹ Most but not all species listed under JAMBA are also specially protected under Specially Protected Species of the BC Act.

4 RESULTS

4.1 Flora

According to the results of the NatureMap search (DBCA, 2020), a total of 206 flora taxa have been recorded within a 40 km radius of the survey area. Dominant genera include *Acacia* and *Eremophila*. Results of database searches identified five introduced taxa as potentially occurring within a 40 km radius of the survey area:

1. *Carrichtera annua* (Wards weed)
2. *Cenchrus ciliaris* (Buffel Grass)
3. *Cynodon dactylon* (Couch)
4. *Polypogon monspeliensis* (Annual Beard grass)
5. *Tribulus terrestris* (Caltrop)



A reconnaissance flora and vegetation survey within M53/191 (referred to as 'the survey') which intersects the northern portion of the Assessment Area was conducted by Botanica in 2020 (Botanica, 2020a). A total of 13 Families, 19 Genera and 37 Taxa (including sub-species and variants) were recorded during the survey. No significant flora were identified during the survey. Two introduced species were recorded during the survey; *Cynodon dactylon* (Couch) and *Tribulus terrestris* (Caltrop). Neither species is listed as a Declared Pest under the *Biosecurity and Agriculture Management (BAM) Act 2007*.



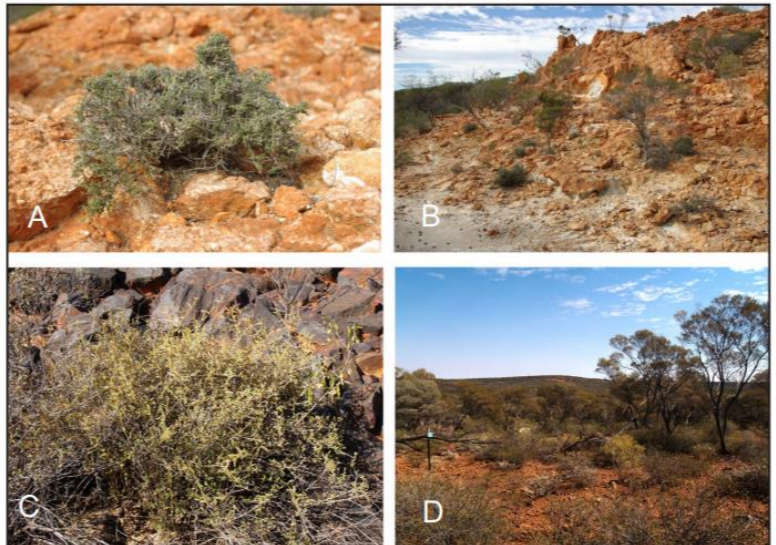
4.1.1 Conservation Significant Flora


The results of the literature review, combined search of the DBCA's Flora of Conservation Significance databases (DBCA, 2019a) and DAWE protected matters search (DAWE, 2021) recorded no Threatened Flora or Priority Flora within the Assessment Area. No Threatened Flora and a total of eleven Priority Flora taxa were listed on the databases as occurring within a 40km radius of the Assessment Area (map of flora locations provided in Appendix B). Priority Flora were assessed and ranked for the likelihood of occurrence within the Assessment Area. The rankings and criteria used were:

- Unlikely: Suitable habitat is not expected to occur and/or the survey area is outside the known range of the species.
- Possible: Suitable habitat may be present, and the area is within the known range of the species. This option is also used when there is insufficient information to determine the preferred habitat of a species.
- Likely: Suitable habitat is expected to occur and there are records within 10 km of the Assessment Area
- Previously Recorded: A record for this species is located within the Assessment Area.

Table 4-1: Likelihood of occurrence for conservation significant flora within the Assessment Area

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description ((DBCA Record, 2019a; WAHERB, 2021)	Image of known Habitat	Likelihood Assessment
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	-	-	P3	Flat plain of orange sandy clay soils with ironstone. Low plain / flat with dry red sand / clay / fluvialite gravel.	Not available	No suitable habitat identified with no ironstone/ fluvialite gravel present within the Assessment Area. The closest known record of this species is located approximately 12km north-east of the Assessment Area (recorded in 2013).
<i>Eremophila arguta</i>	-	-	P1	<ul style="list-style-type: none"> Loam soils, mulga washes Palusplain. Drainage line, Eucalypt woodlands On limestone rise. 		No suitable habitat identified with no mulga washes, drainage lines or limestone rises present within the Assessment Area. The closest known record of this species is a single record located approximately 30km south-west of the Assessment Area (recorded in 1982).
<i>Eremophila congesta</i>	-	-	P1	<ul style="list-style-type: none"> Stony rise in hard red loam. Gently inclined hillcrest with fragments of laterised banded ironstone & ochre. Lateritic outcrop in greenstone hills. Upper slopes of stony quartzite hills. 		No suitable habitat identified with no stony rises, hillslopes, BIF or lateritic outcrops present within the Assessment Area. Botanica have visited previous populations of this taxon in the local region (near Wiluna) and identified the habitat as quartzite slopes/ higher elevation adjacent to a calcrete habitat which differs from the rocky plains present within the Assessment Area. The closest known record of this species is located approximately 35km west of the Assessment Area (recorded in 1993).

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description ((DBCA Record, 2019a; WAHERB, 2021)	Image of known Habitat	Likelihood Assessment
<i>Eremophila pungens</i>	-	-	P4	<ul style="list-style-type: none"> Banded Ironstone hill. Ironstone outcrop. Small rocky breakaway. 		<p>No suitable habitat identified with no laterite, hillslopes, BIF or lateritic ridges, outcrops or breakaways present within the Assessment Area.</p> <p>Botanica have visited previous populations of this taxon in the local region (near Wiluna/ Barwidgee) and identified the habitat as stony uplands, laterite/ limonitic landforms which are not present within the Assessment Area.</p> <p>The closest known record of this species is located approximately 36km south-east of the Assessment Area (recorded in 2007).</p>
<i>Hemigenia exilis</i>	-	-	P4	Rocky lower slopes of hill sides, drainage lines.		<p>No suitable habitat identified with no rocky hill sides or drainage lines present within the Assessment Area.</p> <p>Botanica have visited previous populations of this taxon in the local region (near Wiluna/ Barwidgee) and identified the habitat as low BIF slopes adjacent to Mulga drainage line which are not present within the Assessment Area.</p> <p>The closest known record of this species is located approximately 38km south-west of the Assessment Area (recorded in 1966).</p>
<i>Ptilotus luteolus</i>	-	-	P3	Rocky slopes, screes, and ridges	Not available	<p>No suitable habitat identified with no rocky slopes, screes or ridges present within the Assessment Area.</p> <p>Nearest known location of this taxon located approximately 43km south-west which was recorded in 2004.</p>
<i>Sida picklesiana</i>	-	-	P3	Breakaways and outcrops, banded ironstone.		<p>No suitable habitat identified with no breakaways and outcrops, banded ironstone present within the Assessment Area.</p> <p>Nearest known location of this taxon located approximately 80km south-west which was recorded in 2010.</p>

