OFFSET FAUNA HABITAT ASSESSMENT 2024

Covalent Lithium

ecoscape

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EXECUTIVE SUMMARY

Ecoscape undertook a targeted fauna habitat assessment survey to record fauna habitat values and determine presence of two conservation listed species (Chuditch *Dasyurus geoffroii* and Malleefowl *Leipoa ocellata*) at a Wheatbelt native vegetation remnant adjoining the Chiddarcooping Nature Reserve for the purpose of identifying potential offset sites (the survey area). The survey area (260 ha) is approximately 37 km east of the Mukinbudin town site in the Shire of Westonia.

The selection of offsets is a requirement under the EPBC Act environmental approval process and the field survey is used to confirm desktop information by ground-truthing and to provide supporting information as to the value of the fauna habitats recorded. The survey area is ranked for priority as a potential offset using:

- the habitat values
- proximity to existing Nature Reserves and conservation covenants
- connectivity to other remnant vegetation patches
- proximity to DBCA threatened and priority fauna species records from a database search.

The fauna survey was conducted by Bruce Turner (Principal Zoologist) during 16 to 18 January 2024. The survey was conducted in accordance with the requirements for a targeted survey as outlined in the Fauna Technical Guidance (EPA 2020). Bruce has been working in wildlife research and fauna consulting since 1984 (40 years) with CALM (now DBCA), CSIRO Division of Wildlife and Ecology, and Ecoscape. The information recorded during the habitat assessment is suitable for use in a Commonwealth Offset Calculator by providing information on habitat quality and characteristics.

The field survey team used techniques as described in EPA Technical Guidance and Commonwealth survey guidelines to record fauna habitat values with the following key findings:

- habitat for both targeted species was recorded;
  - Woodland (Chuditch habitat) extent – 78.12 ha
  - Shrubland (Malleefowl habitat) extent – 123.34 ha
  - Rock Outcrop (Malleefowl and Chuditch habitat) extent – 59.06 ha
- Habitat quality was assessed as being in good quality providing both shelter and forage values for the targeted species
- Malleefowl presence was recorded
- Chuditch presence was not recorded
- Introduced fauna taxa (predators) Red Fox and Cat were recorded
- The survey area was ranked at a high priority for potential offset value due to the extent of habitats, connection to adjacent Nature Reserves, evidence of Malleefowl presence, proximity to recent DBCA Malleefowl records, and connectivity to other large areas of native vegetation already under conservation covenant.

ACRONYMS AND ABBREVIATIONS

Table 1: Acronyms and abbreviations

Acronyms	
BC Act	Western Australian *Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
CD	Conservation Dependent (fauna; specially protected species under the Western Australian BC Act)
CR	Critically Endangered (listed under Commonwealth EPBC Act and/or Western Australian BC Act)
DBCA	Western Australian Department of Biodiversity, Conservation and Attractions
DPIRD	Western Australian Department of Primary Industries and Regional Development
DWER	Western Australian Department of Water and Environmental Regulation
EN	Endangered (listed under Commonwealth EPBC Act and/or Western Australian BC Act)
EP Act	Western Australian *Environmental Protection Act 1986*
EPA	Western Australian Environmental Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDA 94	Geographic Datum of Australia 1994
GIS	Geographic Information System
GPS	Global Positioning System
ha	hectare/hectares
IBRA	Interim Biogeographic Regionalisation for Australia
MGA	Map Grid of Australia
MA	Marine species (fauna; protected under international agreements and EPBC Act)
MI	Migratory species (fauna; specially protected species under the Western Australian BC Act, also EPBC Act)
MNES	Matters of National Environmental Significance
NR	Nature Reserve (DBCA managed)
OS	Other specially protected species (fauna; specially protected species under the Western Australian BC Act)
P; P1, P2, P3, P4, P5	Priority Flora and Fauna species rankings (P1-P4) or Priority Ecological Communities (P1-P5)
PMST	Protected Matters Search Tool (hosted by DAWE, used to search for MNES)
VU	Vulnerable (listed under Commonwealth EPBC Act and/or Western Australian BC Act)
WAM	Western Australian Museum

1 INTRODUCTION

1.1 BACKGROUND

Covalent Lithium is developing the Earl Grey Lithium Project (EGLP) which will include the construction and operation of a fully integrated mine, concentrator, and refinery. The mine and concentrator will be located on the Earl Grey lithium deposit 110 km south-east of Southern Cross in the Western Australia's Goldfields region.

Covalent Lithium is required to consider potential land acquisition environmental offset locations to counterbalance the environmental effect of fauna habitat (native vegetation) clearing associated with the EGLP.

The purpose of this report is to provide information on the fauna habitat values, particularly for two targeted conservation listed species, an overview of the existing fauna habitat extents, and to provide discussion on the local and regional context and ecological functions of the survey area.

The conservation listed species targeted were Malleefowl (*Leipoa ocellata*) and Chuditch (*Dasyurus geoffroii*), both species are listed as 'Threatened Species' ('Vulnerable' category) under both the EPBC Act and the BC Act.

The survey area is an area of remnant native vegetation (260.52 ha) approximately 37 km east of the Mukinbudin town site (**Figure 1**). This report also includes fauna habitat mapping and an evaluation of habitat quality for the two targeted species and lists data collected from field sampled habitat assessment points across the survey area.

1.2 SURVEY AREA

The survey area is located within the Shire of Westonia in the Avon Wheatbelt Bioregion, approximately 275 km northeast of Perth (**Figure 1**). The survey area, approximately 260 ha in extent, is part of a remnant native vegetation patch on private land holdings, connected and adjacent to the existing DBCA managed Chiddarcooping NR, which is approximately 7,200 ha in extent, in the central-eastern edge of the wheatbelt agriculture area (**Map 1**).

