NORTHERN STAR RESOURCES LIMITED

CLEARING PERMIT SUPPORTING DOCUMENT – Samphire TSF

Prepared By:
Northern Star Resources Limited
Kalgoorlie Operations - Environment Department
January 2022

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1. INTRODUCTION

1.1 Purpose

This document, and accompanying Appendix (NSR Samphire (M15-456) Flora-Fauna Assessment 2022), has been prepared to support the application for a clearing permit (purpose permit), as required by Part V of the *Environmental Protection Act 1986.*

Northern Star Resources Limited (Northern Star) seeks to apply for a Purpose Permit to clear up to 29 hectares of native vegetation on mining lease M15/456, which is a part of the South Kalgoorlie Operations (SKO).

The propose clearing is located in the immediate surrounds of the existing Samphire in-pit tailings storage facility (TSF), that is to be converted to a 'paddock style' TSF. Land cleared will be used to create earthen embankments which will form the walls of the converted TSF, as well as a toe drain at the base of the embankments and access roads around the TSF.

A Mining Proposal and Works Approval for this Project are being prepared and will be submitted to the relevant regulators in due course. Clearing Permit CPS 9551/1, for the portion of the Project that is located on freehold land (EEL53), is currently under assessment by DWER.

1.2 Location and ownership

The South Kalgoorlie Operations are located approximately 35km south of the City of Kalgoorlie-Boulder in Western Australia (Figure 1).

The registered tenement holder for the mining lease associated with this Project is Northern Star (South Kalgoorlie) Pty Ltd, a wholly owned subsidiary of Northern Star.

Table 1. Tenement Holders of the Project Area

Tenement	Holder	Expiry Date	Area (ha)
M15/456	Northern Star (South Kalgoorlie) Pty Ltd	02/08/2032	433.25

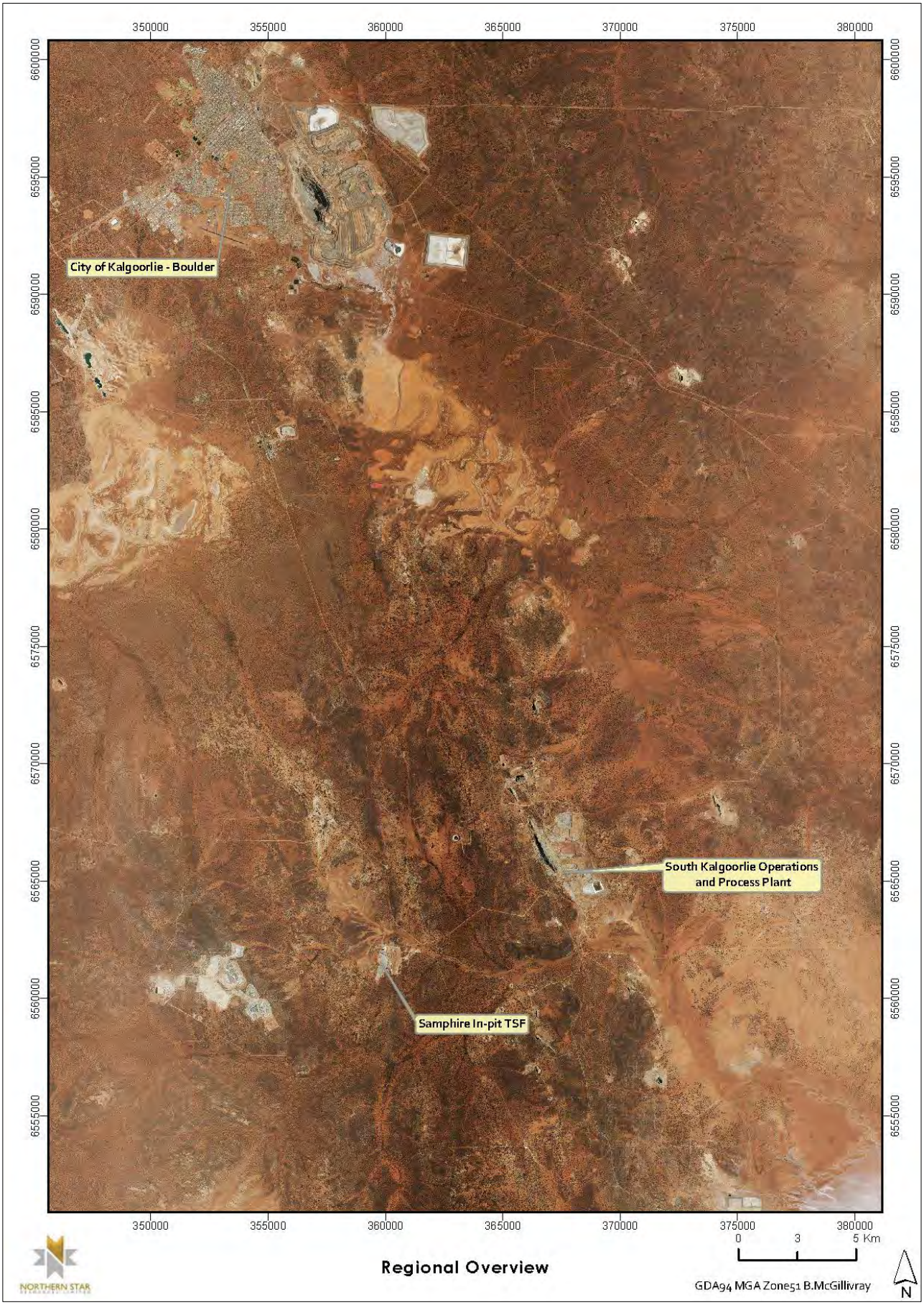

Figure 1. Regional Location Map

1.3 Project Description

The South Kalgoorlie Operations (SKO), owned and operated by Northern Star Resources Ltd (Northern Star or NSR), is located approximately 32km south of the City of Kalgoorlie-Boulder and approximately 18km north of Kambalda in the Eastern Goldfields region of Western Australia.

SKO comprises a large amalgamation of over 40 decommissioned gold mines with a total land area of approximately 1,149 km2. This is broken down between 418 km2 of standard tenure as per the *Mining Act (1978)* and a further 731km2 of freehold land known collectively as the Hampton East Location or Exempted East Locations (EEL) under Northern Star's control. It is important to note that freehold land is not subject to state royalties, is not subject to minimum expenditure commitments or standard planning and approvals processes under the Mining Act and Regulations.

Ore is processed from SKO's HBJ underground mine, and adjacent mines owned and operated by NSR, at the Jubilee Processing Plant. The active SKO tailings storage facilities (TSFs) include the above-ground Jubilee TSF3A and TSF3B, and Samphire In-pit TSF. Samphire in-pit TSF is located approximately 8km east south-east of the Jubilee Processing Plant and has been in operation since 2008, with approximately 7 months capacity remaining.

SKO's future tailings management strategy, based on a 10-year Life of Mine (LoM) with a deposition rate of 1.2Mtpa, includes developing Samphire in-pit TSF into a 'paddock style' facility providing 8.3 years of storage space. This will be undertaken by constructing an embankment around the existing in-pit TSF and, as such, clearing approval must be sought.

The proposed clearing will be the immediate surrounds of the existing Samphire in-pit tailings storage facility. The subsurface material will be used to create earthen embankments which will form the walls of the converted TSF, as well as a toe drain at the base of the embankments and access roads around the TSF. Topsoil will be stripped and stockpiled accordingly.

Spatial data (ESRI shapefile format) of the proposed clearing permit boundary area, as depicted in Figure 2 below, have been provided with this application.

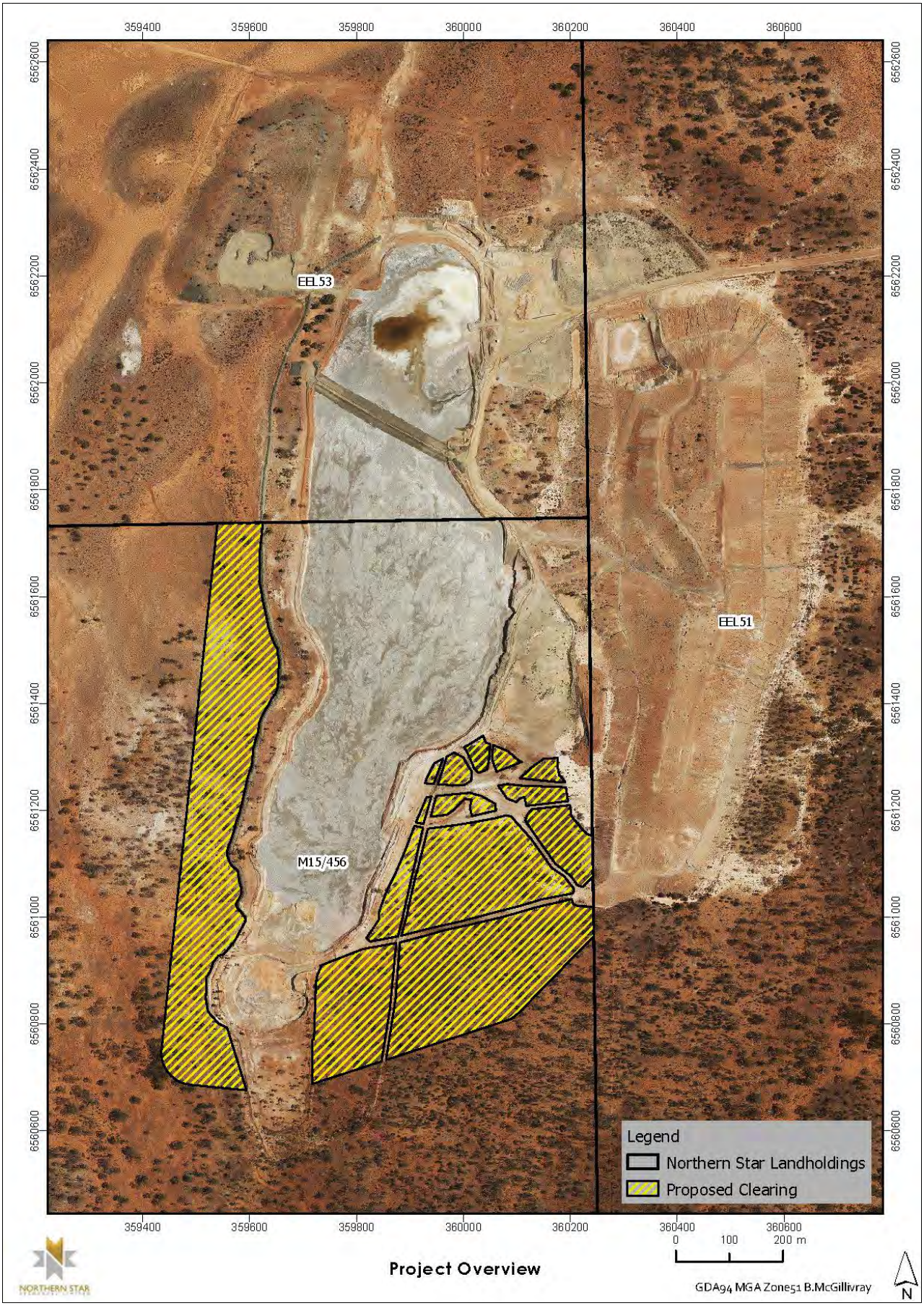

Figure 2. Map of clearing permit application area – showing tenement M15/456 and freehold lots EEL53 and EEL51.

1.4 Flora

A Level 1 flora survey of the Samphire Project (encompassing M15/456) was conducted by GHD in October 2016. In January 2022 Botanica Consulting undertook a desktop review of the GHD report. A copy of the 2022 report can be found in Appendix A.

A total of four vegetation associations were identified during the survey. These vegetation associations were represented by a total of 30 families, 53 genera and 89 taxa (including fifteen annual taxa and seven introduced taxa). A map of the vegetation associations in relation to the Assessment Area is provided in Figure 5.

Vegetation condition ranged from ‘‘Excellent’’ to ‘‘Good’’. The vegetation across the survey area was intact with limited disturbances such as isolated, non-aggressive weeds, and occasional vehicle tracks observed. Areas adjacent to the TSF were rated as Good or Very Good, with the TSF rated as Completely Degraded. Areas associated with the TSF have been partially to completely cleared and are almost to completely without native flora taxa.

Six introduced flora were identified within the survey area, none of which are listed as a Declared Plant under the *Biosecurity and Agriculture Management Act 2007*:

1. *Mesembryanthemum nodiflorum* (Slender Iceplant);
2. *Centaurea melitensis* (Maltese Cockspur);
3. *Oncosiphon suffruticosum* (Calomba Daisy);
4. *Carrichtera annua* (Wards Weed);
5. *Citrullus colocynthis*; and
6. *Salvia verbenaca* (Wild Sage).

No Threatened Flora taxa listed under Commonwealth or State legislation were identified within the Assessment Area. No Priority Flora taxa were identified within the Assessment Area. No other significant flora (i.e. endemic, new or anomalous species, range extension, relictual or unusual species) were identified during the survey or are known to occur within the Assessment Area. The Assessment Area is not located within the boundary of any Threatened or Priority Ecological Communities (PEC). No other significant vegetation as described above, was identified within the Assessment Area. Vegetation types identified are well represented outside of the Assessment Area and are not considered endemic/ restricted to the Assessment Area.

1.5 Fauna

A Level 1 fauna survey of the Samphire Project (encompassing M15/456) was conducted by GHD in October 2016. A total of 47 fauna species comprising 38 birds, five reptiles and four mammals were recorded during the field survey.

One historic mound of the threatened fauna species *Leipoa ocellata* (Malleefowl) was recorded. This inactive mound was identified approximately 2.7km south of the Assessment Area within the fauna habitat type ‘Shrublands on clay loam-Melaleuca open shrubland’, which is not present within the application area. There was no other evidence of Malleefowl activity observed during the survey. No significant fauna species (as described above) were observed during the survey or are known to occur within the Assessment Area.

No matters of national environmental significance as defined by the Commonwealth EPBC Act were identified within the Assessment Area. No evidence of the Assessment Area containing any TEC or Threatened flora or fauna was found during the survey period. The Assessment Area is not located within an ESA. No threatened species or critical habitat listed under the BC Act were recorded within the Assessment Area.

Figure 3. Vegetation Types within the Survey area

2. ENVIRONMENTAL MANAGEMENT & REHABILITATION

The following management recommendations will be incorporated into the planning and development of the Project where appropriate:

- The movement of machines and other vehicles shall be restricted to the limits of the areas to be cleared;
- During site works, areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained;
- Topsoil / growth medium vegetation will be stripped and stockpiled separately for later re-use during rehabilitation activities.
- Earth-moving equipment will be free from soil and vegetation prior to and leaving the area to be cleared (wash down facilities are available at the site); and
- Dust suppression activities will be controlled to ensure that surrounding vegetation is not sprayed with saline water.

A Mine Closure Plan (MCP) for SKO was developed and submitted to the Department of Mines, Industry Regulation and Safety (DMIRS) in April 2022, and is currently being assessed. Future revisions of the Mine Closure Plan and proposed rehabilitation strategies will include updated closure information as a result of activities described by this Project.

3. ASSESSMENT AGAINST TEN CLEARING PRINCIPALS

Clearing of vegetation is required for the purpose of expanding mining infrastructure at the South Kalgoorlie Operations. The total area proposed to clear will not exceed 29 hectares on mining tenement M15/456. Clearing will be undertaken by mechanical means and kept to the minimum extent necessary to minimise any potential environmental impacts of the project.

Statements against the ten 'clearing principles' as defined in Schedule 5 of the *Environmental Protection Act 1986* have been provided below.

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

Vegetation identified within the Assessment Area is not considered to be of high biological diversity and is well represented outside of the Assessment Area. There are no Threatened or Priority Ecological Communities within the Assessment Area.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

The field survey did not record any evidence of the presence of significant fauna within the Assessment Area. The habitat types within the Assessment Area are well represented in the local and broader area and there is direct connectivity from the habitat in the Assessment Area through to the surrounding habitat.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act were identified within the Assessment Area.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

No TEC listed under the EPBC Act or by the BC Act occur within the Assessment Area.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

The pre-European vegetation associations within the Assessment Area (Binneringe 9 and Coolgardie 468) retain >93% of their original pre-European vegetation extent.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

No inland waters or drainage lines (perennial or ephemeral) occur within the Assessment Area. No vegetation associated with a watercourse or wetland occur within the Assessment Area.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

The Assessment Area and surrounding region has not been extensively cleared. Clearing within the Assessment Area is not considered likely to lead to land degradation issues such as salinity, water logging or acidic soils.

Clearing and development within the survey area is unlikely to be at variance to this principle.

Principle (h) – Native vegetation should not be cleared if the clearing of vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation areas.

The Assessment Area is not located within or adjacent to any conservation areas, Environmentally Sensitive Areas or Nationally Important Wetlands.

Clearing and development within the survey area is unlikely to be at variance to this principle.

Principle (i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface and groundwater.

No inland waters or drainage lines (perennial or ephemeral) occur within the Assessment Area. No vegetation associated with a watercourse or wetland occur within the Assessment Area. According to the DWER groundwater salinity database (DWER, 2018), groundwater salinities in the Assessment Area range from 30,000 mg/L to 150,000 mg/L. Clearing within the Assessment Area is not expected to significantly affect water quality.

Clearing and development within the survey area is unlikely to be at variance to this principle.

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

Rainfall in the Eastern Goldfields subregion has an average rainfall of 200-300mm and an evaporation rate of 2400 mm. Rainfall data for Kalgoorlie-Boulder indicates that rainfall is spread throughout the year and rainfall events are unlikely to result in localised flooding. Clearing within the Assessment Area is not likely to increase the incidence or intensity of flooding within the Assessment Area or surrounds.

Clearing and development within the survey area is unlikely to be at variance to this principle.

4. APPENDICES

Appendix A – NSR Samphire (M15-456) Flora-Fauna Assessment 2022 (Botanica Consulting).

SAMPHIRE PROJECT

Environmental Assessment

M15/456

Version 1
January 2022

Prepared by

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Document Information

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Disclaimer

Quality Assurance

An internal quality review process has been implemented to each project task undertaken by BC. Each document and its contents is carefully reviewed by core members of the Consultancy team and signed off at Director Level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Cover Photo: Spatial Imagery of proposed Samphire Project Clearing Permit Area

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1 BACKGROUND

Northern Star Resources Limited (Northern Star) propose to submit a Native Vegetation Clearing Permit application for clearing of native vegetation surrounding the existing Samphire In-pit TSF, located approximately 35 km south of Kalgoorlie-Boulder and 18 km north-west of Kambalda, Western Australia (Figure 1-1). The Samphire Project is located within tenement M15/456 (Figure 1-2).

This document summarises the results of previous flora/vegetation and fauna surveys conducted for the Samphire Project and assesses the potential impacts to flora/ vegetation and fauna from the proposed clearing surrounding the Samphire In-pit TSF (referred to as the 'Assessment Area').

Figure 1-1: Regional map of the Assessment Area

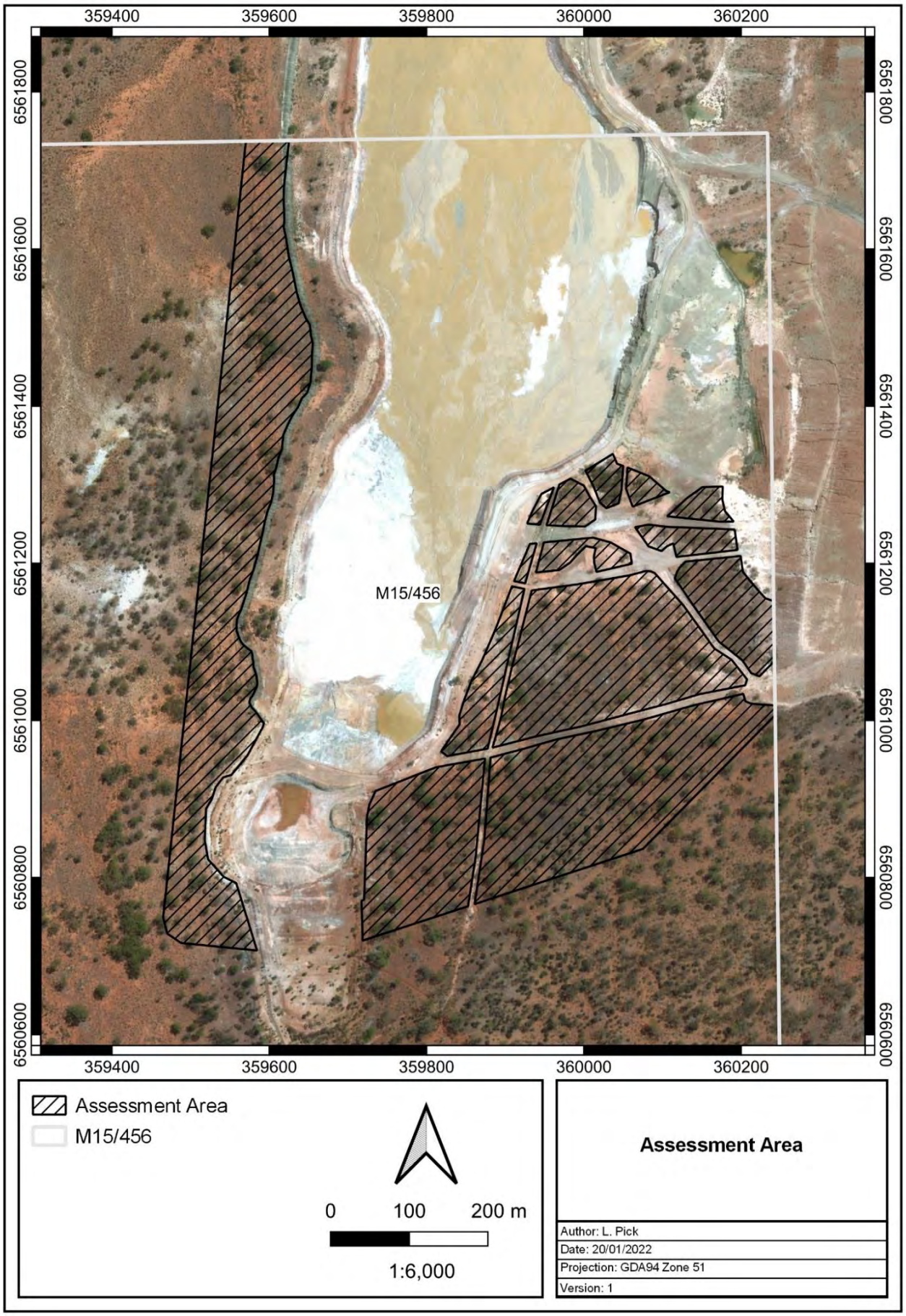

Figure 1-2: Assessment Area

2 EXISTING ENVIRONMENT

2.1 Regional Setting

The Assessment Area occurs in the Coolgardie Bioregion (Figure 2-1), as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) classification system (McKenzie, 2003). The Coolgardie Bioregion is further divided into three subregions; Mardabilla (COO1), Southern Cross (COO2) and Eastern Goldfields (COO3) subregion with the Assessment Area located within the Eastern Goldfields subregion.

The Coolgardie Bioregion is within the Yilgarn Craton. Its granite basement includes Archaean Greenstone intrusions in parallel belts. Drainage is occluded. The climate is arid to semi-arid warm Mediterranean with 250-300mm of mainly winter rainfall (McKenzie, May & McKenna, 2002). Diverse woodlands, rich in endemic eucalypts, occur on low greenstone hills, on alluvial soils on the valley floors, around the saline playas of the region's occluded drainage system, and on broad plains of calcareous earths (McKenzie, May & McKenna, 2002).

The Eastern Goldfields subregion comprises gently undulating plains interrupted in the west by low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying strata are eroded flat and covered with Tertiary sand and gravel soils, scattered exposures of bedrock, and plains of calcareous earths (Cowan, 2001).

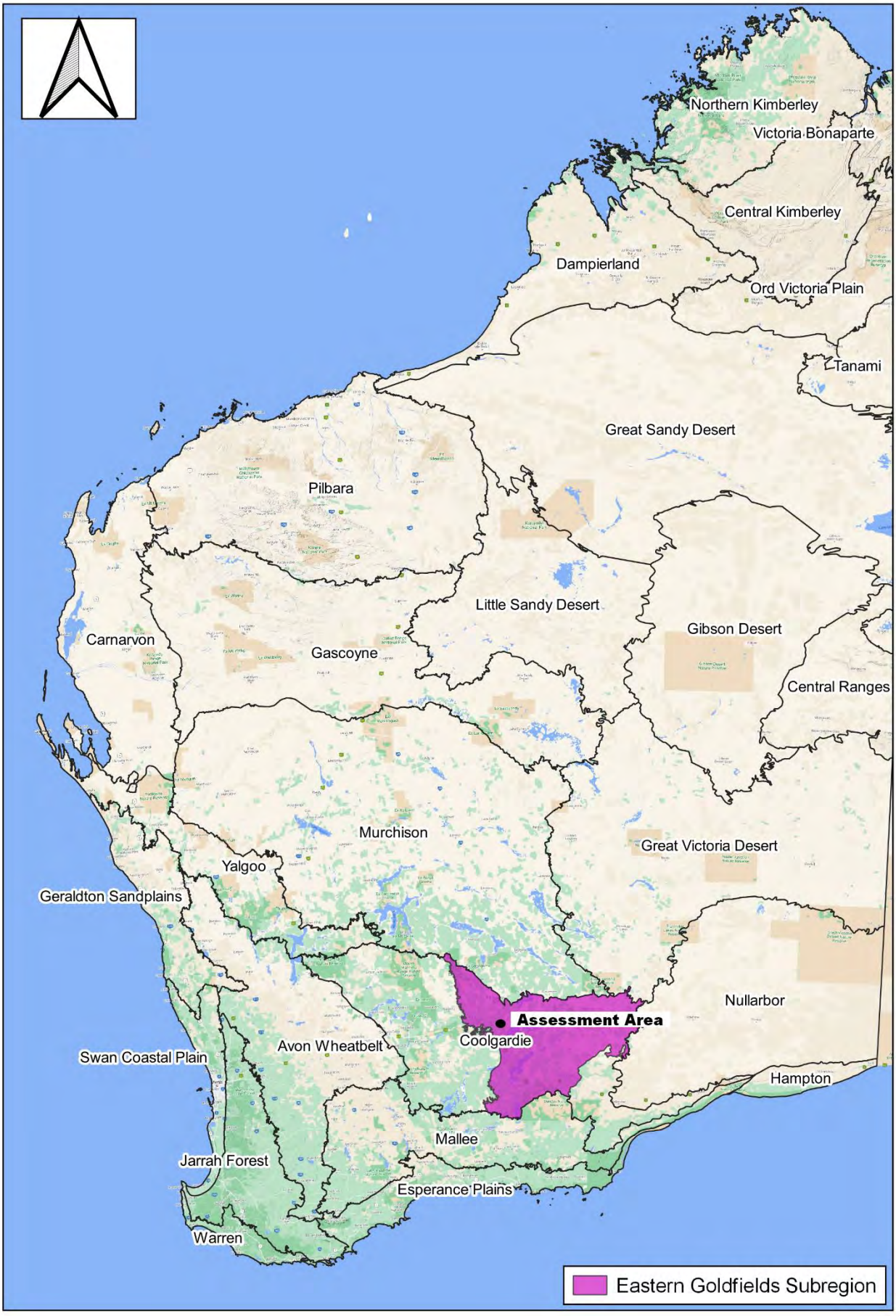

Figure 2-1: Map of IBRA Bioregions in relation to the Assessment Area

2.2 Soil Landscape Systems

The Assessment Area is located within the Kalgoorlie Province which consists of undulating plains (with some sandplains, hills and salt lakes) on granitic rocks and greenstone of the Yilgarn Craton. Soils comprise of calcareous loamy earths and red loamy earths with some salt lake soils, red deep sands, yellow sandy earths, shallow loams and loamy duplexes. Vegetation includes Eucalypt woodlands with some Acacia-Casuarina thickets, mulga shrublands, halophytic shrublands and spinifex grasslands. This Province is located within the southern Goldfields between Payne's Find, Menzies, Southern Cross and Balladonia (Tille, 2006).

The Kalgoorlie Province is located on the central eastern portion of the Yilgarn Craton, mostly overlying Archaean rocks of the Southern Cross Domain and the Eastern Goldfields Superterrane. To the north-west is the Murchison Domain. The basement rocks are a mix of granite, gneiss and greenstone. Even-grained porphyritic granitic rocks (intruded by quartz veins and dolerite dykes) are most common across the north as well as in the western half and the north-east. The largest areas of migmatite and gneiss are found in the south-west (Tille, 2006).

The Kalgoorlie Province is further divided into soil-landscape zones, with the Assessment Area located within the Kambalda Zone (265). This zone is characterised by flat to undulating plains (with hills, ranges and some salt lakes and stony plains) on greenstone and granitic rocks of the Yilgarn Craton. Soils include calcareous loamy earths and red loamy earths with salt lakes soils and some red-brown hardpan shallow loams and red sandy duplexes. Vegetation includes red mallee blackbutt- salmon gum-gimlet woodlands with mulga and halophytic shrublands (and some spinifex grasslands). This zone is located in the south-eastern Goldfields between Menzies, Norseman and the Fraser Range (Tille, 2006).

The Kambalda Zone is further divided into soil landscape systems within the Assessment Area located within three soil landscape systems described in Table 2-2 and Figure 2-2 (ASRIS, 2014).

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

Zone	Landscape System/ Mapping Unit	Description
265 (Kambalda Zone)	BB5	Rocky ranges and hills of greenstones-basic igneous rocks
	Gumland System	Extensive pedeplains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys.
	My154	Undulating country on acid volcanic rocks and sedimentary materials

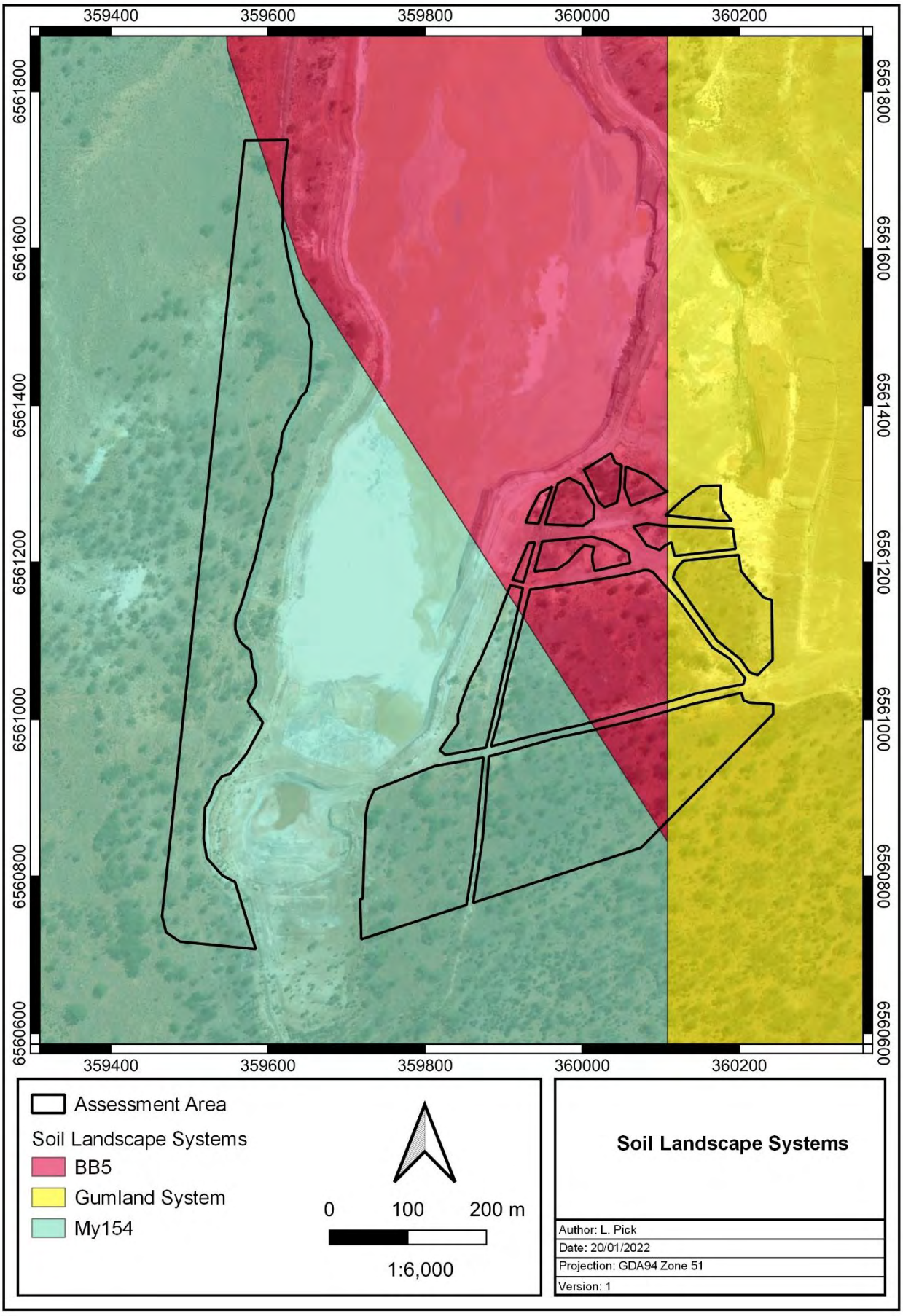

Figure 2-2: Map of soil landscape systems within the Assessment Area

2.3 Hydrology

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

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. According to the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2022) database, there are no known aquatic or terrestrial GDEs located within the Assessment Area; however, the GDE database (BoM, 2022) indicates that the southern extremity of the Assessment Area has moderate potential to contain one terrestrial GDE as listed in Table 2-2 and shown in Figure 2-3.

According to the Department of Water and Environmental Regulation (DWER) groundwater salinity database (DWER, 2018), groundwater salinities in the Assessment Area range from 30,000 mg/L to 150,000 mg/L. Groundwater in the region is a local flow system in Precambrian Rocks.

Table 2-2: Potential Terrestrial Groundwater Dependent Ecosystems within the Assessment Area

Ecosystem Description	Potential Groundwater Dependence (BoM, 2022)
Undulating plains with some sandplains, ferruginous breakaways; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys	Moderate Potential

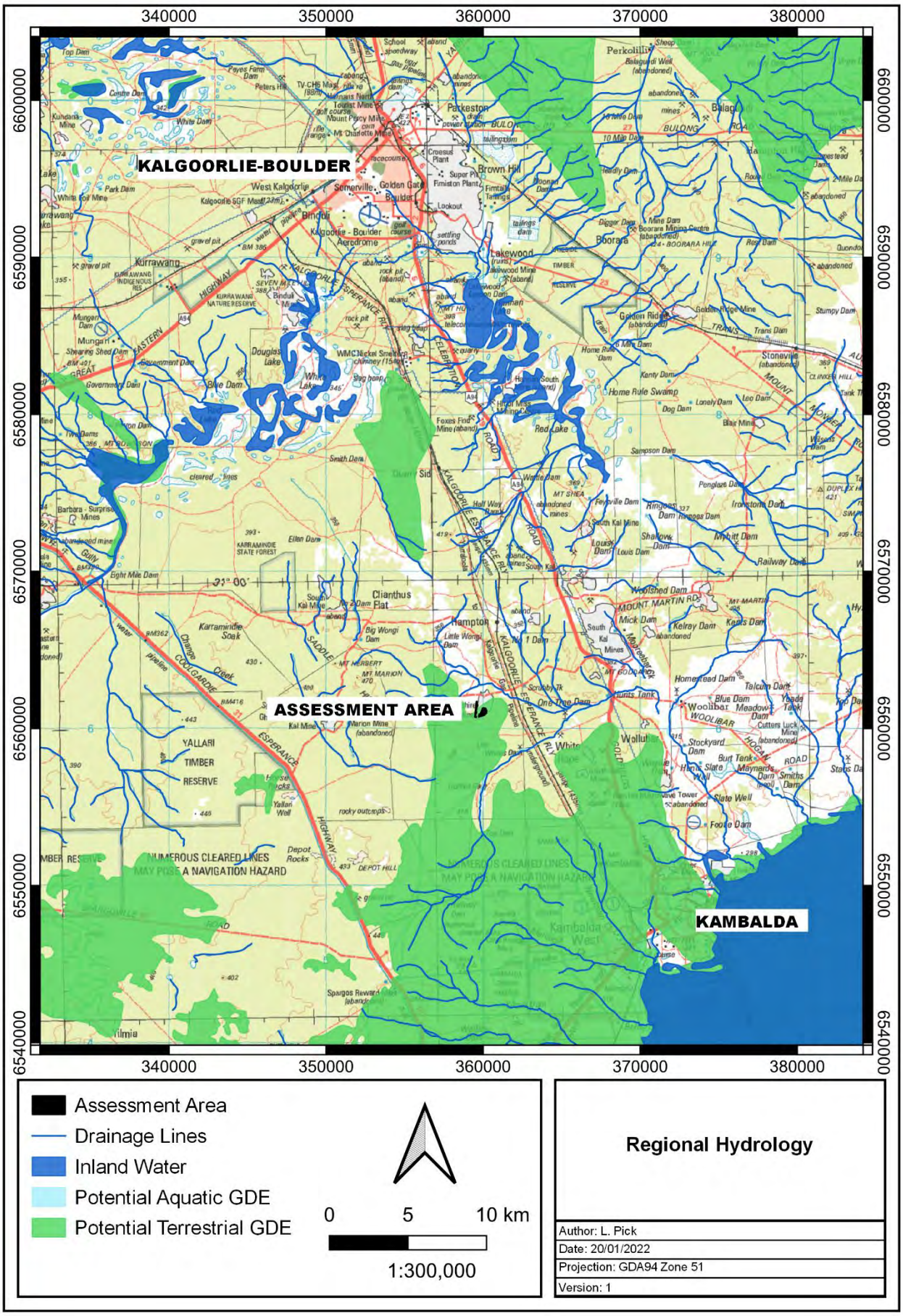

Figure 2-3: Regional hydrology of the Assessment Area

2.4 Conservation Areas

The Assessment Area does not contain any world or national heritage places. There are no wetlands of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetlands within the Assessment Area. The Assessment Area is not located within any proposed or vested Conservation Reserves. The Assessment Area does not contain any Environmentally Sensitive Areas (ESA) listed under the *Environmental Protection Act 1986* (EP Act) and does not occur within a Threatened Ecological Community listed under Commonwealth or State legislation. The Assessment Area is not located within a Priority Ecological Community as listed by the Department of Biodiversity, Conservation and Attractions (DBCA).

