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Coolgardie landfill

Flora, vegetation and fauna habitat
assessment

DRAFT

Prepared for
Shire of Coolgardie
by Strategen

April 2019

Coolgardie landfill

**Flora, vegetation and fauna habitat
assessment**

DRAFT

Strategen is a trading name of
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April 2019

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Client: Shire of Coolgardie

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- Appendix 2 Desktop assessment results (Parks and Wildlife 2007-, DEE 2017c)
- Appendix 3 Photographic record of site and vegetation types
- Appendix 4 Vascular plant taxa recorded from quadrats within the survey area

1. Introduction

1.1 Background

The Shire of Coolgardie (the Shire) proposes to expand the existing Coolgardie landfill facilities, located approximately 3 km to the west of Coolgardie town centre on Great Eastern Highway, to accept Class III and IV wastes from within and outside the Shire.

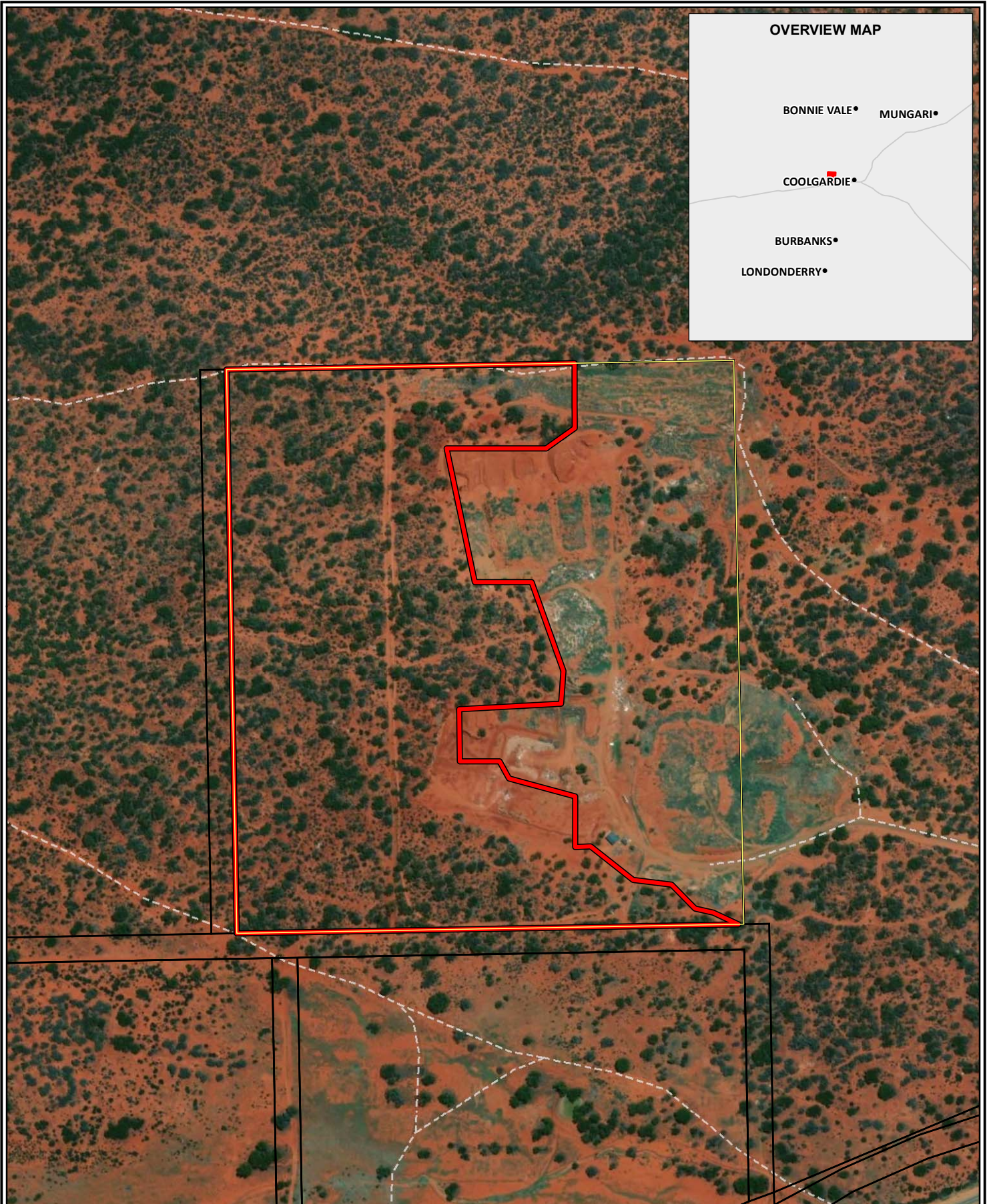
The proposed works will require clearing of approximately 24.7 ha of native vegetation and as such, a flora, vegetation and fauna habitat survey was deemed necessary to determine the environmental values of the potential clearing area.

1.2 Scope

The scope of this survey was to undertake a desktop assessment and field assessment within the Survey Area (Figure 1).

The objectives were to:

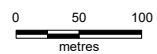
- conduct a desktop survey for Threatened and Priority flora potentially present in or around the Survey Area
- conduct a desktop survey for Threatened and Priority fauna species potentially present in or around the Survey Area
- collect and identify the vascular plant species present within the Survey Area
- define and map the native vegetation communities present within the Survey Area
- map vegetation condition within the Survey Area
- describe fauna habitat within the Survey Area
- provide recommendations on the local and regional significance of the vegetation communities
- prepare a report summarising the findings.