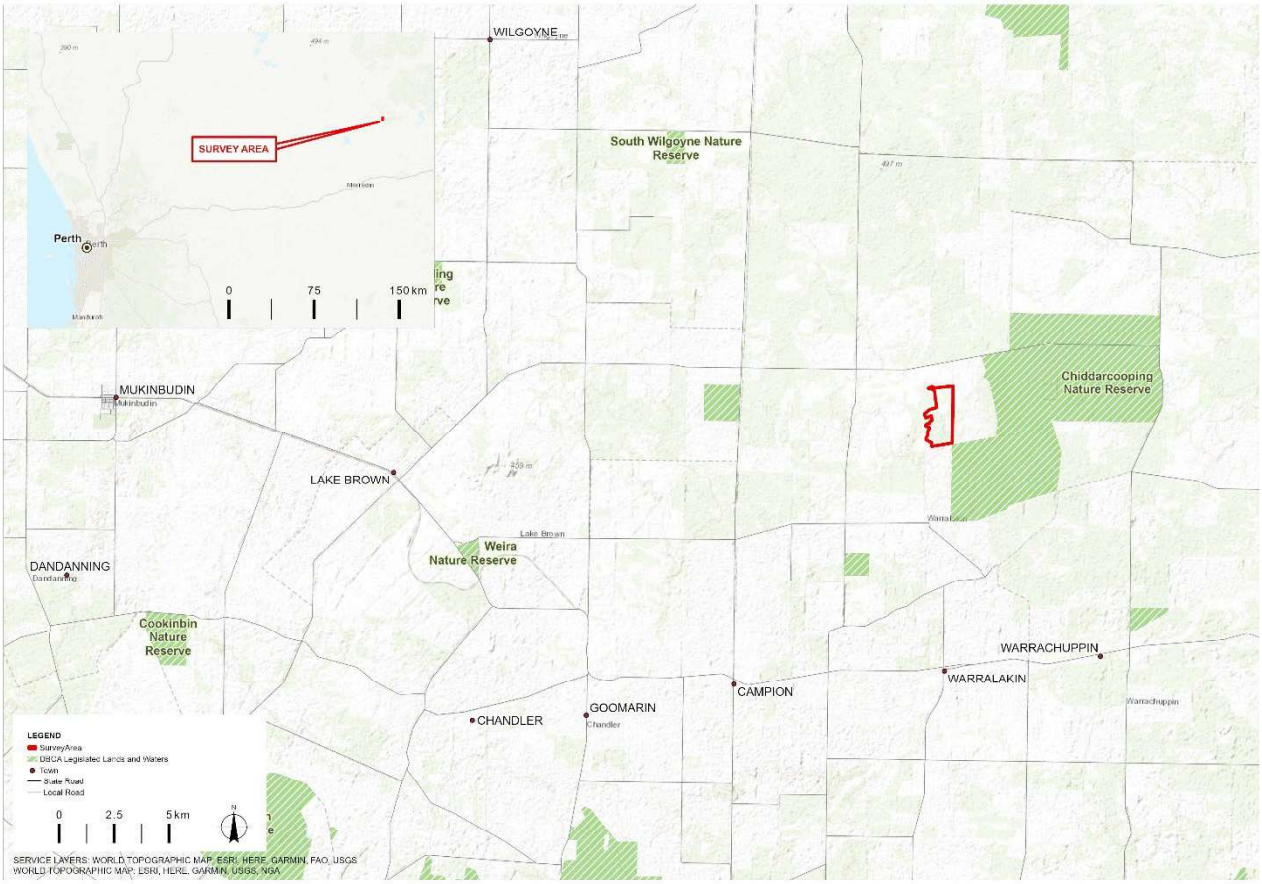

Figure 1: Survey area location

1.2.1 REGIONAL DESCRIPTION

The Interim Biogeographic Regionalisation of Australia (IBRA v7) (DSEWPaC 2012) has identified 26 bioregions in Western Australia. These are further subdivided into 55 sub-regions. The bioregions (including subregions) are classified based on climate, geology, landforms, vegetation, and fauna (Thackway & Cresswell 1995). IBRA regions and subregions are affected by a range of different threatening processes and have varying levels of sensitivity to impact (EPA 2004). The survey area lies within the Avon Wheatbelt Bioregion (AW), Avon Wheatbelt P1 Subregion (AW1) as summarised below.

IBRA Bioregion - Avon Wheatbelt (AW)

The bioregion is an area of active drainage dissecting a Tertiary plateau in Yilgarn Craton with a gently undulating landscape of low relief. Proteaceous scrub-heaths, rich in endemics, on residual lateritic uplands and derived sandplains; mixed eucalypt, *Allocasuarina huegeliana* and Jam-York Gum woodlands on Quaternary alluvials and eluvials. Semi-arid (Dry) Warm Mediterranean. Land uses are primarily dryland agriculture and grazing. Smaller areas include Crown reserves (mainly conservation estate), mining operations and rural residential communities.

Subregion AW1 is an ancient peneplain with low relief, gently undulating landscape. There is no connected drainage; Salt Lake chains occur as remnants of ancient drainage systems that now only function in very wet years. Lateritic uplands are dominated by yellow sandplain. Climate is Semi-arid (Dry) Warm Mediterranean (Beecham 2001).

1.3 SURVEY REQUIREMENTS

The requirements of the survey were to:

- describe and map existing fauna habitats for the targeted species
- collect information on habitat quality and discuss potential use by targeted species.

1.4 COMPLIANCE

This environmental assessment was conducted in accordance with the following Commonwealth and State legislation and guidelines.

The assessment complied with EPA requirements for environmental survey and reporting in Western Australia, following relevant guidelines and legislation:

- EPA (2020) Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment, known herein as the Fauna Technical Guidance
- Department of Environment and Conservation (2012). Chuditch (*Dasyurus geoffroii*) Recovery Plan
- Department for Environment and Heritage (2007). National Recovery Plan for Malleefowl
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Western Australian Environmental Protection Act 1986* (EP Act)
- *Western Australian Biodiversity Conservation Act 2016* (BC Act)
- *Western Australian Biodiversity Conservation Regulations 2018*
- Department of Environment, Water, Heritage and the Arts (DEWHA 2009) *Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999*
- Department of Sustainability Environment Water Population and Communities (DSEWPaC 2011) *Survey guidelines for Australia's threatened mammals*
- DEWHA (DEWHA 2010) *Survey guidelines for Australia's threatened birds*.

Summaries of the main Acts under which this assessment was conducted, and related criteria and definitions, are available in **Appendix One**.

2 METHODS

2.1 SURVEY AIMS

The aims of the habitat assessment survey were to:

- provide information to support the use of the survey area as a potential offset
- provide information and discussion on habitat types, condition, and suitability of the survey area for the targeted conservation listed species
- confirm presence/absence of the conservation listed species.

2.2 GUIDING PRINCIPLES

The field survey was conducted as a basic survey according to the Fauna Technical Guidance (EPA 2020). The EPA recommends a basic survey should:

- be conducted as a low intensity survey to gather broad fauna and habitat information
- verify the adequacy of the desktop assessment
- map, describe and photograph habitats
- record opportunistic fauna observations
- determine if a detailed survey is required.