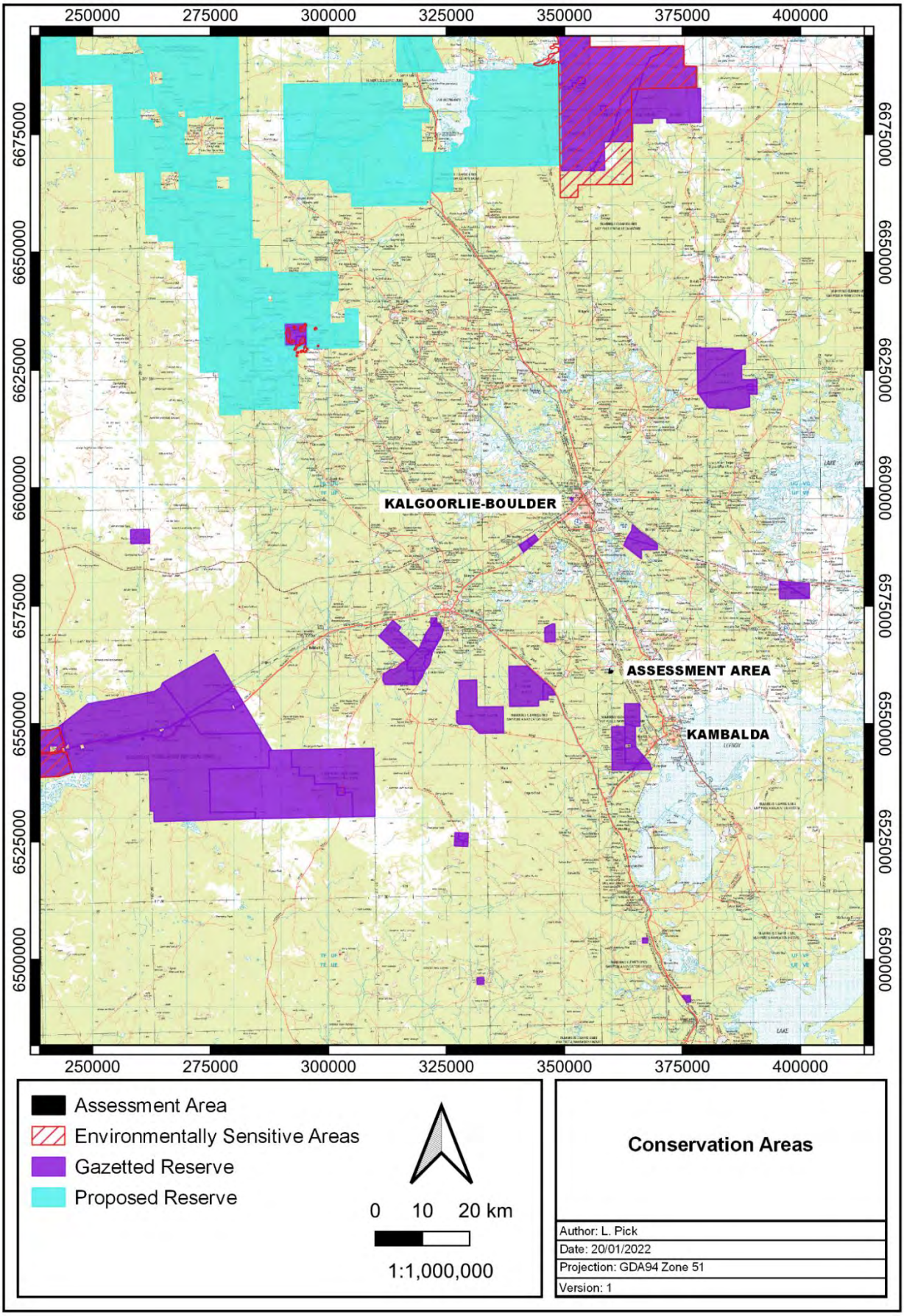

Figure 2-4: Conservation areas in relation to the Assessment Area

2.5 Vegetation and Flora

The vegetation of the Eastern Goldfields subregion consists of Mallees, *Acacia* thickets and shrub heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys (Cowan, 2001).

The Assessment Area is located within two Pre-European Vegetation Associations of the Randell and Zanthus system as shown in Figure 2-5. Both vegetation associations occupy over 99% of their pre-European extent in Western Australia and in the Eastern Goldfields subregion (DBCA, 2019) as shown in Table 2-3.

Table 2-3: Extent of Pre-European Vegetation Associations with the Assessment Area

Region	Pre-European extent, ha	Current extent, ha	% remaining	% current extent protected for conservation[1]	Extent within Assessment Area (ha)	% of current extent within the Assessment Area
Vegetation Association Binneringe 9: Medium woodland; coral gum (*Eucalyptus torquata*) & goldfields blackbutt (*E. lesouefii*)						
Eastern Goldfields Subregion	101,297	100,103	98.82	2.47	19	0.02
Vegetation Association Coolgardie 468: Medium woodland; salmon gum & goldfields blackbutt						
Eastern Goldfields Subregion	65,948	61,727	93.60	0	5	0.008

Note: 1) IUCN categories 1 – IV

Figure 2-5: Pre-European vegetation in relation to the Assessment Area

A Level 1 flora/ vegetation survey of the Samphire Project (encompassing M15/456) was conducted by GHD in October 2016. A copy of the report is provided in Appendix B. A total of four vegetation associations were identified during the survey. These vegetation associations were represented by a total of 30 families, 53 genera and 89 taxa (including fifteen annual taxa and seven introduced taxa). The proposed impacts on each vegetation association within the Assessment Area is provided in Table 2-4. A map of the vegetation associations in relation to the Assessment Area is provided in Figure 2-6. Vegetation condition ranged from Excellent to Good condition. The vegetation across the survey area was intact with limited disturbances such as isolated, non-aggressive weeds, and occasional vehicle tracks observed. Areas adjacent to the TSF were rated as Good or Very Good, with the TSF rated as Completely Degraded. Areas associated with the TSF have been partially to completely cleared and are almost to completely without native flora taxa. Six introduced flora were identified within the survey area, none of which are listed as a Declared Plant under the *Biosecurity and Agriculture Management Act 2007:*

1. *Mesembryanthemum nodiflorum* (Slender Iceplant)
2. *Centaurea melitensis* (Maltese Cockspur)
3. *Oncosiphon suffruticosum* (Calomba Daisy)
4. *Carrichtera annua* (Wards Weed)
5. *Citrullus colocynthis*
6. *Salvia verbenaca* (Wild Sage)

Table 2-4: Summary of extent of vegetation associations within the Assessment Area

Vegetation Association	Description	Landform/ Substrate	Extent within Survey Area		Extent within Assessment Area	
			ha	%	ha	%
Mixed Eucalyptus woodland (EW)	*Eucalyptus lesouefii, E. salmonophloia, E. transcontinentalis, E. salubris* low to mid-woodland over *Melaleuca sheathiana, Exocarpos aphyllus* tall sparse shrubland over *Eremophila* spp. mid-sparse shrubland over *Senna artemisioides* subsp. *filifolia*, *Maireana* spp., *Sclerolaena* spp., *Scaevola spinescens, Olearia muelleri* low open shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, loamy clay	289.6	66.9	19	79.2
Casuarina pauper open woodland (CpW)	*Casuarina pauper, Eucalyptus celastroides* subsp. *celastroides* low open woodland over *Dodonaea lobulata, Acacia colletioides, Eremophila oldfieldii* subsp. *angustifolia* mid- open shrubland over *Scaevola spinescens, Ptilotus obovatus, Acacia erinacea* low sparse shrubland.	Hill crests, slopes, breakaways	33.9	7.8	0	0.0
Melaleuca open shrubland (MS)	*Melaleuca sheathiana* tall open shrubland with emergent *Eucalyptus oleosa* subsp. *oleosa* over *Tecticornia, Maireana villosa, Sclerolaena diacantha, Ptilotus obovatus* low sparse shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, sandy to loamy clay	33.1	7.6	0	0.0
Tecticornia open shrubland (TS)	*Tecticornia halocnemoides, Disphyma crassifolium, Maireana tomentosa* low open shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, clay	28.8	6.6	3	12.5
Highly Disturbed	Previously cleared vegetation	In-pit TSF	47.8	11.0	2	8.3
Total			**385.4**	**100**	**433.2**	**100**

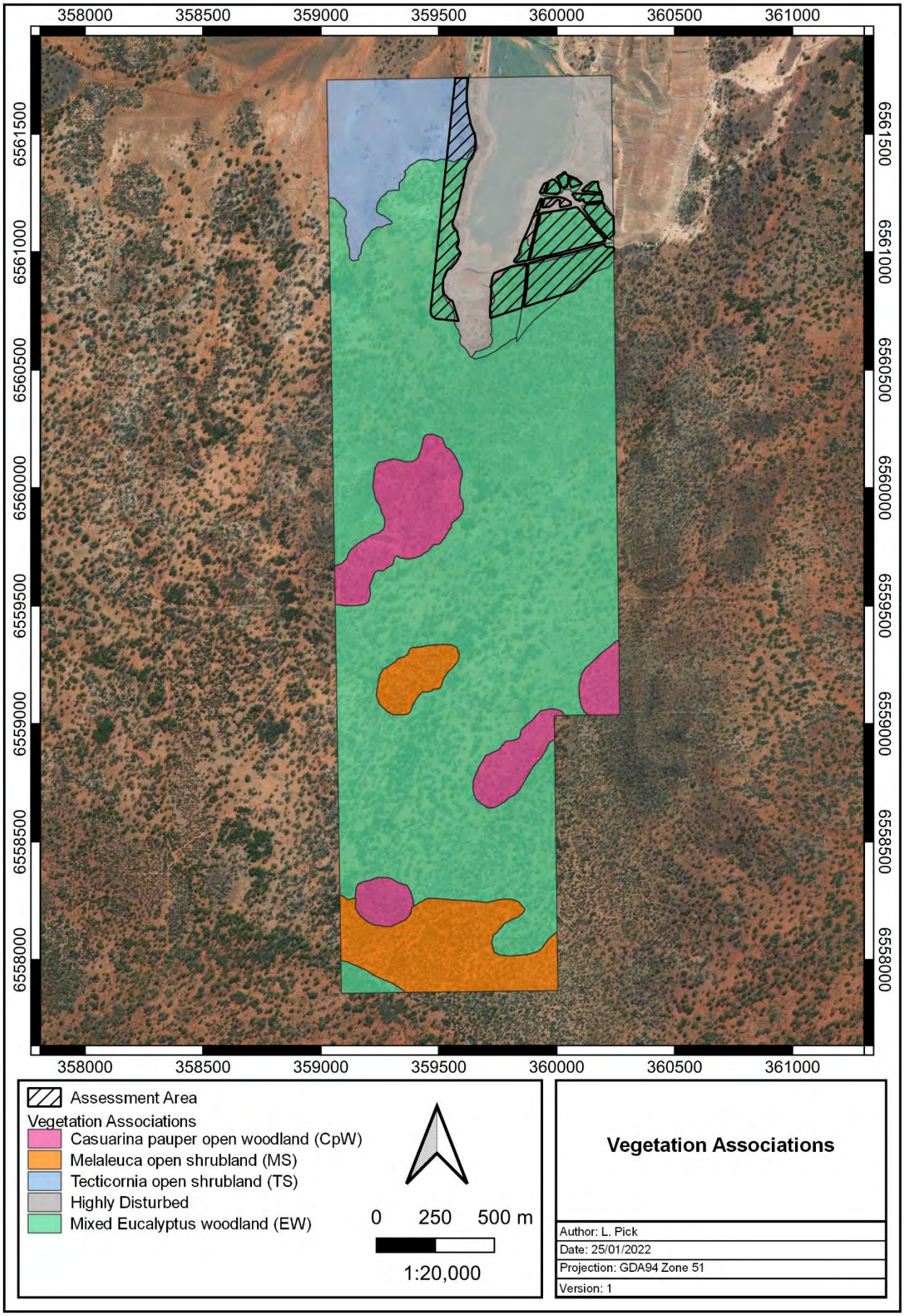

Figure 2-6: Vegetation associations within the Assessment Area

2.5.1 Significant Flora

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) flora of conservation significance includes:

- flora being identified as threatened or priority species
- locally endemic flora or flora associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- new species or anomalous features that indicate a potential new species
- flora representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids
- flora with relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

No Threatened Flora taxa listed under Commonwealth or State legislation were identified within the Assessment Area. No Priority Flora taxa were identified within the Assessment Area. No other significant flora (i.e. endemic, new or anomalous species, range extension, relictual or unusual species) were identified during the survey or are known to occur within the Assessment Area.

2.5.2 Significant Vegetation

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016c) vegetation of conservation significance includes:

- vegetation being identified as threatened or priority ecological communities
- vegetation with restricted distribution
- vegetation subject to a high degree of historical impact from threatening processes
- vegetation which provides a role as a refuge
- vegetation providing an important function required to maintain ecological integrity of a significant ecosystem.

The Assessment Area is not located within the boundary of any Threatened or Priority Ecological Communities (PEC). No other significant vegetation as described above, was identified within the Assessment Area. Vegetation types identified are well represented outside of the Assessment Area and are not considered endemic/ restricted to the Assessment Area.

2.6 Fauna

A Level 1 fauna survey of the Samphire Project (encompassing M15/456) was conducted by GHD in October 2016. A copy of the report is provided in Appendix B. The proposed impacts on each habitat type within the Assessment Area is provided in Table 2-5. A map of the fauna habitats in relation to the Assessment Area is provided in Figure 2-7. A total of 47 fauna species comprising 38 birds, five reptiles and four mammals were recorded during the field survey.

Table 2-5: of extent of fauna habitats within the Assessment Area

Fauna Habitat	Description	Conservation Significant Species that possibly utilize habitat	Extent within Survey Area		Extent within Assessment Area	
			ha	%	ha	%
Eucalypt Woodland-Mixed Eucalypt Woodlands	This habitat type incorporates vegetation association EW Mixed Eucalyptus woodlands dominate the survey area and comprise *Eucalyptus lesouefii, E. salmonophloia*, and *E. salubris* over *Melaleuca* spp., *Exocarpos aphyllus, Eremophila* spp., *Senna artemisioides, Maireana* spp., *Sclerolaena* spp., *Scaevola spinescens, Olearia muelleri* and *Austrostipa* spp. This habitat had excellent canopy cover with areas of denser thickets forming canopy connectivity, other areas were more open in nature. The habitat appeared long unburnt with areas of good litter and branch build up and large logs scattered throughout, with and without hollows present. Ground hollows had signs of use via Echidna scratchings and other small mammal activity via the presences of chewed discarded Quandong nuts. Shrub layers vary in density and structure. In this habitat type evidence of log extraction was observed close to the existing tailings area, however was less evident away from mining activities. Random off road tracks were scattered throughout the habitat, however this did not distract from the quality of the habitat.	• Malleefowl (foraging and breeding) • Peregrine Falcon (foraging and potential breeding in some of the larger Eucalypts) • Chuditch (foraging and breeding – denning) • Central Long-eared Bat (foraging and roosting)	289.6	75.1	19	79.2
Low rocky hills with breakaway or rock exfoliation-*Casuarina pauper* open woodland	This habitat type incorporates vegetation associations CpW. The rocky hills and breakaways are present in several small areas and comprise of exposed rocky ridges, rocky loams and eroded rocks on low hills. The vegetation community differed to the general area at this habitat and would be considered unique to rocky areas, particularly due to the dominance of the Casuarina trees. The rocky areas have cavities, crevices and rock exfoliation providing a variety of micro-habitats for reptile species. Litter and woody debris were also observed in these areas and associated with the Casuarinas isolated on the low hills. The vegetation in this habitat appeared long unburnt probably due to the openness and presence of exposed rock. Numerous signs of echidna were also observed in this habitat type.	• Malleefowl (foraging and breeding – not on the exposed rock but associated vegetation and hill slopes) • Peregrine Falcon (foraging) • Chuditch (foraging and breeding - denning) • Central Long-eared Bat (foraging)	33.9	8.8	0	0.0

Fauna Habitat	Description	Conservation Significant Species that possibly utilize habitat	Extent within Survey Area		Extent within Assessment Area	
			ha	%	ha	%
Shrublands on clay loam-Melaleuca open shrubland	This habitat type incorporates vegetation associations MS. A small area of Melaleuca shrubland was present in the southern portion of the survey area. This habitat was in a low region in the environment however did not appear to retain water during rain events. Few other plant species were present in the habitat and were scattered when located. The soil consisted of clay loan with areas of pebble incursion. Litter and woody debris were present but restricted to under the Melaleuca trees and there were few large logs in the area due to the lack of large Eucalypts. This habitat appeared long unburnt probably due to the open nature of the habitat. An old Malleefowl mound was recorded in this habitat.	• Malleefowl (foraging and breeding) • Peregrine Falcon (foraging) • Chuditch (foraging) • Central Long-eared Bat (foraging)	33.1	8.6	0	0.0
Low open shrubland-Tecticornia open shrubland	This habitat type incorporates vegetation association TS. The low open shrubland comprises *Tecticornia* spp., *Disphyma crassifolium, Maireana tomentosa* with *Austrostipa elegantissima* isolated tussock grasses. This habitat is positioned low in the environment in the north west region of the survey area. The habitat has evidence of some ephemeral, water gaining depressions just outside of the northern boundary of the survey area. The soil type is clay loam with some small pebble incursion. The chenopods provide good habitat to small reptiles, mammals and birds. Some litter and wood debris lay at the base of the Chenopod shrubs, however much of the ground is bare. No large logs were present in this habitat. This area is long unburnt which is probably and artefact of its open nature.	• Peregrine Falcon (foraging) • Chuditch (foraging) • Central Long-eared Bat (foraging)	28.8	7.5	3	12.5
Highly Disturbed	Previously cleared vegetation (in-pit TSF)		47.8	11.0	2	8.3
Total			**433.2**	**100**	**24**	**100**

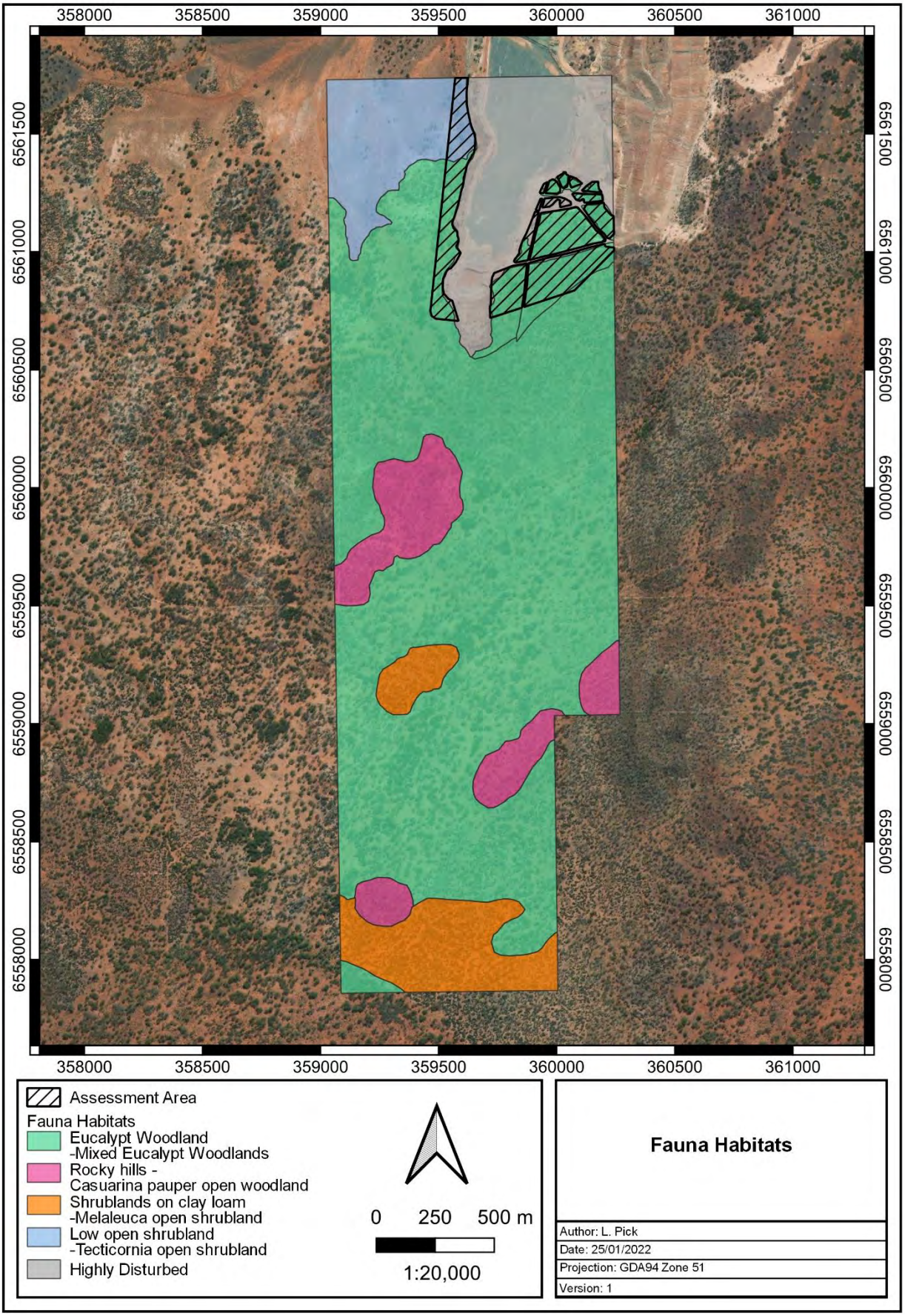

Figure 2-7: Fauna Habitats within the Assessment Area

2.6.1 Significant Fauna

According to the EPA *Environmental Factor Guideline for Terrestrial Fauna* (EPA, 2016b) significant fauna includes:

- Fauna being identified as a threatened or priority species;
- Fauna species with restricted distribution;
- Fauna subject to a high degree of historical impact from threatening processes; and
- Fauna providing an important function required to maintain the ecological integrity of a significant ecosystem.

One historic mound of the threatened fauna species *Leipoa ocellata* (Malleefowl) was recorded within the survey area. This inactive mound was identified approximately 2.7km south of the Assessment Area (Figure 2-8) within the fauna habitat type 'Shrublands on clay loam-Melaleuca open shrubland', which is not present within the survey area. There was no other evidence of Malleefowl activity observed during the survey. No significant fauna species (as described above) were observed during the survey or are known to occur within the Assessment Area.

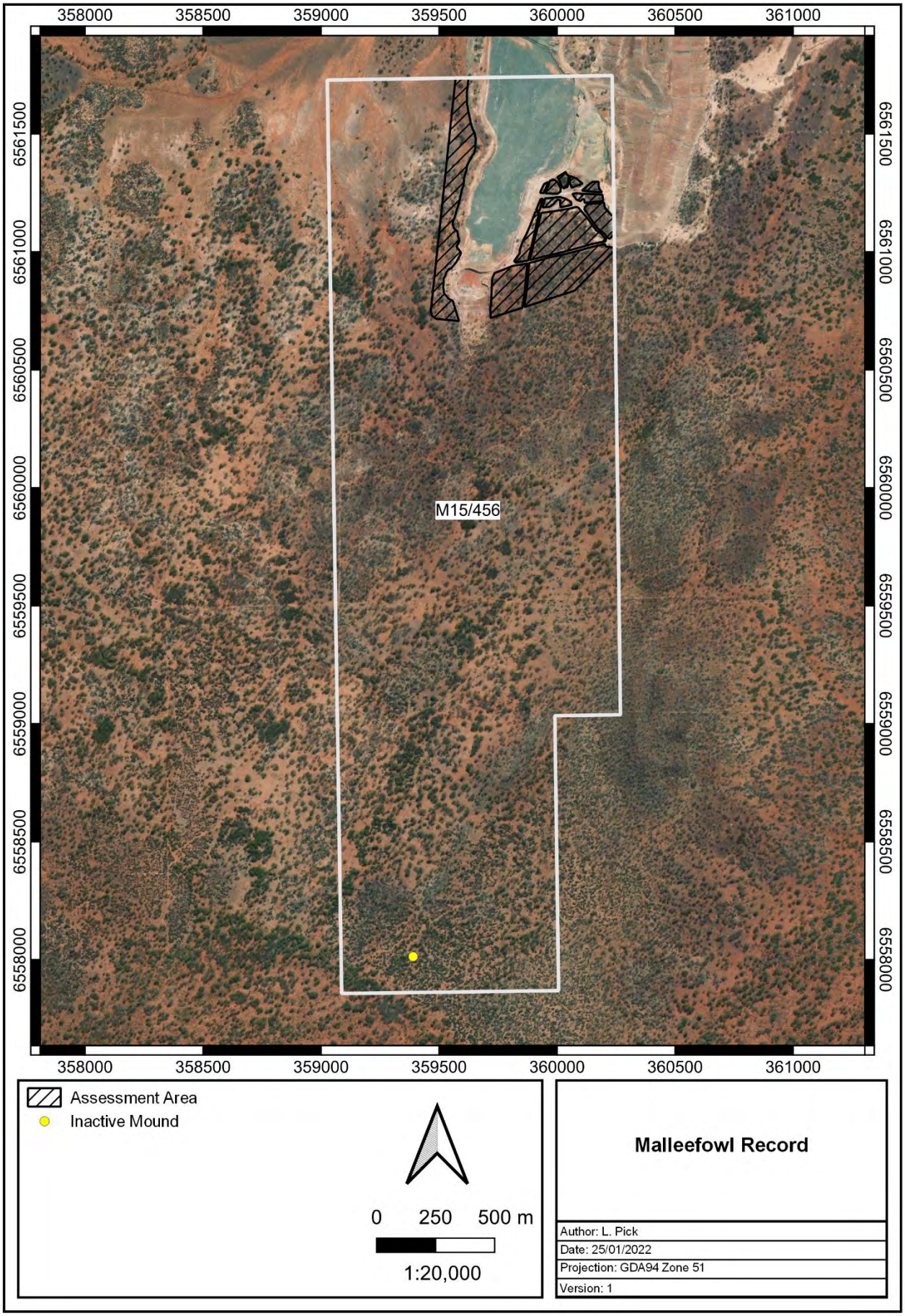

Figure 2-8: Location of inactive Malleefowl mound in relation to the Assessment Area

3 ENVIRONMENTAL SIGNIFICANCE

3.1 Matters of National Environmental Significance

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

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

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

No matters of national environmental significance as defined by the Commonwealth EPBC Act were identified within the Assessment Area.

3.2 Matters of State Environmental Significance

3.2.1 *Environmental Protection Act WA 1986*

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

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

No evidence of the Assessment Area containing any TEC or Threatened flora or fauna was found during the survey period. The Assessment Area is not located within an ESA.

3.2.2 *Biodiversity Conservation Act 2016*

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

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

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

No threatened species or critical habitat listed under the BC Act were recorded within the Assessment Area.

4 NATIVE VEGETATION CLEARING PRINCIPLES

Based on the outcomes from the survey undertaken, Botanica assessed the proposed clearing within the Assessment Area with regards to the native vegetation clearing principles listed under Schedule 5 of the EP Act (Table 4-1). The assessment found that the proposed vegetation clearing activities are unlikely to be at variance with the clearing principles.

Table 4-1: Assessment against native vegetation clearing principles

Letter	Principle Native vegetation should not be cleared if it:	Assessment	Outcome
(a)	comprises a high level of biological diversity.	Vegetation identified within the Assessment Area is not considered to be of high biological diversity and is well represented outside of the Assessment Area. There are no Threatened or Priority Ecological Communities within the Assessment Area.	Clearing is unlikely to be at variance with this principle
(b)	comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	The field survey did not record any evidence of the presence of significant fauna within the Assessment Area. The habitat types within the Assessment Area are well represented in the local and broader area and there is direct connectivity from the habitat in the Assessment Area through to the surrounding habitat.	Clearing is unlikely to be at variance with this principle
(c)	includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act were identified within the Assessment Area.	Clearing is not at variance with this principle
(d)	comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No TEC listed under the EPBC Act or by the BC Act occur within the Assessment Area.	Clearing is not at variance with this principle
(e)	is significant as a remnant of native vegetation in an area that has been extensively cleared	The pre-European vegetation associations within the Assessment Area (Binneringe 9 and Coolgardie 468) retain >93% of their original pre-European vegetation extent.	Clearing is unlikely to be at variance with this principle
(f)	is growing, in, or in association with, an environment associated with a watercourse or wetland	No inland waters or drainage lines (perennial or ephemeral) occur within the Assessment Area. No vegetation associated with a watercourse or wetland occur within the Assessment Area.	Clearing is unlikely to be at variance with this principle
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The Assessment Area and surrounding region has not been extensively cleared. Clearing within the Assessment Area is not considered likely to lead to land degradation issues such as salinity, water logging or acidic soils.	Clearing is unlikely to be at variance with this principle
(h)	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The Assessment Area is not located within or adjacent to any conservation areas, Environmentally Sensitive Areas or Nationally Important Wetlands.	Clearing is unlikely to be at variance with this principle
(i)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality	No inland waters or drainage lines (perennial or ephemeral) occur within the Assessment Area. No vegetation associated with a watercourse or wetland occur within the Assessment Area. According to the DWER groundwater salinity database (DWER,	Clearing is unlikely to be at variance with this principle

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
	of surface or underground water.	2018), groundwater salinities in the Assessment Area range from 30,000 mg/L to 150,000 mg/L. Clearing within the Assessment Area is not expected to significantly affect water quality.	
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding	Rainfall in the Eastern Goldfields subregion has an average rainfall of 200-300mm and an evaporation rate of 2400 mm. Rainfall data for Kalgoorlie-Boulder indicates that rainfall is spread throughout the year and rainfall events are unlikely to result in localised flooding. Clearing within the Assessment Area is not likely to increase the incidence or intensity of flooding within the Assessment Area or surrounds.	Clearing is unlikely to be at variance with this principle

5 ENVIRONMENTAL MANAGEMENT MEASURES

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

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

6 BIBLIOGRAPHY

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

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

BoM (2022). Groundwater Dependent Ecosystems Atlas. Bureau of Meteorology
Available: http://www.bom.gov.au/water/groundwater/gde/map.shtml
Accessed: 12th January 2022.

Cowan, (2001). *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2001- Coolgardie Region (COO3-Eastern Goldfields)*, Department of Conservation and Land Management.

DAWE, (2022a). *Protected Matters Database search.* Department of Agriculture, Water and Environment.
Available: https://www.environment.gov.au/epbc/protected-matters-search-tool
Accessed: 20th January 2022.

DAWE, (2022b). *Species Profile and Threats Database.* Department of Agriculture, Water and Environment.
Available: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
Accessed: 20th January 2022.

DBCA (2019). *2018 Statewide Vegetation Statistics*. Department of Biodiversity, Conservation and Attractions

DBCA (2019a). *Threatened Flora Database search results*, Department of Biodiversity, Conservation and Attractions. Results obtained February2019.

DBCA (2019b). *Ecological Communities Database search results*, Department of Biodiversity, Conservation and Attractions. Results obtained February 2019.

DotEE, (2012). *Interim Biogeographic Regionalisation for Australia (IBRA),* Version 7, Department of the Environment and Energy

DotEE, (2017). *National Vegetation Information System (NVIS) Major Vegetation Groups, Version 4.2*, Department of the Environment and Energy

DPIRD (2018a). *Soil Landscape System of Western Australia,* Department of Primary Industries and Regional Development.

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

DWER (2018). Groundwater Salinity, Statewide Database. Department of Water and Environmental Regulation. Updated March 29th 2018.

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

EPA (2016b). *Environmental Factor Guideline Flora and Vegetation.* Environmental Protection Authority.

EPA (2016c). *Environmental Factor Guideline Terrestrial Fauna.* Environmental Protection Authority.

EPA (2020). *Technical Guidance - Terrestrial Fauna Surveys for Environmental Impact Assessment – June 2020.* Environmental Protection Authority.

GHD (2016). Samphire Clearing Permit Area Flora and Fauna Assessment. Prepared for Metals X Limited.

IUCN (2016a). *The IUCN Red List of Threatened Species. Version 2016-3*. International Union for Conservation of Nature.

IUCN, (2016b). *The IUCN Red List of Ecosystems.* International Union for Conservation of Nature.

Keighery, B. J., (1994). *Bushland Plant Survey: A guide to plant community survey for the community.* Wildflower Society of Western Australia (Inc.), Nedlands.

McKenzie, N.L., May J.E. and McKenna, S, (2002). *Bioregional Summary of the 2002 Biodiversity Audit for Western Australia.*

WAHERB, (2022). *Florabase – Information on the Western Australian Flora,* Department of Biodiversity, Conservation and Attractions.
Available: https://florabase.dpaw.wa.gov.au/
Accessed: 25th January 2022.

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

Definitions of Conservation Significant Species

Code	Category
State categories of Threatened and Priority species	
Threatened Species (T) Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as Threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).	
CR	**Critically Endangered** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
VU	**Vulnerable** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct species Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.	
EX	**Extinct** Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.
EW	**Extinct in the Wild** Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no Threatened fauna or Threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.	
IA	**International Agreement/ Migratory** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Code	Category
	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** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as Threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
Priority species Possibly Threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of Priority for survey and evaluation of conservation status so that consideration can be given to their declaration as Threatened Fauna or Flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.	
P1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Commonwealth categories of Threatened species	
EX	**Extinct** Taxa where there is no reasonable doubt that the last member of the species has died.
EW	**Extinct in the Wild** Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

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

Definitions of conservation significant communities

Category Code	Category
State categories of Threatened Ecological Communities (TEC)	
PD	**Presumed Totally Destroyed**
	An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies:
	• records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or;
	• all occurrences recorded within the last 50 years have since been destroyed.
CR	**Critically Endangered**
	An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:
	The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification;
	The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;
	The ecological community is highly modified with potential of being rehabilitated in the immediate future.
EN	**Endangered**
	An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria:
	The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short-term future, or is unlikely to be substantially rehabilitated in the short-term future due to modification;
	The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;
	The ecological community is highly modified with potential of being rehabilitated in the short-term future.

