Kalgoorlie Nickel Smelter, Reconnaissance Flora and Vegetation Survey and Basic Terrestrial Fauna Survey

Biologic Environmental Survey

Report for BHP Nickel West

December 2021

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EXECUTIVE SUMMARY

BHP Nickel West (BHP NiW) requires a native vegetation clearing permit to support upcoming operations at their Kalgoorlie Nickel Smelter site. BHP NiW commissioned Biologic Environmental Survey (Biologic) to undertake a single-season reconnaissance flora and vegetation survey and basic terrestrial fauna survey for the Kalgoorlie Nickel Smelter, and a targeted flora and fauna survey of two corridors (hereafter collectively known as 'the Survey Area'). The reconnaissance flora and vegetation and basic fauna Survey Area comprises the entire nickel smelter operations tenure (smelter Survey Area) measuring approximately 2.7 kilometres (km) by 2.3 km. Additionally a targeted vertebrate fauna and flora survey was requested for an adjacent road and pipeline corridor (corridor Survey Area), totalling 717 hectares (ha). The Survey Area is located approximately 12.5 km south of Kalgoorlie town in the City of Kalgoorlie-Boulder in the Goldfields region of Western Australia.

A comprehensive flora, vegetation and vertebrate fauna desktop assessment comprising of database searches and literature review was undertaken for the Survey Area as detailed in EPA and BHP guidance documents.

The field survey, which comprised a total of 25 relevé sites, 11 mapping notes and 22 fauna habitat assessments, was completed over three days between the 8th and 10th of September 2021.

Vertebrate Fauna

The desktop assessment identified 297 vertebrate fauna species that have previously been recorded within the vicinity of the Survey Area or have the potential to occur based on estimated distribution. Twenty-three of these species are of conservation significance, being species that are listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Biodiversity Conservation Act 2016* (BC Act); or listed as Priority fauna species by the Department of Biodiversity Conservation and Attractions (DBCA).

Four broad fauna habitat types were identified and mapped within the Survey Area, comprising in order of extent, Open Eucalypt Woodland, Allocasuarina Shrubland, Low Chenopod Shrubland and Claypan. A total of 18 vertebrate fauna species were recorded during the field survey, comprising, 16 bird and two mammal species. One of the species recorded during the survey, the malleefowl (*Leipoa ocellata*), is listed as Vulnerable under the EPBC Act and BC Act. The species was confirmed from an old, inactive mound within the Allocasuarina Shrubland habitat; however, no recent evidence of the species was detected. Of the species of conservation significance recorded during the desktop assessment, eight were considered Possible to occur, comprising:

- common sandpiper (*Actitis hypoleucos)* – Migratory (EPBC and BC Act)
- fork-tailed swift (*Apus pacificus*) – Migratory (EPBC and BC Act)
- sharp-tailed sandpiper (*Calidris acuminata)* - Migratory (EPBC and BC Act)
- common greenshank (*Tringa nebularia*) – Migratory (EPBC and BC Act)
- wood sandpiper (*Tringa glareola*) - Migratory (EPBC and BC Act)
- red-necked stint (*Calidris ruficollis*) – Migratory (EPBC and BC Act)

- glossy ibis (*Plegadis falcinellus*) – Migratory (EPBC and BC Act)
- peregrine falcon (*Falco peregrinus*) – Other Specially Protected (BC Act)

The remaining 14 species are considered Unlikely or Highly Unlikely to occur within the Survey Area.

Open Eucalypt Woodland and Low Chenopod Shrubland fauna habitats were considered to be of low significance as they are widespread in the surrounding landscape and/or are not relied upon by species of conservation significance. Allocasuarina Shrubland habitat was considered to be of moderate significance as it represents potential foraging and breeding habitat for the malleefowl. As no recent evidence of the species was detected and the Survey Area is highly disturbed, it is considered unlikely that the species is active within the area and unlikely that the Survey Area is of significance to the species. The Claypan habitat has the potential to support species of conservation significance, particularly foraging habitat for the eight bird species assessed as being Possible to occur. Given the widespread nature of this habitat type in the region, including an array of large salt lakes and claypans immediately to the west and east of the Survey Area, it is unlikely that these species are reliant on the habitat within the Survey Area. The Claypan habitat was therefore determined to be of moderate significance to vertebrate fauna. No conservation significant vertebrate fauna species listed under the EPBC Act or BC Act are dependent on the fauna habitat within the Survey Area. All habitats are common and widespread in the surrounding landscape.

Flora and Vegetation

A total of 114 vascular flora taxa from 31 families and 62 genera were recorded from the smelter Survey Area during the field survey (109 native taxa and five introduced taxa). Of the five introduced taxa; **Echium plantagineum* (Patterson's Curse) is a Declared Pest under Section 22 of the *Biosecurity and Agriculture Management Act*. **Eragrostis curvula* is on the priority list for weed management for the Goldfields Region due to it being currently absent from lands managed by the Department of Biodiversity, Conservation and Attractions.

No conservation significant flora taxa were recorded during this survey from the smelter or corridor Survey Area. Nine taxa observed and collected from the field were difficult to confidently identify to genus, species or infraspecies level. One of these taxa identified to genus level, *Lepidosperma* sp. indet., does have affinities with the conservation significant taxon *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (Priority 2, DBCA). However, the specimen collected during this survey was sterile, and the Western Australian Herbarium has insufficient material and supporting literature to confidently identify this specimen. Therefore, this specimen is not considered to represent that of a conservation significant taxon. However, *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2) is considered Possible to occur in the Survey Area following the post-survey likelihood assessment. All other conservation significant flora taxa are considered either Unlikely or Highly Unlikely to occur in the Survey Area.

Five flora taxa recorded from the smelter Survey Area by this survey are considered to be flora of "Other" significance:

- *Calandrinia pumila* – range extension 78 km southeast;
- *Centipeda crateriformis* subsp. *compacta* – fills a gap in distribution;

- *Lepidosperma* sp. indet – does not match any taxa currently held and described at the Western Australian Herbarium, most closely resembles *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2);
- *Ptilotus obovatus* var. *obovatus* - range extension 141 km east-southeast;
- *Swainsona purpurea* – range extension 17 km south.

Seven vegetation types were mapped in the smelter Survey Area:

Eucalypt Woodlands (E)

- E1 - Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland;
- E2 - Low open *Eucalyptus flocktoniae* subsp. *flocktoniae* and *Eucalyptus longissima* mallee woodland;
- E3 - Low open *Eucalyptus torquata* mallee woodland;
- E4 - Low open *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* mallee woodland.

Shrublands (S)

- S1 - Tall *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* shrubland;
- S2 - Mid to low open *Lycium australe*, *Frankenia* sp., *Maireana sedifolia*, *Atriplex nummularia*, *Atriplex vesicaria* and *Sclerolaena diacantha* mixed chenopod shrubland;
- S3 - Mid sparse *Duma florentia* shrubland.

A range of landforms were present in the smelter Survey Area including (in descending order of dominance across the smelter Survey Area) gentle hillslopes (lower, mid, upper), flats / saline flats, floodplains and hilltops / crests. The majority of the vegetation within the smelter Survey Area was in very good condition. One additional mapping unit, Cleared, was mapped (representing tracks, infrastructure, and cleared areas).

The area mapped as vegetation type S3 (Mid sparse *Duma florentia* shrubland) shared affinities to a Priority Ecological Community (PEC). This vegetation type contained lignum (*Duma florulenta*), and scattered herbs and grasses fringed by *Melaleuca lateriflora*, and was situated on a small claypan landform. Although this occurrence cannot represent the ‘Emu Land System’ (Priority 3, DBCA) PEC based on geographical distribution, it is considered to represent vegetation of other significance at a local level due to these attributes.

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1 INTRODUCTION

1.1 Background

BHP Nickel West Pty Ltd (BHP NiW) commissioned Biologic Environmental Survey (Biologic) to undertake a single-season reconnaissance flora and vegetation survey and a single-season basic vertebrate fauna survey at their Kalgoorlie Nickel Smelter operations (smelter Survey Area), and a targeted flora and fauna survey of proposed pipeline and road alignment corridors (corridor Survey Area). These areas are collectively referred to as “the Survey Area”. The Survey Area is located approximately 12.5 kilometres (km) south of Kalgoorlie town in the City of Kalgoorlie-Boulder in the Goldfields region of Western Australia. The purpose of the survey is to support a native vegetation clearing permit (NVCP) application for the operations. The Survey Area comprises the nickel smelter operations tenure (smelter Survey Area), which measures approximately 2.7 km by 2.3 km (approximately 607 hectares (ha)) and includes a road corridor and pipeline corridor (corridor Survey Area) to support the operations (Figure 1.1). The Survey Area is approximately 717 ha.

1.2 Objectives

The overarching objective of this assessment was to document the environmental value of the Survey Area as it relates to terrestrial vertebrate fauna, flora and vegetation. The specific objectives of the assessment were to:

- conduct a desktop assessment to gather background information, identify flora, vegetation and fauna which potentially occur in the Survey Area, and verify methods for a field survey;
- define and map vegetation units and fauna habitats occurring in the smelter Survey Area and rate their condition;
- conduct a reconnaissance flora and vegetation survey to identify flora and vegetation occurring in the smelter Survey Area;
- conduct a basic vertebrate fauna survey to identify species occurring in the smelter Survey Area; and
- conduct a targeted survey for flora and fauna within the targeted Survey Area.

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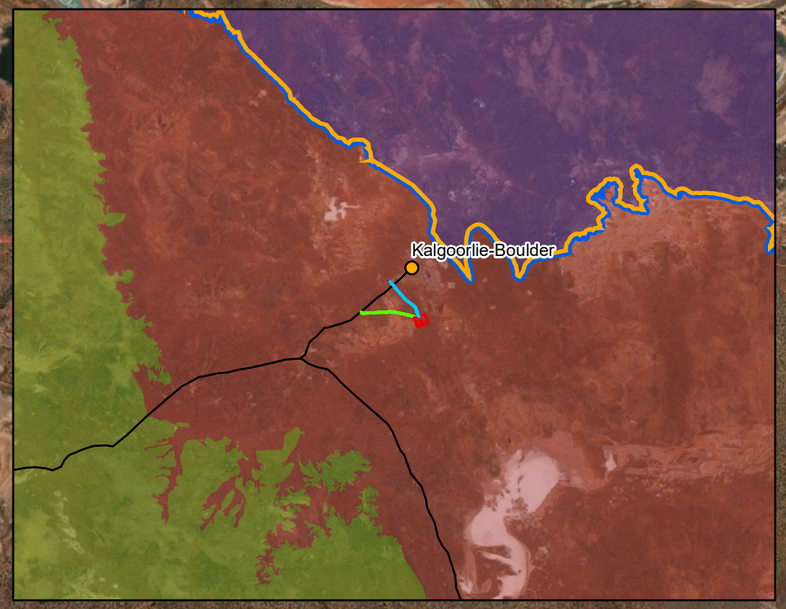


Kalgoorlie
Parkeston
Bulong Rd
Mt Charlotte
Piccadilly St
Hannan St
Brookman St
Goldfields Hwy
Trans Australian Railway
Brown Hill
Superpit
Trafalgar
Western Rd
Great Eastern Hwy
Boulder
Burt St
Hopkins St
Vivian St
Lane St
Anzac Dr
Mount Monger Rd
Lakewood
East Perth Terminal Kalgoorlie Railway
Hall Rd
Kurrawang
West Kalgoorlie Esperance Railway
Lake Douglas Rd
Goldfields Hwy
Ballast Rd
Mungari
Great Eastern Hwy
Smelterman Dr

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail
- Operating Mine

IBRA Region

- Coolgardie
- Murchison

IBRA Subregion

- Eastern Goldfield
- Eastern Murchison
- Southern Cross

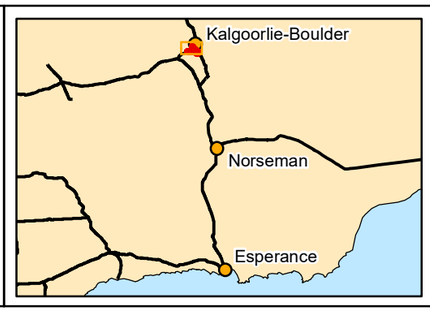
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 04/11/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 1.1: The Survey Area and regional location

1.3 Background to Protection of Flora and Fauna

Within Western Australia, all native flora and fauna is protected under the *Biodiversity Conservation Act 2016* (BC Act), and federally under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action that has the potential to impact native flora or fauna needs to be approved by relevant state and/or federal departments as dictated by the state BC Act and the federal EPBC Act.

Some species of flora and fauna that are determined to be at risk of extinction or decline are afforded extra protection under these acts. A summary of applicable legislation and status codes is provided in Table 1.1 and additional information on status codes is provided in Appendix A.

The EPBC Act identifies Threatened Ecological Communities (TECs) as ecological communities at risk of extinction. The BC Act provides for the statutory listing of TECs by the WA Minister for Environment (the Minister). The Minister has endorsed 69 ecological communities as threatened under Critically Endangered (20), Endangered (17), Vulnerable (28) and Presumed Totally Destroyed (four).

For some species and ecological communities, there is insufficient information to determine their status. These species are generally considered by the Environmental Protection Authority (EPA) and the Department of Biodiversity, Conservation and Attractions (DBCA) as being of conservation significance for all development related approvals and are listed on a 'Priority List' that is regularly reviewed and maintained by the DBCA (Table 1.1). TECs that do not meet the criteria for statutory listing by the Minister for Environment are added to DBCA's Priority Ecological Community (PEC) list under Priorities 1, 2, 3, 4 (near threatened) or 5 (conservation dependent).

Table 1.1: Conservation significance assessment guidelines

Agreement, Act or List	Status Codes
Federal	
Environment Protection and Biodiversity Conservation Act 1999 The Department of Agriculture, Water and the Environment (DAWE) lists Threatened flora, which are determined by the Threatened Species Scientific Committee (TSSC) per criteria set out in the Act. The Act lists flora and fauna that are considered to be of significance in the categories listed under 'Status Codes'. Threatened Ecological Communities (TECs) are those that are at risk of extinction.	Species • Extinct (EX) • Extinct in the Wild (EW) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU) • Conservation Dependent (CD) • Migratory (MI) TECs • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
State	
Biodiversity Conservation Act 2016 At a State level, native flora, fauna and TECs are protected under the BC Act. Species in need of conservation are given a ranking ranging from Critically Endangered to Vulnerable. TECs are given a ranking ranging from Vulnerable to Presumed Totally Destroyed.	Species • Extinct (EX) • Extinct in the Wild (EW) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU) • Migratory (MI) • Conservation Dependent Fauna (CD) • Other Specially Protected Species (OS) TECs • Presumed Totally Destroyed (PD) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
DBCA Priority List DBCA produces a list of Priority species and ecological communities that have not been assigned statutory protection under the BC Act. This system gives a ranking from Priority 1 to Priority 4 for flora and fauna, and Priority 1 to Priority 5 for ecological communities.	• Priority 1 (P1) • Priority 2 (P2) • Priority 3 (P3) • Priority 4 (P4) • Priority 5 (PECs) (P5)

1.4 Conformance with Regulatory Guidance and Best Practice

1.4.1 Vertebrate Fauna

The single-season basic terrestrial fauna and targeted fauna survey was carried out in a manner consistent with the following guidelines and recommendations:

- BHP (2017) Guidance for terrestrial vertebrate fauna surveys in the Pilbara procedure (document number: SPR-IEN-EMS-012);
- BHP WAIO (2020) Biodiversity survey spatial data requirements procedure (document number: SPR-IEN-EMS-015);
- DEWHA (2010) Survey guidelines for Australia's threatened birds;
- DPaW (2017) Interim guidelines for the preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia;
- (EPA, 2020b) Environmental factor guideline: terrestrial fauna;
- EPA (2018) Instructions for the preparation of data packages for the index of biodiversity surveys for assessments (IBSA);
- EPA (2020a) Statement of environmental principles, factors and objectives;
- EPA (2020b) Technical guidance: terrestrial vertebrate fauna surveys for environmental impact assessment; and
- Natural Heritage Trust (2007) National manual for the malleefowl monitoring system: standards, protocols and monitoring procedures;

1.4.2 Flora and Vegetation

The single-season reconnaissance flora and vegetation assessment and targeted flora survey was carried out in a manner consistent with the following guidelines and recommendations from the EPA, DBCA and BHP:

- BHP WAIO (2020) Biodiversity survey spatial data requirements procedure (document number: SPR-IEN-EMS-015);
- BHP (2018) Vegetation and Flora Survey Procedure (document number: 0124627);
- EPA (2016a) Environmental Factor Guideline: Flora and Vegetation;
- EPA (2016b) Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment;
- EPA (2018) Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA); and
- EPA (2020a) Statement of Environmental Principles, Factors and Objectives.

2 ENVIRONMENT

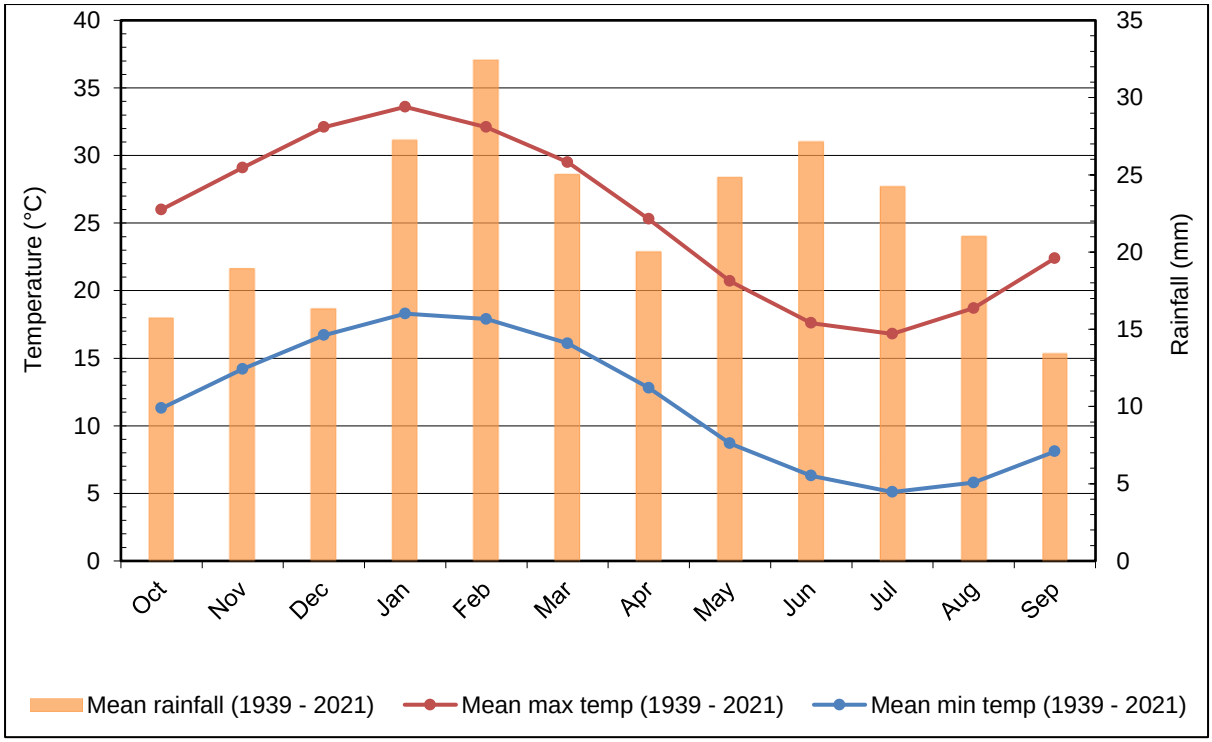
2.1 Biogeography

The Interim Biogeographic Regionalisation for Australia (IBRA) (version 7) is a bioregional framework that divides Australia into 85 bioregions and 419 subregions on the basis of climate, geology, landforms, vegetation and fauna (Thackway & Cresswell, 1995). The Survey Area is located within the Coolgardie bioregion (see Figure 1.1). The Coolgardie bioregion is located within the Yilgarn craton and is characterised by a granite basement with occluded drainage (McKenzie *et al.*, 2002). The Coolgardie bioregion is itself a major biogeographic interzone where communities of acacia on sandplain valley floors, and ephemeral plants on tertiary sandplains and in valley floor woodlands, are extremely rich (McKenzie *et al.*, 2002). The diversity in its eucalypt woodlands reflects a regional radiation in acacias and myrtaceae, with for example 170 species of eucalypt occurring of which many are endemic (McKenzie *et al.*, 2002).

The bioregion is divided into three sub-regions; Mardabilla, Southern Cross and Eastern Goldfields. The Survey Area is located within the Eastern Goldfields subregion (Figure 1.1) which is characterised by low hills and undulating plains, covered with tertiary soils and with scattered exposures of bedrock (Cowan, 2001). Vegetation within the subregion is of mallees, acacia thickets and shrub-heaths on sandplains, and diverse eucalyptus woodlands occur around salt lakes, on ranges and in valleys (McKenzie *et al.*, 2002). The Eastern Goldfields subregion is home to Rowles Lagoon, and Clear and Muddy Lakes, a system of wetlands that is the largest semi-permanent freshwater complex in the region and plays an important ecological role (Cowan, 2001). The Eastern Goldfields subregion hosts a diversity of fauna species; most of which are widespread and can also be found in other subregions. Key threats to fauna within the subregion include grazing, changed fire regimes, feral predators and habitat clearing, mining and fragmentation (Cowan, 2001).

2.2 Climate

The Coolgardie bioregion experiences an arid to semi-arid climate, with an average rainfall between 200-300 mm, sometimes in summer but usually in winter (Cowan, 2001). The Bureau of Meteorology (BoM) weather station at Kalgoorlie-Boulder Airport (station 12038); located 8.8 km north of the Survey Area provides long-term climatic data relevant to the Survey Area. Kalgoorlie-Boulder Airport receives an average annual rainfall of 264.9 mm, with a bimodal rainfall pattern with peak falls in summer (February) and winter (June) (Figure 2.1). Summer rainfall originates from deteriorating tropical cyclones that cross the coast of northern Western Australia and dissipate to the south-east. Winter rainfall results from cold fronts crossing the southern coastline and moving inland. The highest temperatures are recorded between November and March, when mean minimum and maximum temperatures are 18.3°C and 33.6°C, respectively. The lowest temperatures are recorded between June and August, when mean minimum and maximum temperatures are 5.1°C and 16.8°C, respectively.



Source: (BoM, 2021) weather station 12038

Figure 2.1: Climate data for Kalgoorlie-Boulder Airport

2.3 Land Systems

The Department of Agriculture (now the Department of Primary Industries and Regional Development [DPIRD]) has conducted 14 rangeland surveys since 1972. These inventory and condition surveys used an integrated survey method involving the land system approach to rangeland description and evaluation. The primary objective of the surveys was to provide comprehensive descriptions and mapping of the biophysical resources of the region, as well as an evaluation of the condition of soils and vegetation. The mapping was based on patterns in topography, soils and vegetation.

The patchwork of differing soil/rangeland mapping styles, combined with the general lack of clear patterns of geological differentiation and subdued terrain, made identification of soil-landscape zones in the Kalgoorlie Province difficult and mapping requires review (Tille, 2006). Based on this mapping, the Survey Area occurs across three soil-land systems (Table 2.1, Figure 2.2). The western side of the smelter Survey Area consisting mostly of valley plains with instances of outcropping (Mx43 land system) and the eastern side consisting of rocky ranges and hills (BB5 land system) (Figure 2.2). The pipeline corridor is located exclusively within Mx43 land system, with the road corridor intersecting both BB5 and Mx43 systems plus additionally passing through SV15 land system characterised by salt lake and saltpan systems.

All land systems identified in the Survey Area extend well outside the Survey Area.