Legend

- Survey area
- Prescribed premises boundary
- Cadastral boundary
- Track

Scale 1:6,000 at A4



Coord. Sys. GDA 1994 MGA Zone 51



Job No: 58097

Client: Shire of Coolgardie

Version: A

Date: 09-Sep-2020

Drawn By: cthatcher

Checked By: HS

Coolgardie, WA

SURVEY AREA

FIGURE 1



2. Context

2.1 Legislative context

Flora and fauna in WA is protected formally and informally by various legislative and non-legislative measures, which are as follows:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Australian Government
- *Biodiversity Conservation Act 2016* (BC Act) – State
- *Environmental Protection Act 1986* (EP Act) – State
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) – State.

Non-legislative measures:

- WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists for flora, ecological communities and fauna
- Weeds of National Significance
- Recognition of locally significant populations by the DBCA.

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

2.1.1 EPBC Act

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

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

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

2.1.2 BC Act

DBCA lists taxa (flora and fauna) under the provisions of the BC Act as protected and are classified as according to their need for protection (see Appendix 1). The BC Act makes it an offence to 'take' threatened species without an appropriate licence. There are financial penalties for contravening the BC Act.

2.1.3 EP Act

Threatened flora, fauna (and significant habitat necessary for the maintenance of indigenous fauna) and Threatened Ecological Communities (TECs) are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Exemptions for a clearing permit do not apply in an ESA.

2.1.4 BAM Act

The BAM Act provides for management and control of listed organisms, including introduced flora species (weeds). Species listed as declared pests under the BAM Act are classified under three categories:

- C1 Exclusion: Pests assigned under this category are not established in Western Australia, and control measures are to be taken to prevent them entering and establishing in the State.
- C2 Eradication: Pests assigned under this category are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
- C3 Management: Pests assigned under this category are established in Western Australia, but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area that is currently free of that pest.

Under the BAM Act, land managers are required to manage populations of declared pests as outlined under the relevant category.

2.2 Environmental setting

2.2.1 Soils and topography

The survey area is located within the Coolgardie 3 (COO3 - Eastern Goldfields subregion of Western Australia). The topography of the region comprises gently undulating plains with low hills and ridges of Archaean greenstone in the west and Proterozoic basic granulite in the east. The underlying geology is of eroded gneisses and granites overlaid with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan 2001).

2.2.2 Climate

The Coolgardie locality experiences arid, non-seasonal to semi-arid mediterranean climate (Beard 1990). The nearest Bureau of Meteorology (BoM) weather station at Southern Cross Airfield (Station No. 12320) provides average monthly climate statistics for the Coolgardie locality (Figure 2). Average annual rainfall recorded at Southern Cross Airfield since 1996 is 308.2 mm (BoM 2019). Rainfall may occur at any time of year but predominantly in winter. Highest temperatures occur in January, with an average monthly maximum of 34.7°C (BoM 2019). Lowest temperatures occur in July, with an average monthly minimum of 16.6°C (BoM 2019).

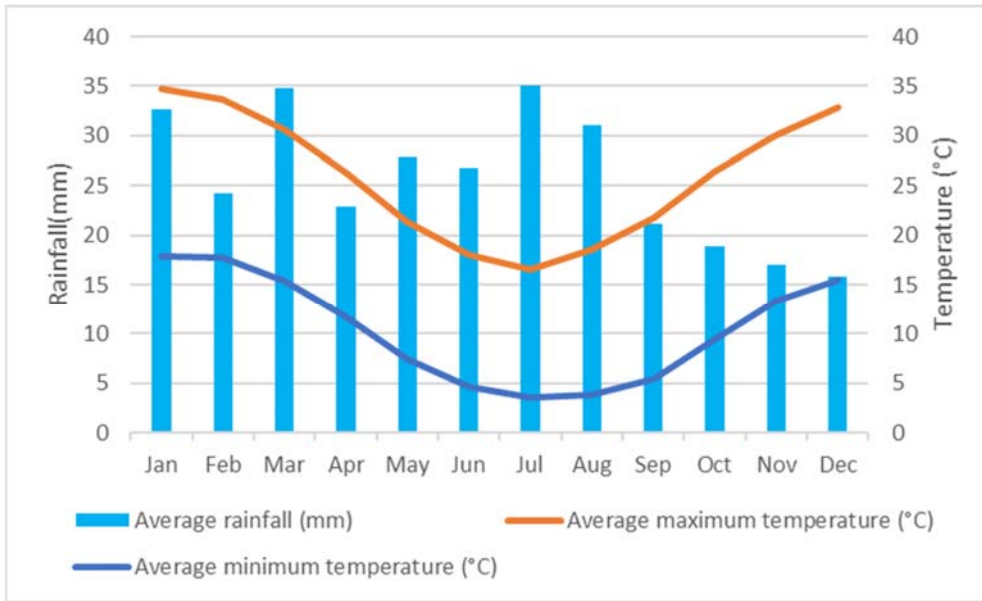


Figure 2: Mean monthly climatic data (temperature and rainfall) for Southern Cross Airfield

Figure 3 illustrates the actual monthly rainfall recorded in 2018. As detailed rainfall data was not available from Southern Cross Airfield, rainfall statistics were taken from the Koorarawalyee weather station (BoM 2019b). The survey was conducted on 18 December 2018, approximately five weeks following a peak in rainfall occurring on 11 November 2018.