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

Appendix B:
Samphire Project Flora and Fauna Assessment (GHD, 2016)

Metals X Limited

Samphire Clearing Permit Area
Flora and Fauna Assessment

November 2016

Executive summary

Metals X Limited (Metals X) is a diversified group exploring and developing minerals and metals in Australia. Metals X is proposing to undertake mine development activities on one of its tenements, Samphire, located approximately 35 kilometres (km) south of Kalgoorlie. GHD Pty Ltd (GHD) was engaged by Metals X to undertake a vegetation, flora and fauna assessment of the Samphire Clearing Permit Area (the 'survey area') to identify key ecological constraints and provide information to support an application for clearing.

The survey methodology and reporting carried out by GHD was undertaken with reference to the Environmental Protection Authority (EPA) Guidance Statement No. 51 (EPA 2004a), Guidance Statement No. 56 (EPA 2004b) and Position Statement No. 3 (EPA 2002).

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout the Report.

Vegetation and flora survey results

The survey area comprised four associations, two woodland associations (*Eucalyptus* and *Casuarina*), two shrubland associations (*Melaleuca* and *Tecticornia*) and areas that were considered highly disturbed/cleared. The vegetation associations are not representative of any Commonwealth or State listed TECs or PECs, nor were any riparian vegetation associations observed within or in the vicinity of the survey area. The vegetation condition of the survey area was rated as *Excellent* to *Good* with highly disturbed/cleared areas rated as *Highly Degraded*. Disturbances throughout the survey area included clearing for tracks, the Samphire tailings storage facility and associated infrastructure.

During the field survey 89 flora taxa were recorded, six of which were introduced. No *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Biodiversity Conservation Act 1950* (BC Act) or Priority listed flora taxa were recorded within the survey area during the field survey. A flora likelihood of occurrence assessment completed post-field survey for conservation significant flora concluded that no taxa were considered likely to occur in the survey area.

Fauna survey results

The fauna survey identified four broad fauna habitat types within the survey area. These habitats are well represented in the immediate area and broader region. The habitat value to species within the survey area is considered to be medium to high, as the areas for fauna to utilise are relatively undisturbed and structurally complete. There is direct connectivity from the habitat in the survey area through to the surrounding habitat and the survey area forms parts of a very large continuous tract of habitat across the central Goldfields with little fragmentation and only scattered interruptions.

No fauna species of conservation significance were recorded within the survey area during the field survey. However, evidence of the Malleefowl (*Leipoa ocellata*) was recorded, with one old (inactive) Malleefowl mound recorded. A further three conservation significant fauna species are considered likely to use the survey area. All habitat types are likely to be utilised by conservation significant fauna species, however none are considered critical to the survival of any one species.

Assessment against the 10 clearing principles

An assessment of the survey area against the 10 clearing principles concluded that clearing within the survey area is unlikely to be at variance to any Principle.

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Appendices

1. Introduction

1.1 Project background

Metals X Limited (Metals X) is a diversified group exploring and developing minerals and metals in Australia. Metals X is proposing to undertake mine development activities on one of its tenements, Samphire, located approximately 35 kilometres (km) south of Kalgoorlie.

GHD Pty Ltd (GHD) was engaged by Metals X to undertake a vegetation, flora and fauna assessment of the Samphire Clearing Permit Area.

1.2 Purpose of the report

This report details a Level 1 flora and fauna assessment of the Samphire Clearing Permit Area. The purpose of the assessment is to identify key ecological constraints within the survey area and provide information to support an application for clearing.

1.3 Survey area

The Samphire Clearing Permit Area (referred to as the 'survey area') is located approximately 35 km south east of Kalgoorlie in the Goldfields Region of Western Australia. The survey area is approximately 3.8 km long, between 920-1200 m wide and covers 433.20 hectares (ha) (Figure 1, Appendix A.

1.4 Scope of works

The scope of works, as detailed in the Metals X brief and GHD proposal was to:

- Undertake a desktop assessment of relevant ecological aspects and constraints
- Undertake a detailed Level 1 (EPA 2004a) vegetation and flora survey to provide:
  - Description and mapping of vegetation units and vegetation condition
  - Inventory of vascular flora taxa
  - Location and counts of conservation significant flora (Threatened and Priority Flora) and any Declared Pest taxa
- Undertake a Level 1 (EPA 2004b) fauna survey to provide:
  - Description and mapping of fauna habitat types
  - Inventory of vertebrate fauna taxa
  - An indication of the presence or likelihood of occurrence of conservation significant fauna within the survey areas
- Prepare a flora and fauna assessment report, documenting the results of the desktop assessment and Level 1 surveys
- Undertake an assessment of the survey area against the 10 Clearing Principles.

1.5 Relevant legislation, conservation codes and background information

In Western Australia significant communities, flora and fauna are protected under both Commonwealth and State legislation. In addition, regulatory bodies also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this Project is provided in Appendix B.

1.6 Limitations and assumptions

This report has been prepared by GHD for Metals X and may only be used and relied on by Metals X for the purpose agreed between GHD and Metals X as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Metals X arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Metals X and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of infrastructure, access and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Methodology

2.1 Desktop assessment

Prior to the commencement of the field survey, a desktop review was undertaken to identify relevant environmental information pertaining to the survey area and to assist in survey design. This included:

- A search using the Department of the Environment and Energy (DotEE) Protected Matters Search Tool (PMST) to identify communities and species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within a 40 km buffer of the survey area (DotEE 2016a) (Appendix C)
- A search of the Department of Parks and Wildlife (DPaW) Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC) databases to determine the potential for TECs or PECs to be present within a 40 km buffer of the survey area
- A search of the DPaW's NatureMap database for flora and fauna species previously recorded within a 40 km buffer of the survey area (DPaW 2007–) (Appendix C)
- A search of the DPaW Threatened and Priority Flora database (TPFL) and Western Australian Herbarium database (WAHERB) for Threatened and Priority flora species listed under the *Biodiversity Conservation Act 2016* (BC Act) and listed by DPaW, previously recorded within a 40 km buffer the survey area
- A review of existing reports and datasets including: previous vegetation mapping of the survey area (Beard 1972), aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment, likely vegetation units and fauna habitats and to identify areas with potential to contain TECs, PECs, and Threatened and Priority listed flora and fauna species.

2.2 Field survey

2.2.1 Vegetation and flora

GHD ecologists conducted a Level 1 vegetation and flora assessment of the survey area on 18 October 2016. The vegetation and flora field survey was undertaken to identify and describe the dominant vegetation units, assess vegetation condition and identify and record vascular flora taxa present at the time of survey. Additionally, opportunistic searches for conservation significant or other significant ecological communities and flora taxa were undertaken.

The survey methodology employed by GHD was consistent with the Environmental Protection Authority (EPA) Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004a), Terrestrial Biological Surveys as an Element of Biodiversity Protection, Position Statement No. 3 (EPA 2002) and Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA and DPaW 2015).

Data collection

Field assessment methodology involved traversing the survey area on foot using a combination of quadrats, transect and opportunistic sampling. Quadrats were established in areas representative of a vegetation assemblage. The quadrats were 20 m x 20 m in size (area of 400 m^2), with shape and/or size adjusted as necessary. Field data at each quadrat were recorded on a pro-forma data sheet. Generally, one quadrat was described for each vegetation unit with a total of four quadrats described throughout the survey area.

A flora inventory was compiled from taxa listed in described quadrats and from opportunistic floristic records throughout the survey area.

Two monitoring transects also occur within the survey area. Flora data collected from these transects in May 2015 and June 2016 was also incorporated into this report.

Vegetation units

Vegetation units were identified and boundaries delineated using a combination of aerial photography, topographic features, previous mapping (Beard 1972) and field data. Vegetation units were described based on structure, dominant taxa and cover characteristics as defined by quadrat data and field observations. Vegetation unit descriptions follow the National Vegetation Information System (NVIS) and are consistent with NVIS Level V (Association), and are grouped within NVIS Level III (Broad Floristic Formation). At Level V up to three taxa per stratum are used to describe the association (ESCAVI 2003).

Vegetation mapping has been undertaken at a suitable scale for this project.

Vegetation condition

The vegetation condition of the survey area was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA and DPaW 2015). The scale recognises the intactness of vegetation, which is defined by the following:

- Completeness of structural levels
- Extent of weed invasion
- Historical disturbance from tracks and other clearing or dumping
- The potential for natural or assisted regeneration

The scale consists of six rating levels as outlined below in Table 1.

Table 1 Vegetation condition scale

Condition	South West and Interzone Botanical Provinces description
Pristine	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of 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.

Flora identification and nomenclature

Species that were well known to the survey ecologists were identified in the field, while species that could not be identified in the field were collected and assigned a unique number to facilitate tracking. Plant species were identified by the use of local and regional flora keys and by comparison with the named species held at the Western Australian Herbarium (WA Herbarium).

The conservation status of all recorded flora was compared against the current lists available on FloraBase (WA Herbarium 1998–) and the EPBC Act Threatened species database provided by DotEE (2016b).

Nomenclature used in this report follows that used by the WA Herbarium as reported on FloraBase (WA Herbarium 1998–).

Targeted surveys for conservation significant flora

Prior to the field survey, information obtained from the desktop assessment (e.g. aerial photography, geology/soils, hydrology and NatureMap, TPFL and WAHERB database search results) was reviewed to determine potential conservation significant flora taxa present and locations. Additionally, ecological information (e.g. habitat, associated flora taxa and phenology) was sourced from FloraBase (DPaW 2007–) and other relevant publications where available, to provide further details.

Where time permitted, potential habitat was searched for conservation significant flora taxa. Locations within the survey area with differing hydrology, fire or disturbance history to the surrounding areas were also searched where identified.

2.2.2 Fauna

The fauna field survey was undertaken to identify and describe the dominant fauna habitat types and their condition, assess habitat connectivity, identify and record fauna taxa within the general survey area and undertake targeted searches for conservation significant fauna taxa and their habitats.

The survey methodology employed by GHD was consistent with EPA Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b) for Level 1 fauna assessments (reconnaissance survey).

Habitat assessment

A fauna habitat assessment sheet was used to document the type, condition and extent of habitats within the survey area, this included:

- Habitat structure (e.g. vegetation type, presence/absence of overstorey, midstorey, understorey and ground cover)
- Presence/absence of refuge including: fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
- Presence/absence of waterways including type, extent and habitat quality within waterways
- Land use or disturbance history
- Location of habitat within the surrounding landscape and habitat connectivity
- Identification of wildlife corridors within and immediately adjacent to the survey area
- A photograph of the habitat type

Opportunistic fauna searches

Opportunistic fauna searches were also conducted across the survey area. Opportunistic searches involved:

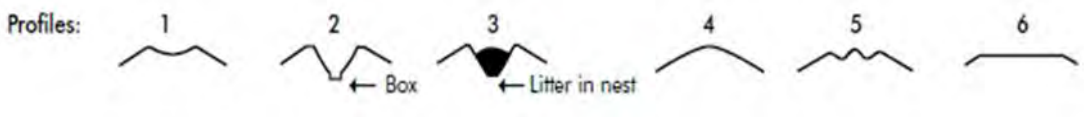
- Searching through microhabitats including turning over logs or rocks, turning over leaf litter and examining tree hollows and hollow logs
- Visual and aural surveys, which accounted for many bird species potentially utilising the survey area
- Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral fauna

Targeted assessments for Malleefowl

The aim of the Malleefowl assessment was to assess the presence, quality and extent of habitat for Malleefowl within the survey area. Malleefowl in the Goldfields are known to utilise dense habitats including woodlands and shrublands. The survey area was ground truthed by GHD personnel via walking a full loop of the survey area. Specific transects were not undertaken. The assessment involved visual assessment of the habitat identifying breeding evidence (presence/absence of Malleefowl mounds), foraging evidence (scratchings), droppings, current activity (via presence of prints) and any other signs of Malleefowl. For the purpose of this assessment, the NHT (2007) National Manual for the Malleefowl Monitoring System standards were used to define mound size, use and age.

Information collected during the field survey included:

- Foraging Activity (scratchings) – Identified by the disturbance of Malleefowl in litter while foraging. Often the disturbance is extensive and close to an existing mound. The location was recorded via GPS
- Droppings – During the transect walks, visual inspection for Malleefowl dropping were conducted. These were assessed for age and images recorded. The location was recorded via GPS
- Prints – During the transect walks, visual inspection for Malleefowl prints were conducted. These were assessed for age and images recorded. The location was recorded via GPS.
- Mounds – Malleefowl utilise a mound to incubate their eggs. The mounds are a good indication of habitat usage, reproductive output, distribution and occurrence. Mounds were assessed according to their current activity status or profile ranking according to NHT (2007). These profiles are shown and described below



Profile descriptions

- Profile 1 – Typical crater with raised rims. This is a typical shape of an inactive mound. However, the mound may also be active and open. (GHD regards Profile 1 mounds as being inactive)
- Profile 2 – Mound fully dug out and active. The characteristic of this profile is that the crater slopes down steeply and at the base the sides drop vertically to form a box-like structure with sides usually 20 to 30 cm deep. Often litter will have been raked into windrows and may have started to enter the mound

- Profile 3 – Mound with litter and active. This is the next stage after Profile 2. Litter will have been raked into the mound by Malleefowl and thick layers of litter are evident on the surface. There may or may not be sand mixed with the litter at this stage
- Profile 4 – Active mound mounded up with debris but no crater. This is the typical profile of an active and worked mound but unopened Malleefowl mound
- Profile 5 – Mound forms a sandy crater with peak in centre. This is a typical profile of an active mound which is in the process of being closed by Malleefowl or being thermoregulated by the birds
- Profile 6 – Mound low and flat without peak or crater. These mounds are long unused and often abandoned. Often have vegetation growing with the rim or crater (if anything is left).

Additionally mounds were measured for their size including total diameter, rim width, rim height (to outside ground level) and crater depth (to rim height). A picture was also taken of any mound and locations were recorded by GPS.

Fauna nomenclature

Nomenclature used in this report follows that used by the Western Australian Museum and the DPaW NatureMap database (DPaW 2007–) with the exception of birds where Christidis and Boles (2008) was used.

2.3 Limitations

2.3.1 Desktop limitations

Desktop investigations use a variety of online resources such as the Western Australian Museum (WAM) and DPaW *NatureMap* database (DPaW 2007–), and the EPBC Act PMST. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD. The PMST database is used to identify species listed under the EPBC Act. This database draws on various sources to report on the potential of the species occurrence within the area. The EPBC Act search tool is broad-scale in its reporting and often the specific habitat requirements of the species do not occur within the survey area. For this reason not all species reported by the search tool need to be considered in management decisions. The *NatureMap* database reports on actual records of the species within the designated area and can provide more accurate information of the likelihood of species presence.

2.3.2 Survey limitations

Guidance Statement No. 51 and No. 56 (EPA 2004a, 2004b) both state that flora and fauna survey reports for environmental impact assessment in Western Australia should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 2.

Table 2 Field survey constraints and limitations

Limitation	Constraint	Impact on survey outcomes
Sources of information and availability of contextual information	Minor	Adequate information is available for the survey area, this includes: • Broad scale (1:250,000) mapping by Beard (1972) and digitised by Shepherd *et al.* (2002) • Regional biogeography (Cowan 2001)
Scope (i.e. what life forms were sampled etc.)	Minor	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not assessed in this survey.
Proportion of flora collected and identified (based on sampling, timing and intensity) Proportion of fauna identified, recorded and/or collected	Minor	The flora recorded from the field survey is detailed in Section 4.2 and a full flora species list provided in Appendix D. Eighty-nine flora taxa representing 30 families and 53 genera were recorded from the survey area. All potential Priority flora taxa were submitted to the Western Australian herbarium for identification and/or verification. The Level 1 flora survey was undertaken in mid-October 2016. The survey area was sufficiently traversed on foot by GHD ecologists and the proportion of flora collected and identified was considered high. The Level 1 fauna survey was undertaken in mid-October 2016 and was a reconnaissance survey only. The fauna assessment only sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings etc. Many cryptic and nocturnal species would not have been identified during a reconnaissance survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all species were identified to species level. The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than that of vertebrate species.
Flora determination	Nil	Flora determination was undertaken by GHD ecologists in the field and at the Western Australian Herbarium. All potential Priority flora taxa were submitted to the WA Herbarium for identification and/or verification. The taxonomy and conservation status of the Western Australian flora is dynamic. This report was prepared with reliance on taxonomy and conservation current at the time issuing, but it should be noted this may change.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed?)	Minor	The survey area was fully surveyed during the Level 1 vegetation, flora and fauna assessment.
Mapping reliability	Minor	The vegetation was mapped at a scale of 1:20,000 using aerial photography, topographical features, previous mapping (Beard 1972) and field data.
Timing, weather, season, cycle	Minor	The field survey was conducted during spring, on 18 October 2016. In the three months prior to the survey (July-September), Kalgoorlie-Boulder Airport weather recording station (No. 012038, BoM 2016) recorded a

Limitation	Constraint	Impact on survey outcomes
		total of 65.6 mm of rainfall. This rainfall total is just over the long term average for the same period (July-September; 60.5 mm) (BoM 2016). The weather conditions (when recorded) during the field survey included: • Daily maximum temperature: 23.0 °C • Daily rainfall 0 mm The weather conditions recorded during the survey period were considered unlikely to have impacted upon the vegetation and flora survey. The survey was undertaken in October (spring) which is considered the most optimal time of year for the flora and fauna field survey.
Disturbances (fire, flood, accidental human intervention etc.)	Nil	There were no disturbances observed that impacted the survey.
Intensity (in retrospect, was the intensity adequate?)	Nil	The vascular flora of the survey area was sampled with reference to EPA (2004a) and terrestrial fauna sampled with reference to EPA (2004b). The survey area was sufficiently covered by GHD ecologists during the survey.
Resources	Nil	Adequate resources were employed during the field survey. A total of 2 person-days were spent undertaking the survey.
Access problems	Nil	No access problems were encountered during the survey. The entirety of the survey area was accessed on foot.
Experience levels	Nil	The ecologists who executed the survey were practitioners suitably qualified in their respective fields. Jordan Tindiglia is a Senior Ecologist (botany) with over 10 years' experience in undertaking ecological surveys. Glen Gaikhorst is a Principal Ecologist (zoology) with over 22 years' experience in undertaking ecological surveys.

3. Existing Environment

3.1 Regional biography

The survey area is situated in the Eremaean Botanical Province of Western Australia (Beard 1990), within the Coolgardie bioregion and the Eastern Goldfields subregion as described by the Interim Biogeographic Regionalisation of Australia (IBRA) (DotEE 2016c). IBRA divides the Australian continent into 89 biogeographic regions based on similar climate, geology, landform, vegetation and fauna (DotEE 2016c).

The Eastern Goldfields subregion lies on the Yilgarn Craton's 'Eastern Goldfields Terrains' and comprises gently undulating plains interrupted in the west by low hills and ridges and a series of large playa lakes. The underlying geology of the subregion is of gneisses and granites eroded into a flat plane covered 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 (Cowan 2001). The Eastern Goldfields subregion is dominated by Mallees, Acacia thickets and shrubheaths on sandplains. Diverse Eucalyptus woodlands occur around salt lakes, on ranges, and in valleys and dwarf shrublands of samphire are common in salt areas (Cowan 2001).

The survey area is also located in the Great Western Woodlands, which is the largest area of intact temperate woodland remaining on earth. The Woodlands cover almost 16 million hectares, stretching from the edge of the Wheatbelt to Kalgoorlie-Boulder in the north, to inland deserts to the north east and the Nullarbor Plain to the east. The area has high floral diversity with more than 3000 species recorded and is a centre for eucalypt diversity (Watson *et al.* 2008, Thomas-Dans *et al.* 2012).

3.2 Vegetation

3.2.1 Broad vegetation associations and extent

Broad scale (1:250,000) pre-European vegetation mapping of the Kalgoorlie area was completed by Beard (1972) at an association level. The mapping indicates that two vegetation associations are present within the survey area. These vegetation associations include:

- Medium woodland; salmon gum *[Eucalyptus salmonophloia*] and goldfields blackbutt [*E. lesouefii*] (association 468) – intersects the northern part of the survey area
- Medium woodland; coral gum [*E. torquata*] & goldfields blackbutt [*E. lesouefii*] (association 9) – intersects the central and southern part of the survey area

The pre-European mapping has been adapted and digitised by Shepherd *et al.* (2002). The extents of the vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by the DPaW (latest update June 2015 – Government of Western Australia (GoWA) 2015). As shown in Table 3, the current extents of both vegetation associations mapped within the survey area at all levels (State, IBRA bioregion, IBRA subregion and local government authority (LGA)) are greater than 96 % of the pre-European extent remaining, and are therefore above the 30 per cent threshold level[1].

[1] The 30 per cent threshold level is the level below which species loss appears to accelerate exponentially at an ecosystem level (EPA 2000).

Table 3 Broad vegetation association extents

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DPaW managed lands
468	State: Western Australia	592,022.37	583,902.78	98.63	23.15
	IBRA bioregion: Coolgardie	583,357.71	575,360.61	98.63	22.72
	IBRA subregion: Eastern Goldfields	482,361.84	474,364.74	98.34	22.42
	LGA: Shire of Kalgoorlie-Boulder	303,529.73	296,699.07	97.75	4.67
9	State: Western Australia	240,509.33	235,161.94	97.78	8.07
	IBRA bioregion: Coolgardie	240,441.99	235,100.97	97.78	8.08
	IBRA subregion: Eastern Goldfields	235,047.15	229,757.07	97.75	8.26
	LGA: Shire of Kalgoorlie-Boulder	38,715.97	37,232.66	96.17	-

3.2.2 Conservation significant ecological communities

A search of the EPBC Protected Matters database did not identify any Commonwealth listed TECs within 40 km of the survey area. Similarly, a search of the DPaW TEC/PEC databases did not identify any TECs or PECs within 40 km of the survey area.

3.3 Flora

3.3.1 Flora diversity

A search of the *NatureMap* database identified 1,223 plant taxa representing 94 families and 405 genera that have previously been recorded within 40 km of the survey area. This totalcomprised 1,127 native flora taxa and 96 naturalised (non-native) flora taxa. Dominant families within this search included Myrtaceae (169 taxa), Fabaceae (152 taxa) and Asteraceae (124 taxa).

3.3.2 Conservation significant flora

Desktop searches identified the presence/potential presence of 43 conservation significant flora taxa within 40 km of the survey area. The desktop searches recorded:

- Three taxa listed under the EPBC Act and/or as Declared Rare Flora under the BC Act
- Thirteen Priority 1 taxa
- Eight Priority 2 taxa
- Fifteen Priority 3 taxa
- Four Priority 4 taxa

The locations of conservation significant flora registered on the DPaW databases are provided in Figure 2, Appendix A.

3.3.3 Introduced flora (weeds)

A search of the *NatureMap* database identified 96 introduced flora taxa previously recorded within the 40 km of the survey area. None of these taxa are listed as Declared Pests (s22)

under the *Biosecurity and Management Act 2007* (BAM Act) or as a Weed of National Significance.

3.4 Fauna

3.4.1 Fauna diversity

A search of *NatureMap* identified 317 vertebrate native fauna taxa previously recorded within 40 km of the survey area. This total included six amphibian, 178 birds, 33 mammals and 100 reptiles.

3.4.2 Conservation significant fauna

Desktop searches identified the presence/potential presence of eight conservation significant vertebrate fauna species and one invertebrate species within 40 km of the survey area. The desktop searches recorded:

- One species listed as Critically Endangered under the EPBC Act and as Schedule 3 (Vulnerable) under the BC Act
- One species listed as Endangered under the EPBC Act and as Schedule 1 (Critically Endangered) under the BC Act
- One species listed as Vulnerable under the EPBC Act and as Schedule 2 (Endangered) under the BC Act
- One species listed as Vulnerable under the EPBC Act and as Schedule 3 (Vulnerable) under the BC Act
- Three species listed as Migratory under the EPBC Act and/or as Schedule 5 (Migratory birds protected under an international agreement) under the BC Act
- One species listed as Priority 4 by DPaW

3.5 Conservation estate and reserves

There are no conservation estates or reserves within the survey area. DPaW-managed reserves within the vicinity of the survey area include:

- Karamindie Forest (Class A) – approximately 12 km north-west of the survey area
- Yallari Timber Reserve (Class C) – approximately 11 km west of the survey area
- Kambalda Nature Reserve (Class C) – approximately 5 km south-east of the survey area
- Scahill Timber Reserve (Class C) – approximately 22 km west of the survey area

3.6 Environmentally sensitive areas

Environmentally Sensitive Areas (ESAs) are declared by notice under Section 51B of the EP Act. There are no ESAs located within, or in close vicinity of the survey area (DER 2016).

4. Field results

4.1 Vegetation

4.1.1 Vegetation associations

Four broad floristic formations containing four vegetation associations as well as highly disturbed/cleared areas were identified and described from the survey area based on field observations. These vegetation associations are described in Table 4 and mapped in Figure 3, Appendix A.

The survey area was dominated by mixed eucalypt woodlands on gently undulating loamy plains interspersed with low rocky rises/breakaways supporting *Casuarina* woodlands. The mixed woodlands supported various *Eucalyptus* species, which tended to occur in patches over mid- and low shrublands. Salmon Gum (*E. salmonophloia*) woodlands generally occurred on soils with higher clay content, Gimlet (*E. salubris*) occurred in more saline areas and Goldfields Blackbutt (*E. lesouefii*) and Redwood (*E. transcontinentalis*) were scattered throughout the entire survey area. *Melaleuca* shrublands with emergent Giant Mallee (*E. oleosa* subsp. *oleosa*) occurred in the southern part of the survey area with *Tecticornia* shrublands on clay flats dominating the north-west part of the survey area. Approximately 48 ha of the survey area was considered highly degraded/cleared; these areas included cleared tracks, the Samphire tailings storage facility (TSF) and associated infrastructure.

4.1.2 Vegetation condition

The vegetation condition of the survey area was rated from *Excellent* to *Good*, with all highly degraded/ cleared areas rated as *Completely Degraded*. The vegetation across the survey area was intact with limited disturbances such as isolated, non-aggressive weeds, and occasional vehicle tracks observed. Areas adjacent to the TSF were rated as *Good* or *Very Good*, with the TSF rated as *Completely Degraded.* Areas associated with the TSF have been partially to completely cleared and are almost to completely without native flora taxa.

4.1.3 Conservation significant ecological communities

No Commonwealth or State listed TECs or PECs were identified within the survey area during the field survey.

4.1.4 Other significant vegetation

No other significant vegetation as defined by the EPA (2004a) was identified within the survey area during the field survey.

Table 4 Vegetation associations within the survey area

Vegetation association	Description	Landform/ substrate	Sample locations and extent (ha)	Indicative photograph
Broad floristic formation: *Eucalytpus* woodland				
Mixed *Eucalyptus* woodland (EW)	*Eucalyptus lesouefii, E. salmonophloia, E. transcontinentalis*, *E. salubris* low to mid-woodland over *Melaleuca sheathiana*, *Exocarpos aphyllus* tall sparse shrubland over *Eremophila* spp. mid-sparse shrubland over *Senna artemisioides* subsp. *filifolia, Maireana* spp., *Sclerolaena* spp., *Scaevola spinescens, Olearia muelleri* low open shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, loamy clay	Q01 289.6 ha	
Broad floristic formation: *Casuarina* woodland				
Casuarina pauper open woodland (CpW)	*Casuarina pauper*, *Eucalyptus celastroides* subsp. *celastroides* low open woodland over *Dodonaea lobulata*, *Acacia colletioides, Eremophila oldfieldii* subsp. *angustifolia* mid-open shrubland over *Scaevola spinescens, Ptilotus obovatus, Acacia erinacea* low sparse shrubland.	Hill crests, slopes, breakaways	Q02 33.9 ha	

Vegetation association	Description	Landform/ substrate	Sample locations and extent (ha)	Indicative photograph
Broad floristic formation: *Melaleuca* shrubland				
Melaleuca open shrubland (MS)	*Melaleuca sheathiana* tall open shrubland with emergent *Eucalyptus oleosa subsp. oleosa* over *Tecticornia, Maireana villosa, Sclerolaena diacantha, Ptilotus obovatus* low sparse shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, sandy to loamy clay	Q03 33.1 ha	
Broad floristic formation: *Tecticornia* shrubland				
Tecticornia open shrubland (TS)	*Tecticornia*, SA17, *Tecticornia halocnemoides*, *Disphyma crassifolium, Maireana tomentosa* low open shrubland with *Austrostipa elegantissima* isolated tussock grasses.	Plains, clay	Q04 28.8 ha	

Vegetation association	Description	Landform/ substrate	Sample locations and extent (ha)	Indicative photograph
Highly disturbed/ cleared (HD)	Areas within the survey area that are highly disturbed or have been completely cleared (e.g. roads and tracks) and comprise limited/no flora diversity.		47.8 ha	

4.2 Flora

4.2.1 Flora diversity

Eighty-nine flora taxa (including subspecies and varieties) representing 30 families and 53 genera were recorded from the survey area during the GHD field survey. Dominant families recorded from the survey area included:

- Chenopodiaceae (16 taxa)
- Scrophulariaceae (11 taxa)
- Fabaceae (8 taxa)
- Myrtaceae (8 taxa)

The survey area is considered to have a moderate level of biodiversity.

A flora taxa list for the survey area is provided in Appendix D.

4.2.2 Introduced flora

Six introduced flora taxa were recorded within the survey area during the field survey. These taxa were recorded around the Samphire tailings storage facility. All of the taxa are considered environmental weeds and have previously been recorded in the Coolgardie IBRA bioregion.

4.2.3 Conservation significant flora

No EPBC Act, BC Act or Priority listed flora taxa were recorded within the survey area during the field survey.

Likelihood of occurrence assessment

A likelihood of occurrence assessment was conducted post-field survey for all conservation significant flora taxa identified in the desktop assessment (Appendix D). This assessment took into account previous records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of species.

The likelihood of occurrence assessment post-field survey concluded that 23 taxa may possibly occur within the survey area and 20 taxa are unlikely to occur within the survey area.

4.2.4 Other significant flora

No other significant flora as defined by the EPA (2004a) was identified within the survey area during the field survey.

4.3 Fauna

4.3.1 Fauna habitat types

Four fauna habitat types as well as highly disturbed areas (e.g. old pit and TSF) were recorded in the survey area . The fauna habitat types broadly aligned with the vegetation associations described in Section 4.1. The habitat types recorded are described in Table 5.

Table 5 Fauna habitat types identified within the survey area

Description	Indicative Photograph
Eucalypt Woodland – Mixed Eucalypt woodlands This habitat type incorporates vegetation association EW Mixed Eucalyptus woodlands dominate the survey area and comprise *Eucalyptus lesouefii, E. salmonophloia*, and *E. salubris* over *Melaleuca spp., Exocarpos aphyllus, Eremophila spp., Senna artemisioides, Maireana spp., Sclerolaena spp., Scaevola spinescens, Olearia muelleri* and *Austrostipa spp.* This habitat had excellent canopy cover with areas of denser thickets forming canopy connectivity, other areas were more open in nature. The habitat appeared long unburnt with areas of good litter and branch build up and large logs scattered throughout, with and without hollows present. Ground hollows had signs of use via Echidna scratchings and other small mammal activity via the presences of chewed discarded Quandong nuts. Shrub layers vary in density and structure. In this habitat type evidence of log extraction was observed close to the existing tailings area, however was less evident away from mining activities. Random off road tracks were scattered throughout the habitat, however this did not distract from the quality of the habitat. This habitat provides resources for a range of conservation significant species including: • Malleefowl (foraging and breeding) • Peregrine Falcon (foraging and potential breeding in some of the larger Eucalypts) • Chuditch (foraging and breeding – denning) • Central Long-eared Bat (foraging and roosting) ***Habitat value – high***	 

Description	Indicative Photograph
Low rocky hills with breakaway or rock exfoliation – Casuarina pauper open woodland This habitat type incorporates vegetation associations CpW. The rocky hills and breakaways are present in several small areas and comprise of exposed rocky ridges, rocky loams and eroded rocks on low hills. The vegetation community differed to the general area at this habitat and would be considered unique to rocky areas, particularly due to the dominance of the Casuarina trees. The rocky areas have cavities, crevices and rock exfoliation providing a variety of micro-habitats for reptile species. Litter and woody debris were also observed in these areas and associated with the Casuarinas isolated on the low hills. The vegetation in this habitat appeared long unburnt probably due to the openness and presence of exposed rock. Numerous signs of echidna were also observed in this habitat type. This habitat provides resources for some conservation significant species including: • Malleefowl (foraging and breeding – not on the exposed rock but associated vegetation and hill slopes) • Peregrine Falcon (foraging) • Chuditch (foraging and breeding - denning) • Central Long-eared Bat (foraging) ***Habitat value – high***	 

Description	Indicative Photograph
Shrublands on clay loam – Melaleuca open shrubland. This habitat type incorporates vegetation associations MS. A small area of Melaleuca shrubland was present in the southern portion of the survey area. This habitat was in a low region in the environment however did not appear to retain water during rain events. Few other plant species were present in the habitat and were scattered when located. The soil consisted of clay loan with areas of pebble incursion. Litter and woody debris were present but restricted to under the Melaleuca trees and there were few large logs in the area due to the lack of large Eucalypts. This habitat appeared long unburnt probably due to the open nature of the habitat. An old Malleefowl mound was recorded in this habitat. This habitat provides resources for some conservation significant species including: • Malleefowl (foraging and breeding) • Peregrine Falcon (foraging) • Chuditch (foraging) • Central Long-eared Bat (foraging) ***Habitat value – high***	

Description	Indicative Photograph
Low open shrubland - Tecticornia open shrubland This habitat type incorporates vegetation association TS. The low open shrubland comprises *Tecticornia spp., Disphyma crassifolium, Maireana tomentosa* with *Austrostipa elegantissima* isolated tussock grasses. This habitat is positioned low in the environment in the north west region of the survey area. The habitat has evidence of some ephemeral, water gaining depressions just outside of the northern boundary of the survey area. The soil type is clay loam with some small pebble incursion. The chenopods provide good habitat to small reptiles, mammals and birds. Some litter and wood debris lay at the base of the Chenopod shrubs, however much of the ground is bare. No large logs were present in this habitat. This area is long unburnt which is probably and artefact of its open nature. This habitat provides resources for some conservation significant species including: • Peregrine Falcon (foraging) • Chuditch (foraging) • Central Long-eared Bat (foraging) ***Habitat value – medium to high***	 

4.3.2 Fauna habitat value

The survey area forms parts of a very large continuous tract of habitat across the central Goldfields with little fragmentation and only scattered interruptions. Main roads, minor roads and mining evidence / disturbance are present within the region, however, vast areas are largely intact. The major disturbances in the survey area are the existing old mine and TSF in the northern portion of the area. A large bund has been established surrounding it to aid in containment. A small amount of logging was recorded in the northern section of the survey area but was not evident in the south. The survey area had not recently been impacted by fire with habitats and micro-habitats intact for fauna use.

One old Malleefowl mound was recorded but appeared long unused and no other evidence of Malleefowl was recorded. The habitat value to species within the survey area is considered to be medium to high, as the areas are relatively undisturbed and structurally complete. However, in the northern portion (in and around the disturbance area) the habitat value was low. No habitat type appeared to be badly impacted by feral species.

All habitat types are likely to be utilised by conservation significant fauna species, however none of the habitats within the survey area are considered critical to the survival of any one species.

4.3.3 Fauna diversity

A total of 47 fauna species comprising 38 birds, five reptiles and four mammals were recorded during the GHD field survey. Of these, 45 species were native species and two species were introduced.

This survey identified far fewer species than that recorded in the *NatureMap* database search, however the survey was a Level 1 assessment and would likely report more species with greater coverage and effort and time.

Most fauna species were visually observed during the survey, however some, such as the Malleefowl, were only identified via the presence of an old mound.

4.3.4 Introduced fauna

Two introduced fauna species were identified from the field survey: the Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*). It is also highly likely the Cat (*Felis catus*) would also be present in the survey area.

4.3.5 Conservation significant fauna

Old evidence of the Malleefowl (Vulnerable) was recorded from field observation within the survey area. The location of the disused nest mound is shown in Figure 3, Appendix A.

In addition to the field survey results, an assessment on the likelihood of conservation significant species occurring in the survey area was undertaken. This assessment is based on species biology, habitat requirements, the quality and availability of suitable habitat as determined during the field survey and records of the species in the survey area and broader area. Species specific searches of the *NatureMap* database with a buffer of 40 km were also conducted in order to gather information about the broader regional occurrence of species to further inform the likelihood of occurrence assessment.