Table 2.1: Land systems occurring within the Survey Area

Land System	Type	Description	Extent in Survey Area	
			Area (ha)	%
BB5	Hillcrest/hillslope	Rocky ranges and hills of greenstones-basic igneous rocks	423.0	59
Mx43	Stony plains/ sand plains	Gently undulating valley plains and pediments; some outcrop of basic rock	263.4	37
SV15	Salt lakes and marshes	Salt lakes and their associated areas	30.6	4
		Total	**717**	**100**

2.4 Soil and Landscape

The Survey Area falls within the Kalgoorlie Province, which consists of an extensive plateau of low relief. Flat to undulating plains with small valleys (occasionally broken by low narrow rocky hills, ridges, tors and bosses) are most commonly found on granitic terrain (Tille, 2006). On these plains may be found some silcrete duricrust, claypans, salt lakes with dunes and lunettes, gilgai areas, small remnants of sand plain, and small dune tracts (Tille, 2006). Atlas of Australian Soils was compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in the 1960s to provide a consistent national description of Australia's soils (CSIRO, 1992; Northcote *et al.*, 1960-1968). It comprises a series of ten maps published at a scale of 1:2,000,000 (with contributing data being mapped at scales from 1:250,000 to 1:500,000), along with explanatory notes. Based on this mapping, the Survey Area occurs across three soil-landscape units closely associated with the corresponding land system mapping (Table 2.2; Figure 2.3). The smelter Survey Area is predominantly characterised by shallow soils of soil unit BB5, with the eastern portion consisting of low nutrient soils (soil unit Mx43) (Figure 2.3). The pipeline corridor intersects both BB5 and Mx43 soil units, while the road corridor to the west intersects all three soil units.

Table 2.2 Soil-landscape units occurring within the Survey Area

Unit code	Description[1]	Extent in Survey Area	
		ha	%
BB5	Soils with predominantly physical limitations; shallow soils.	537.7	75
Mx43	Soils with predominantly chemical limitations; soils naturally low in nutrients	160.3	22
SV15	Soils with predominantly chemical limitations; saline soils	19.0	3
	Total	**717**	**100**

[1]Source: CSIRO (1992). Supporting soil code information is available in McKenzie and Hook (1992) and McKenzie *et al.* (2000).

2.5 Geology

The Survey Area is located within the Kalgoorlie Province (soil-landscape mapping zone), on the eastern portion of the Archaean Yilgarn Craton. Basement rocks are a mix of granite, gneiss and greenstone (Tille, 2006). Even-grained porphyritic granitic rocks (intruded by quartz veins and dolerite dykes) are most common across the north as well as the western half and north-east of the Province

(Tille, 2006). The patchwork of differing soil/rangeland mapping styles, combined with the general lack of clear patterns of geological differentiation and subdued terrain, made identification of soil-landscape zones in the Kalgoorlie Province difficult. The mapping of this province requires review (Tille, 2006). The Survey Area lies on the border of the Kambalda and Norseman soil-landscape zones and can be described as containing undulating plains and uplands (with some sandplains and salt lakes) on granitic rocks of the Yilgarn Craton, with calcareous loamy earths, yellow sandy and loamy earths, red loamy earths, red deep sands and salt lake soils (Tille, 2006).

With respect to regolith geology, the Survey Area contains seven geological units with almost half (46.6%) being described as Sheetwash unit characterised by clay, silt and sand in extensive fans with local ferruginous gravels (Table 2.3; Figure 2.4). The Colluvial unit is the next most prevalent unit at 22.5%, with a similar area of Exposed Bedrock unit at around 18.2% (Table 2.3).

Table 2.3: Geological units occurring within the Survey Area

Unit code	Unit name	Description	Extent in Survey Area	
			ha	%
_W-YPP	Sheetwash unit, YPP	Clay, silt, and sand in extensive fans; local ferruginous gravel	334.45	46.64
_C-YPP	Colluvial unit, YPP	Colluvium derived from different rock types; includes gravel, sand, and silt	161.79	22.56
_X-YPP	Exposed unit, YPP	Exposed bedrock	130.29	18.17
_Lm-YPP	Lacustrine unit, YPP	Mixed dunes, evaporite, and alluvial deposits; typically adjacent to playa lakes	57.02	7.95
_Rr-f-YPP	Residual or relict unit, YPP	Ferruginous duricrust, massive to rubbly; includes iron-cemented reworked products	21.49	3
_A-YPP	Alluvial/fluvial unit, YPP	Clay, silt, sand, and gravel in channels and on floodplains	10.72	1.49
_Lp-YPP	Lacustrine unit, YPP	Saline and gypsiferous evaporite deposits, clay, silt, and sand in playa lakes	1.26	0.18
		Total	**717.03**	**100**

Source: GSWA (2016)

2.6 Hydrology and Surface Drainage

The Survey Area does not contain major rivers or watercourses and is likely to only contain surface water for temporary periods of time following substantial rainfall events. Two minor non-perennial watercourses intersect the eastern boundary of the Survey Area. Surface drainage flows away from the site toward salt lakes situated on both the east and western flanks of the Survey Area (Figure 2.5).

340000

350000

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6590000

6580000

Brown Hill

Trafalgar

Boulder

Lakewood

Kurrawang

Mungari

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

Land System

- BB5
- Graves System
- Gumland System
- Lefroy System
- Moriarty System
- Mx43
- SV15

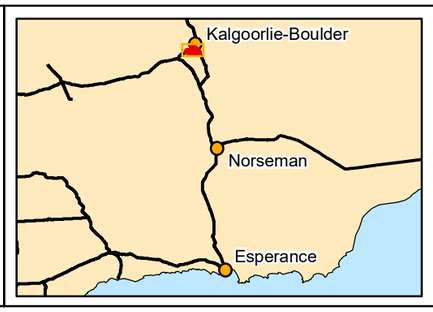
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



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Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 2.2: Land systems of the Survey Area

340000

350000

360000

6590000

6580000

Brown Hill

Trafalgar

Boulder

Lakewood

Kurrawang

Mungari

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

Soil Unit

- BB5
- Mx43
- SV15

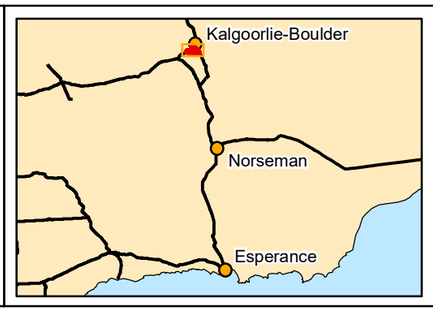
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 2.3: Soils of the Survey Area

340000 350000 360000

6590000

6580000

Brown Hill
Trafalgar
Boulder
Lakewood
Kurrawang
Mungari

A-YPP
C-YPP
Lm-YPP
Lp-YPP
Rr-f-YPP
Rs-g-YPP
S-YPP
W-YPP
X-YPP

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

Regolith Geology

- A-YPP; Alluvial/fluvial unit
- C-YPP; Colluvial unit
- Lm-YPP; Lacustrine unit
- Lp-YPP; Lacustrine unit
- Rr-f-YPP; Residual or relict unit
- Rs-g-YPP; Residual or relict unit
- S-YPP; Sandplain unit
- W-YPP; Sheetwash unit
- X-YPP; Exposed unit

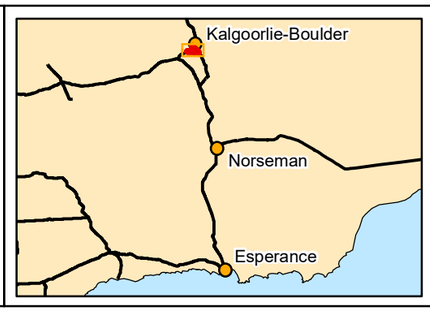
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



BHP NICKEL WEST

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Figure 2.4: Broad geology of the Survey Area

340000 350000 360000

6590000

6580000

Kopai Lake
Kurrawang
Mungari
Brown Hill
Trafalgar
Boulder
Lakewood
Hannan Lake
Douglas Lake
White Lake
Blue Dam
Red Lake
Brown Lake

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Lake/ Wetland

Surface Hydrology

- Minor

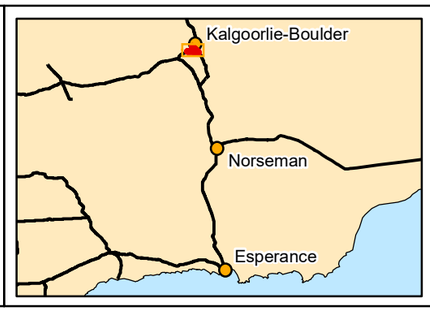
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



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Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 2.5: Hydrology of the Survey Area

2.7 Vegetation System Associations

Located in the Coolgardie Botanical District, in the South Western Interzone Botanical Province, the Survey Area is characterised by eucalypt woodlands, becoming open and with saltbush-bluebush understorey on the more calcareous soils (Beard, 1990). Beard (1990) broadly mapped the vegetation of Western Australia in terms of vegetation associations, including the Survey Area, and Shepherd *et al.* (2002) reinterpreted and updated the mapping to reflect the National Vegetation Information System (NVIS Technical Working Group) standards and to take into account extensive clearing that had occurred since (ESCAVI, 2003).

Based on updated mapping by Shepherd *et al.* (2002), the Survey Area occurs across five vegetation system associations (Table 2.4, Figure 2.6). Coolgardie 9 described as medium woodland: coral gum (*Eucalyptus torquata*) and Goldfields blackbutt (*E. lesouefii*) occurs predominantly in the smelter Survey Area and in the corridor Survey Area (Figure 2.6). Coolgardie 1294 (medium woodland: coral gum) represents a large strip of the eastern portion of the smelter Survey Area and is also present in the targeted Survey Area. This association is well represented in the Coolgardie bioregion (Figure 2.6). Vegetation association Coolgardie 936 is mapped as occurring in the south-western corner of the smelter Survey Area and is characterised by medium woodland comprising salmon gum (Shepherd *et al.*, 2002). The portion of this association within the Survey Area is located at the north-eastern extent of the association within the greater area (Figure 2.6). The remaining two associations Coolgardie 123 (succulent steppe with open low woodland: sheoak over saltbush and bluebush) and Coolgardie 125 (bare areas: salt lakes) are represented in small areas within Survey Area. The latter two associations, while minimally represented within the Survey Area, are proportionately represented in the broader area (Figure 2.6). Clearing of these vegetation system associations has been minimal, with greater than 95 % of the original vegetation remaining at the time of mapping (Government of Western Australia, 2018) (Table 2.4). While the vegetation is largely intact, the level of protection offered to these vegetation system associations is low, with Coolgardie 9 and Coolgardie 1294 having less than 2 % of its extent located within the State Reserve System at state, regional and subregional levels (Government of Western Australia, 2018) (Table 2.4).

Table 2.4: Regional and local extent of vegetation system associations within the Survey Area

Code	Description	Extent in Survey Area (ha /%)	Scale	Pre-European extent (ha)	Current extent (ha /% of Pre-European extent)	Current extent remaining in reserves (ha /%)
Coolgardie 9	Medium woodland; coral gum (*Eucalyptus torquata*) and goldfields blackbutt (*E. lesouefii*)	512.5 / 71.5	State	98,770	95,687 / 96.9	521 / 0.5
			Bioregion	98,770	95,687 / 96.9	521 / 0.5
			Subregion	98,770	95,687 / 96.9	521 / 0.5
			LGA	26,268	25,038 / 95.3	0 / 0
Coolgardie 1294	Medium woodland; coral gum (*E. torquata*)	125.5 / 17.5	State	6,296	6047 / 96.1	114.8 / 1.9
			Bioregion	6,296	6047 / 96.1	114.8 / 1.9
			Subregion	6,296	6047 / 96.1	114.8 / 1.9
			LGA	2,910	2,669 / 91.7	0 / 0
Coolgardie 936	Medium woodland: salmon gum (*E. salmonophloia*)	42.2 / 5.9	State	57,830	57,459 / 99.4	0 / 0
			Bioregion	57,830	57,459 / 99.4	0 / 0
			Subregion	57,551	57,179 / 99.4	0 / 0
			LGA	2,173	2,173 / 100	0 / 0
Coolgardie 123	Succulent steppe with open low woodland; sheoak over saltbush and bluebush	36.2 / 5.0	State	9,090	8,902 / 97.9	0 / 0
			Bioregion	9,090	8,902 / 97.9	0 / 0
			Subregion	9,090	8,902 / 97.9	0 / 0
			LGA	3,082	2,893 / 95.3	0 / 0
Coolgardie 125	Salt lake, lagoon, clay pan	0.6 / 0.1	State	13,429	13,261 / 98.8	0 / 0
			Bioregion	13,391	13,223 / 98.8	0 / 0
			Subregion	13,391	13,223 / 98.8	0 / 0
			LGA	8,828	8,702 / 98.6	0 / 0
	Total	**717 /100**				

NB: Bioregion: Coolgardie, Subregion: Eastern Goldfields, Local Government Authority: City of Kalgoorlie-Boulder

NB: Values have been rounded to two decimal places for hectares and to one decimal place for percentages.

Reserves – International Union of Nature Conservation (IUCN) Class I-IV reserves (i.e. National Parks, Strict Nature Reserves)

Source: Government of Western Australia (2018)

340000
350000
360000
6590000
6580000

Brown Hill
Trafalgar
Boulder
Lakewood
Kurrawang
Mungari

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

Pre-European Vegetation

- BARLEE_20
- COOLGARDIE_123
- COOLGARDIE_125
- COOLGARDIE_1294
- COOLGARDIE_468
- COOLGARDIE_540
- COOLGARDIE_9
- COOLGARDIE_936
- RANDELL_468

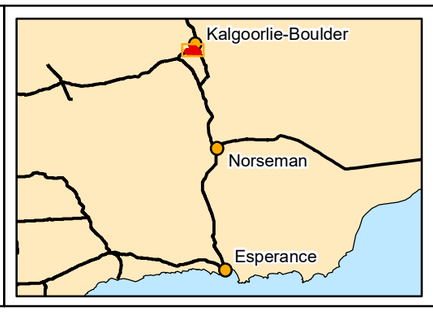
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



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Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 2.6: Pre-European vegetation of the Survey Area

3 DESKTOP ASSESSMENT

3.1 Methods

A desktop assessment comprising database searches and a literature review was undertaken prior to the field survey. The purpose of the desktop assessment was to compile a list of terrestrial vertebrate fauna and terrestrial vascular flora species potentially occurring in the Survey Area. Eight database searches were conducted (Table 3.1). Thirteen reports (four fauna and nine flora) which document the results of previous surveys conducted in the vicinity of the Survey Area were used in the literature review (Table 3.2). These references were sourced from a search of the Index of Biodiversity Surveys for Assessments (IBSA) online portal (provided by the Department of Water and Environmental Regulation), or the EPA website for project assessments. Additional reports were provided to Biologic from BHP NiW.

Table 3.1: Details of database searches conducted

Database	Source	Information	Search parameters
Birdata Online Species Search	BirdLife Australia (BirdLife Australia, 2021)	List of bird species known to occur	Survey Area with a 40 km buffer
Threatened Fauna Database	Department of Biodiversity, Conservation and Attractions (DBCA, 2021c)	Previous records of vertebrate fauna species of conservation significance	Survey Area with an 80 km buffer
NatureMap	Department of Biodiversity, Conservation and Attractions (DBCA, 2021a)	List of vertebrate, invertebrate fauna and vascular flora species known to occur	Survey Area with a 40 km buffer
Protected Matters Database Search Tool	Department of Agriculture, Water and the Environment (DAWE, 2021)	List of Matters of Environmental Significance (MNES) known or likely to occur – vascular flora, vertebrate fauna, ecological communities, weeds	Survey Area with a 40 km buffer
Threatened and Priority Ecological Communities Database	Department of Biodiversity, Conservation and Attractions (DBCA, 2021b)	Known records of ecological communities of conservation significance (TECs/ PECs)	Survey Area with a 50 km buffer
Threatened and Priority Flora Database	Department of Biodiversity, Conservation and Attractions (DBCA, 2021d)	Previous records of flora species of conservation significance	Survey Area with an 80 km buffer
Atlas of Living Australia	Atlas of Living Australia ALA (2021)	List of vascular flora species records from a variety of sources (including citizen science)	Survey Area with a 40 km buffer
Declared Pests Database – Western Australian Organism List (WAOL).	Department of Primary Industries and Regional Development (DPIRD, 2021c)	Introduced flora listed under section 22 of the BAM Act	Search of the entire City of Kalgoorlie-Boulder LGA

Table 3.2: Previous surveys considered in the literature review

Survey	Type[1]	Distance from Survey Area (km)
Fauna		
Biological Assessment - Binduli Expansion Project. Level 1 Vertebrate fauna and short range endemic invertebrate fauna survey (Eco Logical, 2016)	Level 1 fauna assessment and targeted malleefowl survey	Overlaps Survey Area
The biological survey of the eastern goldfields of Western Australia. Part 8: Kurnalpi - Kalgoorlie study area, Records of the Western Australian Museum, Supplement 41 (McKenzie *et al.*, 1992)	Level 2 vertebrate survey of Eastern Goldfields Region	Overlaps Survey Area
Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades (Cowan & How, 2004)	Level 2 vertebrate fauna survey. Several surveys to compare faunal assemblages with a 20 year gap.	50-80 km north
Detailed and Targeted Fauna Survey By-product Storage Site (Onshore, 2021)	Level 2 vertebrate fauna survey	15.0 km north
Flora		
Flora and vegetation survey of the Furnace Rebuild Project Area (Mattiske, 2008)	Level 1 flora and vegetation survey	Covers smelter Survey Area
Reconnaissance flora and vegetation survey of Lot 500 Great Eastern Highway Kalgoorlie (Native Vegetation Solutions, 2018)	Reconnaissance flora and vegetation survey	Adjacent
Reconnaissance flora and vegetation survey for the Mt Marion Project Area (Native Vegetation Solutions, 2019a)	Reconnaissance flora and vegetation survey	14.0 km south-southwest
Joint Venture Operation in the Bulong area: Level 1 vegetation, flora and fauna assessment (GHD, 2015)	Level 1 flora, vegetation and fauna survey	17.0 km east
Flora and vegetation survey for Mungari Gold Operations Cutters Ridge Project (Phoenix, 2019)	Two phase detailed flora and vegetation survey	27.5 km north-northwest
Evolution Mining targeted flora search *Calandrinia lefroyensis/ quartzitica* (Spectrum, 2019)	Targeted flora survey	31 km northwest
Coolgardie landfill: flora, vegetation and fauna habitat assessment (Strategen Environmental, 2019)	Detailed flora and vegetation survey, and fauna habitat assessment	33.5 km west-southwest
Reconnaissance flora and vegetation survey of the Spargos Project (Native Vegetation Solutions, 2020)	Reconnaissance flora and vegetation survey	37 km south
Reconnaissance flora and vegetation survey of the Racetrack, Royal Standard and Golden Funnel Projects (Native Vegetation Solutions, 2019b)	Reconnaissance flora and vegetation survey	37.5 km northwest

[1]A detailed review of these studies, including description of survey effort, is provided in Appendix B.

3.2 Results

3.2.1 Vertebrate Fauna

The desktop assessment identified 297 vertebrate fauna species that have previously been recorded within the vicinity of the Survey Area or have a distribution that potentially extends over the Survey Area. This list comprised 172 birds, 38 mammals (10 introduced), 81 reptiles and six amphibians (Table 3.3, Figure 3.1, Appendix D). Twenty-three of these species are of conservation significance comprising 19 birds, three mammals and one reptile (Table 3.4; Appendix D). One of the conservation significant mammals recorded in the desktop (*Myrmecobius fasciatus*, numbat) is an historical record that no longer represents the species natural distribution. While it is included in the desktop search results section (including within figures and tables for the desktop search results) this species will not be considered further within this report. No species of conservation significance have previously been recorded within the Survey Area.

It is important to note the number of species identified during the desktop assessment is likely to be an overestimation of the number of species potentially occurring in the Survey Area. This is because database searches and previous studies were conducted in areas that contained habitats that are not represented in the Survey Area.

Table 3.3: Vertebrate fauna species richness desktop assessment

Source	Mammals	Mammals (introduced)	Birds	Birds (introduced)	Reptiles	Amphibians	Total
Literature review							
Eco Logical (2016)	3	3	41	0	12	1	60
McKenzie *et al.* (1992)	13	2	55	0	37	3	110
Cowan and How (2004)	6	1	0	0	43	1	51
Onshore (2021)	7	3	46	0	16	0	72
Database searches							
DBCA Threatened Fauna (DBCA, 2021c)	1	0	12	0	1	0	14
NatureMap (DBCA, 2021a)	24	5	131	3	75	6	244
Protected Matters (DAWE, 2021)	2	7	14	3	1	0	27
Birdata (BirdLife Australia, 2021)	0	0	148	3	0	0	151
Total number of species	**28**	**10**	**169**	**3**	**81**	**6**	**297**
Total number of species of conservation significance	**3**	**0**	**19**	**0**	**1**	**0**	**23**

Table 3.4: Conservation significant vertebrate fauna desktop assessment

Species Name	Common Name	Conservation Status		
		EPBC Act	BC Act	DBCA
Mammals				
Dasyurus geoffroii fortis	Chuditch	VU	VU	
Myrmecobius fasciatus	Numbat	EN	EN	
Macrotis lagotis	Greater bilby	VU	VU	
Birds				
Apus pacificus	Fork-tailed swift	MI	MI	
Calyptorhynchus latirostris	Carnaby's cockatoo	EN	EN	
Thinornis cucullatus	Hooded plover			P4
Falco hypoleucos	Grey falcon	VU	VU	
Falco peregrinus	Peregrine falcon		OS	
Leipoa ocellata	Malleefowl	VU	VU	
Motacilla cinerea	Grey wagtail	MI	MI	
Pezoporus occidentalis	Night parrot	EN	CR	
Polytelis alexandrae	Princess parrot	VU		P4
Calidris acuminata	Sharp-tailed sandpiper	MI	MI	
Calidris alba	Sanderling	MI	MI	
Calidris ferruginea	Curlew sandpiper	CR/MI	CR/MI	
Calidris melanotos	Pectoral sandpiper	MI	MI	
Calidris ruficollis	Red-necked stint	MI	MI	
Tringa brevipes	Grey-tailed tattler	MI	MI	P4
Tringa glareola	Wood sandpiper	MI	MI	
Actitis hypoleucos	Common sandpiper	MI	MI	
Tringa nebularia	Common greenshank	MI	MI	
Plegadis falcinellus	Glossy ibis	MI	MI	
Reptiles				
Egernia stokesii badia	Western spiny-tailed skink	EN	VU	

250000 300000 350000 400000 450000 500000

6650000 6600000 6550000 6500000

Coolgardie North Rd
Ora Banda Davyhurst Rd
Kalgoorlie Leonora Railway
Black Flag - Ora Banda Rd
Goldfields Hwy
Yarri Rd
Camelia Rd
Kurnalpi - Pinjin Rd
Mt Walton Access
Bulong Rd
Bulong - Curtin Rd
Jaurdi Hill Rd
East Perth Terminal Kalgoorlie Railway
Great Eastern Hwy
West Kalgoorlie Esperance Railway
Mount Monger Rd
Trans Access Rd
Ryans Find Rd
Coolgardie Esperance Hwy
Nepean Rd
Nepean - Spargoville Rd
Victoria Rock Rd
Burra Rock Rd
St Ives Rd
Great Eastern Hwy
Cave Hill North Rd
Binneringie Rd

DBCA (2021b)

Bird

- Curlew sandpiper - CR
- Carnaby's cockatoo - EN
- Malleefowl - VU
- Blue-billed duck - P4
- Grey-tailed tattler - P4
- Hooded plover - P4
- Western rosella (inland) - P4
- Common sandpiper - MI
- Common greenshank - MI
- Glossy ibis - MI
- Oriental plover - MI
- Red-necked stint - MI
- Ruddy turnstone - MI
- Sanderling - MI
- Sharp-tailed sandpiper - MI
- Wood sandpiper - MI
- Peregrine falcon - OS

Mammal

- Chuditch - VU

Reptile

- Western spiny-tailed skink - VU

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor
- Local Road
- State Road
- Rail

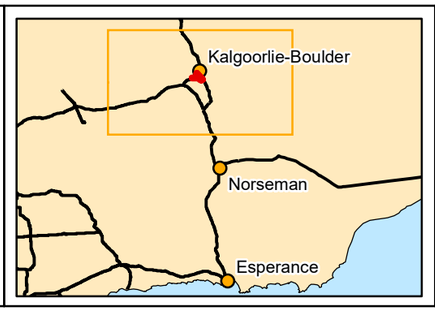
N

biologic Environmental Survey

Scale: 1:750,000

0 20 40 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



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Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 3.1: Conservation significant fauna desktop assessment results

3.2.2 Flora and Vegetation

A total of 1222 vascular flora species from 92 families and 398 genera were identified during the desktop assessment (Appendix E).