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description ((DBCA Record, 2019a; WAHERB, 2021)	Image of known Habitat	Likelihood Assessment
<i>Stackhousia clementii</i>	-	-	P3	Drainage Tract-Eucalypt Woodlands with <i>Eucalyptus camaldulensis</i> and <i>Casuarina obesa</i> .		<p>No suitable habitat identified with no <i>Eucalyptus camaldulensis</i> (River Red Gum) or <i>Casuarina obesa</i> vegetation identified within the survey area. Vegetation associated with an ephemeral drainage line within the survey area comprised of Mulga woodland vegetation.</p> <p>Botanica have visited previous populations of this taxon in the local region (near Wiluna) and identified the habitat as River Red Gum creeklines. No such habitat occurs within the Assessment Area.</p> <p>Nearest known location of this taxon located approximately 55km south-west which was recorded in 1945.</p>
<i>Tribulus adelacanthus</i>	-	-	P3	<ul style="list-style-type: none"> Moderately inclined midslope with fragments of banded ironstone, haematite & quartz. Very slightly rocky banded ironstone & haematite outcrop. On hilltop. Low stony hill 		<p>No suitable habitat identified with no gravelly loams, stony slopes or banded ironstone & haematite outcrop present within the Assessment Area.</p> <p>Botanica have visited previous populations of this taxon in the local region (Booylgoo Range) and identified the habitat as stony uplands, laterite/ Banded Ironstone Formation which are not present within the Assessment Area.</p>
<i>Xanthoparmelia nashii</i>	-	-	P3	Granite breakaway	Not available	<p>No suitable habitat identified with no granite outcrops or breakaways present within the Assessment Area.</p> <p>This taxon is a lichen and has specific habitat requirements (granite) which are not present within the Assessment Area.</p>

4.2 Vegetation

The Assessment Area is situated in the Austin Botanical District within the Eremaean Botanical Province. This botanical district is predominantly Mulga low woodlands on plains, often rich in ephemerals, which reduce to scrub on hills. It is also characterised by hummock grasslands, Saltbush shrublands and Samphire shrublands (Beard, 1990). The Eremaean Province is the largest of the three botanical provinces within Western Australia. The vegetation of the Austin Botanical District of the Murchison Region is predominantly low mulga (*Acacia aneura*) woodlands on plains and reduced to scrub on hills. This district is often associated with a tree steppe of *Eucalyptus* spp. and *Triodia basedowii* on sand plains.

The Department of Primary Industries and Regional Development GIS file (DPIRD, 2018) indicates that the Assessment Area is located within Pre-European Beard vegetation association Wiluna 18. The extent of this vegetation association, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2019) is provided in Table 4-2.



Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered” (EPA, 2000). Development within the Assessment Area will not significantly reduce the extent of pre-European vegetation.

Table 4-2: Pre-European Vegetation Associations with the Assessment Area

Vegetation Association	Pre-European Extent (ha)	Pre-European extent remaining (%)	% of Current extent within DBCA managed lands	Vegetation Description (Beard, 1990)
Wiluna 18	4,273,509.57	99.59	1.05	Low woodland; mulga (<i>Acacia aneura</i>)

Two vegetation types were identified during the survey conducted by Botanica (2020b) as listed in Table 4-3. Vegetation condition across the survey area rated as in good condition. No significant vegetation was identified during the survey.

Table 4-3: Vegetation Types-M53/191 Survey (Botanica, 2020b)

Vegetation Types	Vegetation Code	Image
<p>Low woodland of <i>Acacia incurvaneura</i> over low shrubland of <i>Eremophila forrestii</i>/ <i>E. margarethae</i> and low tussock grassland of <i>Eragrostis eriopoda</i> on clay-loam plain</p>	<p>CLP-AFW1</p>	
<p>Low woodland of <i>Acacia caesaneura</i>/ <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila forrestii</i> and low hummock grassland of <i>Triodia basedowii</i> on sand-loam plain</p>	<p>SLP-AFW1</p>	

4.3 Fauna

According to the results of the NatureMap search (DBCA, 2020), a total of 152 vertebrate fauna taxa have been recorded within a 40 km radius of the Assessment Area including 87 bird species, 5 amphibians, 16 mammals and 44 reptiles. Combined results of database searches identified nine introduced taxa as potentially occurring within the Assessment Area, these being:

1. *Camelus dromedaries* (Camel)
2. *Canis lupus familiaris* (Dog)
3. *Capra hircus* (Goat)
4. *Columba livia* (Rock Pigeon)
5. *Equus asinus* (Donkey)
6. *Felis catus* (Cat)
7. *Mus musculus* (House Mouse)
8. *Oryctolagus cuniculus* (Rabbit)
9. *Vulpes vulpes* (Red Fox)

A Level 1 Fauna survey within M53/191 (referred to as 'the survey') which intersects the northern portion of the Assessment Area was conducted by Botanica in 2020 (Botanica, 2020b). Two broad scale fauna habitats were identified are based on vegetation and associated landforms identified during the flora and vegetation assessment (Table 4-4). No introduced fauna were observed during the survey however there was evidence of cattle tracks and scats within the survey area.

Table 4-4: Fauna Habitats-M53/191 Survey (Botanica, 2020b)

Fauna Habitat	Image
<p><u>Clay-Loam Plain</u> Acacia Woodland</p>	

Fauna Habitat	Image
<p><u>Sand-Loam Plain</u> Acacia Woodland</p>	

4.3.1 Conservation Significant Fauna

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the Assessment Area itself (Table 4-5). The rankings and criteria used were:

- **Would Not Occur:** There is no suitable habitat for the species in the Assessment Area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - **Locally Extinct:** Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the Assessment Area. Populations do however persist outside of this area.
 - **Regionally Extinct:** Populations no longer occur in a large part of the species natural range, in this case within the northern goldfields region. Populations do however persist outside of this area.
- **Unlikely to Occur:** The Assessment Area is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the site itself would not support a population or part population of the species
- **Possibly Occurs:** Assessment Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as likely to be present during the literature review, supported in some cases by recent records being documented in literature from within or near the Assessment Area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

- **Known to Occur:** The species in question has been positively identified as being present (for sedentary species) or as using the Assessment Area as habitat for some other purpose (for non-sedentary/mobile species) during field surveys within or near the Assessment Area. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. tracks, foraging debris, scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

Table 4-5: Likelihood of occurrence for Threatened and Priority Fauna within the Assessment Area