In addition to the historic Mallefowl evidence, a further three species of significance are considered likely to occur. Table 6 summarises the species of conservation significance that are either known, or considered likely, to occur in the survey area.

The parameters for this likelihood of occurrence assessment summary and the full likelihood of occurrence assessment are provided in Appendix E.

Table 6 Summary of likelihood of occurrence for conservation significant fauna

Species	EPBC Act	BC Act/ DPaW	Assessment outcome
Birds			
Malleefowl (*Leipoa ocellata*)	V	S3, V	Likely The species is known from the region and was recorded during this survey via the presence of an old mound. As no recent evidence of their presence was recorded the species is classified as *likely* only.
Peregrine Falcon (*Falco peregrinus*)		S7, SP	Likely The Peregrine Falcon may use the area opportunistically.
Mammals			
Chuditch (*Dasyurus geoffroii*)	V	S3, V	Likely The Chuditch potentially persists in suitable habitat within the survey area.
Central Long-eared Bat (*Nyctophilus major tor*)		P4	Likely The survey area has suitable habitat for the species and the species is known from the greater region.

Malleefowl

Approximately 4 records of Malleefowl within 10 km, and 17 records within 40 km, of the survey area were indicated in the *NatureMap* database. During this survey an old Malleefowl mound was recorded but no other evidence of Malleefowl was found. The old Malleefowl mound was found within the Melaleuca Shrubland habitat (see Plate 1). The mound identified was classified as Profile 1 (long unused) with its measurements shown below in Table 7.

Malleefowl are known from the region in low densities. The survey area is likely habitat for a current population of Malleefowl and use occasionally and opportunistically.

Table 7 Dimensions and mound location

Mound Category	Width (m)	Rim height (mm)	Crater Depth (mm)	Location
1	3.5	300	150	121^0 31’ 32.187” E -31^0 6’ 11.952” S

Plate 1 Profile 1 Malleefowl mound recorded in the survey area

5. Assessment against the 10 clearing principles

In accordance with Section 20 of the EP Act, the Department of Mines and Petroleum (DMP) has been delegated authority for the administration of applications to clear native vegetation for mineral and petroleum activities regulated under the *Mining Act 1978*, the *Petroleum and Geothermal Energy Resources Act 1967*, the *Petroleum Pipelines Act 1969*, the *Petroleum (Submerged Lands) Act 1982*, and activities under State Agreements administered by the Department of State Development, in Western Australia.

An assessment of the survey area against the 10 clearing principles was undertaken to determine whether the project is likely to be at variance to the principles (Table 8). These principles aim to ensure that all potential impacts resulting from removal of native vegetation can be assessed in an integrated way. The assessment concluded that clearing within the survey area is unlikely to be at variance to any principle.

Table 8 Assessment against the 10 clearing principles

Principle	Assessment	Outcome	Data sources
a) – Native vegetation should not be cleared if it comprises a high level of biological diversity.	The survey area is located in the Eremaean Botanical Province of Western Australia (Beard 1990), within the Coolgardie IBRA bioregion and the Eastern Goldfields IBRA subregion. The flora of the Eastern Goldfields subregion is moderately diverse with 1613 recorded native vascular species (DPaW 2007–). Desktop searches identified 1,223 native flora taxa within 40 km of the survey area (DPaW 2007–). A survey of the survey area recorded 83 native flora taxa; the survey area is considered to have a moderate level of flora biodiversity. Desktop searches identified the presence/potential presence of 43 conservation significant flora taxa within 40 km of the survey area (DotEE 2016a, DPaW 2007–). No EPBC Act, BC Act or Priority listed flora taxa were recorded within the survey area during the field survey. Broad scale vegetation mapping of the area undertaken by Beard (1972) identified two vegetation associations within the survey area: • Medium woodland; salmon gum and goldfields blackbutt (association 468) • Medium woodland; coral gum & goldfields blackbutt (association 9) All vegetation associations are considered well represented at all levels (State, IBRA bioregion, IBRA subregion and LGA) with greater than 96 % of their pre-European extents remaining (GoWA 2015). Four vegetation associations and additional areas that were considered highly disturbed/cleared were described within the survey area, these were: • Mixed *Eucalyptus* woodland (EW) • *Casuarina pauper* woodland (CpW) • *Melaleuca* open shrubland (MS) • *Tecticornia* open shrubland (TS) Vegetation condition within the survey area was rated as *Excellent* (2), with all the highly disturbed/cleared areas rated as *Completely Degraded* (6). The survey area does not contain vegetation in better condition than the surrounding area. No Commonwealth or State listed TECs or PECs were identified in the desktop searches or within the survey area. No reserves, conservation areas or other DPaW-managed estates are located within the survey area. The closest conservation area, Kambalda Nature Reserve, is located approximately 5 km south-east of the survey area.	Clearing within the survey area is unlikely to be at variance to this Principle.	Beard (1972) Beard (1990) DotEE (2016a) DPaW (2007–) DPaW TEC/PEC databases GoWA (2015)

Principle	Assessment	Outcome	Data sources
	Desktop assessments identified 317 native fauna taxa within 40 km of the survey area (DPaW 2007–). A survey of the survey area recorded 47 fauna taxa, including 39 birds, 4 mammals and 5 reptiles. The species recorded in the survey area have been previously been recorded in the Coolgardie IBRA bioregion and are not considered to be dependent on the resources in the survey area.		
b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	Four fauna habitat types (as well as highly disturbed areas) that broadly aligned with the vegetation associations were identified within the survey area during the field survey: • Eucalypt woodlands • Low rocky hills with breakaways or rock exfoliation • Shrublands on clay loam • Low open shrubland Apart from the highly disturbed areas, all of the remaining habitats are in good to excellent condition, with limited disturbances observed. The habitat types within the survey area are well represented in the local and broader area and there is direct connectivity from the habitat in the survey area through to the surrounding habitat. Desktop searches of the EPBC Act Protected Matters database and DPaW *NatureMap* records identified the presence/potential presence of eight conservation significant fauna within 40 km of the survey area. No fauna species of conservation significance were recorded within the survey area during the field survey. However, evidence of the Malleefowl (*Leipoa ocellata*) was recorded in the survey area and a further three conservation significant fauna species are considered likely to occur: • Peregrine Falcon *(Falco peregrinus*) • Chuditch (*Dasyurus geoffroii*) • Central Long-eared Bat (*Nyctophilus major tor*) An old Malleefowl mound was recorded within the *Melaleuca* Shrubland habitat type, but no other evidence of Malleefowl were found. Malleefowl are known from the region in low densities. The survey area is likely habitat for a current population of Malleefowl and used occasionally and opportunistically. All habitat types are likely to be utilised by conservation significant fauna species, however none are considered necessary for the maintenance of or represent significant habitat for conservation significant fauna taxa.	Clearing within the survey area is unlikely to be at variance to this Principle.	DPaW (2007–) DotEE (2016a)

Principle	Assessment	Outcome	Data sources
(c) – Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Desktop searches identified the presence/potential presence of three EPBC Act and/or BC Act listed flora taxa within 40 km of the survey area (DPaW 2007–, DotEE 2016a). These taxa include: • *Gastrolobium graniticum* • *Tecticornia flabelliformis* • *Tetratheca spenceri* A likelihood of occurrence assessment, which takes into account the habitats present, known taxa distribution and previous records, was completed for the three Threatened flora taxa identified in the desktop assessment. This assessment concluded that *T. flabelliformis* may possibly occur, and both *G. graniticum* and *T. spenceri* were unlikely to occur within the survey area. Searches for conservation significant flora were undertaken during the GHD field survey. No Threatened flora taxa were recorded during the survey.	Clearing within the survey area is unlikely to be at variance to this Principle.	DotEE (2016a) DPaW (2007–) DPaW TPFL and WAHERB databases
d) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	Desktop searches recorded no TECs within 40 km of the survey area (DPaW TEC/PEC databases, DotEE 2016a). No Commonwealth or State listed TECs were identified within the survey area during the field survey.	Clearing within the survey area is unlikely to be at variance to this Principle.	DotEE (2016a) DPaW TEC/PEC databases
(e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	The survey area is located within the Coolgardie IBRA bioregion. This IBRA bioregion has approximately 97% of its pre-European extent remaining (GoWA 2013). Broad scale vegetation mapping of the area undertaken by Beard (1972) identified two vegetation associations within the survey area: • Medium woodland; salmon gum and goldfields blackbutt (association 468) • Medium woodland; coral gum & goldfields blackbutt (association 9) Both Beard (1972) vegetation associations are considered well represented at all levels (State, IBRA bioregion, IBRA subregion and LGA) with greater than 96 per cent of their pre-European extents remaining (GoWA 2015). Any clearing of these vegetation associations within the survey area will not reduce their pre-European extent to below 30 per cent. The survey area is surrounded by intact native vegetation. Locally, the survey area is well connected to the surrounding vegetation, which is typically in Excellent	Clearing within the survey area is unlikely to be at variance to this Principle.	Beard (1972) GoWA (2015)

Principle	Assessment	Outcome	Data sources
	condition. At a regional scale the survey area is well connected to the surrounding vegetation on all sides.		
(f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	There are no permanent drainage channels or wetlands within or in the vicinity of the survey area. One minor, ephemeral drainage line associated with Mooreerbar Creek intersects the survey area. This drainage line only flows following heavy rain for a short period of time and surface runoff is minimal and localised. No vegetation associated with a watercourse, wetland or drainage depression was recorded within the survey area.	Clearing within the survey area is unlikely to be at variance to this Principle.	DoW (2016)
(g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The Australian Soil Resource Information System (ASRIS) indicates that shallow calcareous loamy soils and neutral red earths with a variable content of ironstone gravel occur within the survey area (ASRIS 2016). The ASRIS database also indicates that the survey area has an 'Extremely Low Probability of Occurrence' of Acid Sulfate Soils (ASS) with a provisional degree of confidence (ASRIS 2015). Any clearing of native vegetation clearing in the survey area is unlikely to result in ASS. According to available databases (DoW 2015), groundwater salinity within the survey area is between 10,000 – 30,000 milligrams/Litre (mg/L) Total Dissolved Solids (TDS), with a small area between 30,000 and 150,000 mg/L TDS. This is considered to be saline. Given the existing high TDS levels, the proposed clearing is not likely to cause salinity levels within the survey area to alter significantly. Any clearing of native vegetation within the survey area has the potential to cause soil and wind erosion, particularly if the natural surface water flow regime is altered. Management actions will be implemented by Metals X to minimise land degradation and will include reducing clearing areas and revegetating or stabilising temporarily disturbed areas.	Clearing within the survey area is unlikely to be at variance to this Principle.	ASRIS (2016) DoW (2016)
(h) – Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	No reserves, conservation areas or other DPaW-managed estates are located within the survey area. The closest conservation area, Kambalda Nature Reserve, is located approximately 5 km south-east of the survey area. The survey area is largely surrounded by remnant native vegetation and if cleared would not be considered a significant barrier to fauna movement or to impact on the ability of the surrounding vegetation to provide a habitat linkage. It is likely that fauna would move through the broader landscape given the extent of the Great Western Woodlands.	Clearing within the survey area is unlikely to be at variance to this Principle.	DPaW estate spatial database

Principle	Assessment	Outcome	Data sources
	The vegetation within the survey area is not considered a buffer to Lakeside Timber Reserve or to any other conservation areas in the broader area. Clearing of the survey area is unlikely to impact on the environmental values of any nearby conservation areas.		
(i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The climate of the region is described as semi-arid with an average annual rainfall of 266.3 mm. Rainfall is relatively evenly spread throughout the year, but can occur in heavy localised falls. Based on an average daily evaporation rate of 7.2 mm (BoM 2016), any surface water resulting from rainfall events is likely to be relatively short lived. There are no permanent drainage channels or wetlands within or in the vicinity of the survey area. However, during heavy localised rainfall events erosion may occur in cleared areas leading to temporary soil erosion and/or sedimentation. These impacts are expected to be minimal and short-term. According to available databases, groundwater salinity within the survey area is between 10,000 – 30,000 mg/L TDS, with a small area between 30,000 and 150,000 mg/L TDS. This is considered to be highly saline. Given the high TDS, the proposed clearing is not likely to cause salinity levels within the survey area to alter significantly. Clearing of the survey area is unlikely to cause appreciable deterioration in the quality of surface or underground water.	Clearing within the survey area is unlikely to be at variance to this Principle.	ASRIS (2016) BoM (2016) DoW (2016)
(j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The climate of the region is described as semi-arid with an average annual rainfall of 266.3 mm. Rainfall is relatively evenly spread throughout the year, but can occur in heavy localised falls. Based on an average daily evaporation rate of 7.2 mm (BoM 2016), any surface water resulting from rainfall events is likely to be relatively short lived. In addition the survey area is largely surrounded by remnant native vegetation and it is likely that a large proportion of runoff is will be absorbed by this natural environment. There are no permanent drainage channels or wetlands within or in the vicinity of the survey area. In addition, the survey area is characterised by predominantly flat to gently undulating plains with loamy clay soils, clay plains and a few low, rocky rises scattered throughout the survey area. Given the likelihood of little surface flow, the proposed clearing within the survey area is unlikely to cause or exacerbate the incidence of flooding or localised waterlogging.	Clearing within the survey area is unlikely to be at variance to this Principle.	BoM (2016)

6. Conclusions and recommendations

6.1 Key findings

6.1.1 Vegetation and flora

The survey area comprised four associations, two woodland associations (*Eucalyptus* and *Casuarina*), two shrubland associations (*Melaleuca* and *Tecticornia*) and areas that were considered highly disturbed/cleared. The vegetation associations are not representative of any Commonwealth or State listed TECs or PECs, nor were any riparian vegetation associations observed within or in the vicinity of the survey area. The vegetation condition of the survey area was rated as *Excellent* with highly disturbed/cleared areas rated as *Highly Degraded*. Disturbances throughout the survey area included clearing for tracks, the Samphire tailings storage facility and associated infrastructure.

No EPBC Act, BC Act or Priority listed flora taxa were recorded during the field survey. A flora likelihood of occurrence assessment completed post-field survey for conservation significant flora concluded that no such taxa were considered likely to occur in the survey area.

6.1.2 Fauna

The fauna survey identified four broad fauna habitat types. These habitats are well represented in the immediate area and broader region. The habitat value to species within the survey area is considered to be medium to high, as the areas are relatively undisturbed and structurally complete. There is direct connectivity from the habitat in the survey area through to the surrounding habitat and the survey area forms parts of a very large continuous tract of habitat across the central Goldfields with little fragmentation and only scattered interruptions.

No fauna species of conservation significance were recorded within the survey area during the field survey. However, evidence of the Malleefowl (*Leipoa ocellata*) was recorded, with one old (inactive) Malleefowl mound identified. Malleefowl are known from the region in low densities. The survey area is likely habitat for a current population of Malleefowl which would occasionally and opportunistically use the area. A further three conservation significant fauna species are considered likely to use the survey area. All habitat types are likely to be utilised by conservation significant fauna species, however none are considered critical to the survival of any one species.

7. References

Australian Soil Resource Information System (ASRIS) 2016, *Australian Soil Resource Information Viewer*, retrieved October 2016, from http://www.asris.csiro.au/index_ie.html

Beard, JS 1972, *The vegetation of the Kalgoorlie area, Western Australia, 1:250,000 vegetation series*, map and explanatory notes, University of Western Australia Press, Western Australia.

Beard, JS 1990, *Plant Life of Western Australia*, Perth, Kangaroo Press.

Bureau of Meteorology (BoM) 2016, *Climatic statistics for Australian locations*, retrieved October 2016, from http://www.bom.gov.au/climate/averages/tables/cw_012038.shtml.

Christidis, L and Boles, WE 2008, *Systematics and Taxonomy of Australian Birds*, Melbourne, CSIRO Publishing.

Cowan, M 2001, *Coolgardie 3 (COO3 – Eastern Goldfields subregion)*, in Department of Conservation and Land Management (ed), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002, pp 156.

Department of Environment Regulation (DER) 2016, *Native Vegetation Map Viewer*, retrieved October 2016, from http://maps.dec.wa.gov.au/idelve/nv/.

Department of Parks and Wildlife (DPaW) 2007–, *NatureMap: Mapping Western Australia's Biodiversity*, Department of Parks and Wildlife, retrieved October 2016, from http://NatureMap.dec.wa.gov.au/default.aspx.

Department of the Environment and Energy (DotEE) 2016a, *Environment Protection and Biodiversity Act 1999 Protected Matters Report*, retrieved October 2016, from http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst.jsf.

Department of the Environment and Energy (DotEE) 2016b, *Environment Protection and Biodiversity Act 1999 List of Threatened Flora*, retrieved October 2016, from http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora

Department of the Environment and Energy (DotEE) 2016c, *Interim Biogeographic Regionalisation of Australia*, Version 7, retrieved October 2016, from http://www.environment.gov.au/topics/land/nrs/science-maps-and-data/australias-bioregions-ibra.

Department of Water (DoW) 2016, *Geographic Data Atlas*, retrieved October 2016, from http://www.water.wa.gov.au/idelve/dowdataext/index.jsp.

Environmental Protection Authority (EPA) 2002, *Terrestrial Biological Surveys as an Element of Biodiversity Protection: Position Statement No. 3*, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) 2004a, *Guidance Statement No. 51: Vegetation and Flora Surveys for Environmental Impact Assessment in Western Australia*, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) 2004b, *Guidance Statement No. 56: Terrestrial Fauna Surveys for Impact Assessment in Western Australia*, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) and Department of Parks and Wildlife (DPaW) 2015, *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment*, (ed. K Freeman, G Stack, S Thomas and N Woolfrey), Perth, WA.

Executive Steering Committee for Australian Vegetation Information (ESCAVI) 2003, *Australian Vegetation Attribute Manual: National Vegetation Information System,* Version 6.0, Canberra, Department of the Environment and Heritage.

Government of Western Australia (GoWA) 2015, *2015 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Current as of June 2015, Perth Western Australia, Department of Environment and Conservation, retrieved October 2016, from https://www2.landgate.wa.gov.au/web/guest/downloader.

Natural Heritage Trust (NHT) 2007, National Manual for The Malleefowl Monitoring System, Standards, Protocols and Monitoring Procedures, NHT.

Thomas-Dans, C, Storrie, A, Brown, A, Chapman, A, Copp, I, Ennis, A, Friend, T, Gleeson, D, Keighery, K, Herford, I, Hunter, J, Hussey, P, Keally, I, Pearson, D, Pronk, G, Winfield, C and Wentzel, K 2012, *Guide to the Great Western Woodlands*, Bentley, Department of Environment and Conservation, pp 160.

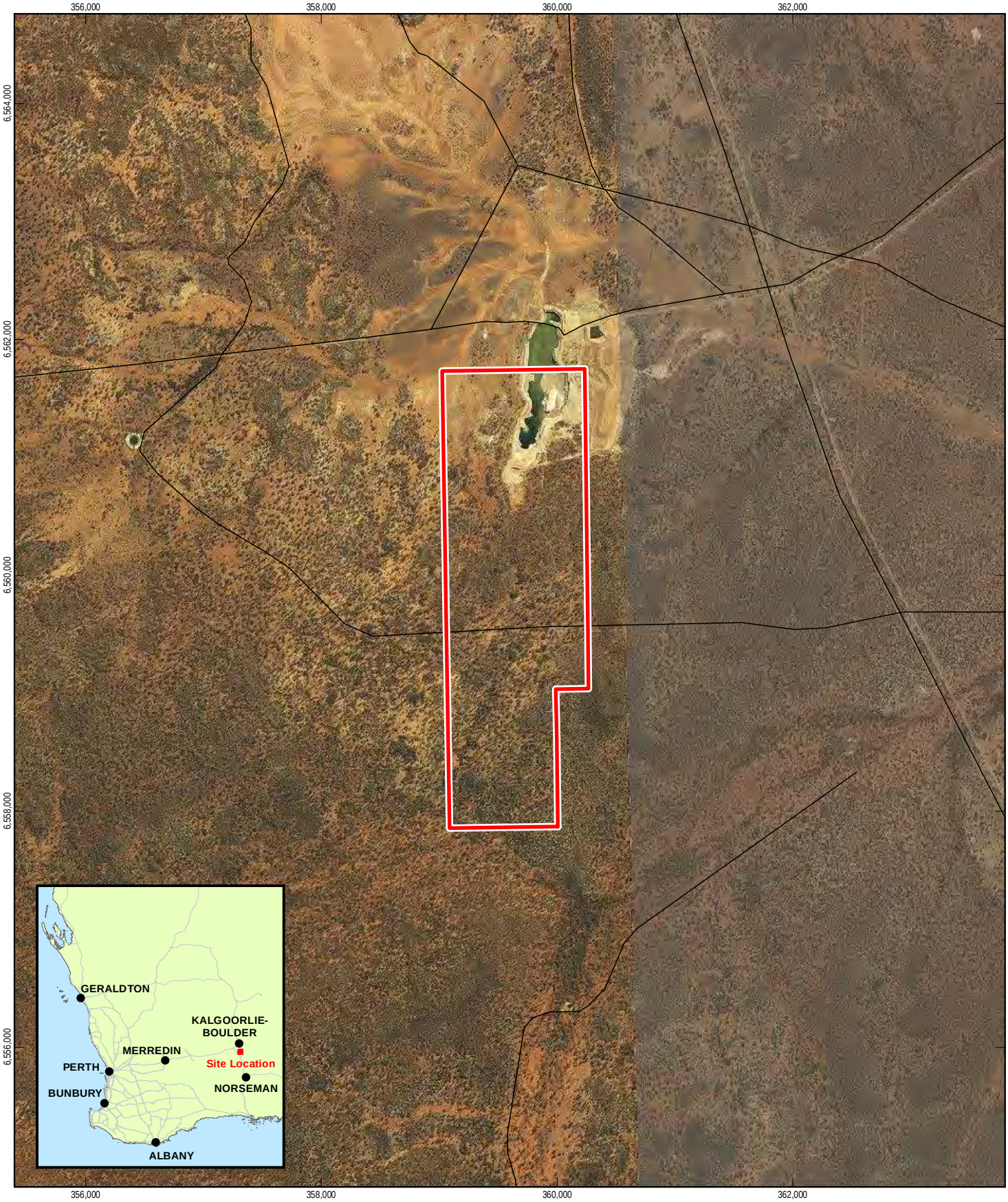
Watson, A, Judd, S, Watson, J, Lam, A and Mackenzie, D 2008, *The Great Western Woodlands*, The Environmental Printing Company.

Shepherd, DP, Beeston, GR, and Hopkins, AJM 2002, *Native Vegetation in Western Australia – Extent, Type and Status*, Resource Management Technical Report 249, Perth, Department of Agriculture, Western Australia.

Western Australian Herbarium 1998–, *FloraBase—the Western Australian Flora,* Department of Parks and Wildlife, retrieved October 2016, from http://florabase.dpaw.wa.gov.au/.

Appendices

Appendix A – Figures



LEGEND

Survey Area

Road/track

Page Size A4

0 500 1,000

Metres

Map Projection: Transverse Mercator

Horizontal Datum: GDA 1994

Grid: GDA 1994 MGA Zone 51

N

Metals X

Samphire Flora and Fauna Assessment

Locality

Figure 1

Job Number	61-35071
Revision	A
Date	15 Nov 2016

G:\61\35071\GIS\Maps\MXD\6134071_001_Fig1SurveyArea_RevA.mxd

999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

Data source: Metals X: Survey Area - 20160902; Landgate: Aerial Imagery - Lake Lefroy March 2011; MRWA: State Roads - 20140723; Geoscience Australia: Roads/tracks, Coastline, Townsites - 2006. Created by:krawlinson

LEGEND

Threatened (Declared Rare) & Significant Species
- Priority Flora - P1
- Priority Flora - P2
- Priority Flora - P3

- Watercourse
- Survey Area
- Waterbody

DPaW Managed Lands
- 5(1)(g) Reserve
- 5(1)(h) Reserve
- Conservation Park
- Nature Reserve
- State Forest
- Timber Reserve

Page Size A4

0 2.5 5 7.5 10

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

Metals X

Samphire Flora and Fauna Assessment

Biological Constraints

Job Number	61-35071
Revision	A
Date	15 Nov 2016

Figure 2

G:\61\35071\GIS\Maps\MXD\6135071_002_Fig2BiolConstraints_RevA.mxd

999 Hay Street, Perth WA 6000 Australia T 61 8 6222 8555 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au

Data source: Metals X: Survey Area - 20160902; Landgate: Imagery (Virtual Mosaic), Watercourse Lines, Waterbody - 201661111; DPaW; Managed Lands - 20161003, Threatened and Declared Rare Flora - 20161028. Created by:krawlinson

LEGEND

- Mallee Fowl *(Leipoa ocellata)* Mound
- Survey Area

Vegetation Association

- *Casuarina pauper* Woodland
- *Melaleuca* Open Shrubland
- *Tecticornia* Open Shrubland
- Highly Disturbed
- Mixed *Eucalyptus* Woodland

Page Size A4

0 250 500 750

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

Metals X

Samphire Flora and Fauna Assessment

Vegetation Association

Job Number	61-35071
Revision	A
Date	17 Nov 2016

Figure 3

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999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

Data source: Metals X: Survey Area - 20160902; Landgate: Imagery (Virtual Mosaic), GHD: Vegetation Association - 20161114, Mallee Fowl Observation - 20161114. Created by:krawlinson

LEGEND

Survey Area

Vegetation Condition
(EPA and DPaW 2015)

- Excellent
- Very Good
- Good
- Completely Degraded

Page Size A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

N

Metals X

Samphire Flora and Fauna Assessment

Vegetation Condition

Job Number	61-35071
Revision	A
Date	17 Nov 2016

Figure 4

G:\61\35071\GIS\Maps\MXD\6135071_004_Fig4VegetationCondition_RevA.mxd

999 Hay Street, Perth WA 6000 Australia T 61 8 6222 8555 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au

Data source: Metals X: Survey Area - 20160902; Landgate: Imagery (Virtual Mosaic); GHD: Vegetation Condition - 20161114. Created by:krawlinson

Appendix B – Relevant legislation, conservation codes and background information

Legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

- Nationally threatened flora and fauna species and ecological communities
- Migratory species

A person must not take an action that has, will have, or is likely to have a significant impact MNES, without approval from the Federal Minister for the Environment.

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Australian Government Minister for the Environment.

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the above.

Clearing of native vegetation in Western Australia requires a permit from the Department of Environment Regulation (DER) (formerly the Department of Environment and Conservation – DEC), unless exemptions apply. Native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native, but not vegetation planted in a plantation or planted with commercial intent.

In the EP Act Section 51A, clearing is defined as the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage of some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above.

When making a decision to grant or refuse a permit to clear native vegetation the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

a) Native vegetation should not be cleared if it comprises a high level of biodiversity.

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

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

d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.

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

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

g) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

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

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

There are a number of Environmentally Sensitive Areas (ESAs) within Western Australia where exemptions in regulations do not apply. ESAs include locations of threatened communities and species.

State *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*

ESAs are declared by a notice under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA (under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 – Reg 6).

Aspects of Environmentally Sensitive Areas

Aspects of Environmentally Sensitive Areas
A declared World Heritage property as defined in Section 13 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
An area that is registered on the Register of the National Estate (RNE), because of its natural values, under the *Australian Heritage Commission Act 1975* of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).
A defined wetland and the area within 50 m of the wetland.
The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located.
The area covered by a TEC.
A Bush Forever Site.
The areas covered by the following policies:
a) The *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*.
b) The *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002*.
The areas covered by the lakes to which the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (SCPL) (EPP Lakes) applies.
Protected wetlands as defined in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*.
Areas of fringing native vegetation in the policy area as defined in the *Environmental Protection (Swan and Canning Rivers) Policy 1997*.

State *Wildlife Conservation Act 1950*

The *Wildlife Conservation Act 1950* (WC Act) provides for the conservation and protection of wildlife. It is administered by the Department of Parks and Wildlife (DPaW) (formerly the DEC) and applies to both flora and fauna. Any person wanting to capture, collect, disturb or study fauna requires a permit to do so. A permit is required under the WC Act if removal of threatened species is required.

State *Biosecurity and Agriculture Management Act 2007*

Under the *Biosecurity and Agriculture Management Act 2007* (BAM Act), a Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) is in force. The Department of Agriculture and Food Western Australia (DAFWA) maintains a list of Declared Pests for Western Australia. If a Pest is declared for the whole of the State or for particular Local Government Areas, all landholders are obliged to comply with the specific category of control. Declared plants are gazetted under categories, which define the action required. The category may apply to the whole of the State, districts, individual properties or even paddocks. Categories of control are defined below. Among the factors considered in categorising Declared Pests are:

- The impact of the plant on individuals, agricultural production and the community in general
- Whether it is already established in the area
- The feasibility and cost of possible control measures

The BAM Act replaces the repealed *Agriculture and Related Resources Protection Act 1976* (ARRP Act).

Department of Agriculture and Food (Western Australia) Categories for Declared Pests under the *Biosecurity and Agriculture Management Act 2007*

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they 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 which currently is free of that pest.

Background information and conservation codes

Reserves and conservation areas

Department of Parks and Wildlife managed lands and waters

DPaW manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DPaW managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. DPaW managed conservation estate, is vested with the Conservation Commission of Western Australia. Access to, or through, some areas of DPaW managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DPaW managed lands will generally be referred to DPaW throughout the assessment process.

Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia's Biological Diversity (ANZECC 2000) and in Environmental Protection Authority (EPA) Position Statement No. 2 on environmental protection of native vegetation in Western Australia (EPA 2000).

From a purely biodiversity perspective and taking no account of any other land degradation issues, there are a number of key criteria now being applied to the clearing of native vegetation in Western Australia (EPA 2000).

- The "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30 percent of the pre-European extent of the vegetation type.
- A level of 10 percent of the original extent is regarded as being a level representing Endangered.
- Clearing which would put the threat level into the class below should be avoided.
- From a biodiversity perspective, stream reserves should generally be in the order of at least 200 metres (m) wide.

The extent of remnant native vegetation has been assessed by Shepherd et al. (2002) and the Government of Western Australia (2015), based on broadscale vegetation association mapping by Beard (1972).

Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State WC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act administered by the Department of the

Environment (DotE) (formerly Department of Sustainability, Environment, Water, Population and Communities – DSEWPaC). The DPaW also maintains a list of TECs for Western Australia; some of which are also protected under the EPBC Act. TECs are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e. Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable.

Possible TEC that do not meet survey criteria are added to the DPaW Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs 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. PECs are not listed under any formal Federal or State legislation.

Conservation codes and definitions for Threatened Ecological Communities endorsed by the Western Australian Minister for the Environment and listed under the *Environment Protection and Biodiversity Conservation Act 1999*

Western Australia conservation categories		Federal Government Conservation Categories (EPBC Act)	
Presumed Totally Destroyed (PD)	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.	Critically Endangered (CR)	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated	Endangered (EN)	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future
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.	Vulnerable (VU)	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future
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.		

Conservation categories and definitions for Priority Ecological Communities as listed by the Department of Parks and Wildlife

Category	Description
Priority 1	**Poorly known ecological communities.** Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. 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 2	**Poorly known ecological communities.** Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate 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 3	**Poorly known ecological communities.** (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or may 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 4	**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.** (i) 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. (ii) 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. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Category	Description
Priority 5	**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.

Other significant vegetation

Vegetation may be significant for a range of reasons, other than a statutory listing as TEC or because the extent is below a threshold level. The EPA (2004) states that significant vegetation may include vegetation that includes the following:

- Scarcity
- Unusual species
- Novel combinations of species
- A role as a refuge
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of the range of a unit (particularly, a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- A restricted distribution

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Conservation significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the WC Act can warrant referral to the DotE and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN).

Threatened species have been published as Specially Protected under the WC 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. The schedules align with the categories of the EPBC Act. Threatened species are those 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.

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.

For the purposes of this assessment, all species listed under the EPBC Act, WC Act and DPaW Priority species are considered conservation significant.

Conservation categories and definitions for *Environment Protection and Biodiversity Conservation Act 1999* listed flora & fauna species

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

Conservation codes and descriptions for Western Australian flora and fauna

Code	Conservation category	Description
Wildlife Conservation Act 1950		
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.

Code	Conservation category	Description
DPaW Priority Listed		
1	Priority One: Poorly-known taxa	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 Two: Poorly-known taxa	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 Three: Poorly-known taxa	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 Four: Rare, Near Threatened and other taxa 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.

Migratory species listed under the EPBC Act

The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)

- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

Other significant flora and fauna

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than as Threatened (Declared Rare) Flora or Priority Flora. The EPA (2004) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened species or supporting large populations representing a significant proportion of the local regional population of a species
- Relic status
- Anomalous features that indicate a potential new discovery
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- The presence of restricted subspecies, varieties, or naturally occurring hybrids
- Local endemism/a restricted distribution
- Being poorly reserved

The application of the degree of significance may apply at a range of scales.

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007.*

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

- Invasiveness
- Impacts
- Potential for spread
- Socio-economic and environmental values

Australian state and territory governments have identified thirty two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012 (Australian Government 2014).

References

Australia New Zealand Environment and Conservation Council (ANZECC) 2000, *Core Environmental Indicators for Reporting on the State of Environment*, ANZECC State of the Environment Reporting Task Force.

Australian Government 2014, *Weeds in Australia*, retrieved 2016, from http://www.environment.gov.au/biodiversity/invasive/weeds/index.html.

Beard, JS 1972, The vegetation of the Kalgoorlie area, Western Australia, 1:250,000 vegetation series, map and explanatory notes, University of Western Australia Press, Western Australia.

Commonwealth of Australia 2001, *National Targets and Objectives for Biodiversity Conservation 2001–2005*, Canberra, AGPS.

English, V and Blyth, J 1997, *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*, Perth, Department of Conservation and Land Management.

Environmental Protection Authority (EPA) 2000, *Environmental Protection of Native Vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2*, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) 2004, *Guidance Statement No. 51, Guidance for the Assessment of Environmental Factors: Vegetation and Flora Surveys for Environmental Impact Assessment in Western Australia*, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) and Department of Parks and Wildlife (DPaW) 2015, Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment, (ed. K Freeman, G Stack, S Thomas and N Woolfrey), Perth, WA.

Government of Western Australia (GoWA) 2015, *Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Current as of June 2015, Perth Western Australia, Department of Environment and Conservation, retrieved 2016, from https://www2.landgate.wa.gov.au/web/guest/downloader.

Shepherd, DP, Beeston, GR & Hopkins, AJM 2002, *Native Vegetation in Western Australia – Extent, Type and Status, Resource Management Technical Report 249*, Perth, Department of Agriculture.

Western Australian Herbarium 1998–, *FloraBase—the Western Australian Flora*. Department of Parks and Wildlife, retrieved 2015, from http://florabase.dpaw.wa.gov.au/.