Ninety-six flora of conservation significance were identified during the desktop assessment. These taxa were assessed and ranked on the likelihood of occurring within the Survey Area. The rankings were assigned using the following definitions presented in Table 3.5.

Table 3.5: Flora likelihood of occurrence decision matrix

Occurrence categories	Habitat categories (within the Survey Area)			
	Core/ critical habitat present	Suitable habitat present/ within known distribution	Marginal habitat present/ adjacent to known distribution	No suitable habitat present/ outside of known distribution
Recorded in the Survey Area	Confirmed	Confirmed	Confirmed	Confirmed
Recorded within <5 km	Highly Likely	Likely	Possible	Possible
Recorded within 5-15 km	Likely	Possible	Possible	Unlikely
Recorded within 15 -50 km	Possible	Possible	Unlikely	Unlikely
Recorded >50 km	Possible	Unlikely	Unlikely	Highly Unlikely
Species considered locally/ regionally extinct	Unlikely	Unlikely	Highly Unlikely	Highly Unlikely

Of the 96 taxa, four are Threatened, 31 are Priority one, 15 are Priority two, 38 are Priority three and eight are Priority four (Appendix F). The pre-survey likelihood of occurrence determined two taxa as Highly Likely to occur, three as Likely, and 11 as Possible (Appendix F; Table 3.6). The remaining 80 taxa were considered either Unlikely (40) or Highly Unlikely (40) to occur. Seven species were from unverified ALA records with known distributions of up to 750 km from the Survey Area and were thus considered Highly Unlikely to occur.

Four conservation significant flora were not identified by any of the database searches but were found in previous reports and have subsequently been included in the total of 96. One of these, *Seringia exastia* (T), was found by Native Vegetation Solutions (2020) approximately 37 km south of the Survey Area. A recent revision of the *Seringia* genus found that *Seringia exastia* (T) and *Seringia elliptica* are the same species, with the latter consequently being subsumed into *S. exastia* (Binks *et al.*, 2020). *Seringia exastia* (T), a species previously only known to occur in the Kimberley, now has a much more widespread distribution (primarily in the Pilbara and mid-West). A nomination to delist the species has

been made to the WA Threatened Species Scientific Committee and is expected to be authorised; however until the change is officially made, *Seringia exastia* is still listed as Threatened.

Table 3.6: Conservation significant flora taxa likelihood (Highly Likely, Likely, Possible)

Taxon	Conservation Status			Habit and Habitat	Distance to nearest record	Likelihood of Occurrence
	DBCA	BC Act	EPBC Act			
Eremophila praecox	P2			Broom-like shrub, 1.5-3 m high. Fl. purple, Oct or Dec. Red/brown sandy loam. Undulating plains.	1.2 km NE	**Highly Likely**
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.	1.6 km N	**Highly Likely**
Notisia intonsa	P3			Prostrate, clumping annual herb, to 0.1 m high. Fl. grey-pink-brown, Sept-Nov. Red clay, ironstone/quartz gravel, cracking clay. Floodplains, slopes, salt lakes.	1.2 km S	**Likely**
Isolepis australiensis	P3			Annual, grass-like or herb (sedge), 0.03-0.055 m high. Fl. Jun or Sep. Silty sand, sandy clay. Lake margins, pools.	1.6 km WSW	**Likely**
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.	1.5 km W	**Likely**
Gastrolobium graniticum	T	VU	EN	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.	19.7 km SW	**Possible**
Acacia websteri	P1			Shrub, 1.2-5 m high, bark fibrous. Fl. Yellow, Jan, June. Red sand, clay or loam. Low-lying areas, flats.	19.7 km SW	**Possible**
Goodenia salina	P2			Annual, herb, 0.02-0.2 m high. Well-drained, saline, grey or brown loamy clay. Low gypseous dunes near salt pans.	1.6 km WSW	**Possible**
Elachanthus pusillus	P2			Ascending or decumbent annual, herb, to 0.15 m high. Fl. yellow-green, Aug to Oct.	8.2 km NE	**Possible**
Lepidium merrallii	P2			Erect to spreading annual (possibly ephemeral), herb, 0.03-0.15 m high. Clay loam.	19.7 km SW	**Possible**
Lepidium fasciculatum	P3			Erect annual, herb, (0.1-)0.3-0.6 m high.	7.8 km NE	**Possible**
Cyathostemon verrucosus	P3			Low spreading shrub, to 0.4 m tall. Fl. White, Mar-Apr, Sept-Dec. Yellow sand. Sandplain, flat or undulating.	10.3 km NNE	**Possible**

Taxon	Conservation Status			Habit and Habitat	Distance to nearest record	Likelihood of Occurrence
	DBCA	BC Act	EPBC Act			
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	P3			Perennial tussock grass up to 0.4 m tall. Fl. Sept-Nov. Cracking clay, red rocky loam, sandy clay. Slopes and claypans.	11.7 km SE	**Possible**
Chrysocephalum apiculatum subsp. *norsemanense*	P3			Upright, spreading, herbaceous annual, to 0.4 m high. Fl. Yellow, Aug-Oct. Loamy sand. Gentle undulating plain, granite hills, sandplain.	19.1 km SW	**Possible**
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)	P3			Erect shrub, 0.3-2 m high. Fl. pink/purple, Aug to Dec. Red/orange loamy sand. Flats and sandplains.	19.7 km SW	**Possible**
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.	11.1 km WSW	**Possible**

One PEC, 'Emu Land System', was identified by the desktop assessment as occurring approximately 40 km to the north-east of the Survey Area (Figure 3.3). This PEC is listed as a Priority 3 community and consists of fresh or brackish ephemeral lakes and swamps with cane grass, lignum and paperbark shrublands (DBCA, 2017). The Emu Land System does not occur within the Survey Area according to soil landscape mapping for the rangelands (DPIRD, 2021a, 2021b).

The NatureMap (DBCA, 2021a), Protected Matters (DAWE, 2021), ALA (ALA, 2021) and the Western Australian Organism List (WAOL) (DPIRD, 2021c) database searches identified a list of 158 introduced taxa that may potentially occur within the Survey Area (Appendix G). The list of introduced taxa known to occur or potentially occur within the Survey Area was reviewed to identify Weeds of National Significance (WoNS) and Declared Pests (DPs).

Of the list of introduced taxa identified during the desktop assessment, 18 are listed as WoNS (Appendix G). Seventeen of the 18 WoNS were identified from the WAOL database search for the entire City of Kalgoorlie-Boulder and occur or may potentially occur within the City's boundaries. The remaining WoNS, **Lycium ferocissimum*, was identified from the EPBC Protected Matters Search Tool and rated as 'occur or may potentially occur' within a 40 km buffer of the Survey Area. The 18 taxa include numerous *Opuntia* species that are grouped together in the WoNS listing. The desktop assessment identified 46 DPs (including numerous cacti species that are all listed as DPs), previously recorded or potentially located within the City of Kalgoorlie-Boulder.

340000 350000 360000

6590000 6580000

Western Rd
Great Eastern Hwy
Hall Rd
East Perth Terminal Kalgoorlie Railway
Lake Douglas Rd
Great Eastern Hwy
Anzac Dr
Hopkins St
Burt St
Johnston St
Forrest St
Goldfields Hwy
Trans Australian Railway
Mount Monger Rd
Ballast Rd
Smelterman Dr
West Kalgoorlie Esperance Railway
Goldfields Hwy

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail

DBCA (2021b)

P1
- *Ptilotus procumbens*

P2
- *Eremophila praecox*
- *Goodenia salina*

P3
- *Alyxia tetanifolia*
- *Isolepis australiensis*
- *Melaleuca coccinea*
- *Notisia intonsa*
- *Xanthoparmelia dayiana*

P4
- *Eucalyptus jutsonii* subsp. *jutsonii*

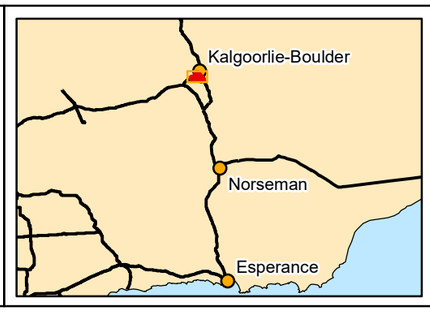
N

biologic Environmental Survey

Scale: 1:80,000

0 2 4 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 3.2: Conservation significant flora desktop assessment results

320000
360000
400000
6600000
6580000
Kintore
Dunnsville Rd
Kunanalling
Coolgardie North Rd
Kundana
Kalgoorlie Leonora Railway
Goldfields Hwy
Kanowna
Yarri Rd
Balagundi
Parkeston
Kalgoorlie
Brown Hill
Trafalgar
Boulder
Bulong Rd
Bulong
Jaurdi Hills Rd
Kurrawang
Anzac Dr
Lakewood
Trans Australian Railway
Boorara
Golden Ridge
Bulong - Curtin Rd
East Perth Terminal Kalgoorlie Railway
Mungari
Bonnie Vale
Great Eastern Hwy
Trans Access Rd
West Kalgoorlie Esperance Railway
Goldfields Hwy
Mount Monger Rd
Feysville
Coolgardie
Great Eastern Hwy
Victoria Rock Rd
Nepean Rd
Coolgardie Esperance Hwy
Mt Martin Rd
Burbanks
Londonderry

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail

Priority Ecological Community

- Emu Land System - Priority 3

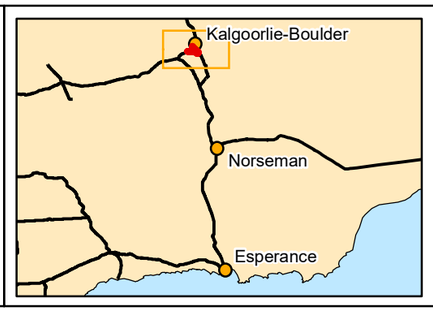
N

biologic Environmental Survey

Scale: 1:250,000

0 4 8 12 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 06/12/2021



BHP NICKEL WEST

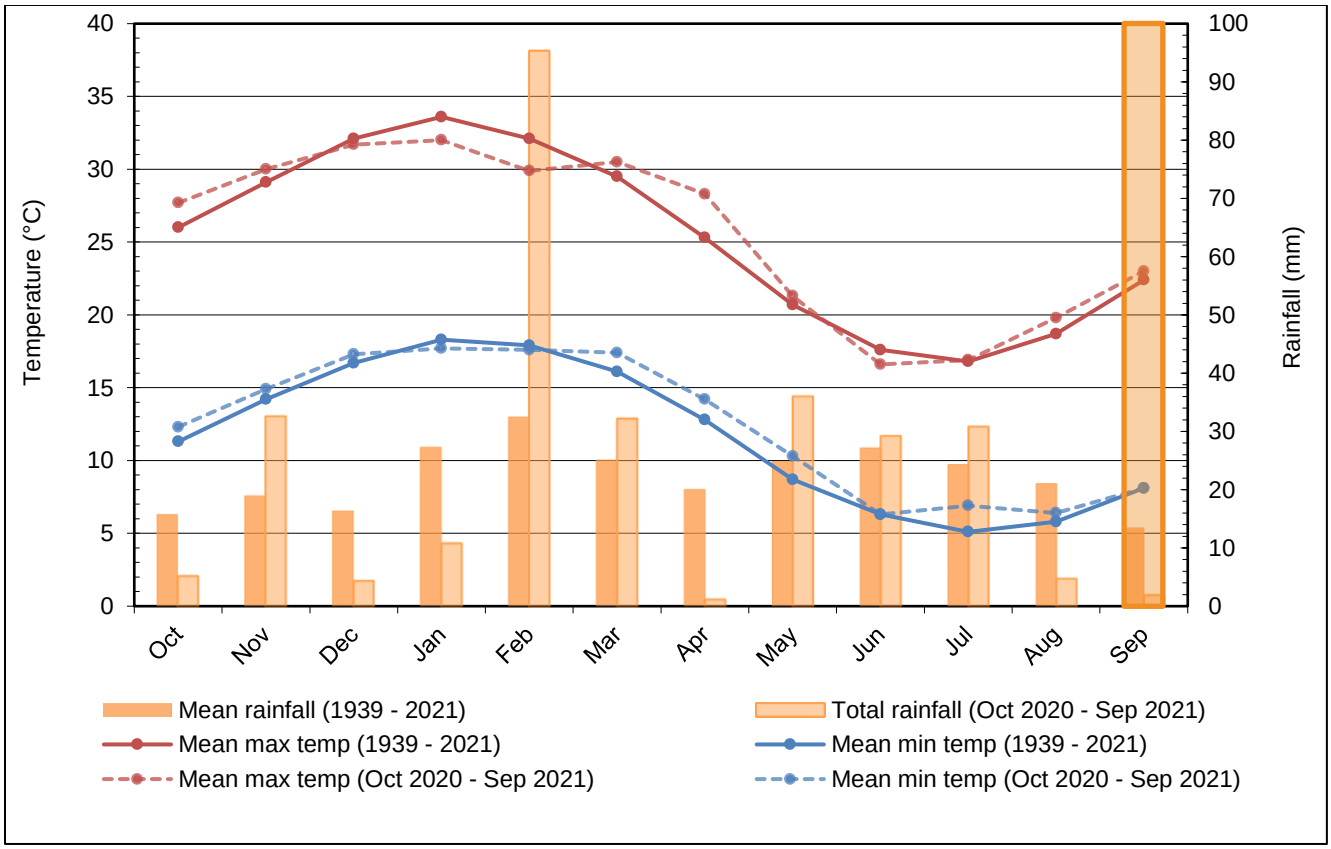
Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 3.3: Conservation significant ecological communities desktop assessment results

4 FIELD SURVEY METHODS

4.1 Survey Timing and Weather

The survey was undertaken over three days, between the 8th and 10th of September 2021. The daytime climatic conditions during the field survey (hot temperatures and clear skies; (BoM, 2021)) were adequate to complete the survey on foot. Rainfall in the 12 months preceding the field survey was variable, with some months receiving record high rainfall; for example February had 95.2 mm compared with the long-term average (LTA) of 32.4 mm, and other months receiving rainfall well below average, including the month preceding the survey (August recorded 4.8 mm compared with an LTA of 21 mm) (Figure 4.1). However, conditions within the Survey Area were favourable, with a high number of annual or short-lived perennial flora taxa present and growing at the time of the field survey. Favourable conditions experienced during the survey were likely a result of the above average rainfall received in the months prior to the survey (May - July) (Figure 4.1). The weather conditions experienced during the survey included minimum temperatures between 10-12°C and maximums between 25.6 and 31.4 °C, with no rainfall over the three days.



Source:(BoM, 2021) weather station 12038

Figure 4.1: Long-term average and pre-survey weather conditions

4.2 Survey Team

The flora and fauna field survey was managed by Sam Coultas, a senior botanist with over seven years' experience. Sam was assisted by ecologist Kaylin Geelhoed who has over 3 years' experience in fauna and flora survey throughout Western Australia. The collection of flora specimens was taken under flora collecting permit (FB62000017-2), pursuant to the BC Act (Regulation 61). Sam also holds a *Permit to Take Declared Rare Flora* for identification purposes (TFL 60-1819), issued under the BC Act, Section 40.

4.3 Vertebrate Fauna

4.3.1 Targeted Searches

The Survey Area was traversed on foot, to provide sufficient coverage and adequately assess the fauna values. Personnel actively searched while traversing the Survey Area focussing on habitat and features considered likely to support species of conservation significance (e.g. outcropping, drainage lines). All GPS tracks, sampling locations and fauna records associated with the fauna survey are displayed in (Figure 4.2, Figure 4.3). Any signs of species presence, whether via the direct observation of individuals or observations of secondary evidence (such as scats, nests, burrows, diggings, bones and carcasses), were recorded. Particular attention was given to species of conservation significance identified by the desktop assessment as potentially occurring in the Survey Area (including the night parrot, princess parrot, malleefowl and peregrine falcon). Efforts were made to search any unique microhabitats encountered, such as by searching crevices and turning rocks and logs.

4.3.2 Habitat Mapping

Habitat assessments were undertaken in the field to characterise and define habitats and their value to vertebrate fauna. These assessments were conducted to meet BHP specifications, which loosely follow methodology described in the *Australian Soil and Land Survey Field Handbook* (National Committee on Soil and Terrain, 2009), with the following habitat variables being considered:

- general site information – location, representative photo;
- landform features – landform type, aspect and inclination of slopes;
- vegetation features – floristic structure and composition, presence of leaf litter, logs, hollow-bearing trees or other habitat structures;
- substrate features – soil texture and colour, amount of bare ground, size and abundance of rocks; and
- level of disturbance – habitat condition, time since last fire, presence of weeds, grazing impacts or other human-induced disturbances.

A total of 22 habitat assessments were conducted within the Survey Area (Figure 4.2; Appendix H).

Mapping of broad fauna habitats was completed using the habitat assessments conducted during the field survey, in conjunction with high-resolution aerial imagery and previous mapping of vegetation,

topography, land systems and drainage. Habitats were delineated and mapped across the Survey Area at a scale of ~1:20,000.

4.3.3 Taxonomy and Nomenclature

The latest checklist of mammal, reptile and amphibian names published by WAM (2020) was used as a guide to the current taxonomy and nomenclature of these groups. For birds, the current checklist of Australian birds maintained by Birdlife Australia (based on Christidis & Boles, 2008) was used in conjunction with the WAM (2020) species list. While compiling a list of fauna potentially occurring in the Survey Area, all records were checked to ensure the latest taxonomy, using recent papers and lists mentioned above.

4.3.4 Likelihood of Occurrence

Species of conservation significance identified by the desktop assessment were assessed following the field survey for their post-survey likelihood of occurring within the Survey Area using a decision matrix which considers habitat suitability of the Survey Area and the proximity of previous records (Table 4.1). Based on this decision matrix, each species was assigned to one of six categories of likelihood: Confirmed, Highly Likely, Likely, Possible, Unlikely, or Highly Unlikely. The Confirmed category also takes into account species which were recorded in the Survey Area during the current field survey.

The decision matrix is intended to be an indicative guide only, and the way in which it is interpreted may vary between species, depending on a given species' habitat preferences and ability to disperse, as well as the reliability and availability of contextual information. For example, considering species which have been previously recorded close to the Survey Area, a species with a limited dispersal capability will have a reduced likelihood of occurring in the Survey Area compared with a species with greater dispersal capability. It is also recognised that a lack of records in the vicinity of the Survey Area may indicate limited sampling effort rather than species' absence, and that previous records may include historic or presumed erroneous information which may misrepresent a species' current distribution. Where the determination of a species' likelihood of occurrence within the Survey Area deviates from the decision matrix, detailed justification for any variation will be presented.

Table 4.1: Vertebrate fauna likelihood of occurrence decision matrix

		Habitat suitability of Survey Area			
		Core habitat[2] present	**Foraging and dispersal habitat present**	**Marginally suitable habitat[3] present**	**No suitable habitat present**
Species Records[1]	**Recorded in Survey Area**	Confirmed	Confirmed	Confirmed	Confirmed
	Recorded within 10 km of Survey Area	Highly Likely	Likely	Possible	Possible
	Recorded within 10–50km of Survey Area	Likely	Possible	Possible	Unlikely
	Recorded within 50–100 km of Survey Area	Possible	Possible	Unlikely	Unlikely
	Recorded >100 km of Survey Area	Possible	Unlikely	Unlikely	Highly Unlikely
	Species considered locally/regionally extinct	Unlikely	Unlikely	Highly Unlikely	Highly Unlikely

[1]Only records within the previous 50 years are considered

[2]Core habitat is habitat which contains elements (e.g. nest sites, roost sites, breeding season foraging locations) which are critical for the survival and reproduction of a species (Bingham & Noon, 1997), or habitat which is otherwise defined as critical habitat within relevant species recovery plans and guidelines.

[3]Marginally suitable habitat is habitat which is possibly used by a species for roosting or nesting, or during foraging and dispersal activities, but is unlikely to be depended upon; for example, it may be of low quality or only sporadically present

4.4 Flora and Vegetation

4.4.1 Reconnaissance Flora and Vegetation Assessment – Smelter Survey Area

Aerial photography (Scale 1: 30,000) of the smelter Survey Area and Google Earth Pro©, were used with previous vegetation mapping (Beard, 1975; Mattiske, 2008; Shepherd *et al.*, 2002), land systems mapping (van Vreeswyk *et al.*, 2004) and soil landscape mapping (Northcote *et al.*, 1960-1968), to determine broad preliminary vegetation type boundaries prior to the field survey. Reconnaissance surveys are traditionally sampled at a low intensity via relevés (unmarked area within which data is collected, EPA, 2016b) and mapping notes (unmarked area within which the vegetation type and condition is broadly described).

Where practical, at least one sampling site (relevé) was established in each of the preliminary vegetation type areas (25 relevés and 11 mapping notes in total; Figure 4.2; Appendix I) to ensure that each vegetation type occurring within the smelter Survey Area was captured by the survey and described appropriately in accordance with EPA (2016b) guidelines.

Dominant vascular flora taxa within each relevé and mapping note were recorded, along with their corresponding height. Taxa not previously recorded from sites or during site traverses were also recorded to document a comprehensive species list. A brief summary of the vegetation assemblage at each site was also recorded to aid in producing vegetation unit descriptions (NVIS Technical Working Group, 2017). In addition, the following information was recorded at each flora site:

- relevé or mapping note number;
- date of survey;
- personnel;
- a central GPS coordinate (GDA 94);
- site photograph of the representative vegetation unit being recorded;
- soil characteristics (texture and colour);
- geology (type, size and nature of any rocks, stones, gravel, or outcropping);
- topography (landform type and aspect);
- vegetation condition (based on Trudgen, 1988) (Appendix J);
- vegetation structure, including the dominant flora species in the three traditional strata, upper, mid and lower.
- disturbance (if present); and
- approximate time since last fire.

For any observed populations of conservation significant taxa or introduced flora, a GPS location and a count of the individuals present, or percentage foliar cover for a given area, were recorded.

4.4.2 Targeted Searching

Prior to the survey, a list of conservation significant flora with the likelihood to occur within the Survey Area was compiled. Field personnel familiarised themselves with photographs, reference samples and descriptions of likely conservation significant taxa before conducting the survey. Field personnel then actively searched for these conservation significant taxa while traversing the Survey Area, as well as in known locations or preferred habitat (Figure 4.2, Figure 4.3).

If a conservation significant flora species or environmentally significant weed species (WoNS or DP listed under Section 22 of the *Biosecurity and Agriculture Management Act* (BAM Act)) were identified in the field, a GPS coordinate of the individual was taken, when occurring in isolation, or a central coordinate for a small population was taken (central coordinate with an approximate 20 m radius). Generalised information was collected for each occurrence, including an estimate of individuals, reproductive status, condition and broad vegetation community and condition.

4.4.3 Identification of Flora Specimens

Plant taxa that could not be identified during the field surveys were collected and pressed for subsequent identification at the Western Australian Herbarium (WAH). Identifications were carried out by Biologic's taxonomist Dr Rachel Meissner. Assistance was sought from WAH employees when required. All taxa were checked against Florabase© (version 2.9.31; WAH, 1998-) to ensure their currency and validity. Any conservation significant flora taxa, including potential threatened and priority species, range extensions and potential new taxa have been verified and vouchered (if appropriate) at the WAH.

4.4.4 Vegetation Type Mapping – Smelter Survey Area

Broad vegetation mapping was conducted in the field, with vegetation boundaries delineated over aerial photography. Following the completion of the site sampling and taxonomic identifications, the broad vegetation types were refined based on the review of the floristic data collected from the relevés and mapping notes and results of flora and vegetation surveys that occur within and in close proximity to the smelter Survey Area. The vegetation structure information collected from the sites was reviewed to describe the vegetation units based on the dominant taxa, foliage cover and height of the three traditional strata (upper, mid and lower/ ground). This method of vegetation type determination is consistent with EPA (2016b). The vegetation type mapping was then digitised using geographic information systems (GIS) software.