Species	Conservation Status			Habitat Description	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA Priority		
Malleefowl <i>Leipoa ocellata</i>	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DAWE, 2020).	Unlikely to Occur. No recent records nearby and habitat unsuitable/very marginal
Grey Falcon <i>Falco hypoleucos</i>		VU		The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (DAWE, 2020).	Possibly Occurs aerially over Assessment Area on very rare occasions. No suitable breeding habitat.
Peregrine Falcon <i>Falco peregrinus</i>	-	OS	-	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings (Birdlife Australia, 2018).	Possibly Occurs aerially over Assessment Area on very rare occasions. No suitable breeding habitat.
Migratory Shorebirds (Various species)	MI	IA	-	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland (DAWE, 2020).	Would Not Occur. No Suitable Habitat.
Grey Wagtail <i>Motacilla cinerea</i>	MI	IA	-	Running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Morecombe 2004).	Would Not Occur. No documented records in goldfields region.
Yellow Wagtail <i>Motacilla flava</i>	MI	IA	-	Occurs in a variety of damp or wet habitats with low vegetation, from rushy pastures, meadows, hay fields and marshes to damp steppe and grassy tundra (Morecombe 2004).	Would Not Occur. No documented records in the goldfields region.
Night Parrot <i>Pezoporus occidentalis</i>	EN	CR	-	Broad habitat requirements include areas of old-growth spinifex (<i>Triodia</i>) for roosting and nesting, together with foraging habitats that are likely to include various native grasses and herbs, and may or may not contain shrubs or low trees. (DPaW, 2017).	Unlikely to Occur. No recent records nearby and no suitable habitat.
Princess Parrot <i>Polytelis alexandrae</i>	VU	-	P4	Inhabits sand dunes and sand flats in the arid zone of western and central Australia. It occurs in open savanna woodlands and shrublands that usually consist of scattered stands of <i>Eucalyptus</i> (including <i>E. gongylocarpa</i> , <i>E. chippendalei</i> and mallee species), <i>Casuarina</i> or <i>Allocasuarina</i> trees; an understorey of shrubs such as <i>Acacia</i> (especially <i>A. aneura</i>), <i>Cassia</i> , <i>Eremophila</i> , <i>Grevillea</i> , <i>Hakea</i> and <i>Senna</i> ; and a ground cover dominated by <i>Triodia</i> species (DAWE, 2020)	Unlikely to Occur. Rarely recorded this far south and no recent records nearby.
Brush-tailed Mulgara <i>Dasyercus blythi</i>	-	-	P4	Occurs on sand dunes with sparse cover of sandhill cain grass or areas around salt lakes (DAWE, 2020).	Unlikely to Occur. Habitat unsuitable/very marginal

Species	Conservation Status			Habitat Description	Likelihood of Occurrence
	EPBC Act	BC Act	DBCA Priority		
Greater Bilby <i>Macrotis lagotis</i>	VU	VU		Suitable habitat includes; open tussock grassland (both grasses and forbs) growing on uplands and hills, mulga woodland/shrubland (both pure mulga and mixed stands of mulga/witchetty bush) growing on ridges and rises, and hummock grassland growing on sand plains and dunes, drainage systems, salt lake systems and other alluvial areas Pavey, C., 2006).	Unlikely to Occur. No recent records nearby and habitat unsuitable/very marginal

4.4 Matters of National Environmental Significance

4.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act protects matters of national environmental significance and is used by the Commonwealth DAWE to list threatened taxa and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The Act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance. Matters of national environmental significance as defined by the Commonwealth EPBC Act include:

- Nationally threatened flora and fauna species;
- World heritage properties;
- National heritage places;
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
- Nationally threatened ecological communities;
- Commonwealth marine area;
- The Great Barrier Reef Marine Park; and
- Nuclear actions (including uranium mining) a water resource, in relation to coal seam gas development and large coal mining development.

No matters of national environmental significance as defined by the Commonwealth EPBC Act are known to occur within the Assessment Area.

4.5 Matters of State Environmental Significance

4.5.1 *Environmental Protection Act WA 1986*

The EP Act provides for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment. The Act is administered by The Department of Water and Environment Regulation (DWER), which is the State Government's environmental regulatory agency.

Under Section 51C of the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations (Regulations) WA 2004* any clearing of native vegetation in Western Australia that is not eligible for exemption under Schedule 6 of the *EP Act 1986* or under the Regulations 2004 requires a clearing permit from the DWER or DMIRS. Under Section 51A of the *EP Act 1986* native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the *EP Act 1986* defines clearing as "the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above". Exemptions under Schedule 6 of the EP Act and the EP Regulations do not apply in ESAs as declared under Section 51B of the EP Act or TEC listed under State and Commonwealth legislation.

No TEC, Threatened Flora or Fauna are known to occur within the Assessment Area. The Assessment Area is not located within an ESA. As the clearing proposed will not exceed 10 hectares of clearing per tenement per annum, clearing for the WRL is exempt from a clearing permit.

4.5.2 Biodiversity Conservation Act 2016

This Act is used by the Western Australian DBCA for the conservation and protection of biodiversity and biodiversity components in Western Australia and to promote the ecologically sustainable use of biodiversity components in the State. Taxa are classified as 'Threatened' when their populations are geographically restricted or are threatened by local processes (see following sections for Threatened definitions). Under this Act all native flora and fauna are protected throughout the State. Financial penalties are enforced under this Act if threatened species are collected without an appropriate license.

Under Section 54(1) of the BC Act, habitat is eligible for listing as critical habitat if:

- a) it is critical to the survival of a threatened species or a threatened ecological community; and
- b) its listing is otherwise in accordance with the ministerial guidelines.

No threatened species or critical habitat listed under the BC Act are known to occur within the Assessment Area.

5 ENVIRONMENTAL MANAGEMENT MEASURES

In order to minimise impacts on flora/vegetation and fauna from the proposed clearing activities, the following measures should be implemented:

- Induction and training on presence of potential significant flora/ fauna and associated habitat to staff and contractors.
- Avoidance of clearing mature trees where possible.
- Vehicle hygiene/ weed management measures be implemented prior to any clearing to prevent introduction or spread of introduced species.

6 BIBLIOGRAPHY

ASRIS (2014). *Atlas of Australian Soils Database*. Australian Soil Resource Information System

Australian Government (2020). *National Map*. Australian Government.

Beard, J.S., (1990). *Plant Life of Western Australia*, Kangaroo Press Pty Ltd, NSW.

BoM (2021). *Groundwater Dependent Ecosystems Atlas*. Bureau of Meteorology
Available: <http://www.bom.gov.au/water/groundwater/gde/map.shtml>

Botanica Consulting (2020a). *Reconnaissance Flora/ Vegetation and Fauna Survey Jundee TSF alternative locations*. Prepared for Northern Star Resources Limited.

Botanica Consulting (2020b). *Reconnaissance Flora/ Vegetation and Fauna Survey within M53/191*. Prepared for Northern Star Resources Limited.

Curry, P.J., Payne, A.L., Leighton, K.A., Hennig, P. and Blood, D.A. (1994). *Technical Bulletin: An inventory and condition survey of the Murchison River catchment, Western Australia (No. 84)*. Department of Agriculture WA.

Cowan, M. (2001). *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2001-Eastern Murchison (MUR1 –Eastern Murchison subregion)*, Department of Conservation and Land Management.

DAWE (2021). *Protected Matters Search Tool, Environment Protection and Biodiversity Conservation Act 1999*, Department of Agriculture, Water and Environment.

DBCAs (2019). *2018 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis)*. Department of Biodiversity, Conservation and Attractions.

DBCAs (2019a). *Threatened and Priority Flora Database search results*, Department of Biodiversity, Conservation and Attractions.