Appendix C – Desktop searches

EPBC Act Protected Matters Search Report (40 km buffer)

Naturemap Flora Report (40 km buffer)

Naturemap Fauna Report (40 km buffer)

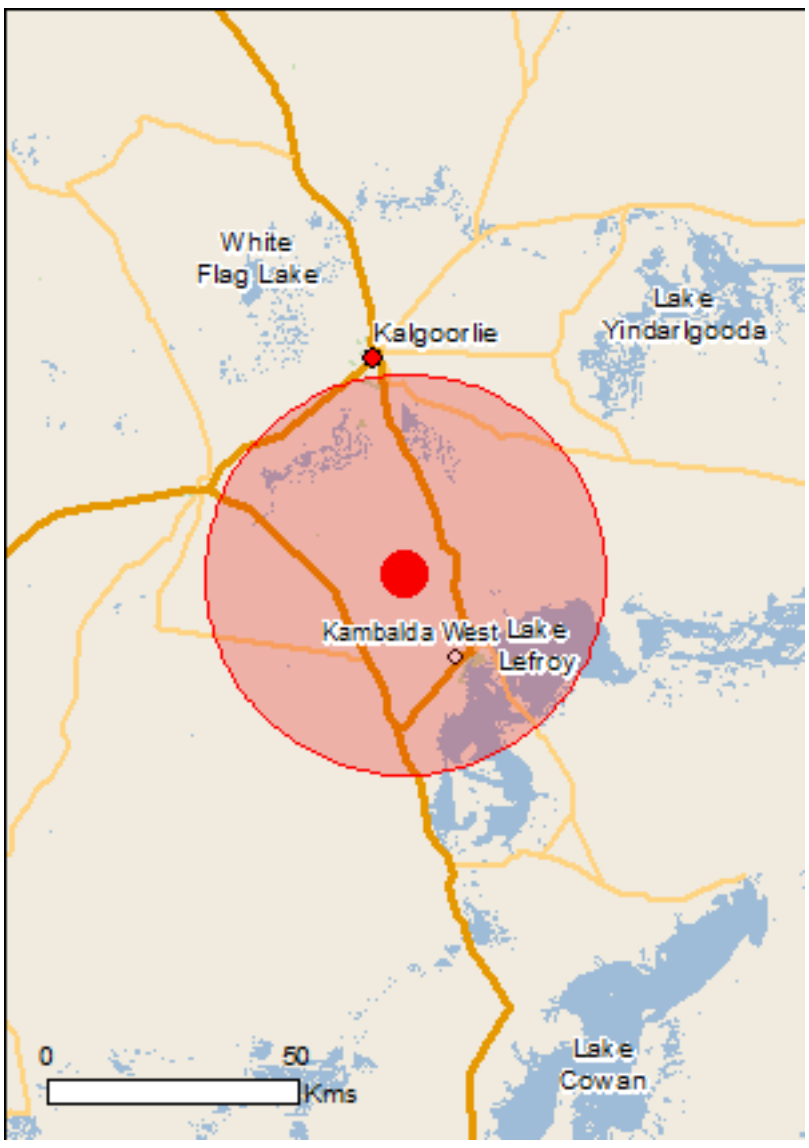
EPBC Act Protected Matters Report

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

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

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

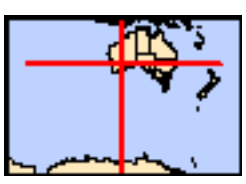
Report created: 17/10/16 16:10:33



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 40.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	6
Listed Migratory Species:	4

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	16
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Historic		
Goldfields Water Supply Scheme, Western Australia	WA	Listed place

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis		
Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Insects		
Ogyris subterrestris petrina		
Arid Bronze Azure [77743]	Critically Endangered	Species or species habitat may occur within area
Plants		
Gastrolobium graniticum		
Granite Poison [14872]	Endangered	Species or species habitat likely to occur within area
Tecticornia flabelliformis		
Bead Glasswort [82664]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -
Defence - AIRTC KALGOORLIE
Defence - KALGOORLIE RIFLE RANGE
Defence - KALGOORLIE TRAINING DEPOT

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Thinornis rubricollis		
Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Kalgoorlie Arboretum	WA
Kambalda	WA
Kurrawang	WA
Lakeside Timber Reserve	WA
Scahill Timber Reserve	WA
Yallari Timber Reserve	WA

Invasive Species	[Resource Information]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.08504 121.52867

Acknowledgements

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

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

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

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

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Flora Species Report 40 km

Created By Guest user on 17/10/2016

Kingdom	Plantae
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	121° 31' 43" E,31° 05' 06" S
Buffer	40km
Group By	Family

Family	Species	Records
Aizoaceae	8	17
Amaranthaceae	23	137
Anacardiaceae	1	2
Apiaceae	7	19
Apocynaceae	6	69
Araliaceae	4	13
Asparagaceae	6	24
Asphodelaceae	1	6
Asteraceae	124	660
Aytoniaceae	1	1
Boraginaceae	13	91
Boryaceae	1	1
Brassicaceae	24	92
Bryaceae	6	6
Cactaceae	7	15
Campanulaceae	3	9
Caryophyllaceae	4	6
Casuarinaceae	11	58
Celastraceae	3	3
Chenopodiaceae	90	584
Cleomaceae	1	1
Colchicaceae	1	2
Convolvulaceae	4	9
Crassulaceae	5	7
Cucurbitaceae	2	3
Cupressaceae	3	21
Cyperaceae	10	18
Dasypogonaceae	1	1
Dicranaceae	1	1
Didiereaceae	1	1
Dilleniaceae	5	6
Ditrichaceae	3	3
Droseraceae	2	4
Elaeocarpaceae	2	12
Ericaceae	9	18
Euphorbiaceae	15	66
Fabaceae	152	857
Fissidentaceae	1	4
Fossombroniaceae	1	1
Frankeniaceae	11	28
Funariaceae	4	5
Geraniaceae	4	23
Gigaspermaceae	2	5
Goodeniaceae	47	215
Grimmiaceae	2	3
Gyrostemonaceae	3	10
Haemodoraceae	5	5
Haloragaceae	7	45
Hemerocallidaceae	3	3
Hypericaceae	1	1
Iridaceae	2	2
Juncaceae	1	1
Lamiaceae	36	242
Lauraceae	1	1
Loganiaceae	1	3
Loranthaceae	5	19
Lythraceae	1	1
Malvaceae	34	168
Meliaceae	1	1
Molluginaceae	1	1
Myrtaceae	169	1348
Nyctaginaceae	1	1
Orchidaceae	9	12
Oxalidaceae	3	6
Papaveraceae	1	2
Pittosporaceae	5	25
Plantaginaceae	6	19
Plumbaginaceae	1	3
Poaceae	57	190
Polygalaceae	2	4
Polygonaceae	5	11
Portulacaceae	7	22
Pottiaceae	11	25
Primulaceae	1	2
Proteaceae	52	192

Pteridaceae	4	9
Ranunculaceae	2	2
Resedaceae	1	2
Restionaceae	3	3
Rhamnaceae	11	56
Ricciaceae	1	2
Rubiaceae	1	3
Ruppiaceae	1	2
Rutaceae	16	76
Santalaceae	6	75
Sapindaceae	9	162
Scrophulariaceae	50	610
Solanaceae	18	143
Stylidiaceae	9	16
Thymelaeaceae	6	28
Urticaceae	2	2
Verbenaceae	3	3
Violaceae	2	12
Zygophyllaceae	14	106
TOTAL	**1223**	**6804**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Aizoaceae					
1.	11681	*Disphyma crassifolium subsp. clavellatum*			
2.	11571	*Galenia pubescens var. pubescens*	Y		
3.	2804	*Gunniopsis glabra*			
4.	2807	*Gunniopsis quadrifida (Sturts Pigface)*			
5.	2813	*Mesembryanthemum crystallinum (Iceplant)*	Y		
6.	2814	*Mesembryanthemum nodiflorum (Slender Iceplant)*	Y		
7.	2822	*Tetragonia eremaea*			
8.	29095	*Zaleya galericulata subsp. galericulata*			
Amaranthaceae					
9.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
10.	2652	*Alternanthera nodiflora (Common Joyweed)*			
11.	2671	*Amaranthus viridis (Green Amaranth)*	Y		
12.	2690	*Ptilotus aervoides*			
13.	2707	*Ptilotus carlsonii*			
14.	2708	*Ptilotus chamaecladus*			
15.	2717	*Ptilotus divaricatus (Climbing Mulla Mulla)*			
16.	11260	*Ptilotus drummondii var. drummondii (Pussytail)*			
17.	11876	*Ptilotus drummondii var. scaposus*			
18.	41505	*Ptilotus gaudichaudii subsp. eremita*			
19.	41506	*Ptilotus gaudichaudii subsp. gaudichaudii*			
20.	2729	*Ptilotus grandiflorus*			
21.	2730	*Ptilotus helichrysoides*			
22.	2731	*Ptilotus helipteroides (Hairy Mulla Mulla)*			
23.	2732	*Ptilotus holosericeus*			
24.	41001	*Ptilotus nobilis subsp. nobilis (Yellow Tails)*			
25.	2747	*Ptilotus obovatus (Cotton Bush)*			
26.	2752	*Ptilotus procumbens*		P1	
27.	2755	*Ptilotus rotundifolius (Royal Mulla Mulla)*			
28.	15855	*Ptilotus schwartzii var. schwartzii*			
29.		*Ptilotus sp.*			
30.	41000	*Ptilotus sp. Goldfields (R. Davis 10796)*			
31.	43203	*Surreya diandra*			
Anacardiaceae					
32.	17056	*Schinus molle var. areira*	Y		
Apiaceae					
33.	6204	*Actinotus humilis*			
34.	6208	*Actinotus superbus*			
35.		*Apium sp.*			
36.	6218	*Daucus glochidiatus (Australian Carrot)*			
37.	6252	*Platysace effusa*			
38.	14999	*Platysace trachymenioides*			
39.	6292	*Xanthosia rotundifolia (Southern Cross)*			
Apocynaceae					
40.	6565	*Alyxia buxifolia (Dysentery Bush)*			
41.	14636	*Alyxia tetanifolia*		P3	
42.	6580	*Asclepias curassavica (Redhead Cottonbush)*	Y		
43.	12949	*Marsdenia australis*			
44.	20233	*Orbea variegata*	Y		Y
45.	6599	*Rhyncharrhena linearis (Bush Bean, Wintjulanypa)*			
Araliaceae					
46.	11546	*Hydrocotyle pilifera var. glabrata*			
47.	19042	*Trachymene coerulea subsp. leucopetala*			
48.	6268	*Trachymene cyanopetala*			
49.	6279	*Trachymene ornata (Spongefruit)*			
Asparagaceae					
50.	1505	*Agave americana (Century Plant)*	Y		
51.	1215	*Chamaexeros fimbriata*			
52.	1313	*Sowerbaea multicaulis (Many Stemmed Lily)*		P4	
53.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
54.	1338	*Thysanotus manglesianus (Fringed Lily)*			
55.	1357	*Thysanotus thyrsoideus*			
Asphodelaceae					
56.	1366	*Bulbine semibarbata (Leek Lily)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Asteraceae					
57.	7817	*Actinobole uliginosum (Flannel Cudweed)*			
58.	7836	*Angianthus tomentosus (Camel-grass)*			
59.	7838	*Arctotheca calendula (Cape Weed)*	Y		
60.	13327	*Argentipallium niveum*			
61.	7846	*Asteridea athrixioides*			
62.	7847	*Asteridea chaetopoda*			
63.		*Asteridea sp.*			
64.	7856	*Blennospora drummondii*			
65.	7871	*Brachyscome ciliaris*			
66.	7878	*Brachyscome iberidifolia*			
67.	7880	*Brachyscome lineariloba*			
68.	7882	*Brachyscome perpusilla*			
69.		*Brachyscome sp.*			
70.	7903	*Calotis hispidula (Bindy Eye)*			
71.	7905	*Calotis multicaulis (Many-stemmed Burr-daisy)*			
72.		*Calotis sp.*			
73.	7910	*Carduus tenuiflorus (Slender Thistle, Winged Slender Thistle, Sheep Thistle)*	Y		
74.	7911	*Carthamus lanatus (Saffron Thistle)*	Y		
75.	7916	*Centaurea melitensis (Maltese Cockspur)*	Y		
76.		*Centratherum sp.*			
77.	7922	*Cephalipterum drummondii (Pompom Head)*			
78.	7924	*Ceratogyne obionoides (Wingwort)*			
79.	12612	*Chrysocephalum apiculatum*			
80.	13138	*Chrysocephalum puteale*			
81.	7933	*Chthonocephalus pseudevax (Woolly Groundheads)*			
82.	7935	*Cichorium intybus (Chicory)*	Y		
83.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		
84.	20074	*Conyza sumatrensis*	Y		
85.	7943	*Cotula australis (Common Cotula)*			
86.	13353	*Craspedia haplorrhiza*			
87.	7949	*Cratystylis conocephala (Greybush)*			
88.		*Cratystylis conocephala x microphylla*			
89.	7950	*Cratystylis microphylla (Small-leaved Grey Bush)*			
90.		*Cratystylis sp.*			Y
91.	7951	*Cratystylis subspinescens (Australian Sage, Spiny Grey Bush)*			
92.	7955	*Cymbonotus preissianus (Austral Bear's Ear)*		P3	
93.	7964	*Elachanthus pusillus (Elacanth)*		P2	
94.	12739	*Erymophyllum ramosum*			
95.	14377	*Erymophyllum ramosum subsp. ramosum*			
96.	16311	*Gazania linearis*	Y		
97.	12780	*Gilberta tenuifolia*			
98.	7989	*Gnephosis brevifolia (Short-leaved Gnephosis)*			
99.	7996	*Gnephosis intonsa (Shaggy Gnephosis)*		P3	
100.	8002	*Gnephosis tenuissima*			
101.	8008	*Helianthus annuus (Sunflower)*	Y		
102.	8045	*Helipterum craspedioides (Yellow Billy Buttons)*			
103.		*Helipterum sp.*			
104.	8085	*Hyalochlamys globifera*			
105.	12741	*Hyalosperma cotula*			
106.	12742	*Hyalosperma demissum*			
107.	12743	*Hyalosperma glutinosum*			
108.	15447	*Hyalosperma glutinosum subsp. glutinosum*			
109.	12756	*Hyalosperma zacchaeus*			
110.	8087	*Isoetopsis graminifolia (Cushion Grass)*			
111.	8092	*Ixiolaena viscosa (Sticky Ixiolaena)*			
112.	8094	*Kippistia suaedifolia*			
113.	29046	*Lactuca serriola forma serriola*	Y		
114.	13284	*Lawrencella rosea*			
115.	19237	*Leiocarpa websteri*			
116.	12628	*Lemooria burkittii*			
117.	44490	*Leontodon rhagadioloides*	Y		
118.	8105	*Millotia myosotidifolia*			
119.	14344	*Millotia tenuifolia var. tenuifolia (Soft Millotia)*			
120.	8107	*Minuria cunninghamii (Bush Minuria)*			
121.	8109	*Minuria integerrima (Smooth Minuria)*			
122.	29418	*Monoculus monstrosus*	Y		
123.	8134	*Olearia exiguifolia (Small-leaved Daisy Bush)*			
124.	8136	*Olearia homolepis*			
125.	19023	*Olearia incana*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
126.	8140	*Olearia muelleri (Goldfields Daisy)*			
127.	8141	*Olearia muricata (Rough-leaved Daisy Bush)*			
128.	8145	*Olearia pimeleoides (Pimelea Daisybush, Burrobunga)*			
129.	8149	*Olearia rudis (Rough Daisybush)*			
130.	44401	*Olearia sp. Eremicola (Diels & Pritzel s.n. PERTH 00449628)*			
131.	8152	*Olearia subspicata (Spiked Daisy Bush)*			
132.	19828	*Oligocarpus calendulaceus*	Y		
133.	20661	*Oncosiphon suffruticosum*	Y		
134.	12642	*Ozothamnus cassiope*			
135.	45238	*Podolepis aristata subsp. affinis*			
136.	8173	*Podolepis capillaris (Wiry Podolepis)*			
137.	8177	*Podolepis lessonii*			
138.	8180	*Podolepis rugata (Pleated Podolepis)*			
139.	45241	*Podolepis rugata subsp. rugata*			
140.	8183	*Podotheca chrysantha (Yellow Podotheca)*			
141.	12731	*Podotheca wilsonii*			
142.	8187	*Pogonolepis muelleriana*			
143.	13306	*Rhodanthe battii*			
144.	13308	*Rhodanthe charsleyae*			
145.	13241	*Rhodanthe chlorocephala subsp. rosea*			
146.	13242	*Rhodanthe chlorocephala subsp. splendida*			
147.	13301	*Rhodanthe floribunda*			
148.	13293	*Rhodanthe haigii*			
149.	13246	*Rhodanthe humboldtiana*			
150.	13294	*Rhodanthe laevis*			
151.	13234	*Rhodanthe manglesii*			
152.	13238	*Rhodanthe maryonii*			
153.	13248	*Rhodanthe oppositifolia*			
154.	13249	*Rhodanthe oppositifolia subsp. oppositifolia*			
155.	13252	*Rhodanthe pygmaea*			
156.	13253	*Rhodanthe rubella*			
157.	13254	*Rhodanthe stricta*			
158.	8200	*Schoenia cassiniana (Schoenia)*			
159.	13287	*Schoenia filifolia subsp. filifolia*			
160.	20722	*Senecio dolichocephalus*			
161.	8207	*Senecio glossanthus (Slender Groundsel)*			
162.	25881	*Senecio lacustrinus*			
163.	8213	*Senecio magnificus (Showy Groundsel)*			
164.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
165.	8234	*Streptoglossa adscendens*			
166.	8236	*Streptoglossa cylindriceps*			
167.	8238	*Streptoglossa liatroides*			
168.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
169.	13298	*Thiseltonia gracillima*			
170.	12652	*Trichanthodium skirrophorum*			
171.	8253	*Triptilodiscus pygmaeus*			
172.	11387	*Vittadinia cervicularis var. cervicularis*			
173.	11788	*Vittadinia dissecta var. hirta*			
174.	8265	*Vittadinia eremaea*			
175.	8268	*Vittadinia humerata*			
176.		*Vittadinia sp.*			
177.	8273	*Vittadinia sulcata*			
178.	13331	*Waitzia acuminata var. acuminata*			
179.	46093	*Waitzia fitzgibbonii*			
180.	8287	*Xanthium spinosum (Bathurst Burr)*	Y		
Aytoniaceae					
181.		*Asterella drummondii*			
Boraginaceae					
182.	6675	*Buglossoides arvensis (Corn Gromwell)*	Y		
183.	6681	*Echium plantagineum (Paterson's Curse)*	Y		
184.	6684	*Halgania andromedifolia*			
185.	6687	*Halgania cyanea (Rough Halgania)*			
186.	29840	*Halgania cyanea var. Allambi Stn (B.W. Strong 676)*			
187.	31117	*Halgania cyanea var. Charleville (R.W. Purdie +111)*			
188.		*Halgania cyanea var. Charleville (R.W.Purdie+ 111)*			
189.	6691	*Halgania integerrima*			
190.	6692	*Halgania lavandulacea (Blue Bush)*			
191.	17303	*Heliotropium euodes*			
192.	6710	*Heliotropium europaeum (Common Heliotrope)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
193.	6723	*Omphalolappula concava (Burr Stickseed)*			
194.	6727	*Trichodesma zeylanicum (Camel Bush, Kumbalin)*			
Boryaceae					
195.	1267	*Borya constricta*			
Brassicaceae					
196.	2990	*Alyssum linifolium (Flax-leaf Alyssum)*	Y		
197.	31876	*Arabidella chrysodema*			
198.	2992	*Arabidella trisecta*			
199.		*Brassica sp.*			
200.	3000	*Brassica tournefortii (Mediterranean Turnip)*	Y		
201.	3004	*Capsella bursa-pastoris (Shepherd's Purse)*	Y		
202.	3008	*Carrichtera annua (Ward's Weed)*	Y		
203.	11270	*Harmsiodoxa brevipes var. brevipes*			
204.	3018	*Lepidium africanum (Rubble Peppercress)*	Y		
205.	3026	*Lepidium fasciculatum (Bundled Peppercress)*		P3	
206.	3031	*Lepidium merrallii*		P2	
207.	3033	*Lepidium oxytrichum*			
208.	3034	*Lepidium papillosum (Warty Peppercress)*			
209.	3037	*Lepidium phlebopetalum (Veined Peppercress)*			
210.	3044	*Lepidium rotundum (Veined Peppercress)*			
211.	3059	*Phlegmatospermum eremaeum*		P3	
212.	3069	*Sisymbrium erysimoides (Smooth Mustard)*	Y		
213.	3070	*Sisymbrium irio (London Rocket)*	Y		
214.	3072	*Sisymbrium orientale (Indian Hedge Mustard)*	Y		
215.	3074	*Stenopetalum anfractum*			
216.	3076	*Stenopetalum filifolium*			
217.	3077	*Stenopetalum lineare (Narrow Thread Petal)*			
218.	30212	*Stenopetalum lineare var. lineare*			
219.	3079	*Stenopetalum pedicellare*			
Bryaceae					
220.	32330	*Bryum argenteum*			
221.	32331	*Bryum lanatum*			
222.		*Bryum pachytheca*			
223.		*Gemmabryum pachytheca*			
224.	44608	*Rosulabryum billarderii*			
225.	32426	*Rosulabryum campylothecium*			
Cactaceae					
226.	20759	*Cylindropuntia fulgida var. mamillata*	Y		
227.	33077	*Cylindropuntia imbricata*	Y		
228.	45513	*Cylindropuntia kleiniae*	Y		Y
229.	20281	*Cylindropuntia tunicata*	Y		Y
230.	31799	*Opuntia elata*	Y		
231.	44779	*Opuntia ficus-indica*	Y		
232.		*Opuntia sp.*			
Campanulaceae					
233.	7397	*Isotoma petraea (Rock Isotome, Tundiwari)*			
234.	7403	*Lobelia heterophylla (Wing-seeded Lobelia)*			
235.	7386	*Wahlenbergia gracilenta (Annual Bluebell)*			
Caryophyllaceae					
236.	15972	*Silene gallica var. gallica*	Y		
237.	2914	*Spergularia diandra (Lesser Sand Spurry)*	Y		
238.	2915	*Spergularia rubra (Sand Spurry)*	Y		
239.	2917	*Stellaria filiformis (Thread Spurry)*			
Casuarinaceae					
240.	1719	*Allocasuarina acuaria*			
241.	1720	*Allocasuarina acutivalvis*			
242.	13904	*Allocasuarina acutivalvis subsp. acutivalvis*			
243.	1721	*Allocasuarina campestris*			
244.	1722	*Allocasuarina corniculata*			
245.	13906	*Allocasuarina eriochlamys subsp. eriochlamys*			
246.	13897	*Allocasuarina eriochlamys subsp. grossa*		P3	
247.	1730	*Allocasuarina helmsii*			
248.	1731	*Allocasuarina huegeliana (Rock Sheoak, Kwowl)*			
249.	1742	*Casuarina obesa (Swamp Sheoak, Kuli)*			
250.	12658	*Casuarina pauper (Black Oak)*			
Celastraceae					

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251.	4725	*Psammomoya choretroides*			
252.	4726	*Psammomoya ephedroides*		P3	
253.	29813	*Stackhousia sp. Mt Keith (G. Cockerton & G. O'Keefe 11017)*			

Chenopodiaceae

254.	2449	*Atriplex acutibractea (Toothed Saltbush)*			
255.	11435	*Atriplex acutibractea subsp. acutibractea*			
256.	11489	*Atriplex acutibractea subsp. karoniensis*			
257.	2450	*Atriplex amnicola (Swamp Saltbush)*			
258.	2453	*Atriplex codonocarpa (Flat-topped Saltbush)*			
259.	2455	*Atriplex eardleyae*			
260.	2459	*Atriplex holocarpa (Pop Saltbush)*			
261.	2466	*Atriplex lindleyi*			
262.	12042	*Atriplex lindleyi subsp. inflata*			
263.	2468	*Atriplex nana*			
264.	2469	*Atriplex nummularia (Old Man Saltbush)*			
265.	11516	*Atriplex nummularia subsp. spathulata (Old Man Saltbush)*			
266.	2472	*Atriplex pumilio*			
267.	2473	*Atriplex quadrivalvata*			
268.	11791	*Atriplex quadrivalvata var. quadrivalvata*			
269.	2475	*Atriplex semibaccata (Berry Saltbush)*			
270.	2476	*Atriplex semilunaris (Annual Saltbush)*			
271.		*Atriplex sp.*			
272.	2478	*Atriplex spongiosa (Pop Saltbush)*			
273.	2479	*Atriplex stipitata (Mallee Saltbush)*			
274.	2480	*Atriplex suberecta*			
275.	2481	*Atriplex vesicaria (Bladder Saltbush)*			
276.	2483	*Chenopodium album (Fat Hen)*	Y		
277.	2487	*Chenopodium curvispicatum*			
278.	2494	*Chenopodium murale (Nettle-leaf Goosefoot)*	Y		
279.	2498	*Didymanthus roei*			
280.	2499	*Dissocarpus paradoxus (Curious Saltbush)*			
281.	33501	*Dysphania cristata (Crested Goosefoot)*			
282.	2502	*Dysphania kalpari (Rat's Tail, Kalpari)*			
283.	33479	*Dysphania melanocarpa (Black Crumbweed)*			
284.	33480	*Dysphania pumilio (Clammy Goosefoot)*			
285.	11704	*Einadia nutans subsp. eremaea (Climbing Saltbush)*			
286.	2511	*Enchylaena tomentosa (Barrier Saltbush)*			
287.	12064	*Enchylaena tomentosa var. tomentosa (Barrier Saltbush)*			
288.	2514	*Eriochiton sclerolaenoides (Woolly Bindii)*			
289.	2533	*Maireana amoena*			
290.	2535	*Maireana appressa*			
291.	2537	*Maireana brevifolia (Small Leaf Bluebush)*			
292.	2538	*Maireana carnosa (Cottony Bluebush)*			
293.	2542	*Maireana erioclada*			
294.	2543	*Maireana eriosphaera*			
295.	2544	*Maireana georgei (Satiny Bluebush)*			
296.	2545	*Maireana glomerifolia (Ball Leaf Bluebush)*			
297.	2550	*Maireana marginata*			
298.	2553	*Maireana oppositifolia*			
299.	2554	*Maireana pentagona (Hairy Bluebush)*			
300.	2555	*Maireana pentatropis*			
301.	2557	*Maireana platycarpa (Shy Bluebush)*			
302.	2560	*Maireana pyramidata (Sago Bush)*			
303.	2561	*Maireana radiata*			
304.	2563	*Maireana sedifolia (Pearl Bluebush, Myall)*			
305.		*Maireana sp.*			
306.	2565	*Maireana suaedifolia*			
307.	2567	*Maireana tomentosa (Felty Bluebush)*			
308.	11662	*Maireana tomentosa subsp. tomentosa*			
309.	2568	*Maireana trichoptera (Downy Bluebush)*			
310.	2569	*Maireana triptera (Threewinged Bluebush)*			
311.	2570	*Maireana turbinata*			
312.	2580	*Rhagodia crassifolia (Fleshy Saltbush)*			
313.	2581	*Rhagodia drummondii*			
314.	2582	*Rhagodia eremaea (Thorny Saltbush)*			
315.	11254	*Rhagodia preissii subsp. preissii*			
316.	30434	*Salsola australis*			
317.		*Salsola sp.*			
318.		*Sarcocornia sp.*			
319.	2599	*Sclerolaena brevifolia*			

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320.	2606	*Sclerolaena cuneata (Yellow Bindii)*			
321.	2609	*Sclerolaena diacantha (Grey Copperburr)*			
322.	2610	*Sclerolaena drummondii*			
323.	2612	*Sclerolaena eurotioides (Fluffy Bindii)*			
324.	2615	*Sclerolaena fusiformis*			
325.	8877	*Sclerolaena gardneri*			
326.	2625	*Sclerolaena obliquicuspis (Limestone Bindii)*			
327.	2626	*Sclerolaena parviflora (Small-flower Saltbush)*			
328.	2627	*Sclerolaena patenticuspis (Spear-fruit Saltbush)*			
329.	31492	*Tecticornia disarticulata*			
330.	31918	*Tecticornia doleiformis (Samphire)*			
331.	33319	*Tecticornia indica subsp. bidens*			
332.	33318	*Tecticornia indica subsp. leiostachya (Samphire)*			
333.	31675	*Tecticornia lylei*			
334.	31832	*Tecticornia mellaria*		P1	
335.	31551	*Tecticornia moniliformis*			
336.	33297	*Tecticornia pergranulata subsp. pergranulata (Blackseed Samphire)*			
337.	31618	*Tecticornia pruinosa*			
338.	33218	*Tecticornia pterygosperma subsp. pterygosperma*			
339.		*Tecticornia sp.*			
340.	31716	*Tecticornia syncarpa*			
341.	31600	*Tecticornia tenuis*			
342.	31494	*Tecticornia triandra (Desert Glasswort)*			
343.	31717	*Tecticornia undulata*			
Cleomaceae					
344.	2988	*Cleome viscosa (Tickweed, Tjinduwadhu)*			
Colchicaceae					
345.	1403	*Wurmbea tenella (Eight Nancy)*			
Convolvulaceae					
346.	6612	*Convolvulus clementii*			
347.	6614	*Convolvulus remotus*			
348.	6621	*Ipomoea calobra (Weir Vine)*			
349.	6659	*Wilsonia humilis (Silky Wilsonia)*			
Crassulaceae					
350.	19376	*Bryophyllum delagoense*	Y		
351.	17701	*Crassula closiana*			
352.	11709	*Crassula colorata var. acuminata*			
353.	11563	*Crassula colorata var. colorata*			
354.	20268	*Crassula tetramera*			
Cucurbitaceae					
355.	7369	*Citrullus colocynthis*	Y		
356.	7370	*Citrullus lanatus (Pie Melon)*	Y		
Cupressaceae					
357.	8466	*Callitris columellaris (White Cypress Pine)*			
358.	96	*Callitris preissii (Rottnest Island Pine, Maro)*			
359.	8637	*Callitris verrucosa*			
Cyperaceae					
360.	903	*Gahnia deusta*			
361.	911	*Isolepis congrua*			
362.	31760	*Lepidosperma diurnum*			
363.		*Lepidosperma sieberi*			
364.		*Lepidosperma sp.*			
365.	30437	*Lepidosperma sp. Kambalda (A.A. Mitchell 5156)*			Y
366.		*Lepidosperma sp. Kambalda (A.A.Mitchell 5156)*			Y
367.	954	*Mesomelaena preissii*			
368.	993	*Schoenus hexandrus*			
369.	1015	*Schoenus subaphyllus*			
Dasypogonaceae					
370.	1214	*Calectasia grandiflora (Blue Tinsel Lily)*			
Dicranaceae					
371.		*Campylopus sp.*			
Didiereaceae					
372.	20374	*Portulacaria afra*	Y		
Dilleniaceae					
373.	5120	*Hibbertia desmophylla*			

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374.	19779	*Hibbertia glomerosa var. glomerosa*			
375.	5134	*Hibbertia huegelii*			
376.		*Hibbertia sp. Bankstown (R.T.Miller & C.P.Gibson s.n. 18/10/06)*			
377.	5173	*Hibbertia subvaginata*			
Ditrichaceae					
378.		*Ceratodon purpureus convolutus*			
379.	32350	*Eccremidium minutum*			
380.		*Eccremidium sp.*			
Droseraceae					
381.	14298	*Drosera macrantha subsp. macrantha*			
382.	3107	*Drosera macrophylla (Showy Sundew)*			
Elaeocarpaceae					
383.	4530	*Tetratheca efoliata*			
384.	41500	*Tetratheca spenceri*		T	Y
Ericaceae					
385.	6334	*Astroloma pallidum (Kick Bush)*			
386.	13527	*Croninia kingiana*			
387.	41770	*Leucopogon sp. Boorabbin (K.R. Newbey 8374)*			
388.	20763	*Leucopogon sp. Coolgardie (M. Hislop & F. Hort MH 3197)*			
389.	29493	*Leucopogon sp. Kambalda (J. Williams s.n. PERTH 07305028)*		P3	Y
390.		*Leucopogon sp. Kambalda (J.Williams s.n. PERTH 07305028)*			Y
391.	6456	*Lysinema ciliatum (Curry Flower)*			
392.	6457	*Lysinema conspicuum*			
393.		*Styphelia sp.*			
Euphorbiaceae					
394.	4591	*Bertya dimerostigma*			
395.	20193	*Bertya virgata*			
396.	4592	*Beyeria brevifolia*			
397.	4598	*Beyeria lechenaultii (Pale Turpentine Bush)*			
398.	34276	*Beyeria sulcata var. brevipes*			
399.	34257	*Beyeria sulcata var. sulcata*			
400.	42869	*Euphorbia porcata*			
401.	12097	*Euphorbia tannensis subsp. eremophila (Desert Spurge)*			
402.	19584	*Monotaxis bracteata*			
403.	4662	*Monotaxis grandiflora (Diamond of the Desert)*			
404.	19587	*Monotaxis grandiflora var. obtusifolia*			
405.	4664	*Monotaxis luteiflora*			
406.		*Monotaxis sp.*			
407.	4701	*Ricinocarpos stylosus*			
408.	4704	*Ricinocarpos velutinus*			
Fabaceae					
409.	3199	*Acacia acuaria*			
410.		*Acacia aculeatissima*			
411.	3200	*Acacia acuminata (Jam, Mangard)*			
412.	3206	*Acacia aestivalis*			
413.	14584	*Acacia ancistrophylla var. ancistrophylla*			
414.	3216	*Acacia andrewsii*			
415.	3217	*Acacia aneura (Mulga, Wanari)*			
416.	3218	*Acacia anfractuosa*			
417.	37260	*Acacia aptaneura*			
418.	3236	*Acacia beauverdiana (Pukkati)*			
419.	3246	*Acacia brachystachya (Turpentine Mulga)*			
420.	3248	*Acacia burkittii (Sandhill Wattle)*			
421.	3249	*Acacia calcarata*			
422.	3251	*Acacia camptoclada*			
423.	3256	*Acacia chrysella*			
424.	44469	*Acacia coatesii*		P1	
425.	44514	*Acacia collegialis*			
426.	3264	*Acacia colletioides (Wait-a-while)*			
427.	3269	*Acacia coolgardiensis (Spinifex Wattle)*			
428.	3282	*Acacia cyclops (Coastal Wattle)*			
429.	3291	*Acacia dempsteri*			
430.	3292	*Acacia densiflora*			
431.	15281	*Acacia desertorum var. desertorum*			
432.	16120	*Acacia donaldsonii*			
433.	3315	*Acacia duriuscula*			
434.	32118	*Acacia effusifolia*			