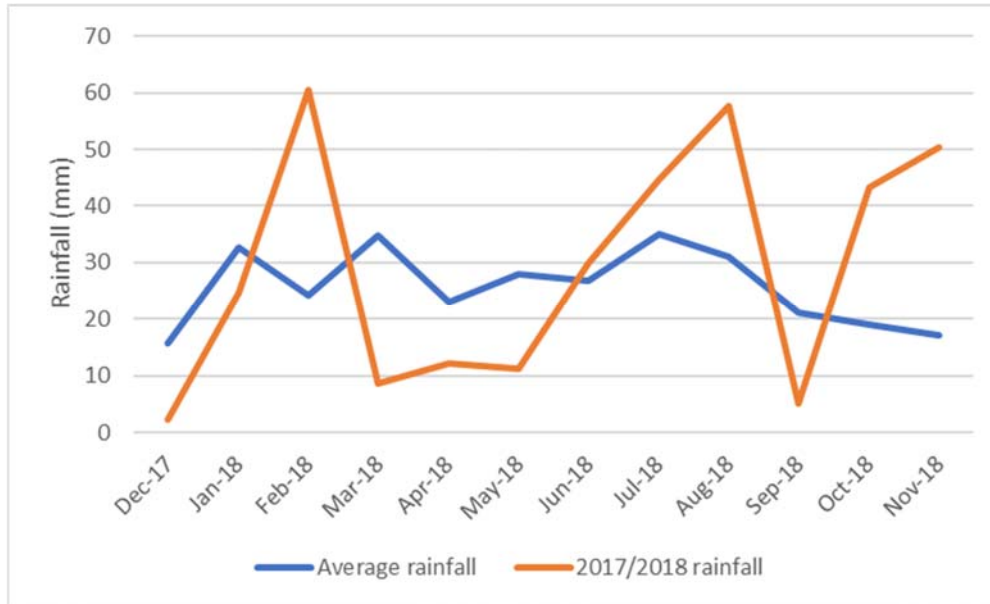


Figure 3: Average vs. actual rainfall at Koorarawalyee

2.2.3 Regional vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1:1 000 000) by Beard during the 1970s. This dataset has formed the basis of several regional mapping systems, including physiographic regions defined by Beard (1981) which led to the delineation of botanical districts as described in Beard (1990), and the biogeographical region dataset (Interim Biogeographical Regionalisation for Australia, IBRA) for Western Australia (DEE 2019a).

Beard (1990) Botanical District

The survey area occurs within the Coolgardie Botanical District which is characterised predominantly by eucalypt woodlands with low salt-tolerant heath on the more calcareous soils. Patches of shrub-steppe are present where the district meets the Great Victoria Desert, and scrub-heath with *Casuarina* thickets occur on sandplains (Beard 1990).

IBRA subregion

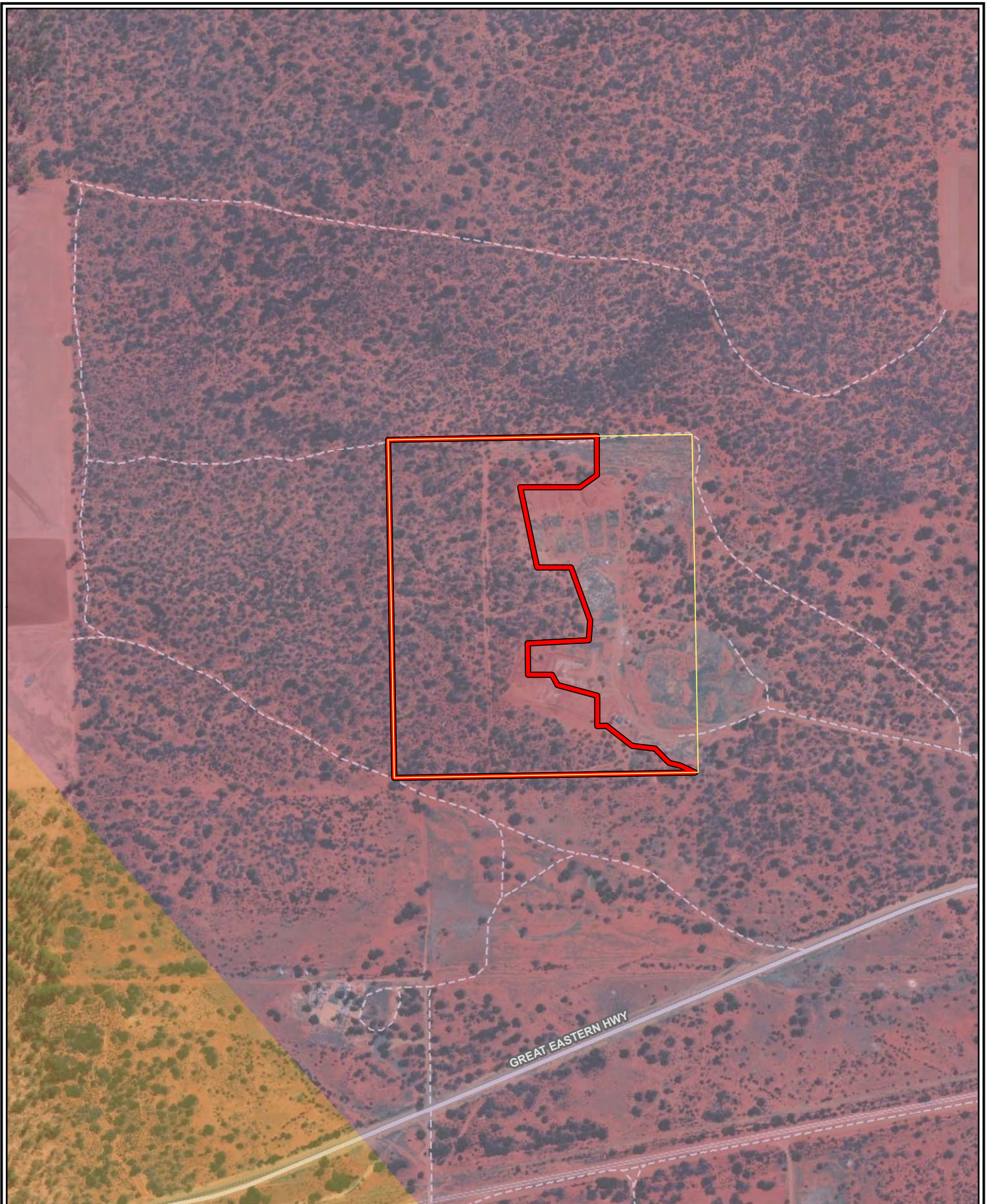
IBRA describes a system of 85 'biogeographic regions' (bioregions) and 403 subregions covering the entirety of the Australian continent (Thackway & Cresswell 1995). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna.