DBCAs (2019b). *Threatened Ecological Community and Priority Ecological Community database search*, Department of Biodiversity, Conservation and Attractions.

DBCAs (2020). *NatureMap Database search*, Department of Biodiversity, Conservation and Attractions.

DPIRD (2014). *Soil Landscape System of Western Australia*, Department of Primary Industries and Regional Development, WA.

DPIRD (2018). *Pre-European Vegetation - Western Australia (NVIS Compliant Version GIS file)*, Department of Primary Industries and Regional Development, WA.

DPIRD (2021). *Declared Organism-database search*, Department of Primary Industries and Regional Development, Western Australia.
Available: <http://www.biosecurity.wa.gov.au/>

Duncan, Anne. & Baker, G. B. & Montgomery, Narelle. & Natural Heritage Trust (Australia) (1999). *The action plan for Australian bats* / edited by Anne Duncan, G. Barry Baker and Narelle Montgomery; with assistance from Lindy Lumsden *et al.* Natural Heritage Trust, Canberra.
Ecologia (1995). *Jundee Gold Project Environmental Assessment*.

EPA (2016a). *Technical Guide - Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016*. Environmental Protection Authority.

- EPA (2020). *Technical Guide – Terrestrial Fauna Surveys for Environmental Impact Assessment – June 2020*. Environmental Protection Authority.
- Geoscience Australia (2015). *Surface Hydrology GIS*. Australian Government.
- Hall, N.J., Newbey, K.R., McKenzie, N.L., Keighery, G.J., Rolfe, J.K & Youngson, W. K., (1993). *The Biological survey of the Eastern Goldfields of Western Australia Part 7: Sandstone-Sir Samuel Laverton-Leonora study area*, West. Aust. Mus. Suppl. 47.
- Halpern Glick Maunsell, (1997). *Barwidgee Pastoral Lease Mulgara Dasyercus cristicauda Survey*. Unpublished report prepared for Great Central Mines, November 1997.
- Hart, R.P. and Kitchener, D.J., (1986). *First Record of Sminthopsis psammophila (Marsupialia: Dasyuridae) from Western Australia*. Records of the Western Australian Museum 13(1): 139-144.
- How, R., Cooper, N.K. and Bannister, J.L. (2001). *Checklist of the mammals of Western Australia*, Records of the Western Australian Museum Supplement No. 63, 91-98.
- Jackson, S. & Groves, C. (2015). *Taxonomy of Australian mammals*. CSIRO Publishing.
- Johnstone, R.E. (2001). *Checklist of the birds of Western Australia*, Records of the Western Australian Museum Supplement No. 63, 75-90.
- Johnstone, R.E. and Storr, G.M. (1998). *Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird)*. Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). *Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch)*. Western Australian Museum, Perth Western Australia.
- Keighery, B. J., (1994). *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands.
- Masters, P., Dickman, C. R., and Crowther, M. (2003). *Effects of cover reduction on mulgara Dasyercus cristicauda (Marsupialia: Dasyuridae), rodent and invertebrate populations in central Australia: implications for land management*. Austral Ecology 28, 658-665.
- Morcombe, M. (2004). *Field Guide to Australian Birds*. Steve Parish Publishing, Archerfield, Queensland.
- Pavey, C. (2006). National Recovery Plan for the Greater Bilby *Macrotis lagotis*. Northern Territory Department of Natural Resources, Environment and the Arts.
- Pizzey, G & Knight, F. (2012). *The Field Guide to the Birds of Australia*. 9th Edition. Harper Collins, Sydney.
- Pringle, H. J. R., Van Vreeswyk, A. M. E. and Gilligan, S. A. (1994). *An inventory and condition survey of the north-eastern Goldfields, Western Australia*. Department of Agriculture Western Australia, Perth, W.A.
- Simpson, K. and Day, N. (2010), *Field Guide to the Birds of Australia*. Penguin Books, Ringwood.
- Tille, P. (2006). *Soil Landscapes of Western Australia's Rangelands and Arid Interior*, Department of Agriculture and Food Western Australia
- WAHERB, (2021). *Florabase – Information on the Western Australian Flora*, Department of Biodiversity, Conservation and Attractions.
Available: <https://florabase.dpaw.wa.gov.au/>

Appendix A: Conservation Significant Species/ Communities Categories (BC Act and EPBC Act)

Definitions of Conservation Significant Species

Code	Category
State categories of Threatened and Priority species	
Threatened Species (T)	
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).	
CR	<p>Critically Endangered</p> <p>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”.</p> <p>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.</p>
EN	<p>Endangered</p> <p>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”.</p> <p>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.</p>
VU	<p>Vulnerable</p> <p>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”.</p> <p>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.</p>
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	<p>Extinct</p> <p>Species where “<i>there is no reasonable doubt that the last member of the species has died</i>”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p> <p>Published as presumed extinct under schedule 4 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> for extinct fauna or the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for extinct flora.</p>
EW	<p>Extinct in the Wild</p> <p>Species that “<i>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</i>”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>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.</p>
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.	
IA	<p>International Agreement/ Migratory</p> <p>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).</p> <p>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 <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (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.</p>

Code	Category
	Published as migratory birds protected under an international agreement under schedule 5 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
CD	Species of special conservation interest 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 <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
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 <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
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.	
P1	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.
P2	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.
P3	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.
P4	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.
Commonwealth categories of Threatened species	
EX	Extinct Taxa where there is no reasonable doubt that the last member of the species has died.
EW	Extinct in the Wild Taxa where it 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.