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435.	12257	*Acacia enervia subsp. explicata*			
436.	3320	*Acacia ephedroides*			
437.	16020	*Acacia eremophila var. eremophila*			
438.	3324	*Acacia erinacea*			
439.	3325	*Acacia erioclada*			
440.	3342	*Acacia fragilis*			
441.	15282	*Acacia gibbosa*			
442.	3366	*Acacia hemiteles*			
443.	3378	*Acacia inaequiloba*			
444.	3379	*Acacia inamabilis*			
445.	16164	*Acacia inceana subsp. inceana*			
446.	3393	*Acacia jennerae*			
447.	3394	*Acacia jensenii*			
448.	14610	*Acacia kalgoorliensis*			
449.	3400	*Acacia kerryana*		P2	
450.	3408	*Acacia lasiocalyx (Silver Wattle, Wilyurwur)*			
451.	3419	*Acacia ligulata (Umbrella Bush, Watarka)*			
452.	15477	*Acacia lineolata subsp. lineolata*			
453.	3426	*Acacia longispinea*			
454.	13503	*Acacia masliniana*			
455.	3440	*Acacia merrallii*			
456.	3442	*Acacia microbotrya (Manna Wattle, Kalyang)*			
457.	36416	*Acacia mulganeura*			
458.	3451	*Acacia multispicata*			
459.	3452	*Acacia murrayana (Sandplain Wattle)*			
460.	3463	*Acacia nyssophylla*			
461.	3474	*Acacia oxyclada*			
462.	3478	*Acacia pachypoda*			
463.	3495	*Acacia prainii (Prain's Wattle)*			
464.	3498	*Acacia pritzeliana*			
465.	15481	*Acacia pulchella var. glaberrima*			
466.	3504	*Acacia pycnantha (Golden Wattle)*	Y		
467.	3507	*Acacia quadrimarginea*			
468.	19499	*Acacia ramulosa var. ramulosa*			
469.	3512	*Acacia rendlei*			
470.	3513	*Acacia resinimarginea*			
471.	3514	*Acacia resinistipulea*			
472.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
473.	13078	*Acacia sclerosperma subsp. sclerosperma*			
474.	3539	*Acacia sericocarpa*			
475.	8949	*Acacia sibirica (Bastard Mulga)*			
476.		*Acacia sp.*			
477.	13070	*Acacia synchronicia*			
478.	3577	*Acacia tetragonophylla (Kurara, Wakalpuka)*			
479.	3599	*Acacia warramaba*			
480.	3600	*Acacia websteri*		P1	
481.	3602	*Acacia willdenowiana (Grass Wattle)*			
482.	3605	*Acacia xerophila*			
483.	16157	*Acacia xerophila var. brevior*			
484.	15292	*Acacia yorkrakinensis subsp. acrita*			
485.	3682	*Alhagi maurorum*	Y		Y
486.	18427	*Bossiaea cucullata*			
487.	11022	*Caesalpinia gilliesii*	Y		
488.	10861	*Callistachys lanceolata (Wonnich)*			
489.	17117	*Cullen cinereum*			
490.	17417	*Cullen discolor*			
491.	17118	*Cullen leucanthum*			
492.	12975	*Daviesia benthamii subsp. acanthoclona*			
493.	3802	*Daviesia croniniana*			
494.	3805	*Daviesia decurrens (Prickly Bitter-pea)*			
495.	3813	*Daviesia grahamii*			
496.	3829	*Daviesia pachyloma*			
497.		*Dillwynia sp.*			
498.	19854	*Dillwynia sp. Coolgardie (V.E. Sands 637.3.1)*			
499.	3869	*Erichsenia uncinata*			
500.	20490	*Gastrolobium coriaceum*			
501.	11034	*Gastrolobium graniticum*		T	
502.	3907	*Gastrolobium laytonii (Breelya, Prilya)*			
503.	3943	*Glycyrrhiza acanthocarpa (Native Liquorice)*			
504.	10777	*Gompholobium gompholobioides*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
505.	3954	*Gompholobium polymorphum*			
506.	3956	*Gompholobium shuttleworthii*			
507.	17787	*Goodia medicaginea*			
508.	3963	*Hovea acanthoclada (Thorny Hovea)*			
509.	3966	*Hovea pungens (Devil's Pins, Puyenak)*			
510.	3968	*Hovea trisperma (Common Hovea)*			
511.		*Indigofera sp. Occidentalis (D.J.Edinger 1259)*			
512.		*Indigofera tryonii*			
513.	3993	*Isotropis drummondii (Lamb Poison)*			
514.	14779	*Jacksonia arida*			
515.		*Jacksonia dilatata*			
516.	4043	*Kennedia prorepens*			
517.	4044	*Kennedia prostrata (Scarlet Runner)*			
518.		*Kennedia sp.*			
519.	17641	*Leptosema cervicorne*			
520.	4056	*Leptosema daviesioides*			
521.	4061	*Lotus cruentus (Redflower Lotus)*			
522.	4077	*Medicago minima (Small Burr Medic)*	Y		
523.	4079	*Medicago polymorpha (Burr Medic)*	Y		
524.	4089	*Mirbelia depressa*			
525.	4094	*Mirbelia microphylla*			
526.	4097	*Mirbelia ramulosa*			
527.	4099	*Mirbelia seorsifolia*			
528.		*Mirbelia sp.*			
529.	3674	*Petalostylis cassioides*			
530.		*Petalostylis sp.*			
531.	4163	*Pultenaea arida*			
532.		*Pultenaea sp.*			
533.	17645	*Senna artemisioides*			
534.	12276	*Senna artemisioides subsp. filifolia*			
535.	17558	*Senna artemisioides subsp. x artemisioides*			
536.	18430	*Senna cardiosperma*			
537.	10818	*Senna planitiicola*			
538.	16378	*Senna pleurocarpa*			
539.	12315	*Senna pleurocarpa var. angustifolia*			
540.	12314	*Senna pleurocarpa var. pleurocarpa*			
541.		*Senna sp.*			
542.	18446	*Senna stowardii*			
543.	4206	*Sphaerolobium macranthum*			
544.	12355	*Swainsona affinis*			
545.	4217	*Swainsona beasleyana*			
546.	4220	*Swainsona canescens (Grey Swainsona)*			
547.	4221	*Swainsona colutoides (Bladder Vetch)*			
548.	12356	*Swainsona formosa*			
549.	4230	*Swainsona incei*			
550.	4231	*Swainsona kingii*			
551.	4233	*Swainsona leeana*			
552.	4237	*Swainsona oliveri*			
553.	4238	*Swainsona oroboides (Variable Swainsona)*			
554.	12357	*Swainsona purpurea*			
555.	4243	*Swainsona rostellata*			
556.		*Swainsona sp.*			
557.	35840	*Templetonia ceracea*			
558.	4252	*Templetonia egena (Round Templetonia)*			
559.	35841	*Templetonia incrassata*			
560.	17261	*Vicia monantha subsp. triflora*	Y		
Fissidentaceae					
561.	32367	*Fissidens megalotis*			
Fossombroniaceae					
562.		*Fossombronia sp.*			
Frankeniaceae					
563.	5191	*Frankenia cinerea*			
564.	5197	*Frankenia desertorum*			
565.	5200	*Frankenia fecunda*			
566.	5202	*Frankenia glomerata (Cluster Head Frankenia)*		P4	
567.	5204	*Frankenia interioris*			
568.	11592	*Frankenia interioris var. interioris*			
569.	11969	*Frankenia interioris var. parviflora*			
570.	5209	*Frankenia pauciflora (Seaheath)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
571.	5212	*Frankenia setosa (Bristly Frankenia)*			
572.		*Frankenia sp.*			
573.		*Frankenia sp. (aff. confusa)*			
Funariaceae					
574.	32353	*Entosthodon apophysatus*			
575.		*Entosthodon muehlenbergii*			
576.	32464	*Entosthodon subnudus var. subnudus*			
577.	32370	*Funaria hygrometrica*			
Geraniaceae					
578.	4331	*Erodium aureum*	Y		
579.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
580.	4334	*Erodium crinitum (Corkscrew)*			
581.	4335	*Erodium cygnorum (Blue Heronsbill)*			
Gigaspermaceae					
582.	32384	*Gigaspermum repens*			
583.		*Gigaspermum sp.*			
Goodeniaceae					
584.	7412	*Anthotium rubriflorum (Red Anthotium)*			
585.	7413	*Brunonia australis (Native Cornflower)*			
586.	19069	*Brunonia sp. Goldfields (K.R. Newbey 6044)*			
587.	7419	*Coopernookia strophiolata*			
588.	7422	*Dampiera angulata*			
589.	7438	*Dampiera eriocephala (Woolly-headed Dampiera)*			
590.	7449	*Dampiera juncea (Rush-like Dampiera)*			
591.	13155	*Dampiera latealata*			
592.	7451	*Dampiera lavandulacea*			
593.	7454	*Dampiera linearis (Common Dampiera)*			
594.	7456	*Dampiera luteiflora (Yellow Dampiera)*			
595.	7459	*Dampiera oligophylla (Sparse-leaved Dampiera)*			
596.	7463	*Dampiera plumosa*		P1	
597.	7469	*Dampiera roycei*			
598.		*Dampiera sp.*			
599.	7477	*Dampiera stenostachya (Narrow-spiked Dampiera)*			
600.	7480	*Dampiera tenuicaulis (Slender-stemmed Dampiera)*			
601.	13158	*Dampiera tenuicaulis var. curvula*			
602.	13159	*Dampiera tenuicaulis var. tenuicaulis*			
603.	7483	*Dampiera tomentosa (Felted Dampiera)*			
604.	7493	*Goodenia azurea*			
605.	7499	*Goodenia concinna (Elegant Goodenia)*			
606.	7506	*Goodenia elderi*			
607.	7514	*Goodenia havilandii*			
608.	12523	*Goodenia helmsii*			
609.	7517	*Goodenia incana (Hoary Goodenia)*			
610.	7519	*Goodenia krauseana*			
611.	7527	*Goodenia mimuloides*			
612.	7535	*Goodenia pinnatifida (Cutleaf Goodenia)*			
613.	7541	*Goodenia pusilliflora (Smallflower Goodenia)*			
614.	7546	*Goodenia scapigera (White Goodenia)*			
615.	13168	*Goodenia watsonii subsp. watsonii*			
616.	7565	*Goodenia xanthosperma (Yellow-seeded Goodenia)*			
617.	7568	*Lechenaultia biloba (Blue Leschenaultia)*			
618.	7569	*Lechenaultia brevifolia*			
619.	7585	*Lechenaultia pulvinaris (Cushion Leschenaultia)*		P4	
620.	7590	*Lechenaultia tubiflora (Heath Leschenaultia)*			
621.	7603	*Scaevola canescens (Grey Scaevola)*			
622.	7639	*Scaevola restiacea*			
623.	7644	*Scaevola spinescens (Currant Bush, Maroon)*			
624.	13174	*Scaevola striata var. arenaria*			
625.	7656	*Velleia cycnopotamica*			
626.	7657	*Velleia daviesii (Hairy Velleia)*			
627.	7658	*Velleia discophora (Cabbage Poison)*			
628.	7664	*Velleia rosea (Pink Velleia)*			
629.	38061	*Verreauxia dyeri (Hairy Verreauxia)*			
630.	7666	*Verreauxia reinwardtii (Common Verreauxia)*			
Grimmiaceae					
631.	32386	*Grimmia laevigata*			
632.		*Grimmia pulvinata africana*			

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Gyrostemonaceae					
633.	2778	*Codonocarpus cotinifolius (Native Poplar, Kundurangu)*			
634.	2780	*Gyrostemon brownii*			
635.	2783	*Gyrostemon racemiger*			
Haemodoraceae					
636.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
637.	11261	*Anigozanthos manglesii subsp. manglesii*			
638.	1427	*Conostylis candicans (Grey Cottonhead)*			
639.	1444	*Conostylis petrophiloides*			
640.	1453	*Conostylis serrulata*			
Haloragaceae					
641.	33620	*Glischrocaryon angustifolium*			
642.	6143	*Glischrocaryon aureum (Common Popflower)*			
643.	6144	*Glischrocaryon flavescens*			
644.	6145	*Glischrocaryon roei*			
645.	11801	*Gonocarpus confertifolius var. helmsii*			
646.	6174	*Haloragis gossei*			
647.	6180	*Haloragis trigonocarpa*			
Hemerocallidaceae					
648.	11636	*Dianella revoluta var. divaricata*			
649.	1260	*Stypandra glauca (Blind Grass)*			
650.	1363	*Tricoryne tenella*			
Hypericaceae					
651.	5180	*Hypericum gramineum (Small St John's Wort)*			
Iridaceae					
652.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
653.	14434	*Patersonia rudis subsp. velutina*			
Juncaceae					
654.	1189	*Juncus pauciflorus (Loose Flower Rush)*			
Lamiaceae					
655.		*Ajuga australis*			
656.	19437	*Brachysola coerulea*			
657.	19436	*Brachysola halganiacea*		P2	
658.	6746	*Chloanthes coccinea*			
659.	6747	*Cyanostegia angustifolia (Tinsel-flower)*			
660.	6750	*Cyanostegia lanceolata (Tinsel Flower)*			
661.	6751	*Cyanostegia microphylla (Tinsel Flower)*			
662.	41025	*Dasymalla terminalis (Native Foxglove)*			
663.	6753	*Dicrastylis brunnea*			
664.	6755	*Dicrastylis corymbosa*			
665.	6771	*Dicrastylis parvifolia*			
666.	6773	*Dicrastylis reticulata*		P3	
667.	6839	*Hemiandra pungens (Snakebush)*			
668.	6848	*Hemigenia dielsii*			
669.	38325	*Hemigenia loganiacea*			
670.	6862	*Hemigenia pedunculata*			
671.	6776	*Hemiphora elderi (Red Velvet)*			
672.	6778	*Lachnostachys bracteosa*			
673.	6779	*Lachnostachys coolgardiensis*			
674.	6891	*Microcorys ericifolia*			
675.		*Microcorys sp.*			
676.	6792	*Newcastelia insignis*		P2	
677.	17206	*Physopsis viscida*			
678.	6812	*Pityrodia lepidota*			
679.	12706	*Prostanthera althoferi*			
680.	15822	*Prostanthera althoferi subsp. althoferi*			
681.		*Prostanthera althoferi subsp. longifolia*			
682.	6912	*Prostanthera campbellii*			
683.	6916	*Prostanthera grylloana*			
684.	6917	*Prostanthera incurvata*			
685.		*Prostanthera sp.*			
686.	6928	*Salvia reflexa (Mintweed)*	Y		
687.	6929	*Salvia verbenaca (Wild Sage)*	Y		
688.	6937	*Teucrium sessiliflorum (Camel Bush)*			
689.	6938	*Westringia cephalantha*			
690.	9247	*Westringia rigida (Stiff Westringia)*			

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Lauraceae					
691.	2953	*Cassytha melantha (Large Dodder-laurel)*			
Loganiaceae					
692.	16824	*Phyllangium sulcatum*			
Loranthaceae					
693.	2369	*Amyema benthamii*			
694.	2380	*Amyema miquelii (Stalked Mistletoe)*			
695.	2383	*Amyema preissii (Wireleaf Mistletoe)*			
696.	2396	*Lysiana casuarinae*			
697.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
Lythraceae					
698.	5281	*Lythrum hyssopifolia (Lesser Loosestrife)*	Y		
Malvaceae					
699.	4889	*Abutilon cryptopetalum*			
700.	4905	*Alyogyne hakeifolia*			
701.	13702	*Alyogyne pinoniana var. pinoniana*			
702.		*Alyogyne sp.*			
703.	40903	*Androcalva aphrix*			
704.	40917	*Androcalva loxophylla*			
705.	40910	*Androcalva luteiflora (Yellow-flowered Rulingia)*			
706.	4999	*Brachychiton gregorii (Desert Kurrajong, Ngalta)*			
707.	40923	*Commersonia craurophylla (Brittle Leaved Rulingia)*			
708.	40924	*Commersonia rotundifolia (Round-leaved Rulingia)*		P3	
709.		*Commersonia sp.*			
710.	5012	*Guichenotia macrantha (Large-flowered Guichenotia)*			
711.	17725	*Hannafordia bissillii subsp. latifolia*			
712.	4941	*Hibiscus solanifolius*			
713.		*Keraudrenia sp.*			
714.	13729	*Keraudrenia velutina*			
715.		*Keraudrenia velutina subsp. elliptica MS*			
716.	19892	*Keraudrenia velutina subsp. velutina*			
717.	4951	*Lawrencia chrysoderma*			
718.	4954	*Lawrencia diffusa*			
719.	4955	*Lawrencia glomerata*			
720.	4956	*Lawrencia helmsii (Dunna Dunna)*			
721.	4957	*Lawrencia repens*			
722.	4959	*Lawrencia squamata*			
723.	4961	*Malva parviflora (Marshmallow)*	Y		
724.	31351	*Malva preissiana*			
725.	41544	*Malva weinmanniana*			
726.	4964	*Radyera farragei (Knobby Hibiscus)*			
727.	4970	*Sida calyxhymenia (Tall Sida)*			
728.	4981	*Sida intricata (Tangled Sida)*			
729.	4985	*Sida petrophila*			
730.		*Sida sp.*			
731.	19712	*Sida sp. dark green fruits (S. van Leeuwen 2260)*			
732.	16924	*Sida spodochroma*			
Meliaceae					
733.	4516	*Melia azedarach (White Cedar)*			
Molluginaceae					
734.	2842	*Mollugo cerviana*			
Myrtaceae					
735.	5316	*Agonis flexuosa (Peppermint, Wonil)*			
736.	19467	*Aluta appressa*			
737.	19463	*Aluta aspera*			
738.	19466	*Aluta aspera subsp. aspera*			
739.	20726	*Astus subroseus*			
740.	5344	*Baeckea elderiana*			
741.		*Baeckea sp.*			
742.	36064	*Baeckea sp. Barbalin (B.L. Rye & M.E. Trudgen BLR 241022)*			
743.	36038	*Baeckea sp. Koonadgin (B.L. Rye & M.E. Trudgen BLR 241137)*			
744.	5375	*Balaustion pulcherrimum (Native Pomegranate)*			
745.		*Balaustion sp.*			
746.	5379	*Beaufortia cyrtodonta*			
747.	5385	*Beaufortia incana*			
748.	5386	*Beaufortia interstans*			
749.		*Beaufortia sp.*			

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750.	5392	*Beaufortia sparsa (Swamp Bottlebrush)*			
751.	5395	*Callistemon phoeniceus (Lesser Bottlebrush, Dubarda)*			
752.		*Callistemon sp.*			
753.	34196	*Calothamnus chrysanthereus (Claw Flower)*			
754.	5408	*Calothamnus gilesii*			
755.	5426	*Calothamnus quadrifidus (One-sided Bottlebrush, Kwowdjard)*			
756.		*Calothamnus sp.*			
757.	5438	*Calytrix amethystina*			
758.	5442	*Calytrix birdii*			
759.	5465	*Calytrix leschenaultii*			
760.	5466	*Calytrix merrelliana*			
761.	5497	*Chamelaucium pauciflorum*			
762.	44082	*Cyathostemon divaricatus*		P1	Y
763.	42066	*Cyathostemon heterantherus*			
764.		*Cyathostemon sp.*			
765.	35618	*Darwinia sp. Karonie (K. Newbey 8503)*			
766.	19846	*Enekbatus eremaeus*			
767.	5536	*Eremaea acutifolia (Rusty Eremaea)*		P3	
768.		*Eremaea zonospila*			
769.	45244	*Ericomyrtus serpyllifolia*			
770.	13035	*Eucalyptus aspratilis*			
771.	5579	*Eucalyptus calycogona (Gooseberry Mallee)*			
772.	19508	*Eucalyptus calycogona subsp. calycogona*			
773.		*Eucalyptus calycogona subsp. spaffordii*			
774.	5581	*Eucalyptus campaspe (Silver Gimlet)*			
775.	12903	*Eucalyptus capillosa subsp. capillosa (Wheatbelt Wandoo)*			
776.	5583	*Eucalyptus carnei (Carne's Blackbutt)*			
777.	5584	*Eucalyptus celastroides (Mirret, Mired)*			
778.	14300	*Eucalyptus celastroides subsp. celastroides (Mirret)*			
779.	5588	*Eucalyptus ceratocorys*			
780.	5592	*Eucalyptus clelandii (Cleland's Blackbutt)*			
781.	5595	*Eucalyptus comitae-vallis (Comet Vale Mallee)*			
782.	5596	*Eucalyptus concinna (Victoria Desert Mallee)*			
783.	5607	*Eucalyptus corrugata (Rough-fruited Mallee)*			
784.	11294	*Eucalyptus crucis subsp. crucis (Silver Mallee)*		T	
785.	5612	*Eucalyptus cylindrocarpa (Woodline Mallee)*			
786.	14814	*Eucalyptus delicata*			
787.	5636	*Eucalyptus eremicola*			
788.	5637	*Eucalyptus eremophila (Tall Sand Mallee)*			
789.	15667	*Eucalyptus eremophila subsp. eremophila (Sand Mallee)*			
790.	5639	*Eucalyptus erythronema (Red-flowered Mallee)*			
791.	42027	*Eucalyptus erythronema subsp. erythronema (Red-flowered Mallee)*			
792.	5648	*Eucalyptus flocktoniae (Merrit, Merid)*			
793.	18521	*Eucalyptus flocktoniae subsp. flocktoniae*			
794.	5649	*Eucalyptus foecunda (Narrow-leaved Red Mallee)*			
795.	14277	*Eucalyptus fraseri subsp. fraseri*			
796.	5662	*Eucalyptus gracilis (Yorrell)*			
797.	5665	*Eucalyptus griffithsii (Griffith's Grey Gum)*			
798.	5673	*Eucalyptus horistes*			
799.	15743	*Eucalyptus incerata (Mount Day Mallee)*			
800.	5675	*Eucalyptus incrassata (Lerp Mallee)*			
801.	5682	*Eucalyptus jutsonii (Jutson's Mallee)*			
802.	31815	*Eucalyptus jutsonii subsp. jutsonii*		P4	
803.	13528	*Eucalyptus kingsmillii subsp. kingsmillii*			
804.	15682	*Eucalyptus leptophylla (Narrow-leaved Red Mallee)*			
805.	13059	*Eucalyptus leptopoda subsp. leptopoda*			
806.	13056	*Eucalyptus leptopoda subsp. subluta*			
807.	5697	*Eucalyptus lesouefii (Goldfields Blackbutt)*			
808.	12901	*Eucalyptus livida (Mallee Wandoo)*			
809.	5701	*Eucalyptus longicornis (Red Morrel, Moril)*			
810.	20802	*Eucalyptus longissima*			
811.	13037	*Eucalyptus loxophleba subsp. lissophloia*			
812.	5703	*Eucalyptus lucasii (Barlee Box)*			
813.	19323	*Eucalyptus moderata*			
814.	5725	*Eucalyptus oldfieldii (Oldfield's Mallee)*			
815.	5726	*Eucalyptus oleosa (Giant Mallee)*			
816.	19275	*Eucalyptus oleosa subsp. cylindroidea*			
817.	20091	*Eucalyptus oleosa subsp. oleosa*			
818.	13524	*Eucalyptus olivina*			
819.	5731	*Eucalyptus orbifolia (Round-leaved Mallee)*			

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820.	5733	*Eucalyptus ovularis (Small-fruited Mallee)*			
821.	5742	*Eucalyptus petraea (Granite Rock Box)*			
822.	5745	*Eucalyptus pileata (Capped Mallee)*			
823.	18580	*Eucalyptus planipes*			
824.	5747	*Eucalyptus platycorys (Boorabbin Mallee)*			
825.	13520	*Eucalyptus polita*			
826.	19064	*Eucalyptus prolixa*			
827.	12380	*Eucalyptus ravida (Silver-topped Gimlet)*			
828.	5761	*Eucalyptus rigidula (Stiff-leaved Mallee)*			
829.	12693	*Eucalyptus salicola (Salt Gum)*			
830.	5766	*Eucalyptus salmonophloia (Salmon Gum, Wurak)*			
831.	5767	*Eucalyptus salubris (Gimlet)*			
832.	29277	*Eucalyptus socialis subsp. victoriensis*			
833.		*Eucalyptus sp.*			
834.	5780	*Eucalyptus stricklandii (Strickland's Gum)*			
835.	13521	*Eucalyptus tenuis*			
836.	5792	*Eucalyptus torquata (Coral Gum)*			
837.	5793	*Eucalyptus transcontinentalis (Redwood, Pungul)*			
838.	15799	*Eucalyptus trichopoda*			
839.	18293	*Eucalyptus urna*			
840.	5798	*Eucalyptus websteriana (Webster's Mallee)*			
841.	13054	*Eucalyptus websteriana subsp. websteriana*			
842.	5799	*Eucalyptus woodwardii (Lemon-flowered Gum, Gunguru)*			
843.		*Eucalyptus woollsiana*			
844.	18269	*Eucalyptus x brachyphylla*		P4	
845.	5802	*Eucalyptus yilgarnensis (Yorrell)*			
846.	16722	*Euryomyrtus maidenii*			
847.	5808	*Homalocalyx coarctatus*			
848.	5813	*Homalocalyx pulcherrimus*			
849.	5815	*Homalocalyx thryptomenoides*			
850.	5827	*Hypocalymma strictum*			
851.	5840	*Kunzea pulchella (Granite Kunzea)*			
852.	5847	*Leptospermum erubescens (Roadside Teatree)*			
853.	5848	*Leptospermum fastigiatum*			
854.	5852	*Leptospermum nitens*			
855.	5855	*Leptospermum roei*			
856.	12692	*Leptospermum subtenue*			
857.	5864	*Malleostemon peltiger*			
858.	5865	*Malleostemon roseus*			
859.	5866	*Malleostemon tuberculatus*			
860.	15063	*Melaleuca acuminata subsp. acuminata*			
861.	15064	*Melaleuca acuminata subsp. websteri*			
862.	5870	*Melaleuca adnata*			
863.	19380	*Melaleuca calyptroides*			
864.	5891	*Melaleuca coccinea (Goldfields Bottlebrush)*		P3	
865.	5893	*Melaleuca concreta*			
866.	5895	*Melaleuca conothamnoides*			
867.	5896	*Melaleuca cordata*			
868.	5909	*Melaleuca elliptica (Granite Bottlebrush, Ngow)*			
869.	20286	*Melaleuca exuvia*			
870.	5912	*Melaleuca fulgens (Scarlet Honeymyrtle)*			
871.	15603	*Melaleuca fulgens subsp. fulgens*			
872.	19486	*Melaleuca hamata*			
873.	5920	*Melaleuca huegelii (Chenille Honeymyrtle)*			
874.	5922	*Melaleuca lanceolata (Rottnest Teatree, Moonah)*			
875.	5925	*Melaleuca lateriflora (Gorada)*			
876.	14700	*Melaleuca macronychia subsp. macronychia*			
877.	15663	*Melaleuca pauperiflora subsp. fastigiata*			
878.	5961	*Melaleuca scabra (Rough Honeymyrtle, Wurru Bush)*			
879.	5966	*Melaleuca sheathiana (Boree, Buri)*			
880.		*Melaleuca sp.*			
881.	5980	*Melaleuca thymoides*			
882.	5984	*Melaleuca uncinata (Broom Bush, Kwidjard)*			
883.	20287	*Melaleuca zeteticorum*			
884.	9187	*Micromyrtus erichsenii*			
885.	19787	*Micromyrtus monotaxis*			
886.	5999	*Micromyrtus obovata*			
887.	6002	*Micromyrtus stenocalyx*			
888.	6050	*Thryptomene australis (Hook-leaf Thryptomene)*			
889.	19699	*Thryptomene australis subsp. brachyandra*			

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890.	6058	*Thryptomene kochii*			
891.		*Thryptomene sp.*			
892.	20680	*Thryptomene sp. Coolgardie (E. Kelso s.n. 1902)*			Y
893.	36017	*Thryptomene sp. Londonderry (R.H. Kuchel 1763)*		P1	
894.		*Thryptomene sp. Londonderry (R.H.Kuchel 1763)*			
895.	6068	*Thryptomene urceolaris*			
896.	6073	*Verticordia chrysantha*			
897.	14711	*Verticordia dasystylis subsp. dasystylis*		P2	
898.	12422	*Verticordia eriocephala (Common Cauliflower)*			
899.	6087	*Verticordia helmsii*			
900.	6103	*Verticordia ovalifolia*			
901.	6109	*Verticordia picta (Painted Featherflower)*			
902.	6113	*Verticordia pritzelii (Pritzel's Featherflower)*			
903.	6114	*Verticordia rennieana*			
Nyctaginaceae					
904.	2770	*Boerhavia coccinea (Tar Vine, Wituka)*			
Orchidaceae					
905.	1614	*Caladenia roei (Ant Orchid)*			
906.	44161	*Diuris hazeliae*			
907.	14382	*Microtis eremaea*			
908.	19327	*Pterostylis sp. dainty brown (N. Gibson & M. Lyons 3690)*			
909.	18657	*Pterostylis sp. inland (A.C. Beauglehole 11880)*			
910.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
911.	20732	*Thelymitra petrophila*			
912.	1714	*Thelymitra sargentii (Freckled Sun Orchid)*			
913.		*Thelymitra sp.*			
Oxalidaceae					
914.	33256	*Oxalis bowiei (Bowie Wood Sorrel)*	Y		
915.	4356	*Oxalis pes-caprae (Soursob)*	Y		
916.		*Oxalis sp.*			
Papaveraceae					
917.	2964	*Papaver hybridum (Rough Poppy)*	Y		
Pittosporaceae					
918.	25798	*Billardiera fusiformis (Australian Bluebell)*			
919.	3168	*Cheiranthera filifolia*			
920.	19421	*Marianthus bicolor (Painted Marianthus)*			
921.	19744	*Pittosporum angustifolium*			
922.		*Pittosporum multiflorum*			
Plantaginaceae					
923.	7299	*Plantago debilis*			
924.	7300	*Plantago drummondii (Sago Weed)*			
925.		*Plantago sp.*			
926.	14198	*Plantago sp. Mt Magnet (A.S. George 6793)*			
927.	7305	*Plantago turrifera*			
928.		*Stemodia sp.*			
Plumbaginaceae					
929.	6489	*Limonium sinuatum (Perennial Sea Lavender)*	Y		
Poaceae					
930.	207	*Aristida contorta (Bunched Kerosene Grass)*			
931.	17232	*Austrostipa blackii*		P3	
932.	17237	*Austrostipa elegantissima*			
933.	17238	*Austrostipa eremophila*			
934.	17246	*Austrostipa nitida*			
935.	19588	*Austrostipa nodosa*			
936.	17247	*Austrostipa platychaeta*			
937.	17251	*Austrostipa scabra*			
938.	34556	*Austrostipa sp. Dowerin (G. Wiehl F 8004)*		P2	
939.	17255	*Austrostipa trichophylla*			
940.	17256	*Austrostipa tuckeri*			
941.	234	*Avena fatua (Wild Oat)*	Y		
942.	247	*Bromus arenarius (Sand Brome)*			
943.	249	*Bromus diandrus (Great Brome)*	Y		
944.	258	*Cenchrus ciliaris (Buffel Grass)*	Y		
945.	271	*Chloris truncata (Windmill Grass)*			
946.	281	*Cymbopogon obtectus (Silkyheads)*			
947.	290	*Dactyloctenium radulans (Button Grass)*			

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948.		*Danthonia sp.*			
949.	11964	*Dichanthium sericeum subsp. sericeum*			
950.	308	*Digitaria ammophila (Silky Umbrella Grass)*			
951.	310	*Digitaria brownii (Cotton Panic Grass)*			
952.	351	*Ehrharta villosa (Pyp Grass)*	Y		
953.	356	*Enneapogon avenaceus (Bottle Washers)*			
954.	357	*Enneapogon caerulescens (Limestone Grass)*			
955.	358	*Enneapogon cylindricus (Jointed Nineawn)*			
956.	368	*Enteropogon ramosus (Windmill Grass, Curly Windmill Grass)*			
957.	378	*Eragrostis dielsii (Mallee Lovegrass)*			
958.	393	*Eragrostis setifolia (Neverfail Grass)*			
959.	399	*Eragrostis xerophila (Knotty-butt Neverfail)*			
960.	417	*Eriachne pulchella (Pretty Wanderrie)*			
961.	448	*Hordeum glaucum (Northern Barley Grass)*	Y		
962.	449	*Hordeum leporinum (Barley Grass)*	Y		
963.		*Hordeum sp.*			
964.	471	*Leptochloa digitata (Whorled Cane Grass)*			
965.	490	*Monachather paradoxus*			
966.	503	*Panicum decompositum (Native Millet, Kaltu-kaltu)*			
967.	519	*Paspalidium constrictum (Knottybutt Grass)*			
968.	521	*Paspalidium gracile (Slender Panic)*			
969.	524	*Paspalidium reflexum*			
970.	40424	*Pentameris airoides subsp. airoides*	Y		
971.	552	*Phalaris paradoxa (Paradoxa Grass)*	Y		
972.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
973.	11151	*Rostraria pumila*	Y		
974.	40431	*Rytidosperma acerosum*			
975.	40425	*Rytidosperma caespitosum*			
976.	40427	*Rytidosperma setaceum*			
977.	596	*Schismus arabicus (Araby Grass)*	Y		
978.	597	*Schismus barbatus (Kelch Grass)*	Y		
979.	606	*Setaria dielsii (Diels' Pigeon Grass)*			
980.		*Setaria sp.*			
981.	617	*Sorghum halepense (Johnson Grass)*	Y		
982.	17881	*Triodia desertorum*			
983.	17874	*Triodia rigidissima*			
984.	699	*Triodia scariosa*			
985.	18326	*Urochloa panicoides*	Y		
986.	12052	*Vulpia myuros forma megalura*	Y		
Polygalaceae					
987.	4553	*Comesperma drummondii (Drummond's Milkwort)*			
988.	4561	*Comesperma scoparium (Broom Milkwort)*			
Polygonaceae					
989.	17739	*Acetosa vesicaria*	Y		
990.	2409	*Emex australis (Doublegee)*	Y		
991.	2412	*Muehlenbeckia adpressa (Climbing Lignum)*			
992.	11052	*Persicaria prostrata*			
993.	2419	*Polygonum aviculare (Wireweed)*	Y		
Portulacaceae					
994.	2846	*Calandrinia calyptrata (Pink Purslane)*			
995.	2853	*Calandrinia eremaea (Twining Purslane)*			
996.	2860	*Calandrinia polyandra (Parakeelya)*			
997.	40824	*Calandrinia sculpta*			
998.		*Calandrinia sp.*			
999.	30396	*Calandrinia translucens*			
1000.	2884	*Portulaca oleracea (Purslane, Wakati)*			
Pottiaceae					
1001.	36436	*Aloina bifrons*			
1002.	32319	*Barbula luteola*			
1003.	32341	*Crossidium davidai*			
1004.	32342	*Crossidium geheebii*			
1005.	32346	*Didymodon torquatus*			
1006.		*Phascum robustum var. robustum*			Y
1007.	36137	*Pseudocrossidium crinitum*			
1008.		*Pterygoneurum macleanum*			Y
1009.		*Tortula antarctica*			
1010.	32444	*Tortula atrovirens*			
1011.	32445	*Tortula muralis*			

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Primulaceae					
1012.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
Proteaceae					
1013.	1834	*Banksia menziesii (Firewood Banksia)*			
1014.		*Banksia sp.*			
1015.	1861	*Conospermum brownii (Blue-eyed Smokebush)*			
1016.	1882	*Conospermum stoechadis (Common Smokebush)*			
1017.	1946	*Grevillea acacioides*			
1018.	1949	*Grevillea acuaria*			
1019.	1954	*Grevillea annulifera (Prickly Plume Grevillea)*			
1020.	1959	*Grevillea asteriscosa (Star-leaf Grevillea)*		P4	
1021.	1962	*Grevillea beardiana (Red Combs)*			
1022.	1971	*Grevillea cagiana (Red Toothbrushes)*			
1023.	13453	*Grevillea didymobotrya subsp. didymobotrya*			
1024.	15769	*Grevillea eremophila*			
1025.	2001	*Grevillea eriostachya (Flame Grevillea, Kaliny-kalinypa)*			
1026.	8832	*Grevillea excelsior (Flame Grevillea)*			
1027.	2009	*Grevillea georgeana*		P3	
1028.	14413	*Grevillea haplantha subsp. haplantha*			
1029.	19314	*Grevillea hookeriana subsp. apiciloba*			
1030.	19435	*Grevillea hookeriana subsp. hookeriana*			
1031.	2018	*Grevillea huegelii*			
1032.	15974	*Grevillea incurva*			
1033.	19541	*Grevillea nematophylla subsp. nematophylla*			
1034.	15981	*Grevillea obliquistigma subsp. obliquistigma*			
1035.	15978	*Grevillea oligomera*			
1036.	2055	*Grevillea oncogyne*			
1037.	2056	*Grevillea paniculata*			
1038.	2057	*Grevillea paradoxa (Bottlebrush Grevillea)*			
1039.	2077	*Grevillea pterosperma*			
1040.	2088	*Grevillea sarissa (Wheel Grevillea)*			
1041.	12822	*Grevillea sarissa subsp. bicolor*			
1042.	13458	*Grevillea sarissa subsp. sarissa*			
1043.	2097	*Grevillea stenomera (Lace Net Grevillea)*		P2	
1044.	2104	*Grevillea teretifolia (Round Leaf Grevillea)*			
1045.	2116	*Grevillea uncinulata (Hook-leaf Grevillea)*			
1046.	2157	*Hakea erecta*			
1047.	2163	*Hakea francisiana (Emu Tree)*			
1048.	2164	*Hakea gilbertii*			
1049.	2181	*Hakea meisneriana*			
1050.	2182	*Hakea minyma*			
1051.	2184	*Hakea multilineata (Grass Leaf Hakea)*			
1052.	2196	*Hakea preissii (Needle Tree, Dandjin)*			
1053.	2197	*Hakea prostrata (Harsh Hakea)*			
1054.	2229	*Isopogon dubius (Pincushion Coneflower)*			
1055.		*Isopogon sp.*			
1056.	15628	*Persoonia helix*			
1057.	2270	*Persoonia quinquenervis*			
1058.	2274	*Persoonia saundersiana*			
1059.		*Persoonia sp.*			
1060.	14446	*Petrophile arcuata*			
1061.	14443	*Petrophile ericifolia subsp. ericifolia*			
1062.	12237	*Petrophile stricta*			
1063.	2317	*Stirlingia simplex*			
1064.	2330	*Xylomelum angustifolium (Sandplain Woody Pear)*			
Pteridaceae					
1065.	12796	*Cheilanthes adiantoides*			
1066.	31	*Cheilanthes austrotenuifolia*			
1067.	37	*Cheilanthes lasiophylla (Woolly Cloak Fern)*			
1068.	12818	*Cheilanthes sieberi subsp. sieberi*			
Ranunculaceae					
1069.	16087	*Clematis delicata*			
1070.	11080	*Myosurus australis*			
Resedaceae					
1071.	3085	*Reseda luteola (Wild Mingnonette)*	Y		
Restionaceae					
1072.	1073	*Lepidobolus chaetocephalus (Bristle-headed Chaff Rush)*			