2.3 FAUNA SURVEY METHODS

The basic fauna survey incorporated a number of survey techniques as per the Terrestrial Fauna Technical Guidance (EPA 2020) including habitat assessment, active searches (day-time), searches for secondary evidence such as scats and tracks, as well as opportunistic observations.

A desktop assessment was conducted to identify the likelihood of any conservation listed species occurring in the survey area.

Conservation listed species Malleefowl and Chuditch were the targets of the field survey. Survey techniques included:

- opportunistic observations while moving between sites and through the survey area
- recording tracks, scats, and nest mounds of Malleefowl
- recording tracks, scats, and potential breeding habitat for Chuditch.

Fauna species were identified opportunistically based on sightings, calls, remains, diggings, and other signs. Potential habitats for conservation listed species were identified and evaluated and their likelihood of presence assessed.

2.4 FAUNA HABITAT ASSESSMENT

The fauna survey was conducted by Bruce Turner (Principal Zoologist) during 16-18 January 2024. The survey was conducted in accordance with the requirements for a basic survey as outlined in the Fauna Technical Guidance (EPA 2020). Bruce has been working in wildlife research and fauna consulting since 1984 (40 years) with CALM (now DBCA), CSIRO Division of Wildlife and Ecology, and Ecoscape. The information recorded during the habitat assessment is suitable for use in a Commonwealth Offset Calculator by providing information on habitat quality and characteristics.

The following attributes of each habitat encountered during traverses on foot were recorded:

- landform: hilltop, valley, slope, drainage line, flat
- habitat type: Plain (shrubland), Woodland (open/closed), Granite outcrop etc.
- habitat description based on vegetation structure and composition e.g. Mallee Shrubland; Salmon Gum woodland
- species observed: sightings or secondary evidence (scats; tracks; bones; feathers)

- disturbance
- fire age
- location co-ordinates (GDA94)
- soil type
- simplified geology
- litter cover (%)
- density of fallen logs
- representative images
- fauna habitat mapping.

The assessments described and mapped the fauna habitats present with respect to their quality and value, site context and condition values. The composition and characteristics of each fauna habitat type was recorded, including noting suitability for the conservation listed species. Habitat types were delineated in the field and digitised upon return from the field survey.

2.4.1 TARGETED SURVEY METHODS

2.4.1.1 Chuditch Survey Methods

Chuditch (*Dasyurus geoffroyi*; EPBC Act VU, BC Act VU)

The suitability of the survey area for Chuditch such as the presence of fallen hollow logs and hollow standing trees, was recorded. Targeted searches were undertaken looking for tracks, scats, and dens.

2.4.1.2 Malleefowl Survey Methods

Malleefowl (*Leipoa ocellata*; EPBC Act VU, BC Act VU)

The *National Malleefowl Recovery Team Monitoring Manual* (NMRT 2019) provided guidance for Malleefowl survey methods. Presence of nest mounds of any age and direct observations of Malleefowl or their scats and tracks were recorded where identified.

2.5 PRIORITY ASSESSMENT

The survey area was subjected to a set of criteria to determine the suitability as a potential offset. The following criteria were used to rank each site:

Extent of suitable Chuditch habitat
- >40 ha (10% of a female home range) scored as 2
- <40 ha =1
- no habitat = 0

Extent of suitable Malleefowl habitat
- >10 ha (approximate size of ha/Malleefowl mound at EGLP) = 2
- <10 =1
- no habitat =0

Connected to DBCA Nature Reserve
- Connected = 2
- <2 km to DBCA reserve = 1
- no connection (>2 km) =0

Presence of conservation listed species
- confirmed = 2
- DBCA record <1 km = 1
- no presence = 0

Vegetation condition (EPA 2016)
- Excellent = 2
- Good = 1
- Degraded = 0.

Chuditch home range size for females is reported as 300-400 ha (3-4 km^2), and males at 1,500 ha (15 km^2) (DBCA 2017). The criteria used 10% of a female home range size (40 ha) to rank the sites in their capacity to support one female Chuditch with sufficient breeding habitat for denning.

The criteria used for Malleefowl habitat extent was based on data collected from the EGLP where 32 mounds were recorded in the 284 ha development envelope giving approximately 9 ha/mound. The EGLP site has both conservation listed species recorded as present (Western Wildlife 2017).

3 RESULTS

3.1 CLIMATE

The southwest of Western Australia is generally described as having a Mediterranean-type climate of mild, wet winters and warm to hot, dry summers. The climate of the region is strongly influenced by the position of a band of high pressure known as the sub-tropical ridge. For much of the year the ridge is located to the south allowing the east or south easterly winds to prevail. During the cooler months the ridge periodically moves to the north, allowing cold fronts to pass over the west coast and deliver much of the annual rainfall (Beard 1990).

According to the Köppen-Geiger climate classification, the survey area has a temperate climate with hot, dry summers (Class Csa) (Peel, Finlayson & McMahon 2007). This classification is considered to represent a Mediterranean climate where average summer maximum temperatures exceed 22°C and the average coldest month maximum is between 18° and -3°C, and summer rainfall is less than one third of winter rainfall.

The closest BoM station with long term records is Bencubbin (BoM 2023 station 010007, operating since 1949) which is located approximately 74 km east of the survey area. The mean annual rainfall is 110 mm falling in winter. The rainfall during the 3-month period prior to the field survey was 41% of the long-term average for this period.

Figure 2 shows the average rainfall and temperatures of the survey area, with rainfall for the year preceding the field survey.