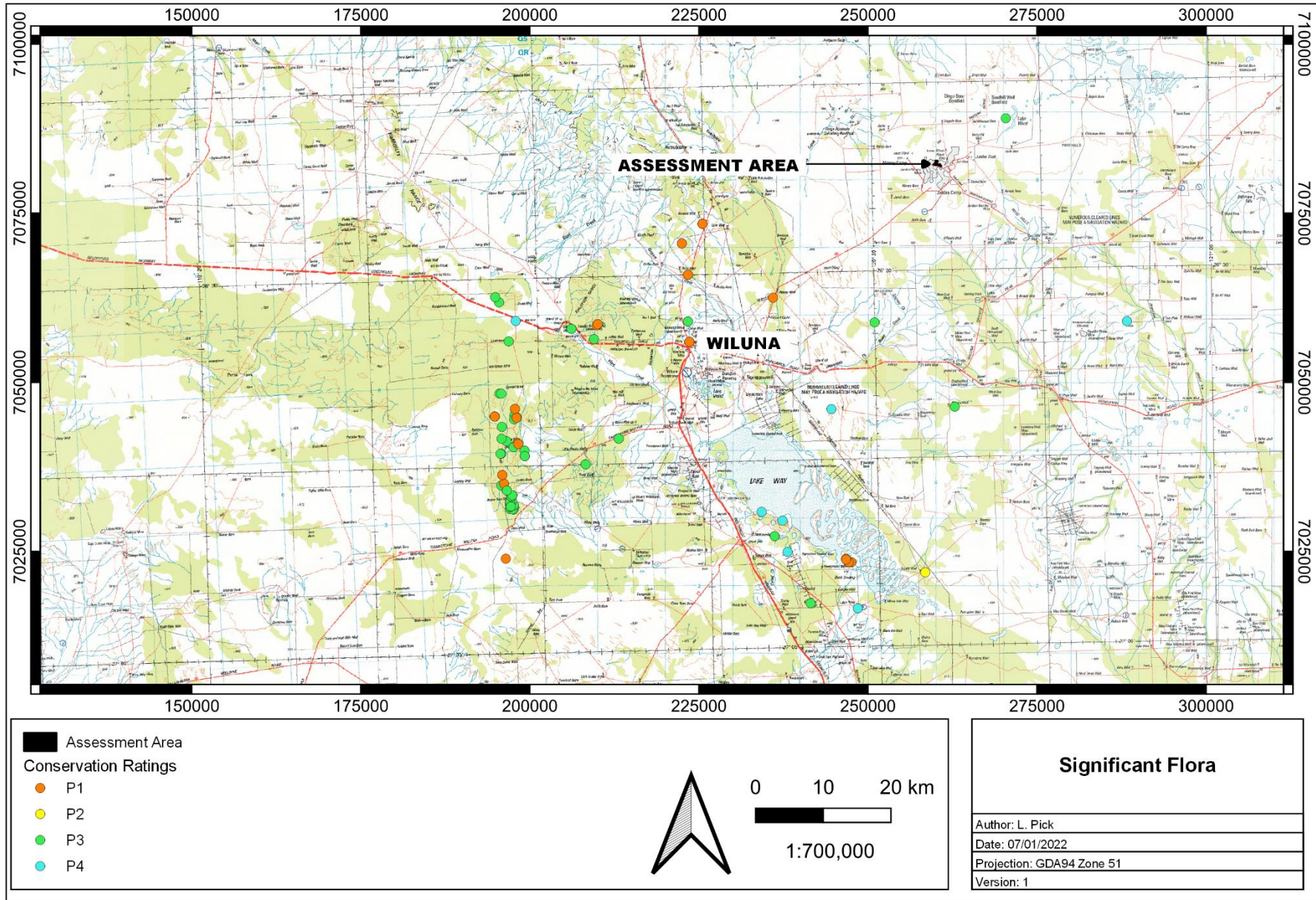
Code	Category
CR	Critically Endangered Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
EN	Endangered Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
VU	Vulnerable Taxa which are 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.
CD	Conservation Dependent Taxa which are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Definitions of conservation significant communities

Category Code	Category
State categories of Threatened Ecological Communities (TEC)	
PD	Presumed Totally Destroyed An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies: <ul style="list-style-type: none">• records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or;• all occurrences recorded within the last 50 years have since been destroyed.
	Critically Endangered An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria: The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; The ecological community is highly modified with potential of being rehabilitated in the immediate future.
	Endangered An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria: The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short-term future, or is unlikely to be substantially rehabilitated in the short-term future due to modification; The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; The ecological community is highly modified with potential of being rehabilitated in the short-term future.
VU	Vulnerable

Category Code	Category
	An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria:
	The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated;
	The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution;
	The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.
Commonwealth categories of Threatened Ecological Communities (TEC)	
CE	Critically Endangered If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
EN	Endangered If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
VU	Vulnerable If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).
Priority Ecological Communities	
P1	Poorly-known ecological communities Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	Poorly-known ecological communities Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, un-allocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	Poorly known ecological communities Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	Conservation Dependent ecological communities Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix B: Conservation significant flora records in relation to the Assessment Area



Appendix C: Database Search Results

NatureMap Species Report

Created By Guest user on 02/04/2020

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 120° 35' 28" E, 26° 21' 25" S
Buffer 40km
Group By Species Group

Species Group	Species	Records
Amphibian	5	61
Bird	87	804
Dicotyledon	171	296
Gymnosperm	2	7
Invertebrate	10	17
Lichen	9	13
Mammal	16	108
Monocotyledon	32	45
Pteridophyte (Fern)	1	1
Reptile	44	179
TOTAL	377	1531

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Amphibian				
1.	25375 <i>Cyclorana maini</i> (Sheep Frog)			
2.	25392 <i>Litoria rubella</i> (Little Red Tree Frog)			
3.	25422 <i>Neobatrachus aquilonius</i> (Northern Burrowing Frog)			
4.	25427 <i>Neobatrachus sutor</i> (Shoemaker Frog)			
5.	25428 <i>Neobatrachus wilmorei</i> (Plonking Frog)			
Bird				
6.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
7.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
8.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
9.	24264 <i>Acanthiza robustirostris</i> (Slaty-backed Thornbill)			
10.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
11.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
12.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
13.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
14.	24312 <i>Anas gracilis</i> (Grey Teal)			
15.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
16.	25670 <i>Anthus australis</i> (Australian Pipit)			
17.	25528 <i>Aphelocephala leucopsis</i> (Southern Whiteface)			
18.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
19.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
20.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
21.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
22.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
23.	<i>Barnardius zonarius</i>			
24.	25715 <i>Cacatua roseicapilla</i> (Galah)			
25.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
26.	24564 <i>Certhionyx variegatus</i> (Pied Honeyeater)			
27.	47909 <i>Cheramoeca leucosterna</i> (White-backed Swallow)			
28.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
29.	25601 <i>Chrysococcyx lucidus</i> (Shining Bronze Cuckoo)			
30.	24434 <i>Chrysococcyx osculans</i> (Black-eared Cuckoo)			
31.	25580 <i>Cinclusoma castaneothorax</i> (Chestnut-breasted Quail-thrush)			
32.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
33.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
34.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
35.	24416 <i>Corvus bennetti</i> (Little Crow)			
36.	25593 <i>Corvus orru</i> (Torresian Crow)			
37.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
38.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
39.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
40.	24322 <i>Cygnus atratus</i> (Black Swan)			
41.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
42.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
43.	24290 <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)			
44.	47937 <i>Euseyornis melanops</i> (Black-fronted Dotterel)			
45.	<i>Eolophus roseicapillus</i>			
46.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
47.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
48.	25621 <i>Falco berigora</i> (Brown Falcon)			
49.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
50.	24473 <i>Falco hypoleucos</i> (Grey Falcon)		T	
51.	25623 <i>Falco longipennis</i> (Australian Hobby)			
52.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
53.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
54.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
55.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
56.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
57.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
58.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
59.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
60.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
61.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
62.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
63.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
64.	47997 <i>Melanodryas cucullata</i> (Hooded Robin)			
65.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
66.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
67.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
68.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
69.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
70.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
71.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
72.	24380 <i>Peltohyas australis</i> (Inland Dotterel)			
73.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
74.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
75.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
76.	24748 <i>Platycercus varius</i> (Mulga Parrot)			
77.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
78.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
79.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
80.	25706 <i>Pomatostomus temporalis</i> (Grey-crowned Babbler)			
81.	<i>Ptilonorhynchus guttatus</i>			
82.	24757 <i>Ptilonorhynchus maculatus</i> subsp. <i>guttatus</i> (Western Bowerbird)			
83.	42344 <i>Purnella albifrons</i> (White-fronted Honeyeater)			
84.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
85.	30948 <i>Smicromis brevirostris</i> (Weebill)			
86.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
87.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
88.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
89.	42351 <i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			
90.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
91.	24851 <i>Turnix velox</i> (Little Button-quail)			
92.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			