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1073.	1074	*Lepidobolus deserti*			
1074.	1075	*Lepidobolus preissianus*			
Rhamnaceae					
1075.	16183	*Cryptandra aridicola*			
1076.	31591	*Cryptandra crispula*		P3	
1077.	16185	*Cryptandra graniticola*			
1078.	4800	*Cryptandra leucopogon*			
1079.	4809	*Cryptandra pungens*			
1080.		*Cryptandra sp.*			
1081.	4815	*Pomaderris forrestiana*			
1082.	16190	*Stenanthemum complicatum*			
1083.	16200	*Stenanthemum stipulosum*			
1084.	4843	*Trymalium myrtillus*			
1085.	16986	*Trymalium myrtillus subsp. myrtillus*			
Ricciaceae					
1086.		*Riccia crinita*			
Rubiaceae					
1087.	18255	*Opercularia vaginata (Dog Weed)*			
Ruppiaceae					
1088.	116	*Ruppia polycarpa*			
Rutaceae					
1089.	11274	*Boronia coerulescens subsp. spinescens*			
1090.	11381	*Boronia ramosa subsp. anethifolia*			
1091.	4441	*Boronia spathulata (Boronia)*			
1092.	11201	*Boronia ternata var. ternata*			
1093.	4459	*Drummondita hasellii*			
1094.	4497	*Phebalium canaliculatum*			
1095.	4498	*Phebalium clavatum*		P2	
1096.	4500	*Phebalium filifolium (Slender Phebalium)*			
1097.	4501	*Phebalium lepidotum*			
1098.	4502	*Phebalium microphyllum*			
1099.	16622	*Phebalium obovatum*			
1100.		*Phebalium sp.*			
1101.	4504	*Phebalium tuberculosum*			
1102.	18385	*Philotheca deserti subsp. deserti*			
1103.		*Philotheca sp.*			
1104.	18506	*Philotheca tomentella*			
Santalaceae					
1105.	10977	*Exocarpos aphyllus (Leafless Ballart)*			
1106.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
1107.	2352	*Leptomeria preissiana*			
1108.	2356	*Santalum acuminatum (Quandong, Warnga)*			
1109.	2358	*Santalum murrayanum (Bitter Quandong, Kulya)*			
1110.	2359	*Santalum spicatum (Sandalwood, Wilarak)*			
Sapindaceae					
1111.	11730	*Alectryon oleifolius subsp. canescens*			
1112.	4752	*Dodonaea adenophora*			
1113.	4753	*Dodonaea amblyophylla*			
1114.	4769	*Dodonaea lobulata (Bead Hopbush)*			
1115.	4770	*Dodonaea microzyga*			
1116.	12034	*Dodonaea microzyga var. acrolobata*			
1117.		*Dodonaea microzyga var. microzyga*			
1118.	4780	*Dodonaea stenozyga*			
1119.	11247	*Dodonaea viscosa subsp. angustissima*			
Scrophulariaceae					
1120.	14887	*Diocirea acutifolia*		P3	
1121.		*Diocirea sp.*			Y
1122.	14889	*Diocirea violacea*			
1123.		*Eremophila acrida*			
1124.	7180	*Eremophila alternifolia (Poverty Bush)*			
1125.	11769	*Eremophila arachnoides subsp. tenera*		P1	
1126.	16377	*Eremophila caerulea subsp. caerulea*			
1127.	13641	*Eremophila caerulea subsp. merrallii*		P4	
1128.	13807	*Eremophila caperata*			
1129.	7189	*Eremophila clarkei (Turpentine Bush)*			
1130.	17156	*Eremophila clavata*			

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1131.	7193	*Eremophila decipiens (Slender Fuchsia)*			
1132.	14895	*Eremophila decipiens subsp. decipiens*			
1133.	7195	*Eremophila dempsteri*			
1134.	7200	*Eremophila drummondii*			
1135.	7204	*Eremophila eriocalyx (Desert Pride)*			
1136.	7211	*Eremophila georgei*			
1137.	7212	*Eremophila gibbosa*			
1138.	14340	*Eremophila glabra subsp. glabra*			
1139.	7219	*Eremophila granitica (Thin-leaved Poverty Bush)*			
1140.	7225	*Eremophila interstans*			
1141.	15112	*Eremophila interstans subsp. interstans*			
1142.	15111	*Eremophila interstans subsp. virgata*			
1143.	7226	*Eremophila ionantha (Violet-flowered Eremophila)*			
1144.	7234	*Eremophila longifolia (Berrigan, Tulypurpa)*			
1145.	7237	*Eremophila maculata (Native Fuchsia)*			
1146.	16363	*Eremophila maculata subsp. brevifolia (Native Fuchsia)*			
1147.	7242	*Eremophila miniata (Kopi Poverty Bush)*			
1148.	14632	*Eremophila oblonga*			
1149.	15003	*Eremophila oldfieldii subsp. angustifolia*			
1150.	18570	*Eremophila oppositifolia subsp. angustifolia*			
1151.	18056	*Eremophila paisleyi subsp. paisleyi*			
1152.	7250	*Eremophila pantonii*			
1153.	7251	*Eremophila parvifolia (Small-leaved Eremophila)*			
1154.	14594	*Eremophila parvifolia subsp. auricampa*			
1155.	7254	*Eremophila platythamnos*			
1156.	15055	*Eremophila platythamnos subsp. platythamnos*			
1157.	14516	*Eremophila praecox*		P1	
1158.	10780	*Eremophila psilocalyx*			
1159.	7259	*Eremophila pustulata (Warted Eremophila)*			
1160.	15172	*Eremophila rugosa*			
1161.	7264	*Eremophila saligna (Willowy Eremophila)*			
1162.	7267	*Eremophila scoparia (Broom Bush ()*			
1163.	7269	*Eremophila serrulata (Serrate-leaved Eremophila)*			
1164.		*Eremophila sp.*			
1165.	37300	*Eremophila sturtii*			
1166.	17162	*Eremophila subfloccosa subsp. lanata*			
1167.	15049	*Eremophila succinea*		P3	
1168.	17158	*Myoporum montanum (Native Myrtle)*			
1169.	18259	*Myoporum platycarpum subsp. platycarpum*			
Solanaceae					
1170.	6952	*Anthotroche pannosa (Felted Anthotroche)*			
1171.	10823	*Datura inoxia*	Y		
1172.	6966	*Duboisia hopwoodii (Pituri, Kundugu)*			
1173.	6967	*Lycium australe (Australian Boxthorn)*			
1174.	6968	*Lycium ferocissimum (African Boxthorn)*	Y		
1175.	6974	*Nicotiana glauca (Tree Tobacco)*	Y		
1176.	6978	*Nicotiana rotundifolia (Round-leaved Tobacco)*			
1177.	6998	*Solanum cleistogamum*			
1178.	6999	*Solanum coactiliferum (Western Nightshade)*			
1179.	7013	*Solanum hoplopetalum (Thorny Solanum)*			
1180.	7018	*Solanum lasiophyllum (Flannel Bush, Mindjulu)*			
1181.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
1182.	7023	*Solanum nummularium (Money-leaved Solanum)*			
1183.	7025	*Solanum oldfieldii*			
1184.	7028	*Solanum petrophilum (Rock Nightshade)*			
1185.	7030	*Solanum plicatile*			
1186.	7034	*Solanum simile (Oondoroo)*			
1187.	7037	*Solanum symonii*			
Stylidiaceae					
1188.	7685	*Stylidium arenicola*			
1189.	7701	*Stylidium choreanthum (Dancing Triggerplant)*		P3	
1190.	7714	*Stylidium dielsianum (Tangle Triggerplant)*			
1191.	7740	*Stylidium induratum (Desert Triggerplant)*			
1192.	34968	*Stylidium involucratum*			
1193.	7749	*Stylidium leptophyllum (Needle-leaved Triggerplant)*			
1194.	7787	*Stylidium rhynchocarpum (Black-beaked Triggerplant)*			
1195.		*Stylidium sp.*			
1196.	7810	*Stylidium yilgarnense (Yilgarn Triggerplant)*			

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Thymelaeaceae					
1197.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
1198.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
1199.	5256	*Pimelea microcephala (Shrubby Riceflower, Banjine)*			
1200.	11185	*Pimelea microcephala subsp. microcephala*			
1201.	12104	*Pimelea spiculigera var. thesioides*			
1202.	5267	*Pimelea subvillifera*			
Urticaceae					
1203.	1762	*Parietaria debilis (Pellitory)*			
1204.	1767	*Urtica urens (Small Nettle)*	Y		
Verbenaceae					
1205.	29836	*Glandularia aristigera*	Y		
1206.	6733	*Lantana camara (Common Lantana)*	Y		
1207.	13557	*Phyla canescens*	Y		
Violaceae					
1208.	5220	*Hybanthus epacroides (Spiny Hybanthus)*			
1209.	11973	*Hybanthus floribundus subsp. curvifolius*			
Zygophyllaceae					
1210.	4383	*Tribulus terrestris (Caltrop)*	Y		
1211.	4385	*Zygophyllum apiculatum (Gallweed)*			
1212.	4386	*Zygophyllum aurantiacum (Shrubby Twinleaf)*			
1213.	20183	*Zygophyllum aurantiacum subsp. aurantiacum*			
1214.	4388	*Zygophyllum compressum*			
1215.	4389	*Zygophyllum eremaeum*			
1216.	4390	*Zygophyllum fruticulosum (Shrubby Twinleaf)*			
1217.	4391	*Zygophyllum glaucum (Pale Twinleaf)*			
1218.	18139	*Zygophyllum halophilum*			
1219.	4392	*Zygophyllum iodocarpum*			
1220.	4394	*Zygophyllum ovatum (Dwarf Twinleaf)*			
1221.	18142	*Zygophyllum reticulatum*			
1222.		*Zygophyllum sp.*			
1223.	17278	*Zygophyllum tetrapterum*			

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

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

NatureMap
Mapping Western Australia's biodiversity

NatureMap Fauna Species Report 40 km

Created By Guest user on 17/10/2016

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 121° 31' 43" E,31° 05' 06" S
Buffer 40km
Group By Species Group

Species Group	Species	Records
Amphibian	6	57
Bird	178	2171
Fish	1	1
Invertebrate	323	877
Mammal	33	315
Reptile	100	862
TOTAL	**641**	**4283**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25388	*Litoria moorei (Motorbike Frog)*			
2.	25425	*Neobatrachus kunapalari (Kunapalari Frog)*			
3.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
4.		*Neobatrachus sp.*			
5.	25427	*Neobatrachus sutor (Shoemaker Frog)*			
6.	25434	*Pseudophryne occidentalis (Western Toadlet)*			
Bird					
7.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
8.		*Acanthiza (Acanthiza) apicalis subsp. apicalis*			
9.		*Acanthiza (Acanthiza) apicalis subsp. whitlocki*			
10.		*Acanthiza (Geobasileus) inornata*			
11.		*Acanthiza (Geobasileus) uropygialis*			
12.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
13.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
14.	24264	*Acanthiza robustirostris (Slaty-backed Thornbill)*			
15.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
16.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
17.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
18.	25536	*Accipiter fasciatus (Brown Goshawk)*			
19.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
20.		*Amytornis (Amytornis) textilis*			
21.		*Amytornis (Amytornis) textilis subsp. textilis*			
22.	24312	*Anas gracilis (Grey Teal)*			
23.	24315	*Anas rhynchotis (Australasian Shoveler)*			
24.	24316	*Anas superciliosa (Pacific Black Duck)*			
25.		*Anhinga novaehollandiae*			
26.		*Anthochaera (Anellobia) lunulata*			
27.		*Anthochaera (Anthochaera) carunculata subsp. woodwardi*			
28.	24561	*Anthochaera carunculata (Red Wattlebird)*			
29.		*Anthus (Anthus) novaeseelandiae subsp. novaeseelandiae*			
30.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
31.	25528	*Aphelocephala leucopsis (Southern Whiteface)*			
32.	24266	*Aphelocephala leucopsis subsp. castaneiventris (Southern Whiteface)*			
33.	24285	*Aquila audax (Wedge-tailed Eagle)*			
34.		*Artamus (Angroyan) cyanopterus subsp. perthi*			
35.		*Artamus (Campbellornis) personatus*			
36.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
37.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
38.	24318	*Aythya australis (Hardhead)*			
39.		*Barnardius zonarius*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
40.		*Barnardius zonarius subsp. semitorquatus*			
41.		*Barnardius zonarius subsp. zonarius*			
42.	24319	*Biziura lobata (Musk Duck)*			
43.	25716	*Cacatua sanguinea (Little Corella)*			
44.		*Cacomantis (Vidgenia) pallidus*			
45.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
46.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
47.		*Cairina moschata*			
48.		*Calyptorhynchus (Zanda) latirostris*			
49.		*Certhionyx (Certhionyx) variegatus*			
50.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
51.		*Cheramoeca leucosterna*			
52.	24488	*Cheramoeca leucosternus (White-backed Swallow)*			
53.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
54.	24434	*Chrysococcyx osculans (Black-eared Cuckoo)*			
55.	24833	*Cincloramphus cruralis (Brown Songlark)*			
56.	30956	*Cinclosoma castanotus (Chestnut Quail-thrush)*			
57.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
58.		*Climacteris (Climacterobates) affinis subsp. superciliosa*			
59.	24396	*Climacteris rufa (Rufous Treecreeper)*			
60.		*Colluricincla (Colluricincla) harmonica subsp. rufiventris*			
61.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
62.	24399	*Columba livia (Domestic Pigeon)*	Y		
63.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
64.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
65.	24416	*Corvus bennetti (Little Crow)*			
66.	25592	*Corvus coronoides (Australian Raven)*			
67.	25593	*Corvus orru (Torresian Crow)*			
68.		*Corvus sp.*			
69.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
70.	25595	*Cracticus tibicen (Australian Magpie)*			
71.	25596	*Cracticus torquatus (Grey Butcherbird)*			
72.		*Cracticus torquatus subsp. leucopterus*			
73.	24322	*Cygnus atratus (Black Swan)*			
74.		*Daphoenositta (Neositta) chrysoptera subsp. pileata*			
75.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
76.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
77.	24470	*Dromaius novaehollandiae (Emu)*			
78.	24650	*Drymodes brunneopygia (Southern Scrub-robin)*			
79.		*Egretta novaehollandiae*			
80.		*Elanus axillaris*			
81.	25540	*Elanus caeruleus (Black-shouldered Kite)*			
82.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
83.		*Elseyornis melanops*			
84.		*Eolophus roseicapillus*			
85.		*Eopsaltria (Eopsaltria) griseogularis subsp. griseogularis*			
86.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
87.		*Epthianura (Parepthianura) tricolor*			
88.	24567	*Epthianura albifrons (White-fronted Chat)*			
89.	24570	*Epthianura tricolor (Crimson Chat)*			
90.	24368	*Eurostopodus argus (Spotted Nightjar)*			
91.	25621	*Falco berigora (Brown Falcon)*			
92.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
93.	25622	*Falco cenchroides (Australian Kestrel)*			
94.	25623	*Falco longipennis (Australian Hobby)*			
95.	24616	*Falcunculus frontatus subsp. leucogaster (Western Shrike-tit, Crested Shrike-tit)*			
96.	25727	*Fulica atra (Eurasian Coot)*			
97.	25530	*Gerygone fusca (Western Gerygone)*			
98.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
99.	24443	*Grallina cyanoleuca (Magpie-lark)*			
100.	24295	*Haliastur sphenurus (Whistling Kite)*			
101.	25734	*Himantopus himantopus (Black-winged Stilt)*			
102.	24775	*Himantopus himantopus subsp. leucocephalus (Black-winged Stilt)*			
103.	24491	*Hirundo neoxena (Welcome Swallow)*			
104.	25629	*Hirundo nigricans (Tree Martin)*			
105.	24277	*Hylacola cauta (Shy Groundwren, Shy Heathwren)*			
106.	34001	*Hylacola cauta subsp. whitlocki (Shy Heathwren (western))*			
107.	24367	*Lalage tricolor (White-winged Triller)*			
108.	24557	*Leipoa ocellata (Malleefowl)*		T	
109.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
110.	24576	*Lichenostomus leucotis subsp. novaenorciae (White-eared Honeyeater)*			
111.	25661	*Lichmera indistincta (Brown Honeyeater)*			
112.		*Lophoictinia isura*			
113.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
114.		*Malurus (Malurus) splendens*			
115.		*Malurus (Malurus) splendens subsp. splendens*			
116.		*Malurus (Musciparus) leucopterus subsp. leuconotus*			
117.		*Malurus (Musciparus) leucopterus subsp. leucopterus*			
118.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
119.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
120.	25654	*Malurus splendens (Splendid Fairy-wren)*			
121.		*Manorina (Myzantha) flavigula subsp. wayensis*			
122.	24583	*Manorina flavigula (Yellow-throated Miner)*			
123.		*Melanodryas (Melanodryas) cucullata subsp. westralensis*			
124.		*Melithreptus (Melithreptus) albogularis subsp. albogularis*			
125.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
126.		*Merops (Merops) ornatus*			
127.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
128.		*Microcarbo melanoleucos*			
129.	25693	*Microeca fascinans (Jacky Winter)*			
130.	24654	*Microeca fascinans subsp. assimilis (Jacky Winter)*			
131.		*Nesoptilotis leucotis*			
132.	25748	*Ninox novaeseelandiae (Boobook Owl)*			
133.	24350	*Nycticorax caledonicus subsp. hilli (Rufous Night Heron)*			
134.	24742	*Nymphicus hollandicus (Cockatiel)*			
135.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
136.	24618	*Oreoica gutturalis (Crested Bellbird)*			
137.	24619	*Pachycephala inornata (Gilbert's Whistler)*			
138.	25679	*Pachycephala pectoralis (Golden Whistler)*			
139.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
140.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
141.	25682	*Pardalotus striatus (Striated Pardalote)*			
142.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
143.		*Petroica (Petroica) goodenovii*			
144.	24658	*Petroica cucullata (Hooded Robin)*			
145.	24659	*Petroica goodenovii (Red-capped Robin)*			
146.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
147.	24409	*Phaps chalcoptera (Common Bronzewing)*			
148.		*Phylidonyris (Meliornis) novaehollandiae*			
149.		*Phylidonyris (Meliornis) novaehollandiae subsp. longirostris*			
150.		*Platycercus (Violania) icterotis subsp. xanthogenys*			
151.	24748	*Platycercus varius (Mulga Parrot)*			
152.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
153.	24751	*Platycercus zonarius subsp. zonarius (Port Lincoln Parrot)*			
154.		*Plectorhyncha lanceolata*			
155.	25703	*Podargus strigoides (Tawny Frogmouth)*			
156.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
157.	24752	*Polytelis alexandrae (Princess Parrot)*		P4	
158.	30854	*Polytelis anthopeplus subsp. westralis (Regent Parrot)*			
159.		*Pomatostomus (Morganornis) superciliosus subsp. superciliosus*			
160.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
161.	24769	*Porzana fluminea (Australian Spotted Crake)*			
162.		*Psephotus (Psephotus) varius*			
163.	42340	*Ptilotula ornatus (Yellow-plumed Honeyeater)*			
164.	42342	*Ptilotula plumulus (Grey-fronted Honeyeater)*			
165.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
166.	24278	*Pyrrholaemus brunneus (Redthroat)*			
167.	25613	*Rhipidura fuliginosa (Grey Fantail)*			
168.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
169.	30948	*Smicrornis brevirostris (Weebill)*			
170.		*Smicrornis brevirostris subsp. occidentalis*			
171.	24329	*Stictonetta naevosa (Freckled Duck)*			
172.	25597	*Strepera versicolor (Grey Currawong)*			
173.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
174.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
175.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
176.	30870	*Taeniopygia guttata (Zebra Finch)*			
177.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
178.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
179.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
180.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
181.	24851	*Turnix velox (Little Button-quail)*			
182.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
183.	24386	*Vanellus tricolor (Banded Lapwing)*			
184.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Fish

185.		*Leiopotherapon unicolor*			

Invertebrate

186.		*Acantholophus suturalis*			
187.		*Achaea janata*			
188.		*Acrophylla nubilosa*			
189.		*Adelium cuprescens*			
190.		*Adelium scytalicum*			
191.		*Adelotopus howdenorum*			Y
192.		*Afraflacilla stridulator*			
193.		*Afrosternophorus hirsti*			Y
194.		*Aganippe sp.*			
195.		*Ahamitermes hillii*			
196.		*Allodessus bistrigatus*			
197.		*Aloa gangara*			
198.		*Alphitobius diaperinus*			
199.		*Amitermes darwini*			
200.		*Amitermes dentosus*			
201.		*Amitermes modicus*			
202.		*Amitermes xylophagus*			
203.		*Aname armigera*			
204.		*Aname mainae*			
205.		*Aname sp.*			
206.		*Ancita sp.*			
207.		*Anidiops sp.*			
208.		*Anidiops villosus*			
209.		*Anisopheidole antipodum*			
210.		*Anisops stali*			
211.		*Anisops thienemanni*			
212.		*Anomotarus (Anomotarus) crudelis*			
213.		*Anthela canescens*			
214.		*Anthela nicothoe*			Y
215.		*Anthela sp.*			
216.		*Aphanesthes succinea*			
217.		*Aposites niger*			
218.		*Apsenterotermes iridipennis*			
219.		*Araneus eburneiventris*			
220.		*Araneus senicaudatus*			
221.		*Argas persicus*			
222.		*Argiope protensa*			
223.		*Argiope trifasciata*			
224.		*Atesta sita*			
225.		*Austracantha minax*			
226.		*Australothis rubrescens*			
227.		*Austrogymnocnemia bipunctata*			
228.		*Austrogymnocnemia interrupta*			
229.		*Austrogymnocnemia lineata*			Y
230.		*Austrogymnocnemia maculata*			
231.		*Backobourkia heroine*			
232.		*Berosus sp.*			
233.		*Bimia bicolor*			Y
234.		*Blackbolbus multifidus*			
235.		*Blackburnium sp.*			
236.		*Bolboleaus hiaticollis*			
237.		*Bolboleaus truncatus*			
238.		*Bolborhachium recticorne*			
239.		*Bostrychopsis jesuita*			
240.		*Bothriembryon (Bothriembryon) barretti*			
241.		*Bothriembryon (bothriembryon)*			
242.		*Brachyhesma (Brachyhesma) dedari*			Y
243.		*Brachyhesma (Brachyhesma) perlutea*			Y
244.		*Bubastes odewahni*			
245.		*Caenestheriella packardi*			
246.		*Cainogenion (Cainogenion) depressum*			Y

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
247.		*Calomela satelles*			
248.		*Calomela sp.*			
249.		*Calomyrmex purpureus*			
250.		*Calosoma (Australodrepa) schayeri*			
251.		*Camponotus capito subsp. capito*			
252.		*Camponotus ephippium subsp. narses*			
253.		*Camponotus gibbinotus*			
254.		*Camponotus novaehollandiae*			
255.		*Camponotus sp.*			
256.		*Camponotus wiederkehri*			
257.		*Candalides heathi subsp. heathi*			
258.		*Candalides hyacinthinus subsp. simplex*			
259.		*Cantareus aspersa*			
260.		*Carenum sp.*			
261.		*Carenum subcyaneum*			Y
262.		*Carenum transversicolle*			
263.		*Castiarina aeraticollis*			
264.		*Castiarina atricollis*			
265.		*Castiarina cincta*			
266.		*Castiarina convexa*			
267.		*Castiarina diversa*			
268.		*Castiarina octopunctata*			
269.		*Castiarina pallidiventris*			
270.		*Castiarina parallela*			
271.		*Castiarina parallelipennis*			
272.		*Castiarina recta*			
273.		*Castiarina sanguinolenta*			
274.		*Catasarcus armatus*			Y
275.		*Catasarcus bilineatus*			
276.		*Catasarcus impressipennis*			
277.		*Catasarcus obesus*			
278.		*Catasarcus spinipennis*			
279.		*Celaenia excavata*			
280.		*Ceratoleon brevicornis*			Y
281.		*Chalcophorotaenia exilis*			
282.		*Chalcophorotaenia martinii*			
283.		*Chalcophorotaenia sphinx*			
284.		*Chalcopteroides acutangulus*			
285.		*Chalcopteroides cyaniventris*			
286.		*Chalcopteroides gilesi*			
287.		*Chalcopteroides iris*			
288.		*Chalcopteroides placidus*			
289.		*Cicindela (Euzona) tetragramma*			Y
290.		*Cicindela (Rivacindela) salicursoria*			Y
291.		*Clynotis albobarbatus*			
292.		*Coccinella transversalis*			
293.		*Comocrus behri*			
294.		*Comptosia sp.*			Y
295.		*Coolgardica tenebrioides*			Y
296.		*Coptotermes acinaciformis*			
297.		*Coptotermes acinaciformis subsp. raffrayi*			
298.		*Coptotermes frenchi*			
299.		*Corasoides australis*			
300.		*Corimaethes campestrus*			
301.		*Cormocephalus turneri*			
302.		*Cosina annulata*			
303.		*Crematogaster frivola*			Y
304.		*Croitana croites*			
305.		*Cryptophlebia sp.*			
306.		*Cryptoplus tibialis*			
307.		*Cyrtophora parnasia*			
308.		*Diadoxus regius*			
309.		*Didymocantha nigra*			
310.		*Drepanotermes perniger*			
311.		*Elasmus trifasciativentris*			Y
312.		*Enochrus elongatulus*			
313.		*Ephelotermes persimilis*			
314.		*Eretes australis*			
315.		*Eriophora biapicata*			
316.		*Euctenia megalops*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
317.		*Euctenia occidentalis*			Y
318.		*Eudesmeola lawsoni*			
319.		*Eunatalis fasciata*			Y
320.		*Eurema smilax*			
321.		*Euryglossa sp.*			
322.		*Euryscaphus obesus subsp. obesus*			
323.		*Genduara fola*			
324.		*Geoscaptus cacus*			
325.		*Geoscaptus laevissimus*			
326.		*Glenoleon macalpinei*			Y
327.		*Glenoleon mulesi*			
328.		*Glenoleon osmyloides*			
329.		*Glenoleon roseipennis*			
330.		*Glenoleon sp.*			
331.		*Gnathaphanus sp.*			Y
332.		*Gonocephalum walkeri*			
333.		*Helea elongata*			
334.		*Helicoverpa punctigera*			
335.		*Heliothis punctifera*			
336.		*Hemichnoodes mniszechii*			
337.		*Hemicloea sublimbata*			
338.		*Heoclisis fundata*			
339.		*Heterotermes occiduus*			
340.		*Hoggicosa castanea*			
341.		*Hoggicosa forresti*			
342.		*Hoggicosa sp.*			
343.		*Hoggicosa storri*			
344.		*Hogna salifodina*			
345.		*Holconia nigrigularis*			
346.		*Holoplatys kalgoorlie*			Y
347.		*Holoplatys planissima*			
348.		*Hopliocnema brachycera*			
349.		*Iridomyrmex bicknelli*			
350.		*Iridomyrmex brennani*			
351.		*Iridomyrmex brunneus*			
352.		*Iridomyrmex chasei*			
353.		*Iridomyrmex dromus*			
354.		*Iridomyrmex purpureus*			
355.		*Iridomyrmex rufoniger*			
356.		*Iridomyrmex sp.*			
357.		*Iridomyrmex turbineus*			
358.		*Isometroides vescus*			
359.		*Isopeda magna*			
360.		*Isopedella cana*			
361.		*Isopedella saundersi*			
362.	33979	*Jalmenus aridus (butterfly)*		P1	
363.		*Jalmenus icilius*			
364.		*Lampona cylindrata*			
365.		*Lamponina scutata*			
366.		*Latrodectus hasseltii*			
367.		*Leptopius areolatus*			
368.		*Leptopius duboulayi*			
369.		*Ligyra sp.*			
370.		*Liparetrus cinctipennis*			Y
371.		*Liparetrus germari*			
372.		*Liparetrus malara*			Y
373.		*Liparetrus niger*			Y
374.		*Lixus mastersii*			Y
375.		*Lycosa ariadnae*			
376.		*Lycosa salifodina*			
377.		*Lycosa sp.*			
378.		*Lycosa woonda*			
379.		*Mallada signatus*			
380.		*Masasteron piankai*			
381.		*Megacephala blackburni*			
382.		*Megachile (Eutricharaea) captionis*			
383.		*Megachile (Eutricharaea) simplex*			
384.		*Megachile (thaumatosoma)*			Y
385.		*Megachile semiluctuosa*			
386.		*Melobasis sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
387.		*Merimna atrata*			
388.		*Metistete protibialis*			Y
389.		*Microcerotermes cavus*			
390.		*Microcerotermes distinctus*			
391.		*Microcerotermes newmani*			
392.		*Microcerotermes serratus*			
393.		*Missulena occatoria*			
394.		*Molochtus gagates*			
395.		*Moraba sp.*			
396.		*Motasingha trimaculata subsp. occidentalis*			
397.		*Myandra bicincta*			
398.		*Myrmecia cephalotes*			Y
399.		*Myrmecia chasei*			
400.		*Myrmecia clarki*			
401.		*Myrmecia desertorum*			
402.		*Myrmecia fuscipes*			
403.		*Myrmecia mandibularis*			
404.		*Myrmecia picta*			
405.		*Myrmecia sp.*			
406.		*Myrmecia tepperi*			
407.		*Myrmecia urens*			
408.		*Myrmecia vindex*			
409.		*Myrmeleon acer*			
410.		*Myrmeleon houstoni*			Y
411.		*Nacaduba biocellata subsp. biocellata*			
412.		*Neocuris aenescens*			Y
413.		*Neolucia agricola subsp. occidens*			
414.		*Nephila edulis*			
415.		*Nicodamus mainae*			
416.		*Notonomus sp.*			
417.		*Occasitermes occasus*			
418.		*Ochrogaster lunifer*			
419.		*Ogyris amaryllis subsp. meridionalis*			
420.		*Ogyris oroetes subsp. apiculata*			
421.		*Ogyris otanes subsp. otanes*			
422.		*Ogyris sp.*			Y
423.	33987	*Ogyris subterrestris subsp. petrina (Arid Bronze Azure Butterfly)*		T	
424.		*Oligodectes mallee*			
425.		*Opisthopsis rufithorax*			
426.		*Opisthopsis sp.*			
427.		*Opsidota guttata*			
428.		*Opsidota infecta*			
429.		*Ostracoda (unident.)*			
430.		*Otiorhynchus cribricollis*			
431.		*Oxyopes amoenus*			
432.		*Oxyopes dingo*			
433.		*Oxyopes sp.*			
434.		*Oxyopes variabilis*			
435.		*Oxyops crassirostris*			
436.		*Oxyops gemellus*			Y
437.		*Oxyops posticalis*			
438.		*Oxyops sp.*			
439.		*Pachydissus boops*			
440.		*Pachylophus luteus*			Y
441.		*Palirika basilikos*			
442.		*Paraspathulina eremostigma*			
443.		*Paropsis sp.*			
444.		*Paropsis yilgarnensis*			
445.		*Paropsisterna morio*			
446.		*Paropsisterna sp.*			
447.		*Philonthus (Philonthus) longicornis*			
448.		*Phoracantha obscurus*			
449.		*Phoracantha recurva*			
450.		*Phoracantha rugithoracica*			
451.		*Phorticosomus nuytsii*			
452.		*Platyscopus moorei*			Y
453.		*Platyzosteria sp.*			
454.		*Plesiochrysa ramburi*			
455.		*Podomyrma adelaidae*			
456.		*Polyphrades rugulosus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
457.		*Pterohelaeus cellulosus*			Y
458.		*Pterohelaeus ellipsoides*			Y
459.		*Pterohelaeus guerini*			
460.		*Rhytiphora (platyomopsis)*			
461.		*Sandalodes scopifer*			
462.		*Saragus ellipsoides*			
463.		*Saragus pascoei*			
464.		*Schedorhinotermes reticulatus*			
465.		*Scolecobrotus bimaculatus*			Y
466.		*Scolopendra laeta*			
467.		*Scolopendra morsitans*			
468.		*Selenotholus foelschei*			
469.		*Sinumelon kalgum*			
470.		*Sipyloidea similis*			Y
471.		*Sipyloidea whitei*			
472.		*Sphallomorpha marginata*			
473.		*Spilosoma glatignyi*			
474.		*Steata tatei*			
475.		*Stigmodera roei*			
476.		*Storena sinuosa*			
477.		*Suphalomitus pygmaeus*			Y
478.		*Synsphyronus dorothyae*			
479.		*Synsphyronus lathrius*			
480.		*Synsphyronus mimulus*			
481.		*Tamopsis circumvidens*			
482.		*Tasmanicosa leuckartii*			
483.		*Temognatha bonvouloirii*			
484.		*Temognatha chevrolatii*			
485.		*Temognatha conspicillata*			
486.		*Temognatha martinii*			
487.		*Temognatha miranda*			
488.		*Temognatha pubicollis*			
489.		*Temognatha rectipennis*			
490.		*Temognatha westwoodii*			
491.		*Tetralycosa alteripa*			
492.		*Teyl sp.*			
493.		*Theclinesthes miskini subsp. miskini*			
494.		*Theclinesthes serpentatus subsp. serpentatus*			
495.		*Thereuopoda lesueurii*			
496.		*Trichocyclus balladong*			
497.		*Tumulitermes comatus*			
498.		*Uraba lugens*			
499.		*Uracanthus fuscus*			
500.		*Urodacus armatus*			
501.		*Urodacus hoplurus*			
502.		*Urodacus yaschenkoi*			
503.		*Utetheisa lotrix*			
504.		*Venator sp.*			
505.		*Venator yalkara*			
506.		*Venatrix konei*			
507.		*Xanthesma (Argohesma) nukarnensis*			Y
508.		*Zizina otis subsp. labradus*			
Mammal					
509.	25451	*Bettongia lesueur (Burrowing Bettong)*		T	
510.	24251	*Bos taurus (European Cattle)*	Y		
511.	24039	*Canis lupus subsp. dingo (Dingo)*	Y		
512.	24253	*Capra hircus (Goat)*	Y		
513.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
514.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
515.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
516.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
517.	24041	*Felis catus (Cat)*	Y		
518.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
519.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
520.	24168	*Macrotis lagotis (Bilby, Dalgyte)*		T	
521.	24184	*Mormopterus planiceps (Southern Freetail-bat)*			
522.	24223	*Mus musculus (House Mouse)*	Y		
523.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
524.	24096	*Ningaui yvonneae (Southern Ningaui)*			
525.	24229	*Notomys mitchellii (Mitchell's Hopping-mouse)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
526.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
527.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
528.	34016	*Ovis aries (Sheep)*			
529.	24232	*Pseudomys bolami (Bolam's Mouse)*			
530.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
531.	24199	*Scotorepens balstoni (Inland Broad-nosed Bat)*			
532.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
533.	24109	*Sminthopsis dolichura (Little long-tailed Dunnart)*			
534.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
535.	24117	*Sminthopsis ooldea (Ooldea Dunnart)*			
536.		*Sminthopsis sp.*			
537.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
538.	24185	*Tadarida australis (White-striped Freetail-bat)*			
539.	24202	*Vespadelus baverstocki (Inland Forest Bat)*			
540.	24205	*Vespadelus finlaysoni (Finlayson's Cave Bat)*			
541.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Reptile					
542.	25243	*Acanthophis pyrrhus (Desert Death Adder)*			
543.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
544.	42380	*Brachyurophis fasciolatus subsp. fasciolatus (Narrow-banded Shovel-nosed Snake)*			
545.	42381	*Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*			
546.	43380	*Chelodina colliei (Oblong Turtle)*			
547.	24980	*Christinus marmoratus (Marbled Gecko)*			
548.	24918	*Crenadactylus ocellatus subsp. ocellatus (Clawless Gecko)*			
549.	30893	*Cryptoblepharus buchananii*			
550.	25020	*Cryptoblepharus plagiocephalus*			
551.	25458	*Ctenophorus caudicinctus (Ring-tailed Dragon)*			
552.	24870	*Ctenophorus caudicinctus subsp. macropus (Ring-tailed Dragon)*			
553.	24871	*Ctenophorus cristatus (Bicycle Dragon)*			
554.	24873	*Ctenophorus fordi (Mallee Sand Dragon)*			
555.	24879	*Ctenophorus maculatus subsp. griseus (Spotted Military Dragon)*			
556.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
557.	24884	*Ctenophorus pictus (Painted Dragon)*			
558.	24886	*Ctenophorus reticulatus (Western Netted Dragon)*			
559.	24888	*Ctenophorus salinarum (Salt Pan Dragon)*			
560.	24889	*Ctenophorus scutulatus (Lozenge-marked Dragon)*			
561.	25026	*Ctenotus atlas*			
562.	25027	*Ctenotus australis*			
563.	25052	*Ctenotus leonhardii*			
564.	25074	*Ctenotus schomburgkii*			
565.	25465	*Ctenotus uber (Spotted Ctenotus)*			
566.	25080	*Ctenotus uber subsp. uber (Spotted Ctenotus)*			
567.	25089	*Cyclodomorphus melanops subsp. elongatus (Slender Blue-tongue)*			
568.	24995	*Delma australis*			
569.	24997	*Delma butleri*			
570.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
571.	25468	*Demansia psammophis (Yellow-faced Whipsnake)*			
572.	25247	*Demansia psammophis subsp. psammophis (Yellow-faced Whipsnake)*			
573.		*Demansia sp.*			
574.	24926	*Diplodactylus conspicillatus (Fat-tailed Gecko)*			
575.	25469	*Diplodactylus granariensis*			
576.	24929	*Diplodactylus granariensis subsp. granariensis*			
577.	24940	*Diplodactylus pulcher*			
578.	25251	*Echiopsis curta (Bardick)*			
579.	25092	*Egernia depressa (Southern Pygmy Spiny-tailed Skink)*			
580.	25094	*Egernia formosa*			
581.	25104	*Egernia richardi*			
582.	25109	*Eremiascincus richardsonii (Broad-banded Sand Swimmer)*			
583.	25301	*Furina ornata (Moon Snake)*			
584.	24957	*Gehyra purpurascens*			
585.	24959	*Gehyra variegata*			
586.	25232	*Hemidactylus frenatus (Asian House Gecko)*	Y		
587.	25474	*Hemiergis initialis*			
588.	25115	*Hemiergis initialis subsp. initialis*			
589.	25117	*Hemiergis peronii subsp. peronii*			
590.	42408	*Hesperoedura reticulata*			
591.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
592.		*Lampropholis guichenoti*			
593.	25131	*Lerista distinguenda*			
594.		*Lerista kingi*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
595.	25155	*Lerista muelleri*			
596.	25162	*Lerista picturata*			
597.	42411	*Lerista timida*			
598.	25005	*Lialis burtonis*			
599.	41411	*Liopholis inornata (Desert Skink)*			
600.	41413	*Liopholis multiscutata (Bull Skink)*			
601.	30935	*Lucasium maini*			
602.	25184	*Menetia greyii*			
603.	24904	*Moloch horridus (Thorny Devil)*			
604.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*		S	
605.	25188	*Morethia adelaidensis*			
606.	25190	*Morethia butleri*			
607.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
608.	24966	*Nephrurus laevissimus*			
609.	24976	*Oedura marmorata (Marbled Velvet Gecko)*			
610.		*Oedura sp.*			
611.	25253	*Parasuta gouldii*			
612.	25254	*Parasuta monachus*			
613.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
614.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
615.	25261	*Pseudechis australis (Mulga Snake)*			
616.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
617.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
618.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
619.	25264	*Pseudonaja nuchalis (Gwardar, Northern Brown Snake)*			
620.		*Pseudonaja sp.*			
621.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
622.	25009	*Pygopus nigriceps*			
623.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			
624.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
625.		*Simoselaps semifasciatus*			
626.	24923	*Strophurus assimilis (Goldfields Spiny-tailed Gecko)*			
627.	24927	*Strophurus elderi*			
628.		*Strophurus sp.*			
629.	25269	*Suta fasciata (Rosen's Snake)*			
630.		*Suta gouldii*			
631.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
632.	25519	*Tiliqua rugosa*			
633.	25207	*Tiliqua rugosa subsp. rugosa*			
634.	30814	*Tympanocryptis cephalus (Pebble Dragon)*			
635.		*Tympanocryptis sp.*			
636.	24983	*Underwoodisaurus milii (Barking Gecko)*			
637.	25211	*Varanus caudolineatus*			
638.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
639.		*Varanus gouldii subsp. gouldii*			
640.	25526	*Varanus tristis (Racehorse Monitor)*			
641.	25227	*Varanus tristis subsp. tristis (Racehorse Monitor)*			