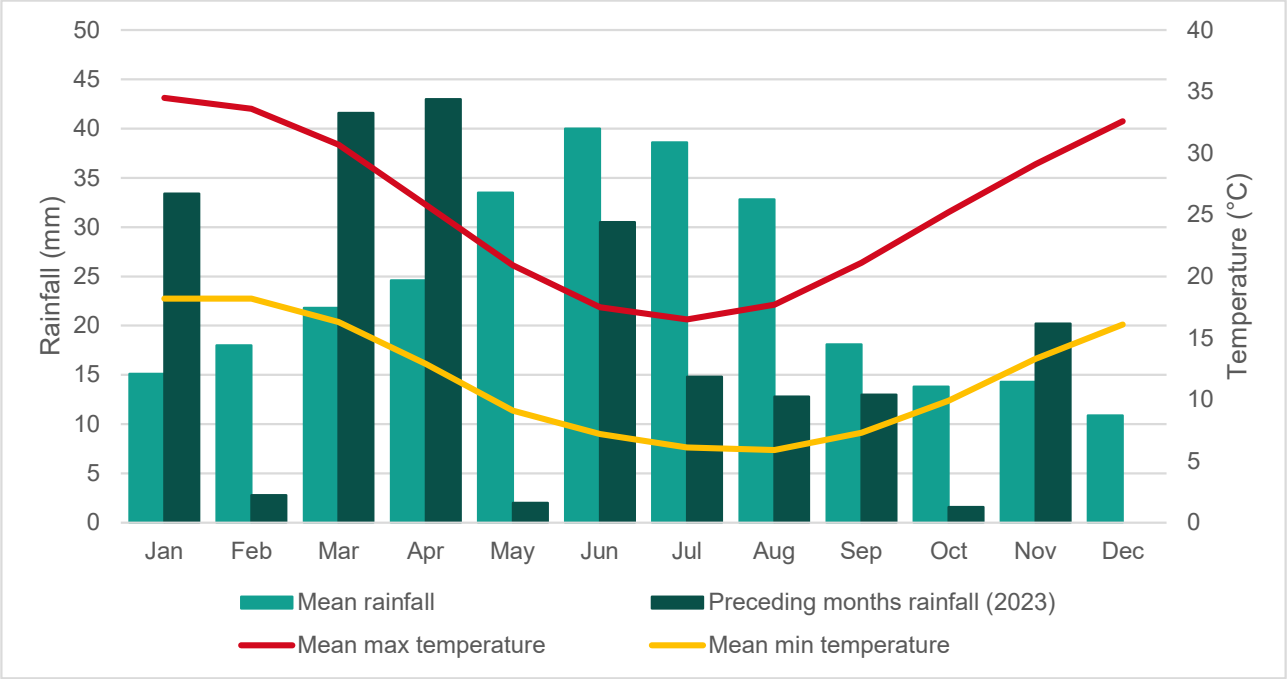

Figure 2: Rainfall and temperature data for the survey area (BoM 2023)

3.2 DESKTOP ASSESSMENT

3.2.1 SITE SELECTION

The field survey site selection was based on land agent advice on potential availability and advice from DBCA regional personnel and comprised one area adjacent to Chiddarcooping NR and connected by native vegetation cover (**Map 1**). DBCA advice indicated that the survey area is comprised of woodland and shrubland habitat potentially consistent with the habitat preferences of the two targeted species.

Based on the desktop assessment, there was one targeted conservation listed species considered to have a high likelihood of occurring in the survey area (**Map 1**):

- *Leipoa ocellata* (Malleefowl) – VU EPBC Act; VU BC Act.

The survey area was traversed on foot and all habitats were assessed for quality and capability of supporting both conservation-listed species. Observations and records of secondary evidence of presence was recorded.

The extents of both woodland and shrubland habitats were delineated in the field and calculated by GIS analysis undertaken post survey. The survey area was subjected to the same criteria of habitat quality as for the previous sites assessed between 2019 – 2023 (Ecoscape 2019a, 2019b, 2020a, 2020b, 2021, 2022, 2023).

3.3 FIELD SURVEY

The fauna survey was conducted by Bruce Turner (Principal Zoologist) during 16 to 18 January 2024. The survey was conducted in accordance with the requirements for a targeted survey as outlined in the Fauna Technical Guidance (EPA 2020). Bruce has been working in wildlife research and fauna consulting since 1984 (40 years) with CALM (now DBCA), CSIRO Division of Wildlife and Ecology, and Ecoscape. The information recorded during the habitat assessment is suitable for use in a Commonwealth Offset Calculator by providing information on habitat quality and characteristics.

3.3.1 FAUNA HABITAT

The field survey assessed the survey area to confirm the presence of suitable fauna habitats for the two targeted species.

The survey completed 14 habitat assessment points within the survey area (**Table 8 Appendix Two**). Three fauna habitat types (**Table 2**) were recorded across the surveyed sites (**Map 2**):

- Woodland (78.12 ha); includes Salmon Gum, Wandoo, and Mallee woodlands
- Shrubland (123.34 ha); *Acacia* and *Allocasuarina* shrublands
- Rock Outcrop (59.06 ha); includes shrublands on granite outcrops and breakaways.

Table 2: Fauna habitat types

Habitat type	Description	Photograph
Woodland (78.12 ha; 29.99%)	Open woodlands of Salmon Gum, Wandoo, and Mallee; clayey-sand soils; minimal understory; 50% litter cover; moderate level of fallen logs. Disturbance: low Fire Age: >10 yrs. Suitable breeding and foraging habitat for Malleefowl and Chuditch	
Shrubland (123.34 ha; 47.34%)	Mixture of open and closed Allocasuarina and Acacia shrubland with scattered mallee and Hakea on clayey sand with scattered patches of granite outcropping; 80% litter cover; no fallen logs. Disturbance: low Fire Age: >10 yrs. Suitable breeding and foraging habitat for Malleefowl and foraging habitat for Chuditch	
Rock Outcrop (59.06 ha; 22.67%)	Rock outcrop shrublands; open granite outcrops and rocky soils with sparse shrubs and herbs; 10% litter cover. Disturbance: low Fire Age: >10 yrs. Not suitable habitat for Malleefowl or Chuditch	

Woodland (78.12 ha)

The Woodland habitat is dominated by tall open woodlands of *Eucalyptus* species (Salmon Gum; Wandoo) and/or low open woodlands of Mallee over shrubs on clayey sand to clay soils. Fallen logs are an important feature in the eucalypt woodlands providing breeding habitat suitable for Chuditch. The Mallee woodlands also occur on sandy soils and have higher litter cover than the eucalypt woodlands making this habitat type suitable for Malleefowl breeding (**Table 10 Appendix Two**).

Shrubland (123.34 ha)

The Shrubland habitat varies from open to closed shrubland dominated by *Allocasuarina campestris*, *Melaleuca uncinata* and mixed Acacia species on sandy soils. The dense vegetation, sandy soils, and high litter cover provides shelter, foraging, and breeding habitat for Malleefowl. Chuditch will use this habitat for foraging on fossorial reptiles and bird eggs in nests close to the ground (**Table 10 Appendix Two**).

Rock Outcrop (59.06 ha)

The Rock Outcrop habitat comprises a mosaic or bare open granite sheets mixed with shrub and herbs on skeletal rocky soils. The habitat provides foraging resources for both Malleefowl and Chuditch with the breakaway areas offering shelter resource for Chuditch (**Table 10 Appendix Two**).

3.3.2 HABITAT QUALITY

The quality of each habitat type was assessed using the field surveyor's experience (40 years) and takes into consideration the level of disturbance to habitats from grazing, fire, the extent and structure of native vegetation, vegetation condition (EPA 2016), litter cover (density) and the context of the habitat with the surrounding landscape (**Table 3** and **Table 8 Appendix Two**).