The vegetation types have been described to Level 5 (Vegetation Association) in the NVIS hierarchical structure (NVIS Technical Working Group, 2017), with shortened vegetation codes (e.g. E1 - Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland) produced by identifying the dominant stratum layer, which is consistent with previous vegetation mapping completed in the smelter Survey Area (Mattiske, 2008).

The vegetation type determination has been undertaken from a broad context utilising existing vegetation mapping completed by Mattiske (2008). It is likely that further systematic sampling would

split and further refine the mapping undertaken for this survey. The mapping reliability is moderate to high across the smelter Survey Area due to the limited sampling, survey type (reconnaissance) and extent traversed.

4.4.5 Vegetation Condition Mapping – Smelter Survey Area

Vegetation condition was defined within the smelter Survey Area using the BHP (2018) vegetation condition scale which has been adapted from Keighery (1994) for the South West and Interzone botanical provinces and is also presented by the EPA (2016b) (Appendix J). The vegetation condition was determined based on the level of disturbance observed in an area. Condition was recorded at each relevé and mapping note, while additional notes were taken while traversing to broadly map vegetation condition boundaries. The vegetation condition mapping was then digitised using GIS software.

352000 354000 356000

6584000 6582000

Goldfields Hwy

West Kalgoorlie Esperance Railway

Smelterman Dr

Kalgoorlie Nickel Smelter

KAL-01 VKAL-01 KAL-02 VKAL-02 KAL-04 VKAL-03 KAL-05 VKAL-05 KAL-06 KAL-07 VKAL-07 KAL-08 VKAL-09 KAL-10 KAL-11 VKAL-11 KAL-12 VKAL-13 KAL-13 KAL-14 VKAL-14 KAL-15 VKAL-15 KAL-16 VKAL-31 KAL-31 KAL-17 KAL-18 VKAL-18 KAL-19 VKAL-19 KAL-20 VKAL-21 KAL-21 KAL-22 VKAL-22 KAL-24 VKAL-24 VKAL-25 KAL-26 KAL-27 VKAL-27 VKAL-30 KAL-28 VKAL-28 KAL-29 VKAL-29 KAL-34 VKAL-34

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor
- Local Road
- State Road
- Rail
- Fauna Site
- Flora Site
- Traverse

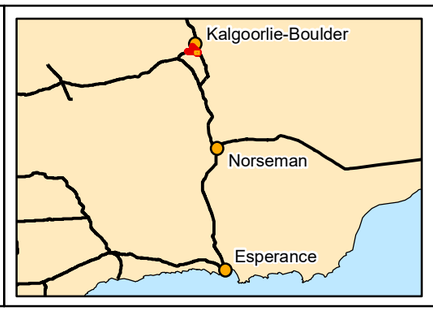
N

biologic Environmental Survey

Scale: 1:15,000

0 400 800 Meters

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 15/12/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 4.2: Sample sites and traverses

340000
344000
348000
352000
6592000
6588000
Kurrawang
Great Eastern Hwy
Sharpe Dr
Lake Douglas Rd
Hall Rd
l Kalgoorlie Railway
West Kalgoorlie Esperance Railway
Ballast Rd
Anzac Dr
Forrest St
Hopkins St
Vivian St
Lane St
VKAL-29
KAL-29
KAL-34
VKAL-34
KAL-28
VKAL-28
VKAL-30
KAL-04

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor
- Local Road
- State Road
- Rail
- Fauna Site
- Flora Site
- Traverse

N

biologic Environmental Survey

Scale: 1:41,000

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 15/12/2021

Kalgoorlie-Boulder
Norseman
Esperance

BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 4.3: Sample sites and traverses

5 RESULTS AND DISCUSSION

5.1 Vertebrate Fauna

5.1.1 Fauna Habitat

Fauna habitat assessments were completed for each of 22 sites (Appendix H) with habitat mapping subsequently completed for the smelter Survey Area (Figure 5.1). Four broad fauna habitat types were identified within the smelter Survey Area, together with a large area that is completely Cleared/ Disturbed. The four fauna habitats were, in decreasing order of extent, Open Eucalypt Woodland, Allocasuarina Shrubland, Low Chenopod Shrubland, and Claypan (Figure 5.1, Table 5.1).

The majority of the smelter Survey Area comprises Open Eucalypt Woodland, of which a variety of eucalypt species are prevalent (for example; *Eucalyptus salubris, E. yilgarnensis, E. salmonophloia, E. torquate, E. trichopoda, E. lesouefii,* and *E. griffithsii*) over a range of sparse mid-storey shrubs and grasses. The Open Eucalypt Woodland occurs on a variety of land types including flat ground to upper slopes and ridges and is not restricted to a particular soil type. Allocasuarina Shrubland habitat interrupts the Open Eucalypt Woodland habitat in a band extending north-south in the eastern portion of the smelter Survey Area. This habitat type is associated with upper slopes and ridges, sandy gravel soils with scattered calcrete and dolerite pebbles. Low Chenopod Shrubland habitat is present in the far western portion of the smelter Survey Area and is characterised by *Lycium austral, and Atriplex* species and is associated with flat ground of clayey-loam soil that is seasonally inundated. A small area of Claypan habitat occurs in the north-western portion of the smelter Survey Area, associated with the low lying, flat land associated with further claypan and salt lake systems located further to the west of the Survey Area.

Cleared/ Disturbed areas occur primarily in the north and north-eastern portions of the smelter Survey Area and are associated with the existing Kalgoorlie Nickel Smelter operations.

The corridor Survey Area was not subjected to vegetation or habitat mapping during this survey, however, the interpretation of pre-european vegetation alongside the habitat mapping undertaken within the smelter Survey Area can provide suppositions on the habitat contained within the corridor Survey Area. Each corridor is affected by cleared or disturbed areas related to existing roads and infrastructure. The road corridor to the east traverses four vegetation associations also represented within the smelter Survey Area (Coolgardie_9, Coolgardie1294, Coolgardie_123 and Coolgardie_125) and as such is likely to contain all four habitat types associated with the vegetation associations respectively (Open Eucalypt Woodland, Allocasuarina Shrubland, Open Chenopod Shrubland and Claypan) (Table 5.1). The pipeline corridor to the north traverses primarily Coolgardie_9 vegetation association (Figure 2.6) which is associated with Open Eucalypt Woodland, with some potential for the occurrence of Allocasuarina Shrubland (Coolgardie_1294) and Open Chenopod Shrubland (Coolgardie_123).

Open Eucalypt Woodland

The Open Eucalypt Woodland habitat provides structure and diversity for fauna species through offering potential nesting and roosting opportunities, shelter, foraging and safe dispersal corridors. Fallen logs and branches and a small accumulations of leaf litter provide habitat for small mammals and reptiles. This

habitat is common throughout the Survey Area and surrounding region and does not provide any specific or unique habitat value to any of the conservation significant fauna species that may utilise the Survey Area.

Allocasuarina Shrubland

The Allocasuarina Shrubland habitat occurs in a north-south directional band that is dissected in several instances by disturbed areas (i.e. cleared areas, mining and infrastructure). This habitat type is not restricted to the Survey Area and is common in the surrounding region (a common habitat of the Coolgardie IBRA bioregion). Allocasuarina Shrubland habitat may provide valuable refuge, dispersal and foraging properties to many fauna species, due to the high-density foliage cover and interconnectivity throughout the landscape. Sandy and pebble-gravel soils can provide potential nesting habitat and material for malleefowl in addition to the added protection of the dense foliage of surrounding vegetation.

Open Chenopod Shrubland

The Open Chenopod Shrubland habitat may provide valuable refuge, dispersal and foraging properties to many fauna species, due to the diversity of form and structure of shrubs and grasses, the proximity to and occasional presence of water, and provision of shelter in an otherwise open and low relief habitat. The habitat is present on the western margin of the Survey Area and extends into the surrounding region associated with a series of claypan and salt lake systems. This habitat is also likely to be present in the corridor Survey Area. The extent of this habitat type within the Survey Area is relatively small and does not provide any specific or unique habitat value to any of the conservation significant fauna species that may utilise the Survey Area.

Claypan

The area of Claypan habitat is restricted to the north-west corner of the Survey Area (Figure 5.1). This habitat type is also likely to be present throughout the road portion of the corridor Survey Area. Claypan habitat is widespread in the Coolgardie bioregion and extensive claypans are located immediately to the west and east of the Survey Area. The Claypan habitat provides for foraging and dispersal for many vertebrate species and when inundated may be used by waterbird and migratory bird species such as the wood sandpiper, sharp-tailed sandpiper, pectoral sandpiper, common sandpiper, red-necked stint, glossy ibis and common greenshank. The small area of Claypan within the Survey Area is only of importance to these species on a seasonal basis (when inundated) and does not represent high quality habitat in comparison to nearby salt lakes and claypans outside of the Survey Area

Cleared/ Disturbed

Artificial water sources located within the north-western portion of the Survey Area may be used by waterbird species, however the series of ponds are located within a highly disturbed area associated with mining operations and therefore not of value to fauna for long-term survival. The habitat provides little to no value to fauna species, particularly those of conservation significance.

Table 5.1: Broad fauna habitat types identified within the Survey Area

Habitat	Distinguishing features	Local and Regional Extent	Representative photo
Open Eucalypt Woodland Extent in Survey Area: 353.4 ha (58.2%)	*Eucalyptus griffiths* and *E. trichopoda* woodland over Senna shrubland, sparse understorey. Fallen branches and bark piles, some logs and hollows present. The understorey vegetation may provide shelter and nesting habitat for ground dwelling birds.	Open Eucalypt Woodland is broadly associated with land system Mx43 (gently undulating plains and pediments with some outcropping) and Vegetation Association Coolgardie_9 (Shepherd *et al.*, 2002), which are wide spread in the surrounding area and bioregion (Figure 2.2, Figure 2.6).	
Allocasuarina Shrubland Extent in Survey Area: 30.2 ha (5.0%)	Characterised by a tall dense shrubland dominated by *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* tall shrubs over sand or rocky substrates. This habitat contains scattered larger trees and mallees. The understorey vegetation may provide shelter and nesting habitat for ground dwelling birds.	Allocasuarina Shrubland habitat is closely associated with the Pre-European mapping extent of Coolgardie_1294 (Figure 2.6). This particular vegetation association is limited to 11 linear bands within the local (40km) region.	

Habitat	Distinguishing features	Local and Regional Extent	Representative photo
Low Chenopod Shrubland Extent in Survey Area: 40.3 ha (6.6%)	Low dense shrublands with scattered grasses. Provides shelter for bird and mammal species of conservation significance with possible nesting habitat and proximity to water sources for foraging, seasonally when inundated.	Low Chenopod Shrubland is broadly associated with land system SV15 and Vegetation Association Coolgardie_123 (Shepherd, 2002 #5083), which are common in the surrounding local area and bioregion in association with salt lakes and claypans (Figure 2.2, Figure 2.6).	
Claypan Extent in Survey Area: 0.8 ha (0.1%)	Open low-lying claypans and flats with scattered shrubs and grasses. Inundated seasonally following rains providing foraging habitat for waterbird and migratory bird species.	Claypan fauna habitat is broadly associated with land system SV15 and Vegetation Association Coolgardie_125 (Shepherd, 2002 #5083), which are common in the surrounding local area and bioregion in association with low relief plains and salt lakes (Figure 2.2, Figure 2.6).	
Cleared/ Disturbed Extent in Survey Area: 182.3 ha (30.0%)	Distinguished by the absence or severe reduction in vegetation and high levels of disturbance activities.	NA	NA

354000
356000
358000
6584000
6582000
West Kalgoorlie Esperance Railway
Kalgoorlie Nickel Smelter
Smelterman Dr

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor
- Local Road
- State Road
- Rail
- Malleefowl - Mound (inactive)

Fauna Habitat

- Allocasuarina Shrubland
- Claypan
- Open Chenopod Shrubland
- Open Eucalypt Woodland
- Cleared/ Disturbed

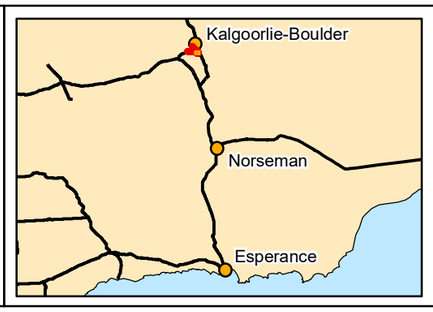
N

biologic Environmental Survey

Scale: 1:14,900

0 300 600 Meters

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 30/11/2021



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Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 5.1: Fauna habitat and species of conservation significance recorded in the Survey Area

5.1.2 Fauna Records

A total of 16 bird species and two mammal species were observed during the field survey. One of these species, the rabbit (**Oryctolagus cuniculus*) is an introduced pest species. One species of conservation significance was recorded, an old and inactive malleefowl mound located in the smelter Survey Area; however, no recent evidence of the species was detected.

Table 5.2: Vertebrate fauna species recorded during the field survey

Scientific Name	Common Name	Conservation Status		
		EPBC Act	BC Act	DBCA
Mammals				
Oryctolagus cuniculus	Rabbit*			
Macropus fuliginosus	Western grey kangaroo			
Birds				
Ptilotula plumula	Grey-fronted honeyeater			
Nymphicus hollandicus	Cockatiel			
Cinclosoma clarum	Chestnut-breasted quail-thrush			
Coracina novaehollandiae	Black-faced cuckoo-shrike			
Cracticus torquatus	Grey butcherbird			
Cracticus tibicen	Australian magpie			
Corvus coronoides	Australian raven			
Smicrornis brevirostris	Weebill			
Grallina cyanoleuca	Magpie-lark			
Malurus lamberti subsp. *assimilis*	Variegated fairy-wren			
Dromaius novaehollandiae	Emu			
Platycercus zonarius	Australian ringneck			
Strepera versicolor	Grey currawong			
Todiramphus sanctus	Sacred kingfisher			
Oreoica gutturalis	Crested bellbird			
Leipoa ocellata	Malleefowl	VU	VU	

* Introduced Species

5.1.3 Species of Conservation Significance

The desktop assessment identified 23 vertebrate fauna species of significance, including 19 birds, three mammals and one reptile (Appendix B). A likelihood of occurrence assessment for species of conservation significance identified in the desktop assessment was undertaken using the decision matrix shown in Table 4.1. The occurrence assessment was based on known information relating to species' distribution, habitat preferences (landforms, substrates and vegetation associations), locality and previous records. The malleefowl was the only vertebrate fauna species of significance to be confirmed within the survey area (recorded during the field survey) (Table 5.2, Figure 5.1), The Survey Area contains suitable habitat for a further nine of the 23 significant species identified in the desktop review, of which eight species are considered Possible to occur (all Migratory bird species). The curlew sandpiper (*Calidris ferruginea*), the ninth species identified in the desktop review as having potential

habitat within the Survey Area, is a predominantly coastal inhabitant and with no suitable nesting habitat identified in the smelter Survey Area, is considered Unlikely to occur. No species were considered Highly Likely or Likely to occur, with the remaining 13 species identified in the desktop assessment considered Unlikely to Highly Unlikely to occur (Table 5.3).

Table 5.3: Conservation significant vertebrate fauna species likelihood of occurrence

Common Name (Scientific Name)	Conservation Status				Preferred Broad Habitats	Nearest Record to the Survey Area	Potential Critical Habitat Within the Survey Area				Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN			Eucalypt Woodland	Allocasuarina Shrubland	Low Chenopod Shrubland	Claypan			
Mammals													
Greater bilby (*Macrotis lagotis*)	VU	VU		VU	Sandy spinifex and tussock grasslands/shrublands throughout current distribution. In the southwest, mixture of woodland including Jarrah, Marri and Wandoo (Abbott, 2001).	~5.2 km (NE) – from road corridor and ~13 km (N) – of Smelter Survey Area -1976 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Chuditch (*Dasyurus geoffroii*)	VU	VU		NT	The species is known to occupy in a wide range of habitats from woodlands, dry sclerophyll (leafy) forests, riparian vegetation, beaches and deserts (DEC, 2012). In the jarrah forest, Chuditch occur in moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest particularly in riparian vegetation (Orell & Morris, 1994).	~37 km SSE – 1974 (DBCA, 2021c)					Highly Unlikely	N/A	Suitable habitat not present
Birds													
Curlew sandpiper *(Calidris ferruginea)*	CR/MG	CR/MG		NT	Inhabits intertidal mudflats in sheltered coastal areas (i.e. estuaries, bays, inlets and lagoons) (Geering *et al.*, 2007). This rare species generally roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (Geering *et al.*, 2007).	~33.8 km (NNE) – 1999 (DBCA, 2021c)				•	Unlikely	N/A	May occur occasionally to forage. Suitable nesting habitat not present.
Night parrot *(Pezoporus occidentalis)*	EN	CR		EN	The Night Parrot prefers sandy/stony plain habitat with old-growth spinifex for roosting and nesting in conjunction with native grasses and herbs for foraging (DPaW, 2017).	~488 km (E) – 1972 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Carnaby's cockatoo (*Calyptorhynchus latirostris*)	EN	EN		EN	Proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests (Johnstone & Storr, 1998).	~11.42 km (NNW) – 2018 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Malleefowl (*Leipoa ocellata*)	VU	VU		VU	Inhabits semi-arid shrublands and low woodlands dominated by mallee eucalypts and/or *Acacia*s with sandy loam soils (Benshemesh, 2007).	~9.05 km (SE) – 2013 (DBCA, 2021c)	•	•			Certain	Confirmed	Potential suitable habitat is found in Survey Area along with the historical remains of a mound within the Allocasuarina Shrubland habitat. The species may use the area for foraging or dispersal but given the level of disturbance, the Survey Area does not present critical habitat for the species.
Princess parrot (*Polytelis alexandrae*)	VU		P4	NT	The Princess Parrot inhabits low open eucalypt woodlands and savannah shrublands in arid deserts, usually with *Casuarina* and *Allocasuarina* spp. Primarily breeds in Marble Gum hollows (Pavey *et al.*, 2014).	~218 km (E) - 1983 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Grey falcon (*Falco hypoleucos*)	VU	VU		VU	Timbered lowlands, particularly *Acacia* shrubland and along inland drainage systems. Also frequent spinifex and tussock grassland (Burbidge *et al.*, 2010; Olsen & Olsen, 1986)	~238km (N) – 1996 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Common sandpiper (*Actitis hypoleucos*)	MI	MI			Estuaries and deltas of streams, as well as banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans (Johnstone & Storr, 1998).	~28 km (WSW) – 2013 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Fork-tailed swift (*Apus pacificus*)	MI	MI			Inhabits dry/open habitats, inclusive of riparian woodlands and tea-tree swamps, low scrub, heathland or saltmarsh, as well as treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes (Johnstone & Storr, 1998). Almost exclusively aerial.	~116 km (E) – 2015 (DBCA, 2021c)	•	•	•	•	Possible	N/A	May occasionally occur within the airspace above the Survey Area to forage. Unlikely to land or nest within Survey Area.
Grey wagtail (*Motacilla cinerea*)	MI	MI			A rare vagrant to Western Australia where it has been recorded within various habitats with open waterbodies (Johnstone & Storr, 2004).	~670 km (SW) – 2013 (DBCA, 2021c)					Highly Unlikely	N/A	Suitable habitat not present.

Common Name (Scientific Name)	Conservation Status				Preferred Broad Habitats	Nearest Record to the Survey Area	Potential Critical Habitat Within the Survey Area				Likelihood of Occurrence	Occurrence	Comments
	EPBC Act	BC Act	DBCA	IUCN			Eucalypt Woodland	Allocasuarina Shrubland	Low Chenopod Shrubland	Claypan			
Pectoral sandpiper (*Calidris melanotos*)	MI	MI			Coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (Johnstone & Storr, 2004; Johnstone *et al.*, 2013). It prefers wetlands with open fringing mudflats and low, emergent or fringing vegetation (Geering *et al.*, 2007).	~327 km (S) – 2010 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Sharp-tailed sandpiper (*Calidris acuminata)*	MI	MI			Coastal and inland areas saline and freshwater but prefers non-tidal fresh or brackish wetlands (Geering *et al.*, 2007)	~8.8km (ESE) – 1980 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Common greenshank *(Tringa nebularia)*	MI	MI			Species occurs as a non-breeding summer Migrant which occurs throughout the region. Occurs mainly in Tidal mudflats, mangrove creeks, flooded samphire flats, beaches, river pools, and saltwork and sewage ponds (Johnstone *et al.*, 2013).	~23.38 km (WNW) – 2001 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Wood sandpiper (*Tringa glareola)*	MI	MI			Freshwater wetlands and occasional brackish intertidal mudflats (Geering *et al.*, 2007).	~5.58 km (N) – 2005 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Red-necked stint (*Calidris ruficollis*)	MI	MI		NT	Lives in permanent or ephemeral wetlands of varying salinity, and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In Western Australia they prefer freshwater to marine environments. The species usually forages in shallow water at the edge of wetlands and roost or loaf on tidal mudflats, near low saltmarsh, and around inland swamps (Johnstone & Storr, 1998).	~37.04km (NNE) – 2001 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Glossy ibis *(Plegadis falcinellus)*	MI	MI			Freshwater wetlands, irrigated areas, margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone *et al.*, 2013).	~14.07 km (NNW) - 1981 (DBCA, 2021c)				•	Possible	N/A	May occur occasionally to forage.
Peregrine falcon (*Falco peregrinus*)		OS			In arid areas, it is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr, 1998). It typically nests on rocky ledges occurring on tall, vertical cliff faces between 25 m and 50 m high (Olsen *et al.*, 2004; Olsen & Olsen, 1989).	~73 km (NW) – 2014 (DBCA, 2021c)	•	•	•	•	Possible	N/A	Likely to occur occasionally to forage. Suitable nesting habitat not present.
Hooded plover (*Thinornis rubricollis*)			P4	VU	Margins and shallows of salt lakes, sandy and sea-weedy beaches and estuaries and also damns (Johnstone & Storr, 1998).	~31.98 km (N) – 1980 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Sanderling (*Calidris alba*)	MI	MI			Broad ocean beaches of firm sand, depositing strands and mounds of seaweed. Often near river mouths, tidal mudflats, inlets and coastal lagoons (Pizzey & Knight, 2007).	~6.9km (NE) – 2016 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Grey-tailed tattler (*Tringa brevipes*)	MI	MI	P4	NT	Found mainly in tidal mudflats, estuaries; shores and reefs of islands and coastal swamps and commercial salt fields (Pizzey & Knight, 2007).	6.21 km (WNW) – 2017 (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present
Reptiles													
Western spiny-tailed skink (*Egernia stokesii badia*)	EN	VU			Found in tall shrubland, open heath and woodland habitats (Cogger *et al.*, 1993). In the north-eastern wheatbelt, the species occupied heavier clay and loam soils supporting eucalypt woodlands which provided shelter in the form of fallen and hollow logs (Cogger *et al.*, 1993).	~27 km ENE – (DBCA, 2021c)					Unlikely	N/A	Suitable habitat not present

Confirmed as occurring in the Survey Area

Malleefowl (Leipoa ocellate)

The Malleefowl is listed as Vulnerable under both the BC Act and EPBC Act. The species was originally common and widespread in semi-arid areas within low eucalypt scrubland on sandy and lateritic soil, and within *Acacia* shrubland on heavy red soils; however, clearing for agriculture has dramatically reduced the extent of suitable habitat for the species, which is consequently now uncommon and patchily distributed (Johnstone & Storr, 1998). The Survey Area was surveyed on foot to search for vertebrate fauna species of significance and their habitat including observation of nesting mounds of malleefowl. A single historical mound was identified within the Allocasuarina Shrubland habitat of the Survey Area (Figure 5.1). The Survey Area provides potentially suitable habitat for this species and previous records also occur in close proximity; with 49 records known within 40 km, the closest of which was recorded approximately 9 km south-east of the Survey Area in 2013 (DBCA, 2021c). The level of disturbance present in the Survey Area however, reduces the suitability of the habitat and therefore the likelihood of this species occurring. No further evidence of the species was recorded, suggesting malleefowl are not currently utilising the Survey Area. The Allocasuarina Shrubland fauna habitat was considered to provide moderate significance habitat for the species, while all other fauna habitat types within the Survey Area are considered to be of low significance to the species.