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

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

Appendix D – Flora data

Flora species list

Flora likelihood of occurrence assessment

Flora species list

Family	Taxon	Status	HD	VT1	VT4	VT5	VT6
Aizoaceae	*Disphyma crassifolium*			X			X
Aizoaceae	*Mesembryanthemum nodiflorum*	*		X			
Amaranthaceae	*Ptilotus holosericeus*			X		X	
Amaranthaceae	*Ptilotus nobilis*			X			
Amaranthaceae	*Ptilotus obovatus*			X	X	X	
Apocynaceae	*Alyxia buxifolia*			X	X		
Asparagaceae	*Thysanotus manglesii*			X			
Asteraceae	*Angianthus tomentosus*			X			
Asteraceae	*Asteraceae sp.*			X		X	
Asteraceae	*Centaurea melitensis*	*		X			
Asteraceae	*Cratystylis microphylla*			X			
Asteraceae	*Cratystylis conocephala*			X	X		
Asteraceae	*Olearia muelleri*			X	X		
Asteraceae	*Oncosiphon suffruticosum*	*				X	
Boraginaceae	*Halgania cyanea* var. Charleville (R.W. Purdie +111)			X			
Brassicaceae	*Carrichtera annua*	*	X				
Casuarinaceae	*Casuarina pauper*				X		
Chenopodiaceae	*Atriplex holocarpa*						X
Chenopodiaceae	*Atriplex nummularia* subsp. *spathulata*			X		X	
Chenopodiaceae	*Atriplex vesicaria*						X
Chenopodiaceae	*Enchylaena tomentosa*					X	
Chenopodiaceae	*Maireana brevifolia*			X			X
Chenopodiaceae	*Maireana georgei*			X	X		
Chenopodiaceae	*Maireana pyramidata*						X
Chenopodiaceae	*Maireana radiata*			X		X	X

Family	Taxon	Status	HD	VT1	VT4	VT5	VT6
Chenopodiaceae	*Maireana sedifolia*			X			
Chenopodiaceae	*Maireana* sp. (insufficient material)				X		
Chenopodiaceae	*Maireana triptera*			X		X	X
Chenopodiaceae	*Maireana villosa*					X	X
Chenopodiaceae	*Rhagodia drummondii*			X			
Chenopodiaceae	*Sclerolaena diacantha*			X		X	X
Chenopodiaceae	*Sclerolaena obliquicuspis*			X			
Chenopodiaceae	*Tecticornia halocnemoides*			X	X	X	X
Convolvulaceae	*Convolvulus remotus*			X			
Cucurbitaceae	*Citrullus colocynthis*	*				X	
Euphorbiaceae	*Euphorbia australis*			X			
Fabaceae	*Acacia acuminata*			X			
Fabaceae	*Acacia colletioides*			X	X		
Fabaceae	*Acacia erinacea*			X	X		
Fabaceae	*Acacia hemiteles*			X			
Fabaceae	*Acacia merrallii*			X			
Fabaceae	*Acacia xerophila* var. *brevior*			X			
Fabaceae	*Senna artemisioides* subsp. *filifolia*			X			
Fabaceae	*Swainsona canescens*			X			
Frankeniaceae	*Frankenia interiors*			X			X
Geraniaceae	*Erodium cygnorum*			X			
Goodeniaceae	*Scaevola spinescens*			X	X		
Hemerocallidaceae	*Dianella revoluta*						X
Lamiaceae	*Salvia verbenaca*	*	X				
Lamiaceae	*Westringia rigida*			X			
Malvaceae	*Androcalva luteiflora*			X			
Malvaceae	*Lawrencia diffusa*			X			

Family	Taxon	Status	HD	VT1	VT4	VT5	VT6
Myrtaceae	*Eucalyptus celastroides* subsp. *celastroides*			X	X		
Myrtaceae	*Eucalyptus lesouefii*			X	X		
Myrtaceae	*Eucalyptus oleosa* subsp. *oleosa*					X	
Myrtaceae	*Eucalyptus salmonophloia*			X			
Myrtaceae	*Eucalyptus salubris*			X	X		X
Myrtaceae	*Eucalyptus transcontinentalis*			X			
Myrtaceae	*Eucalyptus yilgarnensis*			X			
Myrtaceae	*Melaleuca sheathiana*			X		X	
Pittosporaceae	*Pittosporum angustifolium*						X
Poaceae	*Aristida contorta*						X
Poaceae	*Austrostipa elegantissima*			X			X
Poaceae	*Austrostipa scabra*			X			
Poaceae	*Eragrostis dielsii*						X
Poaceae	*Rytidosperma caespitosum*			X			
Portulacaceae	*Calandrinia sp.*						X
Proteaceae	*Grevillea acuaria*				X		
Proteaceae	*Grevillea preissii*						X
Rhamnaceae	*Stenanthemum stipulosum*				X		
Santalaceae	*Exocarpos aphyllus*			X	X		
Santalaceae	*Santalum acuminatum*			X			
Sapindaceae	*Dodonaea lobulata*			X	X		
Scrophulariaceae	*Eremophila alternifolia*			X			
Scrophulariaceae	*Eremophila caperata*			X			
Scrophulariaceae	*Eremophila clarkei*			X			X
Scrophulariaceae	*Eremophila decipiens* subsp. *decipiens*						X
Scrophulariaceae	*Eremophila glabra*			X	X		
Scrophulariaceae	*Eremophila interstans* subsp. *interstans*			X			

Family	Taxon	Status	HD	VT1	VT4	VT5	VT6
Scrophulariaceae	*Eremophila ionantha*			X			X
Scrophulariaceae	*Eremophila oldfieldii* subsp. *angustifolia*				X		
Scrophulariaceae	*Eremophila oppositifolia* subsp. *angustifolia*			X	X		
Scrophulariaceae	*Eremophila parvifolia* subsp. *auricampa*			X	X		
Scrophulariaceae	*Eremophila scoparia*			X	X		X
Solanaceae	*Duboisia hopwoodii*			X			
Solanaceae	*Lycium australe*			X			X
Solanaceae	*Solanum nummularia*		X				
Zygophyllaceae	*Zygophyllum eremaeum*			X			
Zygophyllaceae	*Zygophyllum ovatum*			X			

* Introduced species

Flora likelihood of occurrence guidelines

Likelihood of occurrence	Guideline
Known	Species recorded within survey area from field survey results.
Likely	Species previously recorded within 40 km and large areas of suitable habitat occur in the survey area.
Possible	Species previously recorded within 40 km and areas of suitable habitat occur/may occur in the survey area.
Unlikely	Species previously recorded within 40 km, but suitable habitat does not occur in the survey area.
Highly unlikely	Species not previously recorded within 40 km, suitable habitat does not occur in the survey area and/or survey area is outside the natural distribution of the species.
Other considerations	Intensity of survey, availability of access, growth form type, recorded flowering times, cryptic nature of species

Flora likelihood of occurrence assessment for conservation significant flora within the survey area

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Amaranthaceae	*Ptilotus procumbens*		P1	Spreading procumbent annual, herb, ca 0.1 m high. Fl. pink-white, Nov. Red clay.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Amaranthaceae	*Ptilotus rigidus*		P1	Rigid, subspinescent shrub to 0.25 m high. Associated with salt lakes.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL
Apocynaceae	*Alyxia tetanifolia*		P3	Erect, rigid, pungent shrub, 1-2 m high, to 2.5 m wide. Fl. white-cream, May to Jun or Nov. Sandy clay, loam, concretionary gravel. Drainage lines, near lakes.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Asparagaceae	*Sowerbaea multicaulis*		P4	Tufted perennial, herb, 0.075-0.25 m high. Fl. purple-violet, Oct to Dec or Jan. Yellow-brown sand	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Asteraceae	*Elachanthus pusillus*		P2	Ascending or decumbent annual, herb, to 0.15 m high. Fl. yellow-green, Aug to Oct.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Asteraceae	*Gnephosis intonsa*		P3	Prostrate to ascending annual, herb, 0.01-0.04 m high. Fl. yellow-brown, Sep to Oct. Red/brown clay, stony saline loam	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Brassicaceae	*Lepidium fasciculatum*		P3	Erect annual, herb, (0.1-) 0.3-0.6 m high.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Brassicaceae	*Lepidium merrallii*		P2	Erect to spreading annual (possibly ephemeral), herb, 0.03-0.15 m high. Clay loam.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Brassicaceae	*Phlegmatospermum eremaeum*		P3	Prostrate to spreading annual, herb, 0.02-0.1(-0.2) m high. Fl. white-cream, Jun or Aug to Oct. Stony loam	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Casuarinaceae	*Allocasuarina eriochlamys subsp. grossa*		P3	Dioecious or monoecious shrub, 1-3 m high, bracteoles prominently exceeding cone. Stony loam, laterite clay. Granite outcrops.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM, WAHERB
Chenopodiaceae	*Tecticornia flabelliformis*	V	T	Erect shrub, to 0.2 m high. Clay. Saline flats.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	TPFL, EPBC
Elaeocarpaceae	*Tetratheca spenceri*		T	Know from a single population occurring on low, lateritic outcrops (Butcher and Cockerton 2012)	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Ericaceae	*Leucopogon sp. Kambalda (J. Williams s.n. PERTH 07305028*		P3	-	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, TPFL, WAHERB
Fabaceae	*Acacia coatesii*		P1	Low domed, compact shrub. Fl. Yellow, Sep.to Oct. Grows in shallow, red, sandy clay on flat or gently sloping ground.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Fabaceae	*Acacia kerryana*		P2	Low, spreading, domed shrub, 0.3-1 m high. Fl. yellow, Oct to Dec or Jan to Feb. Granitic loamy sand, stony clayey loam or clayey sand. Low stony ridges, undulating plains.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, WAHERB
Fabaceae	*Acacia websteri*		P1	Shrub, 1.2-5 m high, bark fibrous. Fl. yellow. Red sand, clay or loam. Low-lying areas, flats	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, WAHERB
Fabaceae	*Bossiaea laxa*		P2	Lax, open, spreading shrub, to 2 m high. Fl. yellow-green, May. Brown loam over deep granite. Sheltered positions around outcrops.	Moderate	**Unlikely** – the species has not previously been recorded within 20 km of the survey area and no suitable habitat occurs.	TPFL
Fabaceae	*Gastrolobium graniticum*	E	T	Erect, open shrub, to 2.5 m high. Fl. Yellow & orange & red, Aug to Sep. Sand, sandy loam, granite. Margins of rock outcrops, along drainage lines.	High	**Unlikely** – the species has not previously been recorded within 20 km of the survey area and no suitable habitat occurs.	NM, EPBC
Frankeniaceae	*Frankenia glomerata*		P3	Prostrate shrub. Fl. pink-white, Nov. White sand.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Goodeniaceae	*Dampiera plumosa*		P1	Erect perennial, herb, 0.15-0.2 m high. Fl. blue, Oct. Red sandy soils.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Goodeniaceae	*Goodenia corralina*		P2	Low spreading perennial, herb, 0.1-0.7 m high. Brown loam, granite. Near large outcrop.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL
Lamiaceae	*Newcastelia insignis*		P2	Much-branched shrub, 0.3-0.9(-1.5) m high. Fl. yellow-white, Sep to Nov. Red or yellow sandy soils.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Lamiaceae	*Pityrodia scabra subsp. dendrotricha*		P3	Viscid shrub, 0.7-1.4 m high. Fl. white, Oct to Nov. Clay to loam. Road verges.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL
Lamiaceae	*Prostanthera splendens*		P1	Erect, openly branched shrub, 0.2-1 m high. Fl. blue-purple, Aug to Oct. Stony loam, shallow soils with ironstone pebbles. Breakaways.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	TPFL
Myrtaceae	*Baeckea* sp. Bulla Bulling (D.J.E. Whibley 4648)		P1	Spreading shrub, to 1.6 m high. Yellow sandy loam.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	
Myrtaceae	*Cyathostemon divaricatus*		P1	Low shrub. Fl. white-pink, Apr to May, Aug to Sep. Occurs on rocky hill slopes near Kambalda.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	WAHERB
Myrtaceae	*Cyathostemon verrucosum*		P3	Found on yellow sand plains, recorded in shrublands, sometimes dominated by mallees or *Banksia*.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, TPFL

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Myrtaceae	*Eucalyptus jutsonii subsp. jutsonii*		P4	Mallee, 4-7 m high, bark rough over most stems, grey to light grey-brown. Red to pale orange deep sands. Undulating areas and on dunes.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Myrtaceae	*Eucalyptus x brachyphylla*		P4	Mallee or tree, to 4 m high, bark rough, flaky. Fl. white, Jun. Sandy loam. Granite outcrops.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM, TPFL
Myrtaceae	*Melaleuca coccinea*		P3	Much branched shrub, 1.5-2.6 m high, leaf blade elliptic to ovate, 1.5-2.2 times as long as wide. Fl. red, Sep to Nov or Jan. Sandy loam over granite. Granite outcrops, sandplain, river valleys.	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM, TPFL
Myrtaceae	*Thryptomene sp. Londonderry (R.H. Kuchel 1763)*		P1		Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, TPFL, WAHERB
Poaceae	*Austrostipa blackii*		P3	Tufted perennial, grass-like or herb, 1 m high. Fl. Sep to Nov.	Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, TPFL, WAHERB
Poaceae	*Austrostipa sp. Dowerin (G. Wiehl F 8004)*		P2		Moderate	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Proteaceae	*Grevillea georgeana*		P3	Erect to widely spreading shrub, 1-3 m high, up to 4 m wide. Fl. red/red & pink & cream, Jan or Mar or Sep to Nov. Stony loam/clay. Ironstone hilltops & slopes.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Proteaceae	*Grevillea phillipsiana*		P1	Prickly shrub, 0.8-1.5 m high. Fl. red/red & orange, Jul to Sep. Red sand, stony loam. Granite hills	High	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL
Rhamnaceae	*Cryptandra crispula*		P3	Non-spinescent shrub, 0.25-0.9 m high. Brown sandy clay, yellow loamy sand, red soil, pebbles. Dune ridges, hills, near salt lakes.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM
Rutaceae	*Phebalium clavatum*		P2	Upright shrub, 0.5-1.5 m high. Fl. white, Aug to Sep. Sandy soils. Sandplains.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	NM, TPFL, WAHERB
Rutaceae	*Philotheca apiculata*		P1	Erect shrub, 0.5-1.5 m high. Fl. white-pink, Aug to Nov. Stony clay loam. Rocky outcrops, hillsides.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	TPFL
Scrophulariaceae	*Diocirea acutifolia*		P3	Low, dense, rounded shrub, 0.3-0.8 m high. Fl. white, Nov to Dec. Clay loam, gravelly loam. Undulating flats.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM, TPFL
Scrophulariaceae	*Eremophila arachnoides subsp. tenera*		P1	Broom-like shrub, to 3 m high, branches with tubercules often elongated & coalescing. Fl. white/blue-purple. Occurs on red sandy loams or on calcrete in mixed *Acacia* shrubland or *Casuarina* woodland (Chinnock 2007).	Moderate	**Possible** – the species has not been previously recorded within 20 km of the survey area, but some suitable habitat may occur	NM, TPFL

Family	Taxon	Status		Description and closest record information (if available) (WA Herbarium 1998–)	Efficacy of field survey	Likelihood of occurrence	Source
		EPBC Act	BC Act /DPaW				
Scrophulariaceae	*Eremophila caerulea subsp. merrallii*		P4	Spreading or sprawling shrub, to 0.35 m high, to 0.8 m wide. Fl. blue-purple, Oct to Dec. Sand, clay or loam. Undulating plains.	High	**Possible** – the species has been previously recorded within 40 km of the survey area and some suitable habitat may occur.	NM
Scrophulariaceae	*Eremophila praecox*		P1	Broom-like shrub, 1.5-3 m high. Fl. purple, Oct or Dec. Red/brown sandy loam. Undulating plains. Occurs in Eucalyptus woodland on red-brown earth (Chinnock 2007).	Moderate	**Possible** – the species has been previously recorded within 20 km of the survey area and some suitable habitat may occur.	NM
Stylidiaceae	*Stylidium choreanthum*		P3	Creeping perennial, herb, 0.01-0.03 m high, to 0.3 m wide. Fl. pink/white, Sep to Nov. White/yellow or red sand. Plains.	Moderate	**Unlikely** – the species has been previously been recorded within 40 km of the survey area and no suitable habitat occurs.	TPFL

Refer to Appendix B for conservation code descriptions.

References:

Butcher, R and Cockerton, TB 2012, *Tetratheca spenceri (Elaeocarpaceae), a new rare and range-restricted species from the Coolgardie bioregion, Western Australia*, Nuytsia, vol. 22(3), pp 111-120.

Chinnock, RJ 2007, *Eremophila and allied genera: a monograph of the plant family Myoporaceae*, Rosenberg Publishing Pty Ltd, New South Wales.

Department of the Environment (DotE) 2015, *Species Profile and Threats Database (SPRAT)*, retrieved January 2015, from http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Western Australian Herbarium 1998–, *FloraBase—the Western Australian Flora,* Department of Parks and Wildlife, retrieved January 2015, from http://florabase.dpaw.wa.gov.au/.

Appendix E – Fauna data

Fauna species list

Likelihood of occurrence assessment

Fauna species recorded during the field survey

Family	Scientific Name	Common Name	Status	Quantity	Comment
Birds					
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4	
Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill		6	
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat		1	
Acanthizidae	*Smicrornis brevirostris*	Weebill		4	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		1	
Artamidae	*Strepera versicolor*	Grey Currawong		1	
Cacatuidae	*Eolophus roseicapillus*	Galah		4	
Casuariidae	*Dromaius novaehollandiae*	Emu		1	prints
Climacteridae	*Climacteris rufa*	Rufous Treecreeper		1	
Corvidae	*Corvus coronoides*	Australian Raven		2	
Cuculidae	*Chalcites osculans*	Black-eared Cuckoo		1	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2	
Eupetidae	*Cinclosoma castanotum*	Chestnut Quail-thrush		1	Female on two eggs
Hirundinidae	*Petrochelidon ariel*	Fairy Martin		8	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	
Maluridae	*Malurus lamberti*	Variegated Fairy-wren		4	
Megapodidae	*Leipoa occelata*	Malleefowl	Vu, Vu	0	old mound recorded
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	
Meliphagidae	*Lichenostomus cratitius*	Purple-gaped Honeyeater		6	
Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater		2	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		5	
Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater		2	
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner		4	

Family	Scientific Name	Common Name	Status	Quantity	Comment
Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater		2	
Meropidae	*Merops ornatus*	Rainbow Bee-eater		2	
Monarchidae	*Grallina cyanoleuca*	Mudlark		2	
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella		4	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		1	
Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird		1	calling
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler		2	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote		4	
Petroicidae	*Microeca fascinans*	Jacky Winter		2	
Petroicidae	*Petroica goodenovii*	Red-capped Robin		1	
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler		4	
Psittacidae	*Barnardius zonarius*	Australian Ringneck		2	
Psittacidae	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet		4	
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail		2	
Reptiles					
Ctenophorus	*Ctenophorus cristatus*	Crested Dragon		1	
Reptilia	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink		1	
Reptilia	*Ctenotus schomburgkii*	Barred wedgesnout Ctenotus		1	
Reptilia	*Menetia greyii*	Common Dwarf Skink		1	
Reptilia	*Varanus gouldii*	Sand Goanna		1	Diggings
Mammals					
Canidae	*Vulpes vulpes*	Fox	int	1	Scats
Leporidae	*Oryctolagus cuniculus*	Rabbit	int	10	Diggings, scats
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo		2	
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna		1	Diggings

Parameters of fauna likelihood of occurrence assessment

Assessment outcome	Description
Present	Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.
Likely	Species are **likely** to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area. OR Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.
Unlikely	Species assessed as **unlikely** include those species previously recorded within 10 km of the survey area however: • There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area. • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area. OR Those species that have a known distribution overlapping with the survey area however: • There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.
Highly unlikely	Species that are considered **highly unlikely** to occur in the survey area include: • Those species that have no suitable habitat within the survey area. • Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.

Definitions

Term	Description
study area	a 40 km buffer around the survey area
survey area	the area subject to the current survey
locality	the area within an approximate 20 km radius of the survey area

Fauna likelihood of occurrence assessment

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Birds							
Malleefowl *Leipoa ocellata*	Vu	V	-	Y	Y	The Malleefowl generally occurs in semi-arid areas of Western Australia, from Carnarvon to south east of the Eyre Bird Observatory (south-east Western Australia). The Malleefowl is associated with long unburnt thick vegetation and occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine Callitris woodlands, Acacia shrublands, Broombush (*Melaleuca uncinata)* vegetation or coastal heathlands. The breeding habitat is characterised by light soil and an abundant leaf litter, which is used in the construction of nesting mounds (Frith 1959; Marchant & Higgins 1993 in DotE 2015). The nest is a conspicuous large mound of sand or soil and organic matter (Jones and Goth 2008 in DotE 2015b, Morcombe 2004).	**Likely – irregular visitor** Habitat: Species likely to use vegetation within the survey area particularly the denser regions of Melaleuca and shrubs associated to low rocky hills. One old sign of presence was recorded and consisted of an old mound. Records No signs of birds within survey area. One old mound located which is long unused. Few records within the greater locality (within 20 km of study area)
Night Parrot *Pezoporus occidentalis*	CR	E	-	-	Y	The Night Parrot inhabits arid and semi-arid areas that are characterized by having dense, low vegetation. Based on accepted records, the habitat of the Night Parrot consists of Triodia grasslands in stony or sandy environments and of samphire and chenopod shrublands, on floodplains and claypans, and on the margins of salt lakes, creeks or other sources of water. The distribution of the Night Parrot is very poorly understood (DotE 2015b).	**Highly unlikely** Habitat: No suitable habitat Records: None within study area or locality.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Princess Parrot *Polytelis alexandrae*	P4	V	Y			The Princess Parrot inhabits sand dunes and sand flats in the arid zone of western and central Australia. It occurs in open savanna woodlands and shrublands that usually consist of scattered stands of Eucalyptus (including E. gongylocarpa, E. chippendalei and mallee species), Casuarina or Allocasuarina trees; an understorey of shrubs such as Acacia (especially A. aneura), Cassia, Eremophila, Grevillea, Hakea and Senna; and a ground cover dominated by Triodia species (Allen 1987; Baxter & Henderson 2000;). It also frequents Eucalyptus or Allocasuarina trees in riverine or littoral areas (Carter 1993b).	**Highly unlikely** Habitat: No suitable habitat Records: None within study area or locality.
Peregrine Falcon *Falco peregrinus*	S4			Y		The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities. (Morcombe, 2004).	**Likely – Foraging habitat and potential breeding, resident** Habitat: The peregrine Falcon is known from the region and potentially could utilise some of the large Salmon Gums with hollows for breeding and the remaining habitat for hunting/foraging. However this species is widespread and would not be impacted. Records: No signs of birds within survey area. No records are within the greater locality (within 20 km of study area) however records are present surrounding the Study area and the habitat in the region is all similar. Their lack of presence is likely survey effort rather not present.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Grey Falcon *Falco hypoleucos*	Vu			Y		The Grey Falcon inhabits lightly timbered country, especially stony plains and lightly timbered acacia scrub. This species is considered scarce to rare and is usually found singularly or sometimes in pairs (Morcombe 2004). In Pilbara WA, the grey falcon is very rare. The distribution of the Grey Falcon is centered on inland drainage systems, where it frequents timbered lowland plains, particularly acacia shrublands cross by tree-lined watercourses. It also hunts in treeless areas and frequents tussock grassland and open woodland, especially in winter, but it generally avoids deserts	**Unlikely** Habitat: Habitat is present for the species in Woodlands and shrublands Records: None within study area or greater region. The closest record is approximately 260 km north. The survey area looks to be outside of the species current distribution.
Letter-winged Kite Elanus scriptus	P4			Y		The letter-winged kite is a conspicuous raptor with a core range in central Australia. The adult is a small and graceful, predominantly pale grey and white, bird with black shoulders and red eyes. Breeding is eruptive in response to population booms of the Long-haired Rat during good times. The letter-winged Kite is able to achieve a sudden population increase and during this time disburses in search of resources. The species is rarely recorded in Western Australia but has been seen in the Carnarvon, northern Deserts and Kimberley region during a population boom.	**Unlikely** Habitat: Habitat is present for the species in Woodlands and shrublands Records: None within study area or greater region. The closest record is approximately 500 km west. The survey area looks to be outside of the species current distribution, however the species is highly nomadic during productive season and could turn up anywhere.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Mammals							
Chuditch, Western Quoll *Dasyurus geoffroii*	Vu	V	Y			The Chuditch is now known only from Western Australia where it predominantly occurs in Jarrah (*Eucalyptus marginata*) forest and the Great Western Woodland. It is considered to occur in just 5% of its original range. Occasional records are obtained from the wheatbelt and goldfields where it persists in very low numbers (DotE 2015b) The Chuditch inhabits eucalypt forest (especially Jarrah), dry woodland and mallee shrublands. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows. The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range (Van Dyke & Strahan, 2008).	**Likely – possible regular visitor, possible resident** **Habitat:** The survey area and adjoining habitat is contiguous and would provide habitat for the species and could support a population of Chuditch, however in this region the species is typically in very low densities and occupy very large home ranges (approximately 25 km^2) therefore the numbers of animal occupying the survey area is likely 1-2 individuals if present. Habitat may be part of the species larger home range. **Records:** No individuals or evidence recorded. 1 x records in the study area (within 10 km) and a few records in the locality (region).
Bilby *Macrotis lagotis*	Vu	V	Y			The Greater Bilby occupies three major vegetation types; open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas. In the south of its range, the Greater Bilby lives on rises and ridges among sparse grasses, especially mitchell grass Astrebla and short shrubs. In Western Australia there are disjunct populations in the Gibson Desert, south-western Kimberley, inland areas of the Pilbara and northern Great Sandy Desert (Van Dyke & Strahan, 2008).	**Unlikely – Species no longer present in this region** **Habitat:** The survey area and adjoining habitat is contiguous and would provide habitat for the species and could support a population of Bilby, however in this region the species is locally extinct and has not been recorded in many years. **Records:** Historical records in the study area (20 km) and a few records in the region however they are all very old.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Numbat *Myrmecobius fasciatus*	Vu	En	Y			The Numbat's distribution once encompassed a number of habitat types, including eucalypt forest, eucalypt woodland, Acacia woodland and Triodia grasslands. Current populations occupy several different habitat types: upland Jarrah forest, open eucalypt woodland, banksia woodland and tall closed shrubland. There are currently two remnant native populations at Dryandra and Perup, WA and several reintroduced populations. Habitats usually have an abundance of termites in the soil, hollow logs and branches for shelter (Friend 2008).	**Unlikely – Species no longer present in this region** **Habitat:** The survey area and adjoining habitat is contiguous and would provide habitat for the species and could support a population of Bilby, however in this region the species is locally extinct and has not been recorded in many years.
Central Long-eared Bat *Nyctophilus major tor*	P4	-		Y	-	There is very little published information available for the subspecies, most of which is limited to the distribution of the species within the south-west of WA. Mixed eucalypt woodlands with prominent shrub layers, and around the fringes of she-oak and wattle thickets. Roosts in tree crevices, foliage or under loose bar (Van Dyck, Gynther and Baker 2013). Recent ultrasonic surveys for microchiropteran bats recorded *Nyctophilus* sp. calls (see Appendix M), however species identification could not be confirmed.	**Likely – Unknown, regular visitor / potential resident** **Habitat:** Potentially suitable foraging habitat in survey area and potentially suitable breeding and roosting habitat (i.e. Eucalypts woodlands with hollow-bearing trees and crevices) which were present. **Records:** There are no records of the species in the study area however are present in the Great Western Woodland which is contiguous habitat to the survey area in this region. The lack of survey effort in the region maybe responsible for the records to date.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Reptiles							
Woma *Aspidites ramsayi (southwest subpop)*	P1	-		Y	-	The Woma inhabits woodlands, heaths and shrublands, often with spinifex. It occurs in the sub-humid and arid areas across Australia's interior with a separate sub-population occurring in the Wheatbelt and eastern Goldfields of Western Australia. The Woma shelters mainly in abandoned monitor and mammal burrows and in soil cracks (Wilson and Swan 2013).	**Unlikely** **Habitat:** Habitat is present for the species in Woodlands and shrublands **Records:** None within study area or greater region. The closest record is approximately 170 km east. The survey area looks to be outside of the species current distribution, with a population occurring in the sandplains of the wheatbelt to Geraldton and another in the sand dunes of the Great Victoria Desert.
Migratory Birds							
Curlew Sandpiper *Calidris ferruginea*	Vu	Ce	-	-	Y	In Western Australia, the Curlew Sandpiper is widespread around coastal and sub-coastal plains from Cape Arid to south-west Kimberley Division, but are more sparsely distributed between Carnarvon and Dampier Archipelago. They mainly occur on intertidal mudflats in sheltered coastal areas as well as inland around ephemeral and permanent lakes, dams, waterholes and bore drain, usually with bare edges of mud or sand (DotE 2015b).	**Highly unlikely** **Habitat:** No suitable habitat **Records:** None within study area. Closest records are on the Rebecca Lake north of Kalgoorlie.
Wood Sandpiper *Tringa glareola*	Mi, S5	Mi	Y			The Wood Sandpiper has its largest numbers recorded in north-west Australia. Typical habitat includes well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. This species does not breed in Australia (DotE 2015b).	**Highly unlikely** **Habitat:** No suitable habitat **Records:** None within study area. Closest records are on the Rebecca Lake north of Kalgoorlie.

Species	Status		Desktop Search			Ecology and habitat	Likelihood of occurrence
	BC Act	EPBC	NM	DPaW	PMST		
Common Greenshank *Tringa nebularia*	Mi, S5	Mi	Y			The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands and will also use artificial wetlands (Higgins and Davis 1996)	**Highly unlikely** **Habitat:** No suitable habitat **Records:** None within study area. Closest records are on the Rebecca Lake north of Kalgoorlie.
Grey Wagtail *Motacilla cinerea*	IA	MiT	-	-	Y	Non-breeding habitat only has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes (DotE 2015a). Rare visitor to WA. Mainly banks and rocks in fast-running freshwater habitats: rivers, creeks, streams, and around waterfalls, both in forest and open country; but occurs almost anywhere during migration (Johnstone and Storr 2004).	**Unlikely – migrant** **Habitat:** No breeding habitat. Limited foraging and refuge habitat (during migration period) within survey area. **Records:** None within study area or locality.

References

Allen, R.J 1987, Alexandra's Parrots in the Great Victoria Desert. South Australian Ornithologist. 30:75.

Baxter, C. & R. Henderson 2000, A literature summary of the Princess Parrot Polytelis alexandrae and a suspected recent breeding event in South Australia. South Australian Ornithologist. 33:93-108.

Carter, M 1993b, Alexandra's or Princess Parrot - Status and 'normal' range. Wingspan. 12:32-35.

DotE 2015a, Draft referral guideline for 14 birds listed as migratory species under the EPBC Act, retrieved November 2015, from https://www.environment.gov.au/system/files/resources/c05f5b87-0a99-4998-897e-7072c236cf83/files/migratory-birds-draft-referral-guideline.pdf.

DotE 2015b, Species Profile and Threats Database (SPRAT), Department of the Environment, Australian Government Canberra.

Friend, J.A 2008, Numbat. In: Van Dyke. S & Strahan. R., ed. The Mammals of Australia. Page(s) 163-165. Reed Books: Sydney.

Frith, H 1959, Breeding of the Mallee-fowl, Leipoa ocellata Gould (Megapodiidae). CSIRO Wildlife Research 4(1) 31 - 60

Higgins, P.J. & S.J.J.F. Davies, eds 1996, Handbook of Australian, New Zealand and Antarctic Birds. Volume Three - Snipe to Pigeons. Melbourne, Victoria: Oxford University Press.

Johnstone, RE and Storr, GM 2004, Handbook of Western Australian Birds, Volume I: Non-passerines (Emu to Dollarbird), Perth: Western Australian Museum.

Jones D. and Goth A 2008, Mound-builders. CSIRO Publishing. Victoria Australia

Marchant, S. & P.J. Higgins, eds 1993, Handbook of Australian, New Zealand and Antarctic Birds. Volume 2 - Raptors to Lapwings. Melbourne, Victoria: Oxford University Press.

Morcombe, M 2004, Field Guide to Australian Birds, Steve Parish Publishing Archer Field Queensland Australia.

Van Dyke, S and Strahan, R 2008, The Mammals of Australia, Third Edition, New Holland Publishing, Sydney Australia.

Van Dyck S, Gynther I and Baker A 2013, Field companion to the Mammals of Australia, First edition, New Holland Publishing.

Wilson, S and G, Swan 2013, A Complete Guide to Reptiles of Australia. Reed New Holland. Sydney, Australia.

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