The survey area occurs within the Coolgardie 3 (Eastern Goldfields) subregion which is dominated by mallee eucalypts, acacia thickets and shrub-heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys, while dwarf shrublands of samphire species occur on salt lakes (Cowan 2001).

Vegetation system association

Vegetation occurring within the region was initially mapped at a broad scale (1: 1 000 000) by Beard during the 1970s. This dataset formed the basis of several regional mapping systems, including the biogeographical region dataset (Interim Biogeographic Regionalisation for Australia) for Western Australia (DEE 2017) and physiographic regions defined by Beard (1981).

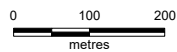
The Survey Area comprises one Beard (1981) vegetation association (Figure 4), Coolgardie 9, defined as medium woodland; redwood (*Eucalyptus transcontinentalis*) & merrit (*E. floctoniae*). The majority of this association is still intact, with 98.8% of pre-European extent remaining (GoWA 2019). The Survey Area falls close to the boundary of Coolgardie 522 (medium woodland of coral gum [*Eucalyptus torquata*] & goldfields blackbutt [*E. le soufii*]).



Legend

- Survey area
- Prescribed premises boundary
- Pre-European vegetation**
- Coolgardie 522
- Coolgardie 9
- Major road
- Track

Scale 1:10,000 at A4



Coord. Sys. GDA 1994 MGA Zone 51



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Client: Shire of Coolgardie

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Drawn By: cthatcher

Checked By: HS

Coolgardie, WA

REGIONAL VEGETATION MAPPING

FIGURE 4



3. Methods

3.1 Flora and vegetation

3.1.1 Desktop assessment

A desktop assessment was conducted using Florabase, Parks and Wildlife, and Department of the Environment and Energy (DEE) databases to identify the possible occurrence of TECs, PECs and Threatened and Priority flora potentially occurring within the survey area. Reports that document regional flora, vegetation and fauna within the surrounds of the survey area were also reviewed prior to the field assessment.

A database search request was also submitted to the Threatened Communities Branch of DBCA to identify any potential TECs or PECs within 5 km of the survey area.

3.1.2 Field assessment

The field survey was conducted according to standards set out in the Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016). The assessment of flora and vegetation within the survey area was undertaken by an ecologist from Strategen on 18 December 2018. Table 1 identifies staff involved in the field surveys, their role and qualifications.

Table 1: Personnel

Name	Role	Flora collection permit
R Chesney Strategen (Senior Ecologist)	Planning, fieldwork, plant identification, data interpretation and report preparation	SL012341

The survey area was traversed on foot to record changes in vegetation structure and type. Four vegetation quadrats were surveyed to identify vegetation types. Site selection for vegetation mapping was determined from aerial photographs and based on differences in structure and species composition of the communities present within the survey area.

Flora and vegetation was described and sampled systematically at each quadrat and additional opportunistic collecting was undertaken wherever previously unrecorded plants were observed. At each site, the following floristic and environmental parameters were noted:

- GPS location
- topography
- soil type and colour
- outcropping rocks and their type
- percentage cover and average height of each vegetation stratum.

For each vascular plant species, the average height, number of plants and percent cover were recorded.

All plant specimens collected during the field surveys were identified using appropriate reference material or through comparisons with pressed specimens housed at the Western Australian Herbarium where necessary. Nomenclature of the species recorded is in accordance with Western Australian Herbarium (1998-).

3.1.3 Data analysis and vegetation mapping

Due to the uniform distribution of vegetation within the survey area; quadrat data were grouped into a species by site matrix to delineate individual vegetation types (VTs) present within the survey area. Aerial photography interpretation and field notes taken during the survey were then used to develop VT mapping polygon boundaries over the survey area. These polygon boundaries were then digitised using Geographic Information System (GIS) software.

VT descriptions (though floristic in origin) have been adapted from the National Vegetation Information System (NVIS) Australian Vegetation Attribute Manual Version 6.0 (ESCAVI 2003), a system of describing structural vegetation units (based on dominant taxa). This model follows nationally-agreed guidelines to describe and represent vegetation types, so that comparable and consistent data is produced nation-wide. For the purposes of this report, a VT is considered equivalent to a NVIS sub-association as described in ESCAVI (2003).

Vegetation condition was recorded at all quadrats, and also opportunistically within the survey area during the field assessment where required. Vegetation condition was described using the vegetation condition scale for the South West Botanical Province (Keighery 1994). Vegetation condition polygon boundaries were developed using this information in conjunction with aerial photography interpretation, and were digitised as for vegetation type mapping polygon boundaries.

3.1.4 Survey limitations and constraints

Table 2 displays the evaluation of the flora and vegetation assessment against a range of potential limitations that may have an effect on that assessment. Based on this evaluation, the assessment has not been subject to constraints that would affect the thoroughness of the assessment and the conclusions reached.