Therefore, although the species has been confirmed within the Survey Area, the species is not likely to currently occur or be dependent on any of the fauna habitat within the Survey Area.

Possibly occurring in the Survey Area

Common Sandpiper (Actitis hypoleucos)

This species occurs in a range of salt and freshwater habitats, including coasts, river pools, drying swamps and floodwaters (Johnstone & Storr, 1998); however, it is most common on the coast (Geering *et al.*, 2007). This species is likely to occur only as a seasonal visitor to the region, with locally occurring salt lakes and claypans providing foraging opportunities. Claypan fauna habitat type within the Survey Area may be utilised by the common sandpiper (Table 5.3); however, given that the area is only seasonally inundated it is considered that the likelihood of the species occurring in the Survey Area is low. Additionally an artificial pond located in the disturbed portion of the Survey Area provides potential foraging habitat for the species; however, due to the artificial nature of the water source it is of no long-term significance to the species. Due to the lack of appropriate habitat for the species within the Survey Area, it is unlikely that this species is dependent on any specific fauna habitat within the Survey Area.

Fork-tailed Swift (Apus pacificus)

All fauna habitat types within the Survey Area are considered to be marginally suitable and of low significance to the species. The fork-tailed swift is an almost exclusively aerial species largely independent of terrestrial habitat types, occupying very low to low airspace above a variety of habitat types (Menkhorst *et al.*, 2017; Morcombe, 2004; Pizzey & Knight, 2007).

Therefore, although the species occurrence within the Survey Area is possible, the species is not likely to be dependent on any of the fauna habitat within the Survey Area and consequently is not considered to be significant to the species.

Sharp-tailed Sandpiper (Calidris acuminata)

The sharp-tailed sandpiper favours non-tidal freshwater or brackish wetlands, though it also occurs in other habitats (Geering *et al.*, 2007). This species is a visitor to the southwest, mostly between September and March (Johnstone & Storr, 1998). Although this species may be an occasional non-breeding visitor to nearby salt lakes, the Survey Area contains limited habitat to support the species. Claypan habitat and artificial ponds in the disturbed areas may be utilised by the sharp-tailed sandpiper within the Survey Area. However, given that there is only a small area of artificial water in a disturbed area within the Survey Area, and the Claypan habitat is only inundated seasonally, it is considered that the likelihood of the species occurring in the Survey Area is low. Due to the lack of appropriate habitat for the species within the Survey Area, it is unlikely that this species is dependent on any specific fauna habitat within the Survey Area.

Common Greenshank (Tringa nebularia)

Only the Claypan habitat within the Survey Area is considered to possibly be utilised by the common greenshank (Table 5.3). The species may occur seasonally as a migrant in nearby salt lakes, however given that there is only a small area of artificial water in a disturbed area within the Survey Area, and the seasonal nature of the Claypan habitat, it is considered that the species presence within the Survey Area is Possible for temporary visitations only. Due to the lack of appropriate habitat for the species within the Survey Area, it is considered unlikely that this species is dependent on any specific fauna habitat within the Survey Area.

Wood Sandpiper (Tringa glareola)

The wood sandpiper favours freshwater wetlands and occasional brackish intertidal mudflats (Geering *et al.*, 2007). Although this species may be present at nearby salt lakes, the Survey Area contains limited habitat to support the species. Claypan habitat within the Survey Area may be utilised by the wood sandpiper on a seasonal basis; however, given that there is only a small area of artificial water in a disturbed area and limited emergent reeds and fallen timber (preferred habitat) within the Survey Area, it is considered that the likelihood of the species is low. Due to the lack of appropriate habitat for the species within the Survey Area, it is unlikely that this species is dependent on any specific fauna habitat within the Survey Area.

Red-necked Stint (Calidris ruficollis)

The Red-necked Stint occurs across a wide range of fresh and saltwater habitats, including freshwater wetlands (Geering *et al.*, 2007). It is a non-breeding visitor to southwest Australia, between October and March (Johnstone & Storr, 1998). The Survey Area contains limited habitat to support the species. Claypan habitat within the Survey Area may be utilised by the red-necked stint (Table 5.3), as a seasonal

migrant. Further, given that there is only a small area of permanent (artificial) water in a disturbed area, it is considered that this species is not dependent on any specific fauna habitat within the Survey Area.

Glossy Ibis (Plegadis falcinellus)

The glossy ibis prefers freshwater wetlands, irrigated areas, margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone & Storr, 1998). It is a non-breeding visitor to southwest Australia (Pizzey & Knight, 2007). An artificial pond located in the disturbed portion of the Survey Area provides potential foraging habitat for the species; however, due to the artificial nature of the water source, it is of no long-term significance to the species. Claypan habitat within the Survey Area may be utilised by the species when seasonally inundated (Table 5.3); however, it is considered that this species is not dependent on this or any other fauna habitat within the Survey Area.

Peregrine Falcon (Falco peregrinus)

The Peregrine Falcon is listed as OS ('other specially protected fauna') under the BC Act, which means that special protection is required to ensure its conservation. In arid areas the species is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr, 1998). It typically nests on rocky ledges occurring on tall, vertical cliff faces and also occasionally within tall trees occurring along major drainage lines, though the species is also known to nest on radio towers and other human-built structures (Olsen & Olsen, 1989).

The species occurs within an extremely diverse range of habitats (Morcombe, 2004) and therefore the species has the possibility of occurring within the Survey Area. Open Eucalypt Woodland habitat within the Survey Area provides tall trees for nesting and from which to forage and disperse. However, as no other preferred habitats occur within the Survey Area, particularly for breeding, such as cliffs, gorges, timbered watercourses, rivers, wetlands and pylons, (Pizzey & Knight, 2007), the Survey Area is considered to contain marginal habitat for the species and is unlikely to be dependent on any specific fauna habitat within the Survey Area.

5.2 Flora and Vegetation

5.2.1 Flora Composition

A total of 114 vascular flora taxa from 31 families and 62 genera were recorded from the smelter Survey Area during the field survey (Appendix K). The total number of vascular flora taxa recorded comprised 109 native taxa and five introduced taxa (Appendix K).

The dominant families equate to 54% of the total taxa recorded and comprised Chenopodiaceae (16 taxa), Asteraceae (12 taxa), Fabaceae (11 taxa), Scrophulariaceae (11 taxa) and Myrtaceae (11 taxa). Of the 31 families, 12 were represented by one taxon, which equates to 10.5% of the total taxa recorded. The dominant genera make up 30% of the total taxa recorded and comprised *Eremophila* (11 taxa), *Acacia* (nine taxa), *Eucalyptus* (eight taxa) and *Maireana* (six taxa). Of the 62 genera recorded, 42 were represented by one taxon, which equates to 37% of the total taxa recorded.

Nine taxa observed and collected from the field were difficult to confidently identify to species or infraspecies level. This was mainly due to the specimens/ individuals lacking suitable flowering and/ or fruiting material for confident taxonomic identification. One taxon was tentatively identified to species level, seven specimens have been identified to genus level, and one specimen tentatively identified as ?*Santalum murrayanum*. One of the taxa identified to genus level, *Lepidosperma* sp. indet., does have affinities to a conservation significant taxon (see section 5.2.2), while the remaining eight taxa are not considered to be analogous with any conservation significant flora.

5.2.2 Flora of Significance

Flora of Conservation Significance

No conservation significant flora were recorded in the Survey Area during this survey.

One taxon recorded in the smelter Survey Area (site KAL-31 (Figure 4.2)) identified to genus level, *Lepidosperma* sp. indet., does have affinities with *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2). Shared characters of the collected specimen with *L*. sp. Kambalda (A.A. Mitchell 5156) (P2) included leaf base hairs, resinosity and lack of distinct hatching. However, this specimen was sterile and could not be confidently matched with *L*. sp. Kambalda (A.A. Mitchell 5156) (P2) due to lack of sufficient comparative material at the WAH and supporting literature (personal communications with Biologic's taxonomist Rachel Meissner and WAH expert taxonomist Mike Hislop, November 2021). There is currently only a singular specimen at the WAH (from one collection and subsequent record - (WAH, 1998-)). Therefore, this specimen is not considered to represent that of a conservation significant taxon. However, *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2) is considered 'possible' to occur in the Survey Area post-survey (see sub-section below).

Flora of Other Significance

The EPA (2004) advises that flora species, subspecies, varieties, hybrids and ecotypes may be considered significant for reasons other than listing as a Threatened or Priority Flora taxa. This may include, but is not limited to, range extensions, keystone species, relic status, local endemism and

anomalous features. Based on these features, the following five flora taxa recorded from the smelter Survey Area by this survey are considered to be flora of 'other' significance:

- *Calandrinia pumila* – range extension 78 km southeast;
- *Centipeda crateriformis* subsp. *compacta* – fills a gap in distribution;
- *Lepidosperma* sp. indet – (see sub-section above);
- *Ptilotus obovatus* var. *obovatus* - range extension 141 km east-southeast; and
- *Swainsona purpurea* – range extension 17 km south.

Review of Likelihood of Occurrence

All taxa considered Highly Likely, Likely and Possible to occur in the Survey Area pre-survey are now considered Unlikely or Highly Unlikely post-survey (Table 5.4, Appendix F).

None of these taxa have previously been recorded in the smelter Survey Area (Mattiske, 2008), which was further confirmed by this survey.

The corridor Survey Area mostly contained previously cleared roads, access tracks, railway and pipeline excavated soil, rather than intact vegetation, which is often required for these taxa. Furthermore, although distances of these taxa to the corridor Survey Area were relatively close (1.2–19.7 km, see section 3.2.2), the long, thin and linear nature of the corridor Survey Area decreases the likelihood of intersecting populations and habitat containing these taxa (Figure 3.2).

Only one taxon, *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2), is considered to have a pre-survey likelihood of Highly Unlikely for the Survey Area. This conservation significant taxon shares some affinities with the collected specimen *Lepidosperma* sp. indet. (see subsection above). While pre-survey analysis indicated that no suitable habitat for this species was present within the Survey Area, potentially suitable landforms and soils were observed during the survey, at the southern boundary of the Survey Area (site KAL-31). This area comprised rocky hills with dolerite and calcrete pebbles on the surface. While there is limited information available for *L*. sp. Kambalda, it is known to occur on basalt hills. This, in conjunction with the morphological affinities of the collected specimen, indicate that the occurrence of this species within the Survey Area cannot be completely excluded. Therefore, the post-survey likelihood for *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2) is considered to be Possible (Table 5.4, Appendix F).

All remaining taxa considered Unlikely or Highly Unlikely pre-survey were either downgraded or remained so post-survey due to distances from the Survey Area and marginal or unsuitable habitat observed (Appendix F).

Table 5.4: Post-survey likelihood of occurrence for conservation significant flora

Taxon	Post-survey likelihood	Reason for change in likelihood
Pre-survey likelihood – Highly Likely		
Eremophila praecox (P2)	Unlikely	Limited suitable habitat observed within Survey Area, intensive searching within the Survey Area
Alyxia tetanifolia (P3)	Unlikely	
Pre-survey likelihood – Likely		
Isolepis australiensis (P3)	Unlikely	Limited suitable habitat observed within Survey Area, intensive searching within the Survey Area
Notisia intonsa (P3)	Unlikely	
Eucalyptus jutsonii subsp. *jutsonii* (P4)	Unlikely	
Pre-survey likelihood – Possible		
Gastrolobium graniticum (T)	Unlikely	Limited suitable habitat observed within Survey Area, intensive searching within the Survey Area
Acacia websteri (P1)	Unlikely	Limited suitable habitat observed within Survey Area, intensive searching within the Survey Area
Elachanthus pusillus (P2)	Unlikely	
Goodenia salina (P2)	Unlikely	
Lepidium merrallii (P2)	Unlikely	
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212) (P3)	Unlikely	
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P3)	Unlikely	
Chrysocephalum apiculatum subsp. *norsemanense* (P3)	Unlikely	
Cyathostemon verrucosus (P3)	Unlikely	
Lepidium fasciculatum (P3)	Unlikely	
Eremophila caerulea subsp. *merrallii* (P4)	Unlikely	
Pre-survey likelihood – Highly Unlikely		
Lepidosperma sp. Kambalda (A.A. Mitchell 5156) (P2)	Possible	Has affinities with a sterile specimen collected from the smelter Survey Area (*Lepidosperma* sp. indet.), suitable habitat present within the Survey Area

5.2.3 Introduced Flora

A total of five introduced flora taxa were recorded in the Survey Area during the field survey (Figure 5.2). None of these taxa are listed as WoNS. **Echium plantagineum* (Patterson's Curse) is a DP under Section 22 of the BAM Act, although is exempt from control and keeping requirements. **Eragrostis curvula* is on the priority list for weed management in the Goldfields Region due to it being currently absent from lands managed by the DBCA (Table 5.5). Generally, weed numbers were relatively low, with very few infestations observed. The largest numbers were observed along the pipeline corridor track with solitary infestations of **Cenchrus ciliaris* (20 individuals from one point location), **Echium plantagineum* (50 individuals from one point location) and **Eragrostis curvula* (50 individuals from one point location).

Table 5.5: Introduced flora recorded from the Survey Area

Taxon	Recorded	Count	WoNS	DP	Priority List for Goldfields	DBCA	
						Impact	Invasiveness
**Cenchrus ciliaris*	Opp (corridor Survey Area)	20	N	N	N	High	Rapid
**Echium plantagineum*	Opp (corridor Survey Area)	50	N	Y	N	Unknown	Unknown
**Eragrostis curvula*	KAL-01	20	N	N	Y	Not assessed	Not assessed
**Eragrostis curvula*	Opp (corridor Survey Area)	100					
**Oligocarpus calendulaceus*	Opp (smelter Survey Area)	20	N	N	N	Unknown	Unknown
**Salvia verbenaca*	Opp (smelter Survey Area)	20	N	N	N	Unknown	Unknown

Legend

Survey Area

- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail

Introduced Flora

- **Cenchrus ciliaris*
- **Echium plantagineum*
- **Eragrostis curvula*
- **Oligocarpus calendulaceus*
- **Salvia verbenaca*

N

biologic Environmental Survey

Scale: 1:53,000

0 1 2 3 Km

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 30/11/2021

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Figure 5.2: Introduced flora recorded in the Survey Area

5.2.4 Vegetation

Broad Floristic Formations

Five broad floristic formations were described from the smelter Survey Area, based on the dominant growth form and land cover, and genus for the dominant stratum. The broad floristic formations are (and their subsequent extents across the Survey Area):

Shrublands:

- *Allocasuarina* Tall Shrubland 30.2 ha / 0.5 %
- Chenopod Mixed Low Open Shrubland 40.3 ha / 0.7 %
- *Duma* Mid Sparse Shrubland 0.8 ha / 0.1 %

Woodlands:

- *Eucalyptus* Low Open Mallee Woodland 180.2 ha / 29.7 %
- *Eucalyptus* Mid Woodland 173.2 ha / 28.5 %

The dominant broad floristic formation based on extent across the Survey Area is *Eucalyptus* Low Open Mallee Woodland (as above). *Eucalyptus* Low Open Mallee Woodland also supported the greatest number of vegetation types (three), while the remaining formations all supported one each.

One additional mapping unit was delineated from the Survey Area: “Cleared” (182.3 ha / 30.0 %). This unit represents cleared areas (roads, tracks, drill pads, bare areas void of vegetation etc.).

Vegetation Types

Seven vegetations types were mapped in the smelter Survey Area (Table 5.6, Figure 5.3). These vegetation types were described and delineated based on the floristic data collected during the survey and comparisons with previous vegetation mapping completed in the smelter Survey Area (Mattiske, 2008). Shortened vegetation codes were produced, in line with Mattiske (2008), by identifying the dominant stratum layer, comprising:

Eucalypt Woodlands (E):

- E1 - Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland;
- E2 - Low open *Eucalyptus flocktoniae* subsp. *flocktoniae* and *Eucalyptus longissima* mallee woodland;
- E3 - Low open *Eucalyptus torquata* mallee woodland;
- E4 - Low open *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* mallee woodland.

Shrublands (S)

- S1 - Tall *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* shrubland;
- S2 - Mid to low open *Lycium australe*, *Frankenia* sp., *Maireana sedifolia*, *Atriplex nummularia*, *Atriplex vesicaria* and *Sclerolaena diacantha* mixed chenopod shrubland;

- S3 - Mid sparse *Duma florentia* shrubland.

The vegetation type representing the greatest proportion of the mapping was E1 (28.5 %), followed by types E4 (25 %) and S2 (6.6 %) (Table 5.6).

A range of landforms were present in the smelter Survey Area comprising (in descending order of dominance across) gentle hillslopes (lower, mid, upper), flats / saline flats, floodplains and hilltops / crests.

Vegetation boundaries and descriptions generally aligned with previous mapping within the smelter Survey Area (Mattiske, 2008). Some boundaries shifted, some mapped areas were added and/or removed, while additional areas have been cleared since the mapping was complete in 2008. However, one additional vegetation type was added in this current survey: S3 - Mid sparse *Duma florulenta* shrubland with scattered fringing *Melaleuca lateriflora* shrubs over scattered herbs and grasses on claypans and depressions on red/brown clay. This unit was previously mapped simply as “Claypan” with no description of vegetation provided (Mattiske, 2008).

Table 5.6: Vegetation types in the smelter Survey Area

Veg Code	Veg code (BHP standard)	Broad Floristic Formation	Vegetation Description	Sample sites	Extent (ha/ %)	Significant Features	Condition	Representative photo
E1	FS EsEsa Ms SeafExaEs AnsOmScsp	Eucalyptus Mid Woodland	Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland over occasional dense patches of *Melaleuca sheathiana* shrubs over mid open *Senna artemisioides* subsp. *filifolia*, *Exocarpos aphyllus* and *Eremophila scoparia* over low open *Atriplex nummularia* subsp. *spathulata*, *Olearia muelleri* and *Scaevola spinescens* shrubland on mid and lower slopes and flats on brown clay loam with limited surface stones	KAL-06, KAL-07, KAL-08, KAL-18, KAL-19, KAL-22, KAL-26, KAL-27	173.2 / 28.5		Very Good, Degraded (E1(d))	
E2	HS EffEl EiSeafSaac HaScsp Ts	Eucalyptus Low Open Mallee Woodland	Low open *Eucalyptus flocktoniae* subsp. *flocktoniae* and *Eucalyptus longissima* mallee woodland over tall open *Eremophila interstans*, *Senna artemisioides* subsp. *filifolia* and *Santalum acuminatum* shrubland over mid to low open *Halgania andromedifolia* and *Scaevola spinescens* shrubland over low open *Triodia scariosa* hummock grassland on mid slopes on red/brown sandy clay loam with limited surface stones	KAL-13 (mapping note), KAL-16	17.8 / 2.9		Excellent, Very Good	
E3	HS Et Ab ScspAsWr Ts	Eucalyptus Low Open Mallee Woodland	Low open *Eucalyptus torquata* mallee woodland over tall sparse *Alyxia buxifolia* shrubland over mid to open low *Scaevola spinescens*, *Acacia erinacea* and *Westringia rigida* shrubland over occasional patches of *Triodia scariosa* hummock grasses on rocky (calcrete pebbles) upper and mid slopes on red/brown sandy clay loam	KAL-21, mapping notes	10.7 / 1.8		Excellent, Very Good	

Veg Code	Veg code (BHP standard)	Broad Floristic Formation	Vegetation Description	Sample sites	Extent (ha/ %)	Significant Features	Condition	Representative photo
E4	SP EgElEle Ms ScspSeaf WrHa Ts	Eucalyptus Low Open Mallee Woodland	Low open *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* mallee woodland over occasional dense patches of *Melaleuca sheathiana* shrubs over mid open *Scaevola spinescens* and *Senna artemisioides* subsp. *filifolia* shrubland over low open *Westringia rigida* and *Halgania andromedifolia* shrubland over occasional patches of *Triodia scariosa* hummock grasses on plains and flats on red/brown sandy clay loam with limited surface stones	KAL-04, KAL-10 (mapping note), KAL-11, KAL-12, KAL-17, KAL-24, KAL-28, KAL-34	151.7 / 25.0		Very Good, Degraded (E4(d))	
S1	HC AhAte ScspPfPs EtEgEl Ts	Allocasuarina Tall Shrubland	Tall *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* shrubland over mid open *Scaevola spinescens*, *Pomaderris forrestiana* and *Prostanthera incurvata* shrubland with low isolated *Eucalyptus torquata*, *Eucalyptus griffithsii* and *Eucalyptus longissima* mallee trees over occasional patches of *Triodia scariosa* hummock grasses on rocky (dolerite and calcrete pebbles) hill tops (crests) and upper hill slopes on red sandy clay loam	KAL-14, KAL-15, KAL-20, KAL-29, KAL-31	30.2 / 5.0		Excellent	
S2	SF LaFsMseAmAvScdi	Chenopod Mixed Low Open Shrubland	Mid to low open *Lycium australe*, *Frankenia* sp., *Maireana sedifolia*, *Atriplex nummularia*, *Atriplex vesicaria* and *Sclerolaena diacantha* on saline flats and floodplains on orange clay loam	KAL-02, KAL-05	40.3 / 6.6		Very Good, Degraded (S2(d))	

Veg Code	Veg code (BHP standard)	Broad Floristic Formation	Vegetation Description	Sample sites	Extent (ha/ %)	Significant Features	Condition	Representative photo
S3	GP Duf Ml	Duma Mid Sparse Shrubland	Mid sparse *Duma florulenta* shrubland with scattered fringing *Melaleuca lateriflora* shrubs over scattered herbs and grasses on claypans and depressions on red/brown clay	KAL-01	0.8 / 0.1	Shares affinities with Emu Land System PEC	Good	
Cl	Cl	Cleared	Cleared	-	182.3 / 30.0		Completely Degraded	
TOTALS					**607 / 100**			

354000
356000
358000
6584000
6582000
West Kalgoorlie Esperance Railway
Kalgoorlie Nickel Smelter
Smelterman Dr

Legend

Survey Area
- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail

Vegetation Type
- E1
- E1(d)
- E2
- E3
- E4
- E4(d)
- S1
- S2
- S2(d)
- S3
- Cleared

N

biologic Environmental Survey

Scale: 1:14,900

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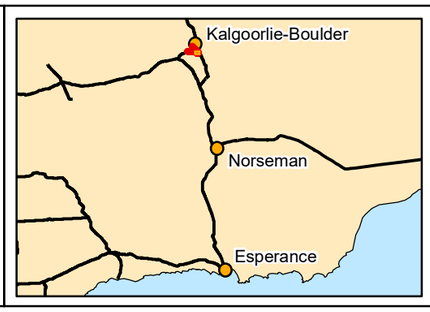
Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 30/11/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 5.3: Vegetation types in the Survey Area

5.2.5 Vegetation of Significance

One PEC, 'Emu Land System', was identified by the desktop assessment as occurring approximately 40 km to the north-east of the Survey Area (see section 3.2.2). This PEC is listed as a Priority 3 community and consists of fresh or brackish ephemeral lakes and swamps with cane grass, lignum and paperbark shrublands (DBCA, 2017). The Emu Land System does not occur within the Survey Area according to soil landscape mapping for the rangelands (DPIRD, 2021a, 2021b).

The area mapped as vegetation type S3 (Mid sparse *Duma florentia* shrubland) shared affinities to a PEC. This vegetation type contained lignum (*Duma florulenta*), and scattered herbs and grasses fringed by *Melaleuca lateriflora*, and was situated on a small claypan landform (Plate 5.1, Figure 5.3). Although this vegetation type cannot represent the PEC based on geographical distribution (i.e. it does not occur on the Emu Land System), it is considered to share affinities with the PEC due to its superficial similarity in landform and vegetation structure; i.e., a claypan containing lignum and scattered herbs and grasses (chiefly *Eragrostis* spp.), with fringing paperbark shrublands. As a result, this vegetation type is considered to represent vegetation of other significance at a local level due to its limited representation within the Survey Area. Given the presence of additional claypans to the west of the Survey Area visible on aerial photography, further study would be required to determine whether this vegetation type extended beyond the boundaries of the Survey Area.