Table 3: Habitat attributes recorded

Value	This site
Woodland (ha)	78.12
Shrubland (ha)	123.34
Connectivity	Yes
Vegetation condition	Good
Disturbance	Low
Fire History	<10 years
Litter cover average (%)	50

3.3.3 TARGETED SPECIES PRESENCE

Malleefowl was recorded within the survey area at fauna observation point FOB02 (**Map 2; Table 9 Appendix Two**). The observation was of an old historical mound indicating that presence had occurred in the past (**Image 1**). A recently used mound was recorded in the adjacent Chiddarcooping NR at point FOB03 (**Map 2**) indicating that Malleefowl are present <2 km from the survey area.

Image 1: Historical Malleefowl mound (FOB02)

Image 2: Recently used Malleefowl mound in Chiddarcooping NR (FOB03)

No evidence of Chuditch presence was recorded during the survey. However, optimal breeding and foraging habitat suitable for Chuditch was recorded, in particular the Woodland habitat exhibits all of the values considered optimal for Chuditch breeding and foraging (**Map 2**).

Image 3: Optimal Chuditch habitat recorded (HAB05)

3.4 PRIORITY ASSESSMENT

The result of applying the priority assessment criteria (**Section 2.5**) indicated that this survey area is ranked as 9, the same as the three second top ranked sites from the 2021 assessments (**Table 4**) (Ecoscape 2021). Factors contributing to this result are the extents of good quality woodland and shrubland habitats adjacent to existing conservation lands and the presence of Malleefowl, as recorded by the field surveys.

The ranking process for sampled sites resulted in the 2022 assessed site Mukinbudin being ranked as top priority (a priority rank score of 1) (**Table 4**). All four ranked 2 sites have extents of suitable habitat and are connected to adjacent Nature Reserves, have recorded targeted species presence, and have recent DBCA records in close proximity.

Table 4: Sampled sites priority rank results

Site number	Extent of Chuditch habitat	Extent of Malleefowl habitat	Connection to Nature Reserve	Presence of conservation listed species	Veg cond.	Total score	Priority rank (1-6)
1	2	2	0	0	1	5	6
2	1	2	0	0	0	3	7
4	2	2	0	0	2	6	5
5	2	2	1	0	2	7	4
6	2	2	0	0	2	6	5
7	2	2	0	2	2	8	3
8	2	2	1	2	2	9	2
11	2	2	0	1	3	8	3
12	2	2	2	1	2	9	2
13	2	2	2	1	2	9	2
14	1	2	0	0	3	6	5
Mukinbudin	2	2	2	2	2	10	1
This Site	2	2	1	2	2	9	2

3.5 FAUNA SURVEY LIMITATIONS

Table 5: Fauna survey limitations

Possible limitations	Constraints (yes/no): Significant, moderate or negligible	Comment
Availability of data and information	No	The habitat preferences of those conservation significant species identified during the desktop assessment are known and guided habitat mapping efforts during the field event.
Competency/experience of the survey team, including bioregion experience	No	Field survey staff were experienced (37+ yrs.) with the fauna survey methods and identification of fauna and fauna habitat.
Scope of survey e.g. excluded fauna groups	No	All major fauna habitat types were investigated, defined, and assessed for likelihood of conservation significant fauna occurrence.
Timing, weather, season	No	Basic level surveys are not constrained by climatic conditions and no adverse weather hampered the field survey
Disturbances that may have affected results	No	No significant disturbances were observed that could negatively affect survey results.
Proportion of fauna identified, recorded, or collected	No	The primary focus of the Basic field survey was the definition of major fauna habitat types, specifically those potentially utilised by conservation significant fauna. Opportunistic vertebrate fauna records were maintained for all survey areas.
Adequacy of survey intensity and proportion of survey achieved	No	All major fauna habitat types including those favoured by conservation significant fauna were investigated and defined. All selected sites for sampling were surveyed.
Access	No	No access restrictions were encountered.
Data and analysis issues including sampling biases	No	No issues encountered.

4 DISCUSSION

4.1 CONSERVATION LISTED SPECIES

4.1.1 MALLEEFOWL

Malleefowl were confirmed as present within the survey area with a nest mound recorded within the Shrubland habitat (FOB02). A recent mound (FOB03) was recorded approximately 1.5 km to the south-east of the survey area (**Map 2**). The most recent Malleefowl DBCA record is from 2010 and approximately 1.7 km to the north-east in Chiddarcooping NR (**Map 1**).

The survey area has larger extents of the Shrubland habitat, that are preferred by the species for breeding and foraging, than the Woodland habitat type. The habitat within the survey area was assessed as being good quality shrubland on sandy soils identified as optimal Malleefowl habitat (Benshemesh 2007) (**Image 4**). Malleefowl also require shrubland that has remained unburnt for long periods, these shrublands provide enough leaf litter for the Malleefowl to build their incubation mounds (Benshemesh 2007). The survey area meets these criteria and is also connected by native vegetation to the neighbouring Chiddarcooping NR, forming a mosaic of shrubland of different ages and compositions.

These data indicate that Malleefowl are persisting within the fragmented wheatbelt landscape and are likely to occur in remnant vegetation with suitable breeding habitat and should the survey area be selected as an offset this would benefit the species (consistent with the objectives of the National Recovery Plan for Malleefowl).

Image 4: Optimal Malleefowl breeding and foraging habitat (HAB02)

4.1.2 CHUDITCH

The survey area recorded potential breeding habitat for Chuditch (open eucalypt woodlands) (**Image 3**) and potential foraging habitat (open woodland including Mallee and shrublands on sandy soils) (Rayner 2009; Rayner et al. 2011; Soderquist & Serena 2000).

Red Fox roadkill, close to the survey area, and tracks of Cat were recorded, this evidence suggests a feral predator presence that is likely to contribute to the reason why Chuditch presence was not recorded.

Records from the DBCA indicate the most recent record of Chuditch is from 2004 approximately 40 km to the west of the survey area (**Map 1**). The age and distance of this record suggest that Chuditch are no longer present in the locality of the survey area and are potentially locally extinct.

The outcomes from this survey are consistent with Action 1 of the Chuditch National Recovery Plan (DEC 2012), which states the following tasks:

- identify areas of remnant vegetation that can be protected or enhanced through re-vegetation
- continue covenants and off-reserve programs (e.g. Land for Wildlife)
- new areas of suitable habitat acquired through land acquisition process
- habitat identified through Environmental Impact Assessment and negotiated through off-set.