Table 2: Flora and vegetation survey potential limitations and constraints

Potential limitation	Impact on assessment	Comment
Sources of information and availability of contextual information (i.e. pre-existing background versus new material).	Not a constraint.	The survey has been undertaken in the Coolgardie Botanical Subdistrict in the Eastern Goldfields bioregion, which has been well studied and documented with ample literature available (Beard 1990).
Scope (i.e. what life forms, etc., were sampled).	Not a constraint.	Due to the uniform distribution of vegetation within the survey area and timing of the survey (i.e. approximately five weeks following a peak in rainfall); sufficient life forms are likely to have been sampled to inform a Reconnaissance Survey.
Proportion of flora/fauna collected and identified (based on sampling, timing and intensity).	Not a constraint.	The proportion of flora surveyed was adequate. The entire survey area was traversed and flora species were recorded systematically.
Completeness and further work which might be needed (i.e. was the relevant survey area fully surveyed).	Not a constraint	The information collected during the survey was sufficient to assess the vegetation that was present during the time of the survey.
Mapping reliability.	Not a constraint.	Aerial photography of a suitable scale was used to map the survey area and identify potential fauna habitat. Sites were chosen from these aerials to reflect changes in community structure. Opportunistic sites were also used if differences were observed during on ground reconnaissance. Vegetation types were assigned to each site based on topography, soil type and presence/absence and percent foliage cover of vegetation.
Timing, weather, season, cycle.	Not a constraint.	Flora and vegetation surveys are normally conducted following winter rainfall in the South-West Interzone Province, ideally during spring (EPA 2016). The field assessment was conducted in December approximately five weeks following a peak in rainfall, in fine weather conditions and therefore these factors are not deemed to be constraints for a Reconnaissance Survey.
Disturbances (fire flood, accidental human intervention, etc.).	Not a constraint.	The survey area and regional surrounds have been subject to disturbance over a significant period of time. Given the wide range of this disturbance, this is not considered to be a limitation within the survey area.
Intensity (in retrospect, was the intensity adequate).	Not a constraint.	The survey area was traversed on foot and all differences in vegetation structure were recorded appropriately.
Resources (i.e. were there adequate resources to complete the survey to the required standard).	Not a constraint.	The available resources were adequate to complete the survey.
Access problems (i.e. ability to access survey area).	Not a constraint.	Existing tracks enabled adequate access to survey the vegetation and fauna within the survey area. Where access was not available by car, the area was easily traversed by foot.
Experience levels (e.g. degree of expertise in species identification to taxon level).	Not a constraint.	All survey personnel have the appropriate training in sampling and identifying the flora of the region.

3.2 Fauna habitat

3.2.1 Desktop assessment

A DBCA Threatened Fauna Database search was undertaken to identify known records of Threatened fauna in the vicinity of the Survey Area. DBCA applied a 40 km buffer in order to select an adequate number of records to demonstrate the potential species composition in proximity to the Survey Area.

Searches of NatureMap and EPBC Protected Matters Search Tool (PMST) (20 km radius from the centre of the Survey Area) were undertaken. The searches were undertaken to identify fauna species of conservation significance potentially occurring in the Survey Area (Parks and Wildlife 2007-, DEE 2019b).

4. Results

4.1 Flora and vegetation

4.1.1 Desktop assessment results

A total of 25 native vascular plant taxa from 11 plant families have the potential to occur within the survey area (Parks and Wildlife 2007-). The majority of taxa were from within the Fabaceae and Myrtaceae families.

Threatened and Priority flora

The desktop assessment identified two Threatened flora and 31 Priority flora species that have been recorded in the regional area (Table 3; Appendix 2). Of these, based on specific habitat requirements, 14 Priority flora species were considered to have the potential to occur within the Survey Area. As insufficient information was available regarding the habitat of a number of these species, a “possible” likelihood was given as their presence was unable to be definitively excluded based on habitat requirements alone.

None of the Threatened flora species identified from the regional area were considered to have the potential to occur within the Survey Area based on the lack of appropriate habitat or a restricted known distribution.

Conservation significant fauna

The desktop assessment identified three conservation significant species as either likely, possibly or unlikely to occur in the Survey Area.

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

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

Based on habitat requirements of these species, only the malleefowl (*Leipoa ocellata*) was considered to have the potential to occur within the Survey Area.

Threatened and Priority Ecological Communities

No TECs or PECs were identified within a 10 km radius of the Survey Area.

Wetlands

No wetlands were present within the Survey Area.

Table 3: Threatened and Priority flora potentially occurring within 20 km the survey area