None of the remaining vegetation types within the smelter Survey Area are considered to be analogous with any other conservation significant ecological community.

Plate 5.1: Claypan community in the northwest of the Survey Area (Biologic photos)

5.2.6 Vegetation Condition

The condition of the vegetation within the smelter Survey Area ranged from completely degraded (cleared areas) to excellent, with the majority of the vegetation in very good condition (Table 5.7, Figure 5.4). The main disturbances observed were associated with mining/ exploration (proximity to smelter), roads and tracks, and weed invasion. Since Mattiske's last monitoring survey completed in 2017 (Mattiske, 2018), the condition of the vegetation surrounding the smelter is generally either improving or has remained the same. This mostly aligns with observations made during this current survey (the majority of the vegetation was in very good condition). There were signs of stock grazing and trampling across most small portions

of the smelter Survey Area confined to the floodplains, saline flats and claypan landforms (vegetation types S2 and S3) that resulted in a low condition rating. Generally weed cover was low, with only sporadic occurrences through the smelter Survey Area.

Table 5.7: Vegetation condition in the smelter Survey Area

Condition	Extent (ha / %)	Comment
Excellent	58.7 / 9.7	Generally occurred on landforms higher in the landscape (mid to upper slopes, hilltops/crests – vegetation types S1, E2 and E3). Minimal disturbances noted, mainly to do with historical clearing and nearby tracks/ roads.
Very Good	356.7 / 58.8	Occurred across majority of the smelter Survey Area and showed only minimal signs of disturbances associated with mining/ exploration (proximity to smelter).
Good	2.3 / 0.4	Occurred across small portions of the smelter Survey Area and showed evidence of stock trampling and grazing, as well as some weed presence. Mainly occurred on landforms low in the landscape with higher moisture retention (floodplains, saline flats and claypan landforms – vegetation types S2 and S3).
Degraded	7.0 / 1.2	Confined to areas directly adjacent cleared areas close to the smelter. Main disturbances include clearing, dust, plant deaths and soil excavation.
Completely Degraded	182.3 / 30.0	Cleared areas (roads, tracks, drill pads, smelter infrastructure area).

354000
356000
358000
6584000
6582000
West Kalgoorlie Esperance Railway
Kalgoorlie Nickel Smelter
Smelterman Dr

Legend

Survey Area
- Smelter Survey Area
- Pipeline Corridor
- Road Corridor

- Local Road
- State Road
- Rail

Vegetation Condition
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

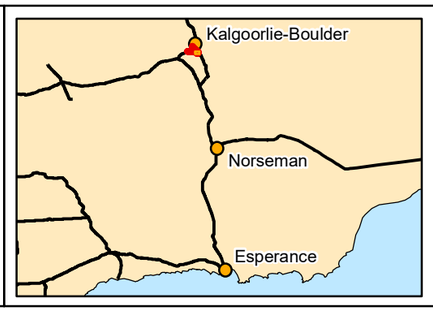
N

biologic Environmental Survey

Scale: 1:14,900

0 300 600 Meters

Coordinate System: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994 Created 30/11/2021



BHP NICKEL WEST

Kalgoorlie Nickel Smelter Reconnaissance Flora and Vegetation and Basic Terrestrial Fauna Survey

Figure 5.4: Vegetation condition in the Survey Area

6 POTENTIAL LIMITATIONS AND CONSTRAINTS

The EPA's *Technical Guidance* documents: *Terrestrial vertebrate fauna surveys for environmental impact assessment (2020);* and *Flora and vegetation surveys for environmental impact assessment (2016),* outline a number of factors that can affect the adequacy of fauna surveys (EPA, 2016b, 2020b) and vegetation and flora surveys (EPA, 2016b), respectively. These factors were assessed in relation to the current survey and are discussed in Table 6.1. The sampling techniques used during the survey were adequate to complete the necessary level of survey and were not constrained by any significant limitations.

Table 6.1: Survey limitations and constraints

Potential limitation or constraint	Applicability to this survey	Limitation to survey
Experience of personnel	The field survey was completed by senior botanist Sam Coultas, who has over seven years of environmental survey experience with significant skills and techniques in flora sampling and identification and having undertaken projects within the Kalgoorlie/Coolgardie area; and ecologist Kaylin Geelhoed with three years of fauna and flora survey experience. Both personnel have experience in conducting biological surveys within a range of bioregions across the state.	No
Scope (faunal groups sampled and whether any constraints affect this)	The scope was a basic fauna and reconnaissance flora and vegetation survey of the smelter Survey Area, and a targeted fauna and flora survey of the corridor Survey Area. The field survey was conducted within that framework. Fauna and flora were sampled via targeted searches and opportunistic sightings across the corridor Survey Area, while fauna habitat assessments and flora relevé sites and mapping notes were conducted across the smelter Survey Area.	No
Proportion of fauna identified	All observed fauna was identified at the point of observation. A total of 18 fauna species were recorded during the survey, comprising a total of 33 individual records. This is an acceptable number of records given this was not the focus of the field survey, which was to record fauna habitats and assess likelihood of occurrence.	No
Proportion of flora identified	A total of 114 vascular flora taxa from 31 families and 62 genera were recorded from the smelter Survey Area during the field survey. This included a number of annual and ephemeral taxa in reasonable condition. As it is not in the scope to record all taxa from the Survey Area, this is considered an acceptable number for a reconnaissance survey of this Survey Area size. Nine taxa observed and collected from the field were difficult to confidently identify to species or infraspecies level. This was mainly due to the specimens/ individuals lacking suitable flowering and/ or fruiting material for confident taxonomic identification. One of these taxa identified to genus level, *Lepidosperma* sp. indet., does have affinities to a conservation significant taxon (see section 5.2.2), while the remaining eight taxa are not considered to be analogous with any conservation significant flora. This small number of unidentifiable taxa is not considered to have limited the reconnaissance flora and vegetation survey.	No

Potential limitation or constraint	Applicability to this survey	Limitation to survey
Sources of information (recent or historic) and availability of contextual information	All contextual resources required to complete the assessment were available (previous surveys, database searches, environmental information, climate data). Land system mapping in the Kalgoorlie area is somewhat patchy and requires review. With only four previous records of vertebrate fauna surveys in the vicinity of the Survey Area, the amount of information available about vertebrate species which potentially occur within the Survey Area was somewhat limited. However, neither of the preceding points impacted the outcomes of the survey.	No
Timing /weather /season /cycle	The field survey was completed in early September which is within the recommended survey timing for flora surveys in the Southwest and Interzone Botanical provinces (September – November) (EPA, 2016b). Furthermore, rainfall leading up to the field survey was above average with the exception of the month immediately preceding the survey (conditions within the Survey Area were favourable with a high number of annual or short-lived perennial species present). Similar to above, the conditions did not limit the ability of the survey to fulfil the objectives of a basic fauna survey i.e. to assess fauna habitats present or the likelihood of species of conservation significance occurring in the Survey Area. Therefore timing, weather and season is not a factor limiting the survey.	No
Disturbances (e.g. fire or flood)	The smelter Survey Area ranged in condition from completely degraded to excellent, with the majority in very good condition. It had not been recently affected by fire. All disturbance activity was expected for the region.	No
Intensity of survey	A basic fauna, reconnaissance flora survey and targeted flora and fauna survey was prescribed by BHP and survey techniques (fauna habitat assessments, flora relevé sites and mapping notes, targeted searches) were appropriate for this level of survey. Survey effort/ intensity is presented in Figure 4.2.	No
Completeness of survey	A basic fauna, reconnaissance flora survey and targeted flora and fauna survey was completed. Fauna habitat assessments, flora relevé sites and mapping notes, and targeted searches were completed across the Survey Area, including within all landform and habitat types present.	No
Resources (e.g. degree of expertise available)	All resources required to complete the survey were available. Field personnel consisted of a qualified botanist and ecologist, who have extensive experience in conducting biological surveys in a range of bioregions across the state.	No
Remoteness or access issues	The majority of the Survey Area was accessible either by vehicle or on foot. While not all parts of the smelter Survey Area were walked, habitat assessments, flora sites and targeted searches were conducted within all habitat types present. The entire corridor Survey Area was traversed on foot.	No

7 CONCLUSIONS

7.1 Vertebrate Fauna

Four habitat types were identified within the smelter Survey Area: Open Eucalypt Woodland, Allocasuarina Shrubland, Low Chenopod Shrubland and Claypan habitats. All fauna habitat types are common throughout the local area (directly surrounding the Survey Area) and throughout the region. These habitat types are considered to be of low or moderate significance for vertebrate fauna species as they are widespread in the surrounding landscape and/or are not exclusively relied upon by species of conservation significance.

Claypan habitat provides unique and valuable habitat to a variety of fauna species, particularly for foraging by migratory bird species including glossy ibis, common sandpiper, sharp-tailed sandpiper, fork-tailed swift, red-necked stint, wood sandpiper, and common greenshank. This habitat within the Survey Area is only inundated on a seasonal basis and therefore only supports these species for part of the year. Given the extent and quality of salt lakes and claypans both locally and in the greater bioregion are more likely to support these conservation significant vertebrate fauna species on a longer-term basis, it is unlikely that these species are exclusively reliant on this habitat type within the Survey Area. Claypan habitat is therefore considered to be of moderate significance.

Allocasuarina Woodland within the Survey Area is dense in areas, providing valuable shelter for dispersing fauna, birds and potential for malleefowl nesting. A single historical (long unused) malleefowl nest was recorded during the survey in this habitat type. However, due to no recent evidence of the species and the proximity to disturbance (mining/roads/tracks), this habitat is considered to be of moderate significance to fauna of conservation significance.

The remaining two fauna habitat types, Open Eucalypt Woodland and Low Chenopod Shrubland, do not present unique or significant habitat, are widespread in the local area and in the Coolgardie bioregion and, as such, are considered of low significance to conservation significant vertebrate species.

While historical evidence of the malleefowl has been confirmed within the Survey Area, no other species were assessed as Highly Likely or Likely to occur. While eight species are considered to Possibly occur, none of the conservation significant vertebrate fauna species listed under the EPBC Act or BC Act and identified in the desktop analysis are dependent on any of the fauna habitat identified from within the Survey Area.

7.2 Flora and Vegetation

A total of 114 vascular flora taxa from 31 families and 62 genera were recorded from the smelter Survey Area during the field survey (109 native taxa and five introduced taxa). Of the five introduced taxa recorded, **Echium plantagineum* (Patterson's Curse) is a Declared Pest under s22 of the BAM Act, and **Eragrostis curvula* is on the priority list for the Goldfields Region due to it being currently absent from lands managed by the DBCA.

No conservation significant flora taxa were recorded by this survey from the smelter or corridor Survey Areas.

Nine taxa observed and collected from the field were difficult to confidently identify to species or infraspecies level. One of these taxa identified to genus level, *Lepidosperma* sp. indet., does have affinities with the conservation significant taxon *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2). However, the specimen collected during this survey was sterile, and the WAH has insufficient material and supporting literature to confidentially identify this specimen. Therefore this specimen is not considered to represent that of a conservation significant taxon. However, *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2) is considered Possible to occur in the Survey Area post-survey.

All other conservation significant flora taxa are considered either Unlikely or Highly Unlikely to occur in the Survey Area post-survey.

Five flora taxa recorded from the smelter Survey Area by this survey are considered to be flora of "other" significance:

- *Calandrinia pumila* – range extension 78 km southeast;
- *Centipeda crateriformis* subsp. *compacta* – fills a gap in distribution;
- *Lepidosperma* sp. indet – doesn't match any taxa currently held and described at the Western Australian Herbarium, most closely resembles *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2);
- *Ptilotus obovatus* var. *obovatus* - range extension 141 km east-southeast;
- *Swainsona purpurea* – range extension 17 km south.

Seven vegetations types were mapped in the smelter Survey Area:

Eucalypt Woodlands (E)

- E1 - Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland;
- E2 - Low open *Eucalyptus flocktoniae* subsp. *flocktoniae* and *Eucalyptus longissima* mallee woodland;
- E3 - Low open *Eucalyptus torquata* mallee woodland;
- E4 - Low open *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* mallee woodland.

Shrublands (S)

- S1 - Tall *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* shrubland;
- S2 - Mid to low open *Lycium australe*, *Frankenia* sp., *Maireana sedifolia*, *Atriplex nummularia*, *Atriplex vesicaria* and *Sclerolaena diacantha* mixed chenopod shrubland;
- S3 - Mid sparse *Duma florentia* shrubland.

A range of landforms were present in the smelter Survey Area comprising gentle hillslopes (lower, mid, upper), flats / saline flats, floodplains and hilltops / crests. The majority of the vegetation within the smelter Survey Area was in very good condition.

No conservation significant vegetation was recorded in the smelter Survey Area by this survey. The area mapped as vegetation type S3 (Mid sparse *Duma florentia* shrubland) shared affinities to a PEC. This vegetation type contained lignum (*Duma florulenta*), and scattered herbs and grasses fringed by *Melaleuca lateriflora*, and was situated on a small claypan landform. Although this vegetation type cannot represent the PEC based on geographical distribution (i.e. it does not occur on the Emu Land System), it is considered to share affinities with the PEC due to its superficial similarity in landform and vegetation structure. As a result, this vegetation type is considered to represent vegetation of other significance at a local level.

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9 APPENDICES

Appendix A – Conservation status definitions

Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Threatened	
Extinct (EX)	Presumed extinct i.e. there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	Presumed extinct in the wild, only surviving in cultivation, captivity or as a naturalised population well outside its past range.
Critically Endangered (CE)	Taxa facing an extremely high risk of extinction in the wild in the immediate future (i.e. 50% chance of extinction in the immediate future).
Endangered (EN)	Taxa facing a very high risk of extinction in the wild in the near future i.e. 20% chance of extinction in the near future.
Vulnerable (Simate & Ndlovu)	Taxa facing a high risk of extinction in the wild in the medium-term future i.e. 10% chance of extinction in the medium-term future.
Conservation Dependent (CD)	Taxa which will become Vulnerable, Endangered or Critically Endangered if specific conservation efforts cease.
Other	
Migratory (MI)	Birds listed under international agreements relating to the protection of migratory birds i.e. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA) or Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Biodiversity Conservation Act 2016

Category	Definition
Extinct	
Extinct (EX)	Presumed extinct i.e. there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	Presumed extinct in the wild i.e. species which have been adequately searched for and there is no reasonable doubt that the last wild individual has died.
Threatened	
Critically Endangered (CE)	Taxa facing an extremely high risk of extinction in the wild.
Endangered (EN)	Taxa facing a very high risk of extinction in the wild.
Vulnerable (Simate & Ndlovu)	Taxa facing a high risk of extinction in the wild.
Specially Protected	
Migratory (MI)	Birds listed under international agreements relating to the protection of migratory birds i.e. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA) or Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
Conservation Dependent (CD)	Species dependent on ongoing conservation intervention to prevent them becoming eligible for listing as threatened.
Other specially protected fauna (OS)	Species otherwise in need of special protection to ensure their conservation.

Department of Biodiversity, Conservation and Attractions Priority codes

Category	Definition
Poorly known	
Priority 1 (P1)	Species that are known from one or a few locations which are potentially at risk. Species whose occurrences are either small, on lands not managed for conservation or otherwise threatened with habitat destruction or degradation. Species that are well known from one or more locations but are under immediate threat from threatening processes. In urgent need of further survey.
Priority 2 (P2)	Species that are known from one or a few locations, some of which are on lands managed for conservation. Species that are well known from one or more locations but are under threat from threatening processes. In urgent need of further survey. In need of further survey.
Priority 3 (P3)	Species that are well known from several locations and are not are under imminent threat. Species known from few but widespread locations with either a large population size or with large areas of suitable habitat remaining, much of which is not under imminent threat. Species that are well known from one or more locations and threatening processes exist that could affect them.
Rare, Near Threatened and other species in need of monitoring	
Priority 4 (P4)	*Rare* – Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. *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. *In need of monitoring* - Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy

International Union for Conservation of Nature

Category	Definition
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EX)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (Simate & Ndlovu)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases, great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

Appendix B – Vertebrate fauna literature review

Survey	Biological Assessment – Binduli Expansion Project. Level 1 vertebrate fauna and short-range endemic invertebrate survey. (Eco Logical, 2016)	The biological survey of the eastern goldfields of Western Australia. Part 8: Kurnalpi - Kalgoorlie study area, Records of the Western Australian Museum, Supplement 41. (McKenzie *et al.*, 1992)	Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades. (Cowan & How, 2004)	Detailed and Targeted Fauna Survey By-product Storage Site (Onshore, 2021)
Consultant	**Ecological**	**McKenzie et al.**	**WAM/CALM**	**Onshore Environmental**
Year	**2016**	**1992**	**2004**	**2021**
Type	Level 1 Vertebrate Fauna and SRE invertebrate fauna	Level 2 Vertebrate fauna	Level 2 Vertebrate Comparison Survey 20 years apart	Level 2 Vertebrate
Duration	23-30 May 2016	October 1979 August 1980 February 1981	Two Surveys with 4 discrete sampling periods; 10-15 March 1979 and 6-11 October 1980 (WAM) 24-30 October 2001 and 6-11 March 2002 (CALM)	4-12 September 2020
Approximate Distance from Survey Area	~0 km	~0 km	~80 km N	~ 15km N
General methods	Opportunistic observations	Drift fence trapping, quadrats, opportunistic sampling, bat mist netting and spotlighting	Sampling at all sites involved the use of pitfall traplines with drift fences, Elliott mammal traps and extensive opportunistic sampling that included both foraging and nocturnal searches	Pit-trap and drift fence; Elliot box traps; Funnel traps; Cage traps; Anabat recording (to detect bat echolocation calls); Detailed and Targeted Fauna Survey: opportunistic searching; and nocturnal searches
No. Trapping Sites	0	Various per site per survey Between 5-16 nights, averaging 10 nights.	10 13,050 trapping nights	2
Elliot trap nights	0	Not specified	Not specified	8
Pitfall trap nights	336	Not specified	Not specified	160
Funnel trap nights	0	Not specified	0	192
Cage trap nights	0	Not specified	Not specified	64
Diurnal search (person hours)	0	Not specified	Not specified	0
Nocturnal search (person hours)	0	Not specified	Not specified	2

Survey	Biological Assessment – Binduli Expansion Project. Level 1 vertebrate fauna and short-range endemic invertebrate survey. (Eco Logical, 2016)	The biological survey of the eastern goldfields of Western Australia. Part 8: Kurnalpi - Kalgoorlie study area, Records of the Western Australian Museum, Supplement 41. (McKenzie *et al.*, 1992)	Comparisons of ground vertebrate assemblages in arid Western Australia in different seasons and decades. (Cowan & How, 2004)	Detailed and Targeted Fauna Survey By-product Storage Site (Onshore, 2021)
Consultant	**Ecological**	**McKenzie et al.**	**WAM/CALM**	**Onshore Environmental**
Year	**2016**	**1992**	**2004**	**2021**
Targeted avifauna survey (person hours)	0	Sampled daily for 5 days during each survey period	Not specified	4
Bat survey effort	N/A	1 night per survey at each location Mist net or spotlighting	N/A	Anabat ultrasonic bat recorders: 1 unit for 1 night at each of 2 sites
Motion-sensor Camera nights	0	0	N/A	0
Active foraging for SRE invertebrates	Yes	0	0	0
Leaf litter sieving for SRE invertebrates	Yes	0	0	0
Survey Limitations	Poor taxonomic resolution SRE species Some areas inaccessible	None identified	None identified	None identified

Appendix C – Flora literature review

Study Details	Methods	Results	Significant Findings	Limitations
Mattiske (2008) **Client**: BHP Billiton **Type**: Level 1 flora and vegetation survey **Location**: Kalgoorlie Nickel Smelter (same survey area) **Timing**: March 2008	• Sites • Opportunistic records • Targeted searches	• 98 vascular flora taxa from 26 families and 42 genera • Six vegetation units • Completely degraded to very good condition	○ No significant findings	Survey was out of season
Native Vegetation Solutions (2018) **Client**: City of Kalgoorlie-Boulder **Type**: Reconnaissance flora and vegetation survey **Location**: Lot 500 Great Eastern Hwy Kalgoorlie (adjacent to pipeline survey area) **Timing**: June 2018	• 23 relevés	• 77 vascular flora species from 21 families and 38 genera • Six vegetation units • Good to very good condition	○ No significant findings	No substantial limitations
Native Vegetation Solutions (2019a) **Client**: Mineral Resources Ltd **Type**: Reconnaissance flora and vegetation survey **Location**: Mt Marion (14.0 km south-southwest) **Timing**: May 2012, January/ March 2013, November 2015, September/ November 2017, July 2018	• Relevés • Targeted searches	• 198 flora species from 38 families and 84 genera • 30 vegetation units • Degraded to excellent condition	○ 28 populations of *Eremophila acutifolia* (P3) – known as *Diocirea acutifolia* at time of surveys	No substantial limitations
GHD (2015) **Client**: Metals X Limited **Type**: Level 1 flora, vegetation and fauna survey **Location**: leases L25-48 and L25-43 Bulong (17 km east) **Timing**: February 2015	• 12 relevés • Opportunistic searches	• Nine vegetation units • No other results given	• No significant findings	Survey was out of season

Study Details	Methods	Results	Significant Findings	Limitations
Phoenix (2019) **Client**: Evolution Mining Ltd **Type**: Two phase detailed flora and vegetation survey **Location**: (27.5 km north-northwest) **Timing**: June and October 2018	• 38 quadrats • Three transects • Six relevés	• 215 flora taxa from 36 families and 81 genera • 19 vegetation units • Completely degraded to pristine condition	• Four priority flora taxa: ○ *Eremophila praecox* (P2) – P1 at time of survey ○ *Allocasuarina eriochlamys* subsp. *grossa* (P3) ○ *Austrostipa blackii* (P3) ○ *Calandrinia ?quartzitical ?lefroyensis* (P1)	• Targeted searches not exhaustive • Access restrictions • Identification issues
Spectrum (2019) **Client**: Evolution Mining **Type**: Targeted flora survey **Location**: Regional survey **Timing**: November 2019	• Targeted searches	• n/a	• Three populations of *Calandrinia lefroyensis* (P1) – closest was 31 km northwest of Survey Area	• Access restrictions
Strategen Environmental (2019) **Client**: Shire of Coolgardie **Type**: Detailed flora and vegetation survey, and fauna habitat assessment **Location**: (33.5 km west-southwest) **Timing**: December 2018	• Four quadrats	• 25 vascular flora taxa from 11 families • One vegetation unit • Completely to excellent condition	• No significant findings	No substantial limitations
Native Vegetation Solutions (2020) **Client**: Karora Resources Inc **Type**: Reconnaissance flora and vegetation survey **Location**: Spargos Project (37 km south) **Timing**: October and December 2020	• Relevés • Targeted searches	• 146 flora species from 35 families and 71 genera • 10 vegetation units • Completely degraded to very good condition	• One Threatened taxon: ○ *Seringia exastia* (T) – taxon now encompasses the common *Seringia elliptica* and is due to be de-listed • Six priority taxa: ○ *Eremophila microphylla* (P3) – known as *Diocirea microphylla* at time of survey ○ *Cryptandra crispula* (P3) ○ *Acacia crenulata* (P3) ○ *Styphelia rectiloba* (P3) ○ *Lepidosperma* sp. Parker Range (N. Gibson & M. Lyons 2094) (P1) ○ *Lepidosperma lyonsii* (P1) • Two WoNS/ DPs: ○ *Opuntia ficus-indica* ○ *Opuntia* sp.	No substantial limitations

Study Details	Methods	Results	Significant Findings	Limitations
Native Vegetation Solutions (2019b) **Client**: Norton Gold Fields Pty Ltd **Type**: Reconnaissance flora and vegetation survey **Location**: Kanowna (37.5 km northwest) **Timing**: June and November 2019	• Relevés • Opportunistic sampling	• 113 flora species from 28 families and 58 genera • 17 vegetation units • Degraded to very good condition	○ No significant findings	No substantial limitations

Appendix D – Vertebrate fauna identified by the desktop assessment and field survey