It remains unknown how much breeding habitat is required to sustain a population of Chuditch however the criteria analysis for priority ranking has used 10% of a female home range (40 ha) as a broad guide to the extent necessary to provide breeding habitat to establish denning sites. Habitat assessments completed outside the survey area has confirmed the Woodland habitat within the survey area as very good quality and consistent with these conservation areas. Similarly, habitat adjacent to the survey area to the east provides very good quality habitats that provide connection to the large area of Chiddarcooping NR (**Map 1**).

Whilst positive evidence of Chuditch was not recorded by the field survey, multiple sites exhibited fauna habitat values that are characteristic of optimal Chuditch breeding habitat. Consistent with the objectives of the National Recovery Plan for Chuditch, the acquisition of land areas containing suitable foraging/breeding habitat, combined with appropriate predator control, would assist in the recovery of this species; being either through allowing any low-density resident individuals to persist, or through reintroduction recovery actions (DEC 2012). The absence of positive evidence of Chuditch presence from the survey area should therefore not be used as a basis for discounting the current, or future values, of the suitable foraging and breeding habitat for Chuditch in the application of environmental offsets.

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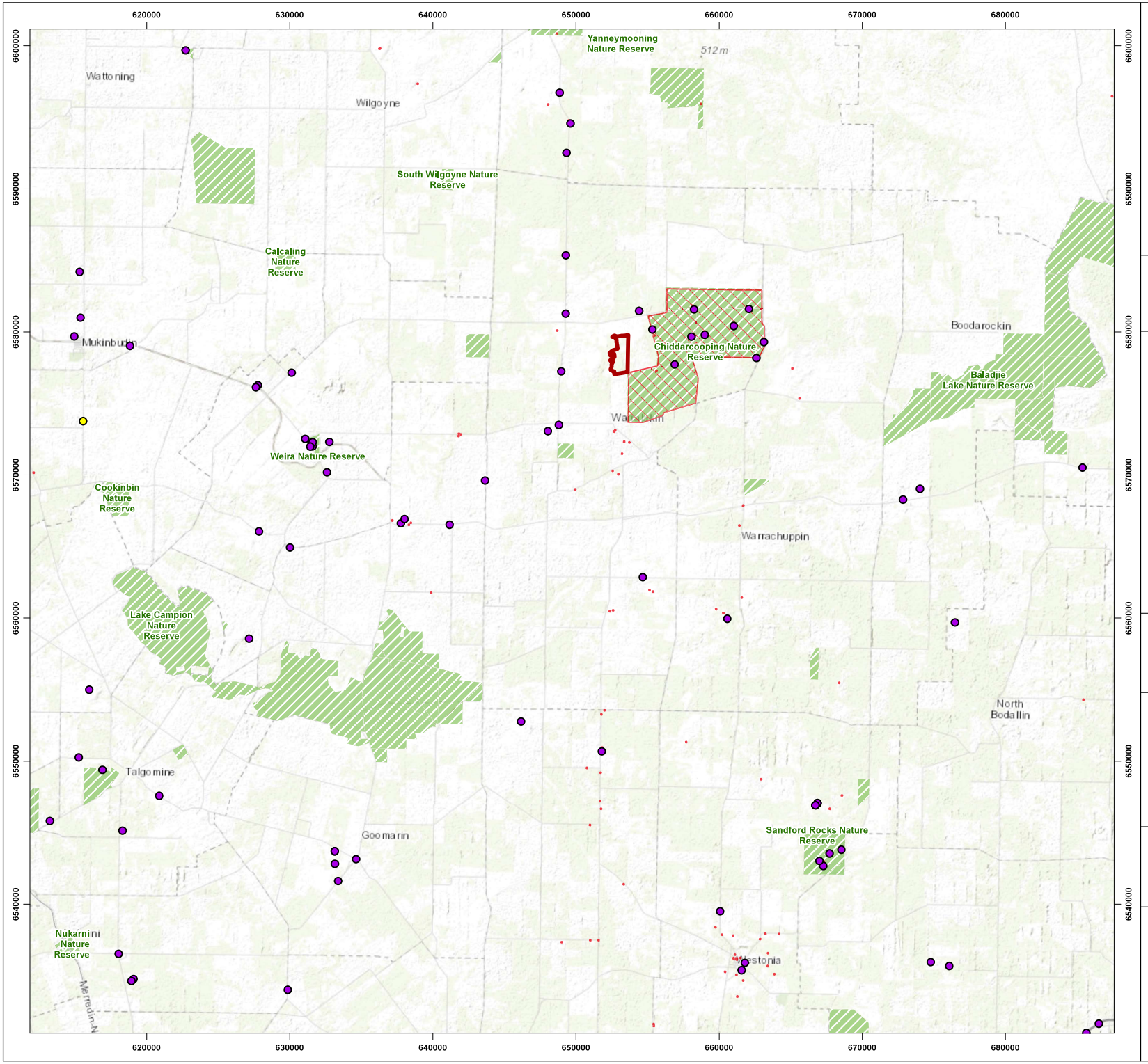
MAPS



LEGEND

- Survey Area
- DBCA Parks and Reserves
- Environmentally Sensitive Areas

Conservation-listed Fauna

- *Dasyurus geoffroii* (Vulnerable)
- *Leipoa ocellata* (Vulnerable)

DATA SOURCES:
SOURCE DATA: CONSERVATION-LISTED FAUNA (DBCA 2023), CLEARING REGULATIONS - ENVIRONMENTALLY SENSITIVE AREAS (DWER-046) (DWER 2021); DBCA - LEGISLATED LANDS AND WATERS (DBCA-011) (DBCA 2022); ROAD NETWORK (MRWA 2023)
BASEMAP: ESRI TOPOGRAPHIC
SERVICE LAYERS: WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, NOAA, USGS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, USGS, NGA

ecoscape

DBCA DATABASE SEARCH RESULTS

OFFSET FAUNA HABITAT ASSESSMENTS 2024

covalent LITHIUM

COORDINATE SYSTEM: GDA 1994 MGA ZONE 50
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