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Acacia coatesii</i>	NA	P1	Low shrub up to 40 cm tall forming hemispherical cushions, growing in shallow, red sandy clay on flat or gently sloping ground towards the base of low greenstone ridges in open Eucalyptus woodland. Species flowers September – October (Maslin 2018).	Unlikely due to absence of preferred habitat.
<i>Acacia crenulata</i>	NA	P3	Bushy shrub or tree, 0.7 - 3 m high, flowering yellow. Occurs on clay, sandy clay, or yellow sand on rocky rises, granite outcrops and breakaways (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Acacia epedunculata</i>	NA	P1	Low spreading, rounded, multi-stemmed shrub, 0.5 - 0.65 m high. Flowers yellow in August. Occurs on yellow sandplains (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>	NA	P1	Spreading, much-branched shrub, 0.25-2.5 m high, flowering yellow between September and October. Occurs on clay & loamy soils (Western Australian Herbarium 1998-).	Possible due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Acacia websteri</i>	NA	P1	Shrub, 1.2-5 m high with fibrous bark, flowering yellow. Occurs on red sand, clay or loam on low-lying areas, flats (Western Australian Herbarium 1998-).	Possible due to presence of preferred habitat.
<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>	NA	P3	Dioecious or monoecious shrub, 1-3 m high occurring on stony loam or laterite clay, on granite outcrops (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Alyxia tetanifolia</i>	NA	P3	Erect, rigid shrub, 1-2 m high to 2.5 m wide. Flowers white – cream between May and June or November. Occurs on sandy clay, loam and concretionary gravel on drainage lines and near lakes (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Austrostipa blackii</i>	NA	P3	Tufted perennial herb to 1 m high, flowering September to November (Western Australian Herbarium 1998-). No habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Austrostipa</i> sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	NA	P1	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Austrostipa</i> sp. Dowerin (G. Wiehl F 8004)	NA	P2	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i>	NA	P3	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Dampiera plumosa</i>	NA	P1	Erect perennial herb, 0.15 - 0.2 m in height, flowering blue in October. Occurs on red sandy soils (Western Australian Herbarium 1998-).	Possible due to presence of preferred habitat.
<i>Diocirea microphylla</i>	NA	P3	Rounded shrub reaching 0.45 - 0.9 m in height and 1 m in width. Flowers November to December. Occurs on red-brown clay loam (Western Australian Herbarium 1998-).	Possible due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Eremophila caerulea</i> subsp. <i>merrallii</i>	NA	P4	Spreading or sprawling shrub to 0.35 m high and 0.8 m wide. Flowers blue-purple between October and December. Occurs on sand, clay or loam on undulating plains (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Eremophila praecox</i>	NA	P1	Broom-like shrub, 1.5-3 m high. Flowers purple in October or December. Occurs on red / brown sandy loam on undulating plains.	Unlikely due to absence of preferred habitat.
<i>Eremophila veronica</i>	NA	P3	Spreading, erect shrub, 0.5 - 1 m high, flowering purple between April and May. Occurs on stony clay or clay loam on lateritic breakaways (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Eucalyptus exigua</i>	NA	P3	Mallee eucalypt, 2 - 5 m high. Flowers white-cream in March. Occurs on sandy loam and white sand on sandplains (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>	NA	P1	Spreading mallee eucalypt to 3 m high, with 'minni-ritchi' bark. Flowers yellow between September and November. Occurs on rocky rises (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Gastrolobium graniticum</i>	Endangered	T	Erect, open shrub, to 2.5 m high. Flowers yellow, orange and red between August and September. Occurs on sand, sandy loam, and granite. Occurs on margins of rock outcrops and along drainage lines (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Gompholobium cinereum</i>	NA	P3	Shrub to 0.3 m high. Occurs on yellow sand, clayey sand, brown loam, sandy gravel or laterite in well-drained open sites, slopes or plains. Also known from roadsides (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Grevillea georgeana</i>	NA	P3	Erect to widely spreading shrub, up to 3 m in height and 4 m wide. Flowers red / red, pink and cream, between January and March or September and November. Occurs on stony loam / clay on ironstone hilltops & slopes (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Hakea rigida</i>	NA	P2	Shrub reaching 2.7 m in height. Flowers September to October. Occurs on sandy soils and yellow sand (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Lepidium merrallii</i>	NA	P2	Erect to spreading annual (possibly ephemeral) herb, 0.03 - 0.15 m in height. Occurs on clay loam (Western Australian Herbarium 1998-).	Possible due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Lepidosperma</i> sp. Parker Range (N. Gibson & M. Lyons 2094)	NA	P1	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Leucopogon</i> sp. Kambalda (J. Williams s.n. PERTH 07305028)	NA	P3	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Myriophyllum petraeum</i>	NA	P4	Aquatic annual herb with stems 0.15 - 0.3 m long. Flowers white between August and December. Strictly confined to ephemeral rock pools on granite outcrops (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Notisia intonsa</i>	NA	P3	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Phebalium appressum</i>	NA	P1	Rounded shrub, approximately 1 m high. Flowers white in July. Occurs on yellow sandplains (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Phebalium clavatum</i>	NA	P2	Upright shrub, 0.5-1.5 m high. Flowers white between August and September. Occurs on sandy soils on sandplains (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.
<i>Phlegmatospermum eremaeum</i>	NA	P3	Prostrate to spreading annual herb, 0.02-0.1 m high. Flowers white-cream in Jun or August to October. Occurs on stony loam (Western Australian Herbarium 1998-).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Thryptomene</i> sp. Coolgardie (E. Kelso s.n. 1902)	NA	P1	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Thryptomene</i> sp. Londonderry (R.H. Kuchel 1763)	NA	P1	No description or habitat information available.	Possible. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat.
<i>Tetrateca spenceri</i>	NA	T	Clumped shrub, 0.5 – 0.6 m high and 0.8–1 m wide. Flowers pink between November and December. Only known from a single population occurring on low, lateritic outcrops c. 43 km south-east of Coolgardie where it occurs primarily on drainage channels (Butcher & Cockerton 2012).	Unlikely due to absence of preferred habitat.

Table 4: Threatened and Priority fauna potentially occurring within 20 km of the survey area

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Actitis hypoleucos</i> (Common Sandpiper)	Migratory, Marine	International Agreement (CAMBA, JAMBA, ROKAMBA)*	Habitat includes a wide range of coastal wetlands and inland wetlands, with varying levels of salinity. Mostly found around muddy margins or rocky shores and sometimes on mudflats. Also recorded in estuaries and stream deltas, upstream banks, lakes and man-made water bodies including dams and reservoirs (DEE 2019c).	Unlikely due to absence of preferred habitat.
<i>Calidris ferruginea</i> (Curlew Sandpiper)	Critically Endangered	Threatened International Agreement (CAMBA, JAMBA, ROKAMBA)*	<i>C. ferruginea</i> inhabits intertidal mudflats in sheltered coastal areas including estuaries bays and inlets as well as man-made water bodies including salt ponds, foraging among emergent vegetation (DAWE 2020). This species roosts on beaches, islets, sand spits and occasionally dunes (DAWE 2020).	Unlikely due to absence of preferred habitat.
<i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)	Vulnerable	Threatened	The majority of the remaining natural population of this species occurs in the Jarrah Forest bioregion; however, it has occasionally been recorded from drier woodland and mallee shrubland in the Wheatbelt and Goldfields regions (DEC 2012).	Possible due to presence of potential habitat.
<i>Leipoa ocellata</i> (Malleefowl)	Vulnerable	Vulnerable	Mainly found in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee, or other associated species including <i>Melaleuca 17errucos</i> and <i>Callitris 17errucose</i> , as well as <i>Eucalyptus sideroxylon</i> at the eastern limit of their distribution. Species requires a sandy substrate and abundance of leaf litter are clear requirements for nest construction (Benshemesh 2007).	Possible due to presence of preferred habitat.