Scientific Name	Common Name	Conservation Status				Database Searches				Previous Surveys				This Survey
		EPBC Act	BC Act	DBCA	IUCN	NatureMap (40 km)	EPBC (40km)	DBCA (40km)	Birdlife (40km)	Eco Logical (2016)	McKenzie *et al.* (1992)	Cowan and How (2004)	Onshore (2021)	
Bovidae														
**Bos taurus*	Cow					•							•	
**Capra hircus*	Goat					•	•			•				
Ovis aries	*Sheep					•								
Burramyidae														
Cercartetus concinnus	Western pygmy-possum, mundarda					•					•		•	
Canidae														
**Canis familiaris* subsp. *familiaris*	Dog						•							
**Vulpes vulpes*	Fox						•			•	•			
Dasyuridae														
Dasyurus geoffroii fortis	Chuditch	*VU*	*VU*		*NT*	•	•	•						
Ningaui ridei	Wongai ningaui											•		
Ningaui yvonneae	Southern ningaui					•								
Sminthopsis crassicaudata	Fat-tailed dunnart					•					•	•		
Sminthopsis dolichura	Little long-tailed dunnart					•					•	•		
Sminthopsis gilberti	Gilbert's dunnart					•								
Sminthopsis ooldea	Ooldea dunnart					•								
Emballonuridae														
Taphozous hilli	Hill's sheathtail-bat					•							•	
Equidae														
**Equus asinus*	Donkey						•							
**Equus caballus*	Horse						•							
Felidae														
**Felis catus*	Domestic cat					•	•			•			•	

Scientific Name	Common Name	Conservation Status				Database Searches				Previous Surveys				This Survey
		EPBC Act	BC Act	DBCA	IUCN	NatureMap (40 km)	EPBC (40km)	DBCA (40km)	Birdlife (40km)	Eco Logical (2016)	McKenzie *et al.* (1992)	Cowan and How (2004)	Onshore (2021)	
Leporidae														
**Oryctolagus cuniculus*	Rabbit					●	●			●			●	●
Macropodidae														
Macropus fuliginosus	Western grey kangaroo					●				●	●		●	●
Osphranter robustus subsp. *erubescens*	Euro					●								
Osphranter rufus	Red kangaroo					●					●			
Molossidae														
Austronomus australis	White-striped free-tailed bat										●			
Ozimops planiceps	Southern free-tailed bat										●			
Muridae														
**Mus musculus*	House mouse					●	●				●	●	●	
Notomys alexis	Spinifex hopping-mouse											●		
Notomys mitchellii	Mitchell's hopping-mouse											●		
Pseudomys bolami	Bolam's mouse					●					●			
Pseudomys hermannsburgensis	Sandy inland mouse					●						●		
Myrmecobiidae														
Myrmecobius fasciatus	Numbat, walpurti	*EN*	*EN*		*EN*	●								
Tachyglossidae														
Tachyglossus aculeatus subsp. *acanthion*	Short-beaked Echidna					●				●			●	
Thylacomyidae														
Macrotis lagotis	Greater bilby	*VU*	*VU*		*VU*	●								
Vespertilionidae														
Chalinolobus gouldii	Gould's wattled bat					●					●		●	
Chalinolobus morio	Chocolate wattled bat					●					●			

Scientific Name	Common Name	Conservation Status				Database Searches				Previous Surveys				This Survey
		EPBC Act	BC Act	DBCA	IUCN	NatureMap (40 km)	EPBC (40km)	DBCA (40km)	Birdlife (40km)	Eco Logical (2016)	McKenzie *et al.* (1992)	Cowan and How (2004)	Onshore (2021)	
Nyctophilus geoffroyi	Lesser long-eared bat					●					●			
Scotorepens balstoni	Inland broad-nosed bat					●					●			
Vespadelus baverstocki	Inland forest bat					●								
Vespadelus finlaysoni	Finlayson's cave bat					●								
Vespadelus regulus	Southern forest bat					●					●		●	
Acanthizidae														
Acanthiza apicalis	Broad-tailed thornbill or inland thornbill					●			●		●		●	
Acanthiza chrysorrhoa	Yellow-rumped thornbill					●			●		●		●	
Acanthiza inornata	Western thornbill												●	
Acanthiza iredalei	Samphire thornbill												●	
Acanthiza robustirostris	Slaty-backed thornbill					●			●					
Acanthiza uropygialis	Chestnut-rumped thornbill					●			●		●			
Aphelocephala leucopsis	Southern whiteface					●			●				●	
Calamanthus cautus	Shy groundwren					●								
Gerygone fusca	Western gerygone					●			●					
Pyrrholaemus brunneus	Redthroat					●			●		●		●	
Sericornis frontalis	White-browed scrubwren								●					
Smicrornis brevirostris	Weebill					●			●	●	●		●	●
Accipitridae														
Accipiter cirrocephalus	Collared sparrowhawk					●			●					
Accipiter fasciatus	Brown goshawk					●			●					
Aquila audax	Wedged-tailed eagle					●			●	●	●		●	
Circus assimilis	Spotted harrier								●					
Elanus caeruleus subsp. *axillaris*	Black-shouldered kite					●			●					

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Haliastur sphenurus	Whistling kite					●			●					
Hamirostra isura	Square-tailed kite								●					
Hieraaetus morphnoides	Little eagle					●			●					
Aegothelidae														
Aegotheles cristatus	Australian owlet-nightjar					●			●					
Alcedinidae														
Todiramphus pyrrhopygius	Red-backed kingfisher					●			●		●			
Todiramphus sanctus	Sacred kingfisher					●			●					●
Anatidae														
Anas gracilis	Grey teal					●			●	●	●			
Anas platyrhynchos	*Mallard					●			●					
Anas rhynchotis	Australasian shoveler					●			●					
Anas superciliosa	Pacific black duck					●			●					
Aythya australis	Hardhead					●			●					
Biziura lobata	Musk duck					●				●				
Chenonetta jubata	Australian wood duck					●			●					
Cygnus atratus	Black swan					●			●	●				
Malacorhynchus membranaceus	Pink-eared duck					●			●					
Stictonetta naevosa	Freckled duck					●			●					
Tadorna tadornoides	Australian shell duck					●			●	●				
Anhingidae														
Anhinga novaehollandiae	Australasian darter					●			●					
Apodidae														
Apus pacificus	Fork-tailed swift	*MI*	*MI*				●							

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Ardeidae														
Ardea ibis	Cattle egret						•							
Ardea modesta	Eastern great egret					•			•					
Ardea novaehollandiae	White-faced heron					•			•					
Ardea pacifica	White-necked heron					•			•					
Artamus cinereus	Black-faced woodswallow					•			•	•	•			
Artamus cyanopterus	Dusky woodswallow					•			•		•			
Artamus minor	Little woodswallow								•					
Artamus personatus	Masked woodswallow					•			•	•				
Cracticus nigrogularis	Pied butcherbird					•			•	•	•		•	
Cracticus tibicen	Australian magpie					•			•	•	•		•	•
Cracticus torquatus	Grey butcherbird					•			•	•	•		•	•
Strepera versicolor	Grey currawong					•			•	•	•		•	•
Cacatuidae														
Cacatua roseicapilla	Galah					•			•		•		•	
Cacatua sanguinea	Little corella					•			•					
Calyptorhynchus banksii	Red-tailed black cockatoo								•					
Calyptorhynchus latirostris	Carnaby's cockatoo	*EN*	*EN*		*EN*	•		•	•					
Lophochroa leadbeateri	Major Mitchell's cockatoo								•					
Nymphicus hollandicus	Cockatiel					•			•		•			•
Campephagidae														
Coracina maxima	Ground cuckoo-shrike					•			•		•			
Coracina novaehollandiae subsp. *subpallida*	Black-faced cuckoo-shrike					•			•	•	•		•	•
Lalage tricolor	White-winged triller					•			•		•			

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Caprimulgidae														
Eurostopodus argus	Spotted nightjar					●			●					
Casuariidae														
Dromaius novaehollandiae	Emu					●			●	●	●		●	●
Charadriidae														
Charadrius ruficapillus	Red-capped plover					●			●					
Erythrogonys cinctus	Red-kneed dotterel					●			●					
Elseyornis melanops	Black-fronted dotterel					●			●				●	
Peltohyas australis	Inland dotterel								●					
Thinornis cucullatus	Hooded plover			*P4*	*VU*	●	●	●						
Vanellus tricolor	Banded lapwing					●			●					
Cinclosomatidae														
Cinclosoma clarum	Western chestnut quail-thrush								●					●
Cinclosoma castaneothorax	Chestnut-breasted quail-thrush								●					
Climacteridae														
Climacteris affinis	White-browed treecreeper								●					
Climacteris rufa	Rufous treecreeper								●		●			
Columbidae														
**Columba livia*	Domestic pigeon					●	●		●					
Ocyphaps lophotes	Crested pigeon					●			●	●	●		●	
Phaps chalcoptera	Common bronzewing					●			●	●	●		●	
Spilopelia chinensis	*Spotted turtle dove						●							
Spilopelia senegalensis	*Laughing turtle dove					●	●		●					

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Corvidae														
Corvus bennetti	Little crow					•			•					
Corvus coronoides	Australian raven					•			•	•			•	•
Corvus orru subsp. *cecilae*	Torresian crow					•			•					
Cuculidae														
Cacomantis flabelliformis	Fan-tailed cuckoo					•			•					
Cacomantis pallidus	Pallid cuckoo					•			•		•			
Chrysococcyx basalis	Horsfield's bronze cuckoo					•			•		•		•	
Chrysococcyx osculans	Black-eared cuckoo					•	•		•					
Dicaeidae														
Dicaeum hirundinaceum	Mistletoebird					•			•					
Estrildidae														
Taeniopygia guttata subsp. *castanotis*	Zebra finch					•			•					
Falconidae														
Falco berigora	Brown falcon					•			•	•	•		•	
Falco cenchroides	Nankeen kestrel					•			•	•				
Falco hypoleucos	Grey falcon	*VU*	*VU*		*VU*		•							
Falco longipennis	Australian hobby					•			•	•				
Falco peregrinus	Peregrine falcon		*OS*						•					
Hirundinidae														
Cheramoeca leucosterna	White-backed swallow					•			•					
Hirundo neoxena	Welcome swallow					•			•	•	•			
Petrochelidon ariel	Fairy martin					•			•					
Petrochelidon nigricans	Tree martin					•			•	•	•			

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Laridae														
Larus novaehollandiae	Silver gull					●			●					
Locustellidae														
Cincloramphus cruralis	Brown songlark								●					
Cincloramphus mathewsi	Rufous songlark								●					
Maluridae														
Malurus lamberti subsp. *assimilis*	Variegated fairywren													●
Malurus leucopterus subsp. *leuconotus*	White-winged fairywren					●			●	●	●		●	
Malurus pulcherrimus	Blue-breasted fairywren					●			●					
Malurus splendens	Splendid fairywren					●			●				●	
Megapodiidae														
Leipoa ocellata	Malleefowl	*VU*	*VU*		*VU*	●	●	●	●					●
Meliphagidae														
Acanthagenys rufogularis	Spiny-cheeked honeyeater					●			●		●		●	
Anthochaera carunculata	Red wattlebird					●			●	●	●		●	
Certhionyx variegatus	Pied honeyeater								●					
Epthianura albifrons	White-fronted chat					●			●				●	
Epthianura tricolor	Crimson chat					●			●				●	
Gavicalis virescens subsp. *forresti*	Inland singing honeyeater								●	●	●		●	
Lichmera indistincta	Brown honeyeater					●			●	●	●			
Manorina flavigula	Yellow-throated miner					●			●	●	●		●	
Melithreptus brevirostris	Brown-headed honeyeater					●			●		●			
Melithreptus chloropsis	Western white-naped honeyeater									●				
Nesoptilotis leucotis	White-eared honeyeater					●			●		●		●	

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Ptilotula keartlandi	Grey-headed Honeyeater									•			•	
Ptilotula ornata	Yellow-plumed honeyeater								•		•		•	
Ptilotula penicillata	White-plumed honeyeater												•	
Ptilotula plumula	Grey-fronted honeyeater								•					•
Purnella albifrons	White-fronted honeyeater					•			•		•		•	
Sugomel niger	Black honeyeater								•					
Meropidae														
Merops ornatus	Rainbow bee-eater					•	•		•		•			
Monarchidae														
Grallina cyanoleuca	Magpie-lark					•			•	•	•		•	•
Motacillidae														
Anthus australis subsp. *australis*	Australasian pipit					•			•		•			
Motacilla cinerea	Grey wagtail	*MI*	*MI*				•							
Neosittidae														
Daphoenositta chrysoptera	Varied sittella					•			•		•		•	
Oreoicidae														
Oreoica gutturalis	Crested bellbird					•			•	•	•		•	•
Otididae														
Ardeotis australis	Australian bustard					•			•					
Pachycephalidae														
Colluricincla harmonica subsp. *rufiventris*	Grey shrike thrush					•			•	•	•		•	
Pachycephala inornata	Gilbert's whistler					•			•					
Pachycephala fuliginosa occidentalis	Western golden whistler								•					
Pachycephala rufiventris subsp. *rufiventris*	Rufous whistler					•			•				•	

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Pardalotidae														
Pardalotus punctatus	Spotted pardalote					•			•				•	
Pardalotus striatus subsp. *murchisoni*	Striated pardalote					•			•	•	•		•	
Petroicidae														
Drymodes brunneopygia	Southern scrub robin					•			•					
Eopsaltria griseogularis	Western yellow robin					•								
Melanodryas cucullata	Hooded robin								•		•			
Microeca fascinans	Jacky winter					•			•	•	•		•	
Petroica goodenovii	Red-capped robin					•			•		•		•	
Phaethontidae														
Phalacrocorax melanoleucos	Little pied cormorant					•			•					
Phalacrocorax sulcirostris	Little black cormorant					•			•					
Podargidae														
Podargus strigoides	Tawny frogmouth					•			•	•	•		•	
Podicipedidae														
Poliocephalus poliocephalus	Hoary-headed grebe					•			•					
Tachybaptus novaehollandiae	Australasian grebe					•			•					
Pomatostomidae														
Pomatostomus superciliosus	White-browed babbler					•			•	•	•			
Psittacidae														
Barnardius zonarius	Australian ringneck												•	•
Melopsittacus undulatus	Budgerigar					•			•					
Parvipsitta porphyrocephala	Purple-crowned lorikeet								•	•	•			
Pezoporus occidentalis	Night parrot	*EN*	*CR*		*EN*		•							

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Platycercus zonarius subsp. *zonarius*	Port Lincoln parrot					●				●	●			
Polytelis alexandrae	Princess parrot	*VU*		*P4*	*NT*				●					
Polytelis anthopeplus	Regent parrot					●			●					
Psephotus varius	Mulga parrot					●			●	●	●			
Rallidae														
Fulica atra	Eurasian coot					●			●					
Porzana fluminea	Australian spotted crake					●								
Tribonyx ventralis	Black-tailed native hen					●			●					
Recurvirostridae														
Cladorhynchus leucocephalus	Banded stilt					●			●					
Himantopus himantopus	Black-winged stilt					●			●					
Recurvirostra novaehollandiae	Red-necked avocet					●			●	●				
Rhipiduridae														
Rhipidura albiscapa	Grey fantail					●			●					
Rhipidura leucophrys subsp. *leucophrys*	Willie wagtail					●			●	●	●		●	
Scolopacidae														
Calidris acuminata	Sharp-tailed sandpiper	*MI*	*MI*			●	●	●	●					
Calidris alba	Sanderling	*MI*	*MI*			●		●	●					
Calidris ferruginea	Curlew sandpiper	*CR/ MI*	*CR/ MI*		*NT*	●	●	●	●					
Calidris melanotos	Pectoral sandpiper	*MI*	*MI*				●							
Calidris ruficollis	Red-necked stint	*MI*	*MI*		*NT*	●		●	●					
Tringa brevipes	Grey-tailed tattler	*MI*	*MI*		*NT*	●		●						
Tringa glareola	Wood sandpiper	*MI*	*MI*			●		●	●					

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Actitis hypoleucos	Common sandpiper	*MI*	*MI*			●	●	●	●					
Tringa nebularia	Common greenshank	*MI*	*MI*			●	●	●	●					
Strigidae														
Ninox boobook	Boobook owl								●		●			
Threskiornithidae														
Platalea flavipes	Yellow-billed spoonbill					●			●					
Plegadis falcinellus	Glossy ibis	*MI*	*MI*					●						
Threskiornis spinicollis	Straw-necked ibis					●			●					
Turnicidae														
Turnix velox	Little button quail					●			●					
Tytonidae														
Tyto javanica	Eastern barn owl					●			●					
Zosteropidae														
Zosterops lateralis	Silvereye					●			●					
Reptiles														
Agamidae														
Ctenophorus caudicinctus	Ring-tailed dragon					●								
Ctenophorus cristatus	Bicycle dragon					●					●	●	●	
Ctenophorus fordi	Mallee sand dragon					●					●	●		
Ctenophorus isolepis subsp. *isolepis*	Crested dragon					●								
Ctenophorus nuchalis	Central netted dragon					●								
Ctenophorus reticulatus	Western netted dragon					●				●	●	●		
Ctenophorus salinarum	Salt pan dragon					●				●				
Ctenophorus scutulatus	Dragon					●					●	●		

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Moloch horridus	Thorny devil					●					●	●		
Pogona minor	Western bearded dragon					●				●	●	●	●	
Tympanocryptis pseudopsephos	Pebble dragon					●								
Carphodactylidae														
Nephrurus laevissimus	Gecko					●						●		
Nephrurus vertebralis						●					●			
Underwoodisaurus milii	Barking gecko					●				●	●	●	●	
Chelidae														
Chelodina steindachneri	Flat-shelled turtle					●								
Diplodactylidae														
Diplodactylus granariensis						●					●	●	●	
Diplodactylus pulcher	Fine-faced gecko					●					●	●	●	
Hesperoedura reticulata						●					●			
Lucasium damaeum						●								
Rhynchoedura ornata	Western beaked gecko					●					●	●	●	
Strophurus assimilis	Goldfields spiny-tailed gecko					●						●		
Strophurus elderi	Jewelled gecko					●					●			
Elapidae														
Acanthophis pyrrhus	Desert death adder					●								
Brachyurophis fasciolatus						●						●		
Brachyurophis semifasciatus						●						●		
Demansia psammophis subsp. *cupreiceps*	Yellow-faced whipsnake					●						●		
Echiopsis curta	Bardick					●								
Furina ornata	Moon snake					●								

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Neelaps bimaculatus	Black-naped snake					●								
Parasuta gouldii	Gould's hooded snake					●					●			
Suta monachus	Snake					●					●	●		
Pseudechis australis	Mulga snake					●				●				
Pseudonaja affinis	Dugite					●								
Pseudonaja mengdeni	Western brown snake					●					●			
Pseudonaja modesta	Ringed brown snake					●					●	●		
Simoselaps bertholdi	Jan's banded snake					●					●	●		
Suta fasciata	Rosen's snake					●								
Gekkonidae														
Gehyra purpurascens	Gecko					●						●	●	
Gehyra variegata	Tree gecko					●				●	●	●	●	
Hemidactylus frenatus	Asian house gecko					●	●							
Heteronotia binoei	Binoe's gecko					●				●	●	●	●	
Pygopodidae														
Delma australis						●				●	●			
Delma butleri	Legless lizard					●						●		
Lialis burtonis	Burton's legless lizard					●					●			
Pygopus lepidopodus	Common scaly foot					●								
Pygopus nigriceps	Legless lizard					●						●		
Pythonidae														
Morelia spilota	Carpet python					●								
Scincidae														
Cryptoblepharus buchananii	Buchanan's snake-eyed skink					●					●			

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Cryptoblepharus plagiocephalus	Skink					●						●		
Ctenotus atlas						●					●	●		
Ctenotus brooksi	Skink											●		
Ctenotus leonhardii	Skink					●								
Ctenotus schomburgkii	Skink					●					●	●		
Ctenotus uber	Spotted ctenotus					●					●	●		
Cyclodomorphus melanops subsp. *melanops*	Slender blue-tongue					●					●	●		
Egernia depressa	Pygmy spiny-tailed skink					●						●		
Egernia formosa	Goldfields crevice-skink					●					●	●		
Egernia stokesii badia	Western spiny-tailed skink	*EN*	*VU*			●		●						
Eremiascincus richardsonii	Broad-banded sand swimmer					●								
Hemiergis initialis						●							●	
Hemiergis peronii						●								
Lerista desertorum													●	
Lerista kingi						●				●				
Lerista macropisthopus	Skink											●		
Lerista picturata						●					●			
Lerista timida	Timid slider					●						●		
Liopholis inornata						●				●	●	●		
Liopholis multiscutata						●								
Menetia greyii	Common dwarf skink					●				●	●	●	●	
Morethia adelaidensis						●					●		●	
Morethia butleri						●					●	●		

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Morethia obscura						●								
Tiliqua occipitalis	Western blue-tongue					●						●		
Tiliqua rugosa						●				●	●		●	
Typhlopidae														
Anilios australis												●		
Anilios bituberculatus												●		
Anilios hamatus	Blind-snake											●		
Ramphotyphlops waitii	A blind-snake												●	
Varanus caudolineatus	Stripe-tailed pygmy monitor					●					●			
Varanus gouldii	Bungarra					●					●	●		
Varanus tristis subsp. *tristis*	Racehorse goanna					●						●		
Limnodynastidae														
Neobatrachus kunapalari	Kunapalari frog					●				●				
Neobatrachus pelobatoides	Humming frog					●								
Neobatrachus sutor	Shoemaker frog					●					●			
Neobatrachus wilsmorei	Plonking frog					●					●	●		
Myobatrachidae														
Pseudophryne occidentalis	Western toadlet					●					●			
Pelodryadidae														
Litoria moorei	Motorbike frog					●								

*denotes introduced species

Appendix E – Flora identified by the desktop assessment

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Aizoaceae	*Aizoon pubescens*	●	●								Y
	Disphyma crassifolium		●								
	Disphyma crassifolium subsp. *clavellatum*	●									
	Gunniopsis quadrifida	●	●								
	Mesembryanthemum crystallinum	●	●								Y
	Mesembryanthemum nodiflorum	●	●								Y
	Tetragonia eremaea	●	●								
Alismataceae	*Sagittaria platyphylla*						●				Y
Amaranthaceae	*Alternanthera denticulata*	●	●								
	Alternanthera nodiflora	●	●								
	Amaranthus viridis	●	●								Y
	Ptilotus aervoides	●	●								
	Ptilotus carlsonii	●	●								
	Ptilotus chamaecladus		●								
	Ptilotus divaricatus		●								
	Ptilotus drummondii		●								
	Ptilotus eremita	●	●								
	Ptilotus exaltatus	●									
	Ptilotus gaudichaudii	●	●								
	Ptilotus grandiflorus	●									
	Ptilotus helichrysoides	●	●								
	Ptilotus holosericeus	●	●								
	Ptilotus nobilis		●								
	Ptilotus obovatus	●	●								
	Ptilotus polystachyus	●	●								
	Ptilotus procumbens	●	●	●				P1			
	Ptilotus rigidus		●	●	●			P1			
	Ptilotus rotundifolius		●								
	Ptilotus schwartzii		●								
	Ptilotus sp. Kalgoorlie (J. Jackson & B. Moyle 260)			●				P1			
	Surreya diandra	●	●								
Anacardiaceae	*Schinus molle*		●								Y