Dicotyledon

93.	3217 <i>Acacia aneura</i> (Mulga, Wanari)
94.	37260 <i>Acacia aptaneura</i>
95.	3232 <i>Acacia ayersiana</i>
96.	3248 <i>Acacia burkittii</i> (Sandhill Wattle)
97.	36417 <i>Acacia caesaneura</i>
98.	3264 <i>Acacia colletioides</i> (Wait-a-while)
99.	3300 <i>Acacia dictyophleba</i> (Sandhill Wattle, Ngarkalya)
100.	15287 <i>Acacia heteroneura</i> var. <i>prolixa</i>
101.	36418 <i>Acacia incurvaneura</i>
102.	3392 <i>Acacia jamesiana</i>
103.	3393 <i>Acacia jennerae</i>
104.	3399 <i>Acacia kempeana</i> (Witchetty Bush, Ilykuwara)
105.	37240 <i>Acacia macraneura</i>
106.	36416 <i>Acacia mulganeura</i>

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
107.	3475 <i>Acacia pachyacra</i>			
108.	3500 <i>Acacia pruinocarpa</i> (Gidgee)			
109.	3507 <i>Acacia quadrimarginea</i>			
110.	19483 <i>Acacia ramulosa</i> var. <i>linophylla</i>			
111.	3577 <i>Acacia tetragonophylla</i> (Kurara, Wakalpuka)			
112.	3609 <i>Albizia lebeck</i>			
113.	2372 <i>Amyema fitzgeraldii</i> (Pincushion Mistletoe)			
114.	13265 <i>Amyema miraculosa</i> subsp. <i>boormanii</i>			
115.	40917 <i>Androcalva loxophylla</i>			
116.	7836 <i>Angianthus tomentosus</i> (Camel-grass)			
117.	2333 <i>Anthobolus leptomerioides</i>			
118.	6952 <i>Anthotroche pannosa</i> (Felted Anthotroche)			
119.	7413 <i>Brunonia australis</i> (Native Cornflower)			
120.	15885 <i>Brunonia australis</i> var. <i>A Kimberley Flora</i> (K.F. Kenneally 5452)			
121.	35056 <i>Calandrinia</i> sp. <i>Lumeah</i> (R.W. Purdie 2168)			
122.	7903 <i>Calotis hispidula</i> (Bindy Eye)			
123.	34358 <i>Calotis</i> sp. <i>Carnarvon Range</i> (D.J. Edinger & K.F. Kenneally D 2708 K 12243)			
124.	5446 <i>Calytrix carinata</i>			
125.	5451 <i>Calytrix desolata</i>			
126.	9138 <i>Calytrix watsonii</i>			
127.	7922 <i>Cephalopterum drummondii</i> (Pompom Head)			
128.	3756 <i>Chorizema genistoides</i>			
129.	12612 <i>Chrysocephalum apiculatum</i>			
130.	47153 <i>Chrysocephalum apiculatum</i> subsp. <i>glandulosum</i>			
131.	12613 <i>Chrysocephalum eremaeum</i>			
132.	17095 <i>Corymbia lenziana</i>			
133.	6957 <i>Cyphanthera miersiana</i>			
134.	7433 <i>Dampiera dentata</i>			
135.	6753 <i>Dicrastylis brunnea</i>			
136.	6759 <i>Dicrastylis flexuosa</i>			
137.	6774 <i>Dicrastylis sessilifolia</i>			
138.	12023 <i>Diplopeltis stuartii</i> var. <i>stuartii</i> (Desert Pepperflower)			
139.	4779 <i>Dodonaea rigida</i>			
140.	6966 <i>Duboisia hopwoodii</i> (Pituri, Kundugu)			
141.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
142.	19846 <i>Enekbatus eremaeus</i>			
143.	7180 <i>Eremophila alternifolia</i> (Poverty Bush)			
144.	15178 <i>Eremophila arguta</i>		P1	
145.	14635 <i>Eremophila citrina</i>			
146.	15177 <i>Eremophila congesta</i>		P1	
147.	14895 <i>Eremophila decipiens</i> subsp. <i>decipiens</i>			
148.	12951 <i>Eremophila enata</i>			
149.	7207 <i>Eremophila foliosissima</i>			
150.	7209 <i>Eremophila fraseri</i> (Burra)			
151.	16732 <i>Eremophila gilesii</i> subsp. <i>gilesii</i>			
152.	14191 <i>Eremophila glabra</i> subsp. <i>tomentosa</i>			
153.	17172 <i>Eremophila hughesii</i> subsp. <i>hughesii</i>			
154.	17171 <i>Eremophila jucunda</i> subsp. <i>jucunda</i>			
155.	7230 <i>Eremophila latrobei</i> (Warty Fuchsia Bush, Mintjingka)			
156.	7233 <i>Eremophila linearis</i> (Harlequin Fuchsia Bush)			
157.	7234 <i>Eremophila longifolia</i> (Berrigan, Tulypurpa)			
158.	16363 <i>Eremophila maculata</i> subsp. <i>brevifolia</i> (Native Fuchsia)			
159.	15157 <i>Eremophila malacoides</i>			
160.	7239 <i>Eremophila margarethae</i> (Sandbank Poverty Bush)			
161.	15054 <i>Eremophila platythamnos</i> subsp. <i>exotrachys</i>			
162.	15055 <i>Eremophila platythamnos</i> subsp. <i>platythamnos</i>			
163.	7256 <i>Eremophila punctata</i>			
164.	16793 <i>Eremophila pungens</i>		P4	
165.	7269 <i>Eremophila serrulata</i> (Serrate-leaved Eremophila)			
166.	7272 <i>Eremophila spinescens</i>			
167.	15168 <i>Eremophila spuria</i>			
168.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
169.	35345 <i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> (Blunt-budded River Red Gum)			
170.	5636 <i>Eucalyptus eremicola</i>			
171.	20300 <i>Eucalyptus eremicola</i> subsp. <i>peeneri</i>			
172.	5660 <i>Eucalyptus gongylocarpa</i> (Marble Gum, Baarla)			
173.	15670 <i>Eucalyptus kochii</i> subsp. <i>plenissima</i>			
174.	5703 <i>Eucalyptus lucasii</i> (Barlee Box)			
175.	29733 <i>Eucalyptus trivalva</i> (Victoria Spring Mallee)			
176.	5209 <i>Frankenia pauciflora</i> (Seaheath)			