Species	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
<i>Pezoporus occidentalis</i> (Night parrot)	Endangered	Threatened	Species is known from <i>Triodia</i> (<i>Spinifex</i>) grasslands and/or chenopod shrublands in the arid and semi-arid zones (DAWE 2020).	Unlikely due to absence of preferred habitat.
<i>Tringa nebularia</i> (<i>Common Greenshank, greenshank</i>)	Migratory, Marine	International Agreement (CAMBA, JAMBA, ROKAMBA)*	Inhabits a wide variety of inland wetlands and sheltered coastal habitats of varying salinity including large mudflats and saltmarsh, mangroves or seagrass. May use permanent and ephemeral terrestrial wetlands, or artificial wetlands, including sewage farms, rice crops and bores (DEE 2019c)	Unlikely due to absence of preferred habitat.

*CAMBA – China – Australia Migratory Bird Agreement
 JAMBA – Japan – Australia Migratory Bird Agreement
 ROKAMBA – Republic of Korea Migratory Bird Agreement



Legend <ul style="list-style-type: none"> Survey area Prescribed premises boundary 10km search buffer Major road 		Coolgardie, WA THREATENED AND PRIORITY FLORA WITHIN 10KM OF THE DEVELOPMENT ENVELOPE	
Priority flora species (DBCAs) <ul style="list-style-type: none"> ▲ <i>Acacia coatesii</i> ▲ <i>Acacia websteri</i> ▲ <i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i> ▲ <i>Austrostipa blackii</i> ▲ <i>Austrostipa</i> sp. Carlingup Road (S. Kern and R. Jasper LCH 18459) 		<ul style="list-style-type: none"> ● <i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i> ● <i>Dampiera plumosa</i> ● <i>Eremophila veronica</i> ● <i>Gastrolobium graniticum</i> ● <i>Grevillea georgeana</i> <i>Lepidium merrallii</i> <i>Lepidosperma</i> sp. Parker Range (N. Gibson and M. Lyons 2094) <i>Phlegmatospermum eremaeum</i> <i>Thryptomene</i> sp. Coolgardie (E. Kelso s.n. 1902) <i>Thryptomene</i> sp. Londonderry (R.H. Kuchel 1763) 	
Scale 1:110,000 at A4 			
Coord. Sys. GDA 1994 MGA Zone 51		Job No: 58097	
Client: Shire of Coolgardie		FIGURE 5	
Version: A	Date: 09-Sep-2020		
Drawn By: cthatcher	Checked By: HS		

4.1.2 Field survey results

Native flora

A total of 25 native vascular plant taxa from 11 plant families were recorded from quadrats within the Survey Area. The majority of taxa were recorded within the Fabaceae (eight taxa) and Myrtaceae (four taxa) families (Appendix 4).

Threatened and Priority flora

No Threatened flora species as listed under section 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act, or Priority flora species as listed by Western Australian Herbarium (1998-) were recorded within the Survey Area.

Introduced (exotic) taxa

No introduced (exotic) taxa were recorded within the Survey Area. This is likely a result of surveying quadrats within remnant vegetation away from disturbance areas. It is expected that introduced species would be likely to occur at the interfaces of remnant vegetation with either the landfill site or major roads.

Vegetation types

One native vegetation type (VT) was defined and mapped within the Survey Area (Appendix 3; Figure 6, Table 5). Areas containing vegetation in parkland cleared or highly degraded state have not been counted as unique native VTs but have been included in Table 5 for area calculation purposes.

Table 5: Vegetation Types

Vegetation Type	Description
1	Open mallee woodland to mallee woodland of <i>Eucalyptus yilgarnensis</i> , <i>Eucalyptus oleosa</i> subsp. <i>oleosa</i> and sometimes <i>Eucalyptus celastroides</i> subsp. <i>celastroides</i> over open shrubland of <i>Scaevola spinescens</i> , <i>Acacia ?hemiteles</i> , <i>Eremophila ionantha</i> and <i>Eremophila scoparia</i> over isolated native shrubs and herbs, with emergent <i>Eucalyptus salmonophloia</i> .
C	Cleared areas

Vegetation type coverage

The total area mapped within the survey area was approximately 24.7 ha which includes cleared areas (Table 6).

Table 6: Area (ha) covered by each VT within the survey area

VT	Area (ha)	Percentage of the Survey area
1	3.93	15.9
C	20.76	84.1
TOTAL	24.7	100

Vegetation condition

The majority of the Survey Area has been subject to low-level disturbance including informal tracks, fencing and firebreaks. The eastern boundary at the interface of the landfill has been heavily disturbed by earthworks, rubbish dumping and other site activity. As such, vegetation condition within the Survey Area ranged from Completely Degraded (where vegetation had been completely cleared) to Very Good – Excellent (Keighery 1994; Figure 6; Table 7).

Table 8 gives a numerical breakdown of the area occupied by each vegetation condition rating within the survey area.

Table 7: Vegetation condition scale (Keighery 1994)

Condition rating	Description
Pristine (1)	Pristine or nearly so, no obvious sign of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good (3)	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good (4)	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback, grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded (6)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Table 8: Area (ha) covered by each vegetation condition category within the Survey Area

Vegetation Condition	Area (ha)	Percentage of the survey area
Completely Degraded	3.93	15.9
Very Good	20.76	84.1
Total	24.7	100

Threatened and Priority Ecological Communities

No TECs or PECs are known from within 10 km of the Survey Area.