SCALE: 1:260,000 @ A3

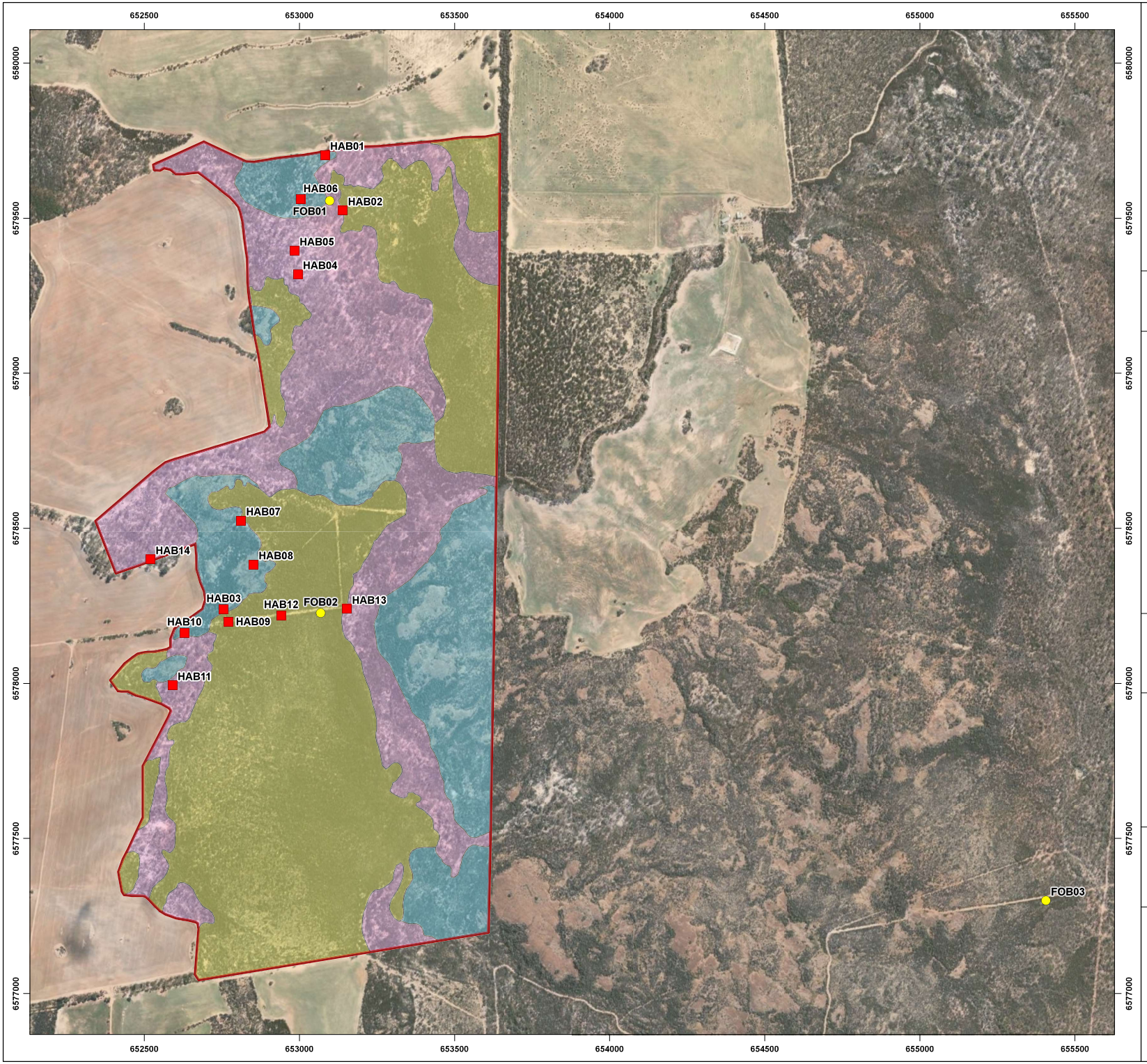
0 10 km

PROJECT NO: 4895-24

REV	AUTHOR	APPROVED	DATE
0	TDV	LC	23/01/2024

MAP 01

Path: X:\01_Projects\4895-24 Covalent Offset 2024\Maps\APRXs\GDA_1994_Templates\Report_Maps_4895.aprx



LEGEND

- Survey Area
- Habitat Assessment Point
- Fauna Observation Point

Fauna Habitat Types

- Woodland
- Shrubland
- Rocky Outcrop

DATA SOURCES:
SOURCE DATA: FAUNA DATA (ECOSCAPE 2024)
BASEMAP: ESRI WORLD IMAGERY (2021)
SERVICE LAYERS: WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, NOAA, USGS
WORLD IMAGERY: MAXAR

ecoscape

FAUNA SITES AND HABITAT

OFFSET FAUNA HABITAT ASSESSMENTS 2024

covalent LITHIUM

COORDINATE SYSTEM: GDA 1994 MGA ZONE 50
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

SCALE: 1:12,000 @ A3

0 250 500 m

PROJECT NO: 4895-24

REV	AUTHOR	APPROVED	DATE
0	TDV	LC	23/01/2024

MAP 02

Path: X:\01_Projects\4895-24 Covalent Offset 2024\Maps\APRXs\GDA_1994_Templates\Report_Maps_4895.aprx

APPENDIX ONE LEGISLATIVE CONTEXT, DEFINITIONS AND CRITERIA

COMMONWEALTH ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act is a legal framework to protect and manage matters of national environmental significance (MNES) including important flora, fauna, ecological communities, and heritage areas listed under the Act.

Threatened taxa (flora and fauna) are protected under the EPBC Act, which lists species and ecological communities that have been assessed as meeting the criteria to be listed as Critically Endangered, Endangered, Vulnerable, Conservation Dependant, Extinct, or Extinct in the Wild, as detailed in **Table 6**.

Threatened Ecological Communities protected under the EPBC Act are categorised as Critically Endangered, Endangered or Vulnerable, also detailed in this table.

Migratory species subject to international agreements are also protected under the EPBC Act. The definition of a migratory species under the Act follows that prescribed by the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (Department of the Environment 2021):

> *Migratory species are the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries.*

Species listed by the following international agreements are currently protected under the EPBC Act:

- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Table 6: EPBC Act categories for flora, fauna and ecological communities

Category	Threatened species	Threatened Ecological Communities
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	n/a
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) 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.	n/a
Critically Endangered (CE)	A native species is eligible to be included in the *critically endangered* category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the *critically endangered* category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria

Category	Threatened species	Threatened Ecological Communities
Endangered (EN)	A native species is eligible to be included in the *endangered* category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the *endangered* category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the *vulnerable* category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the *vulnerable* category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is 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 management 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.	n/a

WESTERN AUSTRALIAN ENVIRONMENTAL PROTECTION ACT 1986

The Western Australian EP Act was created to provide for an Environmental Protection Authority (the EPA) that has the responsibility for:

- prevention, control and abatement of pollution and environmental harm
- conservation, preservation, protection, enhancement and management of the environment
- matters incidental to or connected with the above.