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177.	3907 <i>Gastrolobium laytonii</i> (Breelya, Prilya)			
178.	7989 <i>Gnephosis brevifolia</i> (Short-leaved Gnephosis)			
179.	6151 <i>Gonocarpus ephemerus</i>			
180.	7507 <i>Goodenia eremophila</i>			
181.	12530 <i>Goodenia macroplectra</i>			
182.	7529 <i>Goodenia mueckeana</i>			
183.	1946 <i>Grevillea acacioides</i>			
184.	15845 <i>Grevillea juncifolia</i> subsp. <i>juncifolia</i>			
185.	2077 <i>Grevillea pterosperma</i>			
186.	2096 <i>Grevillea stenobotrya</i>			
187.	2784 <i>Gyrostemon ramulosus</i> (Corkybark)			
188.	2163 <i>Hakea francisiana</i> (Emu Tree)			
189.	2182 <i>Hakea minyma</i>			
190.	2200 <i>Hakea rhombales</i>			
191.	29840 <i>Halgania cyanea</i> var. <i>Allambi Strn</i> (B.W. Strong 676)			
192.	6688 <i>Halgania erecta</i>			
193.	16371 <i>Haloragis odontocarpa</i> forma <i>pterocarpa</i>			
194.	6180 <i>Haloragis trigonocarpa</i>			
195.	6707 <i>Heliotropium curassavicum</i> (Smooth Heliotrope)			
196.	17308 <i>Heliotropium moorei</i>			
197.	6853 <i>Hemigenia exilis</i>		P4	
198.	4043 <i>Kennedia prorpens</i>			
199.	13289 <i>Lawrencella davenportii</i>			
200.	4953 <i>Lawrenzia densiflora</i>			
201.	3033 <i>Lepidium oxytrichum</i>			
202.	4055 <i>Leptosema chambersii</i>			
203.	13258 <i>Leucochrysum stipitatum</i>			
204.	7669 <i>Levenhookia chippendalei</i>			
205.	2396 <i>Lysiana casuarinae</i>			
206.	2398 <i>Lysiana murrayi</i> (Mistletoe, Parka-Parka)			
207.	4728 <i>Macgregoria racemigera</i> (Snow Flower)			
208.	2556 <i>Maireana planifolia</i> (Low Bluebush)			
209.	12949 <i>Marsdenia australis</i>			
210.	5908 <i>Melaleuca eleuterostachya</i>			
211.	20288 <i>Melaleuca interioris</i>			
212.	3053 <i>Menkea sphaerocarpa</i>			
213.	5995 <i>Micromyrtus flaviflora</i>			
214.	4098 <i>Mirbelia rhagodioides</i>			
215.	4664 <i>Monotaxis luteiflora</i>			
216.	8114 <i>Myriocephalus appendiculatus</i> (White-tip Myriocephalus)			
217.	6786 <i>Newcastelia cephalantha</i>			
218.	6789 <i>Newcastelia cladotricha</i> (Lambs Tail)			
219.	3674 <i>Petalostylis cassioides</i>			
220.	11185 <i>Pimelea microcephala</i> subsp. <i>microcephala</i>			
221.	5271 <i>Pimelea trichostachya</i> (Spiked Riceflower)			
222.	8167 <i>Pluchea dentex</i>			
223.	8176 <i>Podolepis kendallii</i>			
224.	8188 <i>Pogonolepis stricta</i>			
225.	15822 <i>Prostanthera althoferi</i> subsp. <i>althoferi</i>			
226.	18154 <i>Psydax latifolia</i>			
227.	2691 <i>Ptilotus albidus</i>			
228.	2708 <i>Ptilotus chamaecladus</i>			
229.	2731 <i>Ptilotus helipteroides</i> (Hairy Mulla Mulla)			
230.	35576 <i>Ptilotus luteolus</i>		P3	
231.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
232.	2755 <i>Ptilotus rotundifolius</i> (Royal Mulla Mulla)			
233.	10809 <i>Ptilotus sessilifolius</i>			
234.	13246 <i>Rhodanthe humboldtiana</i>			
235.	6484 <i>Samolus repens</i> (Creeping Brookweed)			
236.	2359 <i>Santalum spicatum</i> (Sandalwood, Wilarak)			
237.	7599 <i>Scaevola basedowii</i>			
238.	13172 <i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>			
239.	13285 <i>Schoenia ayersii</i>			
240.	17558 <i>Senna artemisioides</i> subsp. <i>x artemisioides</i>			
241.	12275 <i>Senna artemisioides</i> subsp. <i>x coriacea</i>			
242.	12283 <i>Senna artemisioides</i> subsp. <i>x sturtii</i>			
243.	18444 <i>Senna charlesiana</i>			
244.	12305 <i>Senna glutinosa</i> subsp. <i>chatelainiana</i>			
245.	12315 <i>Senna pleurocarpa</i> var. <i>angustifolia</i>			
246.	14578 <i>Senna</i> sp. <i>Billabong</i> (J.D. Alonzo 721)			

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247.	40861 <i>Sida picklesiana</i>		P3	
248.	4986 <i>Sida platycalyx</i> (Lifesaver Burr)			
249.	7018 <i>Solanum lasiophyllum</i> (Flannel Bush, Mindjulu)			
250.	11241 <i>Solanum orbiculatum</i> subsp. <i>orbiculatum</i> (Round-leaved Solanum)			
251.	4729 <i>Stackhousia clementii</i>		P3	
252.	4732 <i>Stackhousia megaloptera</i>			
253.	3076 <i>Stenopetalum filifolium</i>			
254.	12355 <i>Swainsona affinis</i>			
255.	4220 <i>Swainsona canescens</i> (Grey Swainsona)			
256.	7363 <i>Synaptantha tillaeacea</i>			
257.	33318 <i>Tecticornia indica</i> subsp. <i>leiostachya</i> (Samphire)			
258.	13298 <i>Thiseltonia gracillima</i>			
259.	6273 <i>Trachymene glaucifolia</i> (Wild Carrot)			
260.	18065 <i>Tribulus adelacanthus</i>		P3	
261.	4383 <i>Tribulus terrestris</i> (Caltrop)	Y		
262.	7664 <i>Velleia rosea</i> (Pink Velleia)			
263.	48986 <i>Vincetoxicum lineare</i>			

Gymnosperm

264.	96 <i>Callitris preissii</i> (Rottnest Island Pine, Maro)
265.	8637 <i>Callitris verrucosa</i>

Invertebrate

266.	<i>Argiope protensa</i>
267.	<i>Cormocephalus turneri</i>
268.	<i>Hoggicosa bicolor</i>
269.	<i>Hoggicosa storri</i>
270.	<i>Isometroides vescus</i>
271.	<i>Lamponina scutata</i>
272.	<i>Missulena insignis</i>
273.	<i>Scolopendra laeta</i>
274.	<i>Scolopendra morsitans</i>
275.	<i>Urodacus hoplurus</i>

Lichen

276.	27574 <i>Acarospora citrina</i>
277.	27703 <i>Collema coccophorum</i>
278.	48194 <i>Collema novozelandicum</i>
279.	27734 <i>Endocarpon aridum</i>
280.	28000 <i>Psora decipiens</i>
281.	28105 <i>Xanthoparmelia antleriformis</i>
282.	18000 <i>Xanthoparmelia nashii</i>
283.	28168 <i>Xanthoparmelia prodomokosii</i>
284.	28188 <i>Xanthoparmelia weberii</i>