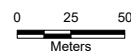
Additionally, comparison of the vegetation type recorded in the Survey Area with descriptions of known TECs and PECs indicated the vegetation within the Survey Area did not align with any known TECs and PECs (DBCA 2018, DBCA 2019, DEE 2019d).



Legend

- Survey area
- Prescribed premises boundary
- Vegetation type**
- Cleared - Completely degraded (3.934ha)
- VT1 - Very good condition (20.764ha)

Scale 1:3,500 at A4



Coord. Sys. GDA 1994 MGA Zone 51



Job No: 58097

Client: Shire of Coolgardie

Version: A

Date: 10-Sep-2020

Drawn By: cthatcher

Checked By: HS

Coolgardie, WA

VEGETATION TYPES AND CONDITION

FIGURE 6



5. Discussion

A total of 25 native vascular plant taxa from 11 plant families were recorded from quadrats within the Survey Area. The majority of taxa were recorded within the Fabaceae (eight taxa) and Myrtaceae (four taxa) families.

The desktop assessment identified 14 Priority flora species that had the potential to occur within the Survey Area due to presence of preferred habitat. None of these, or any other Threatened flora species as listed under section 178 of the EPBC Act or pursuant to Schedule 1 of the WC Act, or Priority flora species as listed by Western Australian Herbarium (1998-), were recorded within the Survey Area.

One native vegetation type (VT) was defined and mapped within the Survey Area, described as open mallee woodland to mallee woodland of *Eucalyptus yilgarnensis*, *Eucalyptus oleosa* subsp. *oleosa* and sometimes *Eucalyptus celastroides* subsp. *celastroides* over open shrubland of *Scaevola spinescens*, *Acacia ?hemiteles*, *Eremophila ionantha* and *Eremophila scoparia* over isolated native shrubs and herbs, with emergent *Eucalyptus salmonophloia*. Condition of remnant native vegetation was mapped as Very Good – Excellent condition.

No TECs or PECs are known from within or near the Survey Area.

The desktop assessment identified six conservation significant fauna species as either likely, possible or unlikely to occur in the Survey Area. Based on habitat requirements of these species, malleefowl (*Leipoa ocellata*) and Chuditch (*Dasyurus geoffroii*) were both considered to have the potential to occur within the Survey Area.

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Appendix 1
Conservation significant flora and
ecological community definitions

Conservation Codes for Western Australian Flora and Fauna (Parks and Wildlife 2017)

Specially protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

Categories of specially protected fauna and flora are:

T Threatened species

Published as Specially Protected under the Wildlife Conservation Act 1950, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

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

CR Critically endangered species

Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EN Endangered species

Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

VU Vulnerable species

Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EX Presumed extinct species

Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

IA Migratory birds protected under an international agreement

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 the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

CD Conservation dependent fauna

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

OS Other specially protected fauna

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

Priority Flora and Fauna

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 flora or fauna.

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

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

1 Priority 1: Poorly-known species

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

2 Priority 2: Poorly-known species

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

3 Priority 3: Poorly-known species

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

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

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Definition of Threatened Ecological Communities (DEC 2013)

A threatened ecological community (TEC) is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

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 (A or B):

- A)** Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats, or
- B)** All occurrences recorded within the last 50 years have since been destroyed.

Critically Endangered (CR)

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. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

- A)** The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply:
 - * geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years)
 - * modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.
- B)** Current distribution is limited, and one or more of the following apply:
 - * geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years)
 - * there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
 - * there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
- C)** The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

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. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply:

- * the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years)
- * modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, and one or more of the following apply"

- * geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years)
- * there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes
- * there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

Definition of Priority Ecological Communities (DEC 2013)

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: 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. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: 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, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: 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
- 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
- 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 by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four

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. These include:

- a) Rare.** Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.
- b) Near Threatened.** Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- c)** Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: 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 2
Desktop assessment results (Parks and
Wildlife 2007-, DEE 2017c)

Appendix 3
Photographic record of site and
vegetation types



Plate 1: VT1 in the southern section of the Survey Area



Plate 2: VT1 in the northern section of the Survey Area

Appendix 4
Vascular plant taxa recorded from
quadrats within the survey area

Family	Species
Amaranthaceae	<i>Ptilotus exaltatus</i>
Apocynaceae	<i>Marsdenia australis</i>
Asteraceae	<i>Olearia muelleri</i>
Chenopodiaceae	<i>Atriplex nummularia</i> <i>Sclerolaena diacantha</i>
Fabaceae	<i>Acacia ?hemiteles</i> <i>Acacia colletioides</i> <i>Acacia enervia</i> subsp. <i>explicata</i> <i>Acacia merrallii</i> <i>Acacia resinistipulea</i> <i>Acacia tetragonophylla</i> <i>Senna artemisioides</i> subsp. <i>filifolia</i> <i>Templetonia ceracea</i>
Goodeniaceae	<i>Scaevola spinescens</i>
Lamiaceae	<i>Westringia rigida</i>
Myrtaceae	<i>Eucalyptus celastroides</i> subsp. <i>celastroides</i> <i>Eucalyptus oleosa</i> subsp. <i>oleosa</i> <i>Eucalyptus salmonophloia</i> <i>Eucalyptus yilgarnensis</i>
Poaceae	<i>Austrostipa platychaeta</i> <i>Paspalidium gracile</i>
Santalaceae	<i>Exocarpos aphyllus</i> <i>Santalum acuminatum</i>
Scrophulariaceae	<i>Eremophila ionantha</i> <i>Eremophila scoparia</i>