The EPA is responsible for providing the guidance and policy under which environmental assessments are conducted. It conducts environmental impact assessments (based on the information provided by the proponent), initiates measures to protect the environment and provides advice to the Minister responsible for environmental matters.

WESTERN AUSTRALIAN BIODIVERSITY CONSERVATION ACT 2016

The Western Australian BC Act provides for the conservation, protection and ecologically sustainable use of biodiversity and biodiversity components in Western Australia.

Threatened species (both flora and fauna) and ecological communities that meet the categories listed within the BC Act are protected under this legislation and require authorisation by the Minister to take or disturb. These are known as Threatened Flora, Threatened Fauna and Threatened Ecological Communities. The conservation categories of Critically Endangered, Endangered and Vulnerable are detailed in **Table 7**; these categories align with those of the EPBC Act. Some State-listed threatened species and ecological communities are provided with additional protection as they are also listed under the Commonwealth EPBC Act (see **Table 6** for conservation status category descriptions).

The most recent Western Australian flora and fauna listings were published in the Government Gazette on 11 September 2018 (Government of Western Australia 2018).

PRIORITY-LISTED FLORA AND FAUNA

Conservation significant fauna species are listed by the DBCA as Priority Fauna where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to threatened fauna categories. Whilst Priority Fauna are not specifically listed in the BC Act, these have a greater level of significance than other native species. The categories covering Priority Fauna species are outlined in **Table 7**.

Flora and fauna species may be listed as being of special conservation interest if they have a naturally low population, have a restricted natural range, are subject to or recovering from a significant population decline or reduction of range or are of special interest, and the Minister considers that taking may result in depletion of the species. Migratory species and those subject to international agreement are also listed under the Act. These are known as 'specially protected species' in the BC Act.

Table 7: Conservation codes for Western Australian flora and fauna (DBCA 2019)

Conservation Codes for Western Australian Flora and Fauna	
Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such. **The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.** **Categories of Threatened, Extinct and Specially Protected fauna and flora are:**	
T	**Threatened species** Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act). Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.
CR	**Critically endangered species** Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*". Listed as critically endangered undersection 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.
EN	**Endangered species** Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

Conservation Codes for Western Australian Flora and Fauna	
VU	**Vulnerable species** Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*". Listed as vulnerable undersection 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.
Extinct species **Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.**	
EX	**Extinct species** Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.
EW	Extinct in the wild species Species that "*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species **Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.** **Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.**	
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14of the BC Act). Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18of the BC Act). Published as other specially protected fauna under schedule 7of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
P	**Priority species** Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Conservation Codes for Western Australian Flora and Fauna	
1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

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

APPENDIX TWO FIELD SURVEY RESULTS

Table 8: Habitat Assessment sites (GDA94, Zone 50)

Sampling Point No.	Habitat Unit	Habitat Description	Habitat Quality	Context	Level of Cover	Level of Disturbance	Disturbance	Fire Age	Litter Cover	Soil Type	Rock Type	Easting	Northing
HAB01	Woodland	Woodland,Open,Salmon Gum,Mixed Shrubs,Herbs	Good	Contiguous	Moderate	Low	ferals species	>10 years	50%	Clayey-sand	n/a	653083.67	6579705.07
HAB02	Shrubland	Shrubland,Closed,Allocasuarina,Bare Ground	Good	Contiguous	No cover	Low	ferals species	>10 years	80%	Clayey-sand	n/a	653140.85	6579526.17
HAB03	Shrubland	Shrubland,Closed,Melaleuca,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	20%	Rocky	Granite	652756.86	6578239.93
HAB04	Rocky Outcrop	Shrubland,Closed,Melaleuca,Herbs	Good	Contiguous	Moderate	Low	ferals species	>10 years	20%	Clayey-sand	Granite	652995.87	6579320.36
HAB05	Woodland	Woodland,Open,Wandoo,Mixed Shrubs,Herbs	Good	Contiguous	Moderate	Low	ferals species	>10 years	50%	Clayey-sand	Granite	652985.30	6579396.76
HAB06	Shrubland	Shrubland,Closed,Acacia,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	50%	Clayey-sand	Granite	653004.79	6579563.01
HAB07	Shrubland	Shrubland,Closed,Acacia,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	80%	Clayey-sand	n/a	652812.55	6578526.38
HAB08	Shrubland	Shrubland,Closed,Melaleuca,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	20%	Rocky	Granite	652853.21	6578384.53
HAB09	Shrubland	Shrubland,Closed,Acacia,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	80%	Clayey-sand	n/a	652772.56	6578200.48
HAB10	Woodland	Woodland,Open,Mallee,Mixed Shrubs,Herbs	Good	Contiguous	Low	Low	ferals species	>10 years	50%	Clayey-sand	n/a	652630.33	6578164.37
HAB11	Woodland	Woodland,Open,Wandoo,Mixed Shrubs,Herbs	Good	Contiguous	Moderate	Low	ferals species	>10 years	50%	Clayey-sand	Granite	652591.81	6577995.56
HAB12	Shrubland	Shrubland,Closed,Acacia,Herbs	Good	Contiguous	No cover	Low	ferals species	>10 years	80%	Clayey-sand	n/a	652941.92	6578220.75
HAB13	Rocky Outcrop	Shrubland,Closed,Melaleuca,Herbs	Good	Contiguous	Low	Low	ferals species	>10 years	10%	Rocky	Granite	653154.01	6578241.42
HAB14	Woodland	Woodland,Open,Wandoo,Mixed Shrubs,Herbs	Good	Contiguous	Moderate	Low	ferals species	>10 years	50%	Clayey-sand	n/a	652521.06	6578401.34

Table 9: Fauna Observation Sites (GDA94 zone 50)

Site Name	Common Name	Taxon Name	Site Type	Easting	Northing
FOB01	Western Grey Kangaroo	*Macropus fuliginosus melanops*	Observed (seen or heard)	653098.41	6579557.60
FOB02	Malleefowl	*Leipoa ocellata*	Mound old	653069.34	6578228.56
FOB03	Malleefowl	*Leipoa ocellata*	Mound recent	655407.03	6577301.46

Table 10: Habitat Assessment Point Images

	
HAB01	HAB02
	
HAB03	HAB04
	
HAB05	HAB06

	
HAB07	HAB08
	
HAB09	HAB10
	
HAB11	HAB12

	
HAB13	HAB13-1
	
HAB14	FOB02
	
FOB03	