Mammal

285.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)
286.	30903 <i>Dasycercus blythi</i> (Brush-tailed Mulgara, Ampurta)
287.	48395 <i>Dasycercus</i> sp. (<i>mulgara</i>)
288.	24041 <i>Felis catus</i> (Cat)
289.	25489 <i>Macropus robustus</i> (Euro, Biggada)
290.	24136 <i>Macropus rufus</i> (Red Kangaroo, Marlu)
291.	24223 <i>Mus musculus</i> (House Mouse)
292.	24094 <i>Ningauai ridei</i> (Wongai Ningau)
293.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)
294.	24106 <i>Pseudantechinus woolleyae</i> (Woolley's Pseudantechinus)
295.	24235 <i>Pseudomys desertor</i> (Desert Mouse)
296.	24237 <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)
297.	24199 <i>Scotorepens balstoni</i> (Inland Broad-nosed Bat)
298.	24109 <i>Sminthopsis dolichura</i> (Little long-tailed Dunnart)
299.	24116 <i>Sminthopsis macroura</i> (Stripe-faced Dunnart)
300.	24117 <i>Sminthopsis ooldea</i> (Ooldea Dunnart)

Monocotyledon

301.	196 <i>Amphipogon caricinus</i> (Long Greybeard Grass)
302.	212 <i>Aristida inaequiglumis</i> (Feathertop Threawn)
303.	17918 <i>Aristida jerichoensis</i> var. <i>subspinulifera</i>
304.	279 <i>Cymbopogon ambiguus</i> (Scentgrass)
305.	281 <i>Cymbopogon obiectus</i> (Silkyheads)
306.	283 <i>Cynodon dactylon</i> (Couch)
307.	310 <i>Digitaria brownii</i> (Cotton Panic Grass)
308.	48378 <i>Diplachne fusca</i> subsp. <i>fusca</i>
309.	357 <i>Enneapogon caerulescens</i> (Limestone Grass)

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310.	358 <i>Enneapogon cylindricus</i> (Jointed Nineawn)			
311.	380 <i>Eragrostis eriopoda</i> (Woollybutt Grass, Wangurnu)			
312.	381 <i>Eragrostis falcata</i> (Sickle Lovegrass)			
313.	387 <i>Eragrostis lanipes</i> (Creeping Wanderrie)			
314.	392 <i>Eragrostis pergracilis</i>			
315.	393 <i>Eragrostis setifolia</i> (Neverfail Grass)			
316.	403 <i>Eriachne benthamii</i> (Swamp Wanderrie)			
317.	408 <i>Eriachne flaccida</i> (Claypan Grass)			
318.	413 <i>Eriachne mucronata</i> (Mountain Wanderrie Grass)			
319.	16486 <i>Eriachne pulchella</i> subsp. <i>pulchella</i>			
320.	11011 <i>Eulalia aurea</i>			
321.	14541 <i>Lomandra leucocephala</i> subsp. <i>robusta</i> (Woolly Mat-rush)			
322.	490 <i>Monachather paradoxus</i>			
323.	494 <i>Neurachne minor</i>			
324.	515 <i>Paraneurachne muelleri</i> (Northern Mulga Grass)			
325.	10975 <i>Paspalidium basicladum</i>			
326.	518 <i>Paspalidium clementii</i> (Clements Paspalidium)			
327.	582 <i>Polypogon monspeliensis</i> (Annual Beardgrass)	Y		
328.	675 <i>Thyridolepis multiculmis</i> (Soft Wanderrie Grass)			
329.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
330.	680 <i>Triodia basedowii</i> (Lobed Spinifex)			
331.	17877 <i>Triodia melvillei</i>			
332.	1392 <i>Wurmbea deserticola</i>			

Pteridophyte (Fern)

333.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			
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Reptile

334.	30833 <i>Amphibolurus longirostris</i> (Long-nosed Dragon)			
335.	25339 <i>Chelodina steindachneri</i> (Flat-shelled Turtle)			
336.	24869 <i>Ctenophorus caudicinctus</i> subsp. <i>mensarum</i> (Ring-tailed Dragon)			
337.	25459 <i>Ctenophorus isolepis</i> (Crested Dragon, Military Dragon)			
338.	24875 <i>Ctenophorus isolepis</i> subsp. <i>gularis</i> (Central Military Dragon)			
339.	24882 <i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
340.	24886 <i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
341.	24889 <i>Ctenophorus scutulatus</i> (Lozenge-marked Dragon)			
342.	25025 <i>Ctenotus ariadnae</i>			
343.	25032 <i>Ctenotus calurus</i>			
344.	25041 <i>Ctenotus grandis</i> subsp. <i>grandis</i>			
345.	25045 <i>Ctenotus helenae</i>			
346.	25052 <i>Ctenotus leonhardii</i>			
347.	25463 <i>Ctenotus pantherinus</i> (Leopard Ctenotus)			
348.	25064 <i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i> (Leopard Ctenotus)			
349.	25074 <i>Ctenotus schomburgkii</i>			
350.	25465 <i>Ctenotus uber</i> (Spotted Ctenotus)			
351.	24997 <i>Delma butleri</i>			
352.	25001 <i>Delma nasuta</i>			
353.	25468 <i>Demansia psammophis</i> (Yellow-faced Whipsnake)			
354.	24926 <i>Diplodactylus conspicillatus</i> (Fat-tailed Gecko)			
355.	24930 <i>Diplodactylus granariensis</i> subsp. <i>rex</i>			
356.	24940 <i>Diplodactylus pulcher</i>			
357.	25092 <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)			
358.	25109 <i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
359.	24959 <i>Gehyra variegata</i>			
360.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
361.	25125 <i>Lerista bipes</i>			
362.	25130 <i>Lerista desertorum</i>			
363.	25155 <i>Lerista muelleri</i>			
364.	42411 <i>Lerista timida</i>			
365.	25184 <i>Menetia greyii</i>			
366.	25190 <i>Morethia butleri</i>			
367.	25254 <i>Parasuta monachus</i>			
368.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
369.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
370.	25009 <i>Pygopus nigriceps</i>			
371.	24982 <i>Rhynchoedura ornata</i> (Western Beaked Gecko)			
372.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
373.	24927 <i>Strophurus elderi</i>			
374.	24949 <i>Strophurus wellingtonae</i>			
375.	25210 <i>Varanus brevicauda</i> (Short-tailed Pygmy Monitor)			
376.	25211 <i>Varanus caudolineatus</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
377.	25526 <i>Varanus tristis</i> (Racehorse Monitor)			

Conservation Codes

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

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



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Jan-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	5
Listed Migratory Species:	6

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

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 Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

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

Details

Matters of National Environmental Significance

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

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area	In feature area

MAMMAL

Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat may occur within area	In feature area
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Listed Migratory Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Migratory Wetlands Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

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.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51749]	WA	In buffer area only
Commonwealth Land - [51748]	WA	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Controlled action					
Wiluna Uranium Project	2009/5174	Controlled Action	Post-Approval	In buffer area only	
Not controlled action					
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area	

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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