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Anacardiaceae cont.	*Schinus molle* var. *areira*	●									Y
Apiaceae	*Daucus glochidiatus*	●	●								
	Platysace effusa	●	●								
	Platysace trachymenioides	●	●								
Apocynaceae	*Alyxia buxifolia*	●	●								
	Alyxia tetanifolia	●	●	●	●			P3			
	Asclepias curassavica	●	●								Y
	Calotropis procera						●				Y
	Cryptostegia madagascariensis						●				Y
	Marsdenia australis	●	●								
	Orbea variegata	●	●								Y
	Vincetoxicum lineare	●	●								
Araceae	*Pistia stratiotes*						●				Y
	Zantedeschia aethiopica						●				Y
Araliaceae	*Hydrocotyle intertexta*		●								
	Hydrocotyle pilifera		●								
	Hydrocotyle pilifera var. *glabrata*	●									
	Hydrocotyle ranunculoides						●				Y
	Trachymene coerulea		●								
	Trachymene croniniana		●					P3			
	Trachymene cyanopetala		●								
	Trachymene ornata	●	●								
	Trachymene pyrophila			●				P1			
Asparagaceae	*Agave americana*	●	●								Y
	Asparagus asparagoides						●				Y
	Chamaexeros fimbriata	●	●								
	Sowerbaea multicaulis		●	●				P4			
	Thysanotus manglesianus	●	●								
	Thysanotus sp.	●									
Asphodelaceae	*Bulbine semibarbata*	●	●								
Asteraceae	*Actinobole uliginosum*	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Angianthus prostratus	●	●	●				P3			
Asteraceae cont.	*Angianthus tomentosus*	●	●								
	Arctotheca calendula	●	●								Y
	Asteridea athrixioides	●	●								
	Asteridea chaetopoda	●	●								
	Blennospora drummondii		●								
	Brachyscome ciliaris	●	●								
	Brachyscome iberidifolia	●	●								
	Brachyscome lineariloba	●	●								
	Brachyscome perpusilla	●	●								
	Calotis breviradiata	●	●								
	Calotis hispidula	●	●								
	Calotis multicaulis	●	●								
	Calotis plumulifera		●								
	Carthamus lanatus	●	●								Y
	Centaurea melitensis	●	●								Y
	Cephalipterum drummondii	●	●								
	Ceratogyne obionoides	●	●								
	Chondrilla juncea						●				Y
	Chondropyxis halophila		●								
	Chrysocephalum apiculatum		●								
	Chrysocephalum apiculatum subsp. *norsemanense*	●		●				P3			
	Chrysocephalum puteale	●	●								
	Chthonocephalus pseudevax		●								
	Cichorium intybus	●	●								Y
	Conyza bonariensis	●									Y
	Conyza sumatrensis	●									Y
	Cotula australis	●	●								
	Craspedia haplorrhiza	●									
	Cratystylis conocephala	●	●								
	Cratystylis microphylla	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Cratystylis subspinescens	●	●								
	Cratystylis centralis			●				P3			
Asteraceae cont.	*Cymbonotus preissianus*		●					P3			
	Elachanthus pusillus	●	●	●				P2			
	Erigeron bonariensis		●								Y
	Erigeron sumatrensis		●								Y
	Erymophyllum glossanthus	●									
	Erymophyllum ramosum	●	●								
	Erymophyllum ramosum subsp. *ramosum*	●									
	Gazania linearis	●	●								Y
	Gilberta tenuifolia	●	●								
	Gnephosis brevifolia	●									
	Gnephosis macrocephala	●	●								
	Gnephosis tenuissima	●	●								
	Helianthus annuus	●	●								Y
	Helipterum craspedioides		●								
	Hyalochlamys globifera		●								
	Hyalosperma cotula		●								
	Hyalosperma demissum	●	●								
	Hyalosperma glutinosum	●	●								
	Hyalosperma glutinosum subsp. *glutinosum*	●									
	Hyalosperma zacchaeus	●	●								
	Isoetopsis graminifolia	●	●								
	Kippistia suaedifolia	●	●								
	Lactuca serriola		●								Y
	Lactuca serriola forma *serriola*	●									Y
	Lawrencella rosea	●	●								
	Leiocarpa websteri	●	●								
	Lemooria burkittii	●	●								
	Millotia myosotidifolia	●	●								
	Millotia perpusilla	●	●								
	Millotia tenuifolia		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Minuria cunninghamii	●	●								
	Minuria gardneri	●	●								
Asteraceae cont.	*Minuria leptophylla*	●	●								
	Monoculus monstrosus	●	●								Y
	Myriocephalus pygmaeus	●	●								
	Notisia intonsa	●	●	●	●			P3			
	Olearia adenolasia		●								
	Olearia exiguifolia	●	●								
	Olearia homolepis	●	●								
	Olearia incana	●	●								
	Olearia muelleri	●	●								
	Olearia muricata		●								
	Olearia paucidentata		●								
	Olearia pimeleoides	●	●								
	Olearia rudis	●	●								
	Olearia sp. Eremicola (Diels & Pritzel s.n. PERTH 00449628)	●									
	Olearia subspicata	●	●								
	Olearia trifurcata		●								
	Oligocarpus calendulaceus	●	●								Y
	Oncosiphon suffruticosum	●	●								Y
	Onopordum acaulon						●				Y
	Ozothamnus cassiope	●	●								
	Podolepis aristata		●								
	Podolepis aristata subsp. *affinis*	●									
	Podolepis capillaris	●	●								
	Podolepis lessonii	●	●								
	Podolepis rugata	●	●								
	Podotheca wilsonii	●	●								
	Pterocaulon sphacelatum	●	●								
	Rhodanthe battii	●	●								
	Rhodanthe charsleyae	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Rhodanthe chlorocephala		●								
	Rhodanthe chlorocephala subsp. *rosea*	●									
	Rhodanthe chlorocephala subsp. *splendida*	●									
Asteraceae	*Rhodanthe floribunda*	●	●								
	Rhodanthe haigii	●	●								
	Rhodanthe humboldtiana		●								
	Rhodanthe laevis	●	●								
	Rhodanthe manglesii	●	●								
	Rhodanthe nullarborensis	●	●								
	Rhodanthe oppositifolia		●								
	Rhodanthe oppositifolia subsp. *oppositifolia*	●									
	Rhodanthe pygmaea	●	●								
	Rhodanthe rubella	●	●								
	Rhodanthe stricta	●	●								
	Rhodanthe uniflora	●	●	●				P1			
	Schoenia cassiniana	●	●								
	Schoenia filifolia		●								
	Schoenia filifolia subsp. *filifolia*	●									
	Senecio dolichocephalus	●	●								
	Senecio glossanthus	●	●								
	Senecio gregorii		●								
	Senecio lacustrinus	●	●								
	Senecio magnificus	●	●								
	Senecio minimus		●								
	Senecio pinnatifolius	●	●								
	Silybum marianum						●				Y
	Sonchus oleraceus	●	●								Y
	Sondottia connata		●								
	Streptoglossa liatroides	●	●								
	Symphyotrichum squamatum	●	●								Y
	Thiseltonia gracillima	●	●								
	Trichanthodium skirrophorum	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Triptilodiscus pygmaeus	●	●								
	Verbesina encelioides		●								Y
	Vittadinia cervicularis		●								
Asteraceae cont.	*Vittadinia cervicularis* var. *cervicularis*	●									
	Vittadinia dissecta		●								
	Vittadinia dissecta var. *hirta*	●									
	Vittadinia eremaea		●								
	Vittadinia humerata	●	●								
	Vittadinia sulcata	●	●								
	Waitzia acuminata		●								
	Waitzia acuminata var. *acuminata*	●									
	Waitzia fitzgibbonii	●									
	Xanthium spinosum	●	●				●				Y
Bignoniaceae	*Jacaranda mimosifolia*		●								Y
Boraginaceae	*Buglossoides arvensis*	●	●								Y
	Echium plantagineum	●	●				●				Y
	Halgania andromedifolia	●	●								
	Halgania cyanea		●								
	Halgania cyanea var. Allambi Stn (B.W. Strong 676)	●									
	Halgania cyanea var. Charleville (R.W. Purdie +111)	●									
	Halgania integerrima	●	●								
	Halgania lavandulacea		●								
	Heliotropium euodes		●								
	Heliotropium europaeum	●	●								Y
	Heliotropium supinum	●	●								Y
	Omphalolappula concava	●	●								
	Trichodesma zeylanicum	●	●								
Boryaceae	*Borya constricta*		●								
Brassicaceae	*Alyssum linifolium*	●	●								Y
	Arabidella chrysodema	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Arabidella trisecta	●	●								
	Brassica tournefortii	●	●								Y
	Capsella bursa-pastoris	●	●								Y
	Carrichtera annua	●	●			●					Y
Brassicaceae cont.	*Harmsiodoxa brevipes*		●								
	Lepidium africanum	●	●								Y
	Lepidium fasciculatum	●	●	●				P3			
	Lepidium merrallii	●		●				P2			
	Lepidium oxytrichum	●	●								
	Lepidium papillosum	●	●								
	Lepidium phlebopetalum	●	●								
	Menkea australis		●								
	Phlegmatospermum eremaeum	●	●	●	●			P3			
	Sisymbrium irio	●	●								Y
	Sisymbrium orientale	●	●								Y
	Stenopetalum anfractum		●								
	Stenopetalum filifolium	●	●								
	Stenopetalum lineare	●	●								
	Stenopetalum lineare var. *lineare*	●									
	Stenopetalum pedicellare	●									
Cactaceae	*Austrocylindropuntia cylindrica*						●				Y
	Austrocylindropuntia subulata						●				Y
	Cylindropuntia fulgida		●				●				Y
	Cylindropuntia fulgida var. *mamillata*	●									Y
	Cylindropuntia imbricata	●	●				●				Y
	Cylindropuntia kleiniae	●	●				●				Y
	Cylindropuntia pallida						●				Y
	Cylindropuntia spp.					●					Y
	Cylindropuntia tunicata	●	●				●				Y
	Opuntia elata	●	●				●				Y
	Opuntia elatior						●				Y
	Opuntia engelmannii						●				Y

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Opuntia ficus-indica	●	●				●				Y
	Opuntia microdasys						●				Y
	Opuntia monacantha						●				Y
	Opuntia polyacantha						●				Y
Cactaceae cont.	*Opuntia puberula*						●				Y
	Opuntia stricta						●				Y
	Opuntia tomentosa						●				Y
Campanulaceae	*Isotoma petraea*	●	●								
	Wahlenbergia gracilenta	●	●								
Caryophyllaceae	*Silene gallica*		●								Y
	Spergularia diandra	●	●								Y
	Spergularia marina	●	●								
Casuarinaceae	*Allocasuarina acutivalvis*		●								
	Allocasuarina campestris	●	●								
	Allocasuarina eriochlamys		●								
	Allocasuarina eriochlamys subsp. *eriochlamys*	●									
	Allocasuarina eriochlamys subsp. *grossa*			●				P3			
	Allocasuarina helmsii	●	●								
	Allocasuarina huegeliana		●								
	Casuarina obesa	●	●								
	Casuarina pauper	●	●								
Celastraceae	*Psammomoya choretroides*	●									
	Psammomoya ephedroides		●								
Chenopodiaceae	*Atriplex acutibractea*	●	●								
	Atriplex acutibractea subsp. *acutibractea*	●									
	Atriplex acutibractea subsp. *karoniensis*	●									
	Atriplex amnicola	●	●								
	Atriplex codonocarpa	●	●								
	Atriplex eardleyae	●	●								
	Atriplex exilifolia		●								
	Atriplex holocarpa	●	●								
	Atriplex lindleyi		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Atriplex lindleyi subsp. *conduplicata*			●				P3			
	Atriplex lindleyi subsp. *inflata*	●									
	Atriplex nana	●	●								
	Atriplex nummularia	●	●								
Chenopodiaceae cont.	*Atriplex nummularia* subsp. *spathulata*	●									
	Atriplex pumilio	●	●								
	Atriplex quadrivalvata		●								
	Atriplex quadrivalvata var. *quadrivalvata*	●									
	Atriplex semibaccata	●	●								
	Atriplex semilunaris		●								
	Atriplex spongiosa	●	●								
	Atriplex stipitata	●	●								
	Atriplex suberecta	●	●								
	Atriplex vesicaria	●	●								
	Chenopodium album	●	●								Y
	Chenopodium curvispicatum	●	●								
	Chenopodium murale	●	●								Y
	Didymanthus roei	●	●								
	Dissocarpus paradoxus	●	●								
	Dysphania cristata	●	●								
	Dysphania kalpari	●	●								
	Dysphania melanocarpa		●								
	Dysphania pumilio	●	●								
	Dysphania simulans		●								
	Einadia nutans		●								
	Einadia nutans subsp. *eremaea*	●									
	Enchylaena tomentosa	●	●								
	Enchylaena tomentosa var. *tomentosa*	●									
	Eriochiton sclerolaenoides	●	●								
	Maireana amoena	●	●								
	Maireana appressa	●	●								
	Maireana atkinsiana	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Maireana brevifolia	●	●								
	Maireana carnosa	●	●								
	Maireana erioclada	●	●								
	Maireana eriosphaera	●	●								
Chenopodiaceae cont.	*Maireana georgei*	●	●								
	Maireana glomerifolia	●	●								
	Maireana integra	●	●								
	Maireana marginata	●	●								
	Maireana oppositifolia	●	●								
	Maireana pentagona	●	●								
	Maireana pentatropis	●	●								
	Maireana platycarpa	●	●								
	Maireana pyramidata	●	●								
	Maireana radiata	●	●								
	Maireana sedifolia	●	●								
	Maireana suaedifolia	●	●								
	Maireana tomentosa	●	●								
	Maireana tomentosa subsp. *tomentosa*	●									
	Maireana trichoptera	●	●								
	Maireana triptera	●	●								
	Maireana turbinata	●	●								
	Rhagodia crassifolia		●								
	Rhagodia drummondii	●	●								
	Rhagodia eremaea	●	●								
	Rhagodia preissii		●								
	Roycea divaricata	●	●								
	Salsola australis	●	●								
	Sclerolaena brevifolia	●	●								
	Sclerolaena cuneata	●	●								
	Sclerolaena diacantha	●	●								
	Sclerolaena drummondii	●	●								
	Sclerolaena eurotioides	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Sclerolaena fusiformis	●	●								
	Sclerolaena gardneri	●	●								
	Sclerolaena obliquicuspis	●	●								
	Sclerolaena parviflora	●	●								
Chenopodiaceae cont.	*Sclerolaena patenticuspis*		●								
	Tecticornia arbuscula		●								
	Tecticornia chartacea	●	●								
	Tecticornia disarticulata	●	●								
	Tecticornia doleiformis		●								
	Tecticornia doliiformis	●	●								
	Tecticornia flabelliformis	●		●	●	●		P1		VU	
	Tecticornia indica		●								
	Tecticornia indica subsp. *bidens*	●									
	Tecticornia mellarium			●				P1			
	Tecticornia peltata	●	●								
	Tecticornia pergranulata		●								
	Tecticornia pergranulata subsp. *elongata*	●									
	Tecticornia pergranulata subsp. *pergranulata*	●									
	Tecticornia pruinosa	●	●								
	Tecticornia pterygosperma		●								
	Tecticornia pterygosperma subsp. *pterygosperma*	●									
	Tecticornia sp. Burnerbinmah (D. Edinger et al. 101)	●									
	Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	●									
	Tecticornia syncarpa		●								
	Tecticornia triandra	●	●								
	Tecticornia undulata	●	●								
Colchicaceae	*Wurmbea tenella*	●	●								
Convolvulaceae	*Convolvulus clementii*	●	●								
	Convolvulus remotus	●	●								
	Ipomoea calobra	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Crassulaceae	*Bryophyllum delagoense*	●	●								Y
	Crassula colorata		●								
	Crassula colorata var. *acuminata*	●									
	Crassula colorata var. *colorata*	●									
	Crassula tetramera	●	●								
Cucurbitaceae	*Cucumis myriocarpus*		●								Y
	Cucumis myriocarpus subsp. *myriocarpus*	●									Y
Cupressaceae	*Athrotaxis cupressoides*		●								
	Callitris columellaris	●									
	Callitris preissii	●	●								
	Callitris tuberculata		●								
	Callitris verrucosa	●	●								
Cyperaceae	*Chrysitrix distigmatosa*	●	●								
	Eleocharis acutangula	●	●								
	Gahnia deusta	●	●								
	Isolepis australiensis	●	●	●				P3			
	Lepidosperma diurnum	●									
	Lepidosperma lyonsii							P1			
	Lepidosperma sp.	●									
	Lepidosperma sp. Kambalda (A.A. Mitchell 5156)			●				P2			
	Lepidosperma sp. Parker Range (N. Gibson & M. Lyons 2094)			●				P2			
	Mesomelaena preissii	●	●								
	Schoenus hexandrus	●									
	Schoenus subaphyllus	●	●								
Didiereaceae	*Portulacaria afra*	●	●								Y
Dilleniaceae	*Hibbertia ancistrophylla*	●	●								
	Hibbertia desmophylla		●								
	Hibbertia glomerosa		●								
	Hibbertia glomerosa var. *glomerosa*	●									
	Hibbertia pachyphylla			●				P3			
Droseraceae	*Drosera macrantha*		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Drosera macrophylla		●								
	Drosera sp. Branched styles (S.C. Coffey 193)	●									
Elaeocarpaceae	*Tetratheca efoliata*	●	●								
	Tetratheca spenceri			●	●			T	VU		
Ericaceae	*Andersonia carinata*		●					P2			
	Astroloma pallidum		●								
Ericaceae cont.	*Astroloma serratifolium*		●								
	Leucopogon sp. Boorabbin (K.R. Newbey 8374)	●									
	Leucopogon sp. Coolgardie (M. Hislop & F. Hort MH 3197)	●									
	Lysinema ciliatum		●								
	Melichrus sp. Coolgardie (K.R. Newbey 8698)			●				P3			
	Styphelia rectiloba	●	●	●	●			P3			
	Styphelia saxicola			●				P3			
Euphorbiaceae	*Bertya dimerostigma*		●								
	Beyeria lechenaultii	●	●								
	Beyeria sulcata		●								
	Beyeria sulcata var. *brevipes*	●									
	Beyeria sulcata var. *sulcata*	●									
	Euphorbia drummondii	●	●								
	Euphorbia multifaria	●	●								
	Euphorbia porcata	●	●								
	Jatropha gossypiifolia						●				Y
	Monotaxis bracteata		●								
	Monotaxis grandiflora		●								
	Monotaxis grandiflora var. *obtusifolia*	●									
	Monotaxis luteiflora	●	●								
	Ricinocarpos digynus			●				P1			
	Ricinocarpos stylosus	●	●								
	Ricinocarpos velutinus	●	●								
Fabaceae	*Acacia acuminata*	●	●								
	Acacia aestivalis		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Acacia ancistrophylla		●								
	Acacia ancistrophylla var. *ancistrophylla*	●									
	Acacia andrewsii	●	●								
	Acacia aneura	●	●								
	Acacia beauverdiana	●	●								
	Acacia brachystachya		●								
	Acacia burkittii	●	●								
Fabaceae cont.	*Acacia calcarata*	●	●								
	Acacia camptoclada	●	●								
	Acacia chrysella	●	●								
	Acacia coatesii		●	●				P1			
	Acacia collegialis	●	●								
	Acacia colletioides	●	●								
	Acacia coolgardiensis	●	●								
	Acacia crenulata		●	●	●			P3			
	Acacia cyclops		●								
	Acacia dempsteri	●	●								
	Acacia densiflora		●								
	Acacia desertorum		●								
	Acacia desertorum var. *desertorum*	●									
	Acacia donaldsonii	●	●								
	Acacia duriuscula	●	●								
	Acacia effusifolia	●	●								
	Acacia enervia		●								
	Acacia enervia subsp. *explicata*	●									
	Acacia epedunculata			●	●			P1			
	Acacia eremophila		●								
	Acacia eremophila var. *eremophila*	●									
	Acacia erinacea	●	●								
	Acacia fragilis		●								
	Acacia gibbosa	●	●								
	Acacia hemiteles	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Acacia inaequiloba	●	●								
	Acacia inamabilis		●								
	Acacia inceana		●								
	Acacia inceana subsp. *inceana*	●									
	Acacia jennerae	●	●								
	Acacia jensenii	●	●								
	Acacia kalgoorliensis	●	●								
Fabaceae cont.	*Acacia kerryana*		●	●				P2			
	Acacia lasiocalyx	●	●								
	Acacia leptopetala	●	●								
	Acacia ligulata	●	●								
	Acacia lineolata		●								
	Acacia longispinea	●	●								
	Acacia masliniana	●	●								
	Acacia merrallii	●	●								
	Acacia microbotrya		●								
	Acacia mulganeura	●	●								
	Acacia multispicata	●	●								
	Acacia murrayana	●	●								
	Acacia nyssophylla	●	●								
	Acacia oswaldii	●	●								
	Acacia pachypoda	●	●								
	Acacia prainii	●	●								
	Acacia pritzeliana	●	●								
	Acacia pulchella		●								
	Acacia pycnantha	●	●								Y
	Acacia quadrimarginea		●								
	Acacia ramulosa		●								
	Acacia rendlei	●	●								
	Acacia resinimarginea	●	●								
	Acacia resinistipulea	●	●								
	Acacia rostellifera		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Acacia sclerophylla		●								
	Acacia sclerophylla var. *teretiuscula*			●				P1			
	Acacia sclerosperma		●								
	Acacia sclerosperma subsp. *sclerosperma*	●									
	Acacia sericocarpa	●	●								
	Acacia sibirica	●	●								
	Acacia sp. Mt Jackson (B. Ryan 176)	●									
Fabaceae cont.	*Acacia synchronicia*	●	●								
	Acacia tetragonophylla	●	●								
	Acacia warramaba	●	●								
	Acacia websteri	●	●	●	●			P1			
	Acacia xerophila		●								
	Acacia xerophila var. *brevior*	●									
	Acacia yorkrakinensis		●								
	Acacia yorkrakinensis subsp. *acrita*	●									
	Alhagi maurorum	●	●				●				Y
	Bossiaea celata			●				P3			
	Bossiaea cucullata	●	●								
	Bossiaea laxa			●				P2			
	Callistachys lanceolata		●								
	Chorizema racemosum	●	●								
	Cullen discolor	●	●								
	Cullen leucanthum	●	●								
	Daviesia aphylla	●									
	Daviesia benthamii		●								
	Daviesia croniniana	●	●								
	Daviesia decurrens		●								
	Daviesia grahamii	●	●								
	Daviesia nematophylla	●	●								
	Daviesia pachyloma	●	●								
	Dillwynia acerosa		●								
	Dillwynia sp. Coolgardie (V.E. Sands 637.3.1)	●									

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Erichsenia uncinata		●								
	Erythrostemon gilliesii	●	●								Y
	Gastrolobium graniticum	●	●	●	●			T	VU	EN	
	Glycyrrhiza acanthocarpa	●	●								
	Gompholobium cinereum			●	●			P3			
	Gompholobium gompholobioides	●	●								
	Goodia medicaginea		●								
Fabaceae cont.	*Hovea acanthoclada*	●	●								
	Indigofera occidentalis		●								
	Jacksonia arida	●	●								
	Kennedia prorepens	●	●								
	Leptosema cervicorne	●	●								
	Leptosema daviesioides	●	●								
	Lotus cruentus	●	●								
	Medicago laciniata	●	●								Y
	Medicago minima	●	●								Y
	Medicago polymorpha	●	●								Y
	Mirbelia depressa	●	●								
	Mirbelia microphylla	●	●								
	Mirbelia ramulosa	●	●								
	Mirbelia seorsifolia	●	●								
	Parkinsonia aculeata						●				Y
	Petalostylis cassioides	●	●								
	Prosopis glandulosa x *Prosopis velutina*						●				Y
	Senna alata						●				Y
	Senna artemisioides	●	●								
	Senna artemisioides subsp. *filifolia*	●									
	Senna artemisioides subsp. x *artemisioides*	●									
	Senna cardiosperma	●	●								
	Senna flexuosa		●								
	Senna obtusifolia						●				Y
	Senna pleurocarpa	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Senna pleurocarpa var. *angustifolia*	●									
	Senna pleurocarpa var. *pleurocarpa*	●									
	Senna stowardii	●	●								
	Swainsona affinis	●	●								
	Swainsona beasleyana	●	●								
	Swainsona canescens	●	●								
	Swainsona colutoides	●	●								
Fabaceae cont.	*Swainsona formosa*		●								
	Swainsona gracilis	●	●								
	Swainsona halophila		●								
	Swainsona incei	●	●								
	Swainsona kingii	●	●								
	Swainsona leeana	●	●								
	Swainsona microphylla		●								
	Swainsona oliveri	●	●								
	Swainsona oroboides	●	●								
	Swainsona paradoxa	●	●								
	Swainsona purpurea	●	●								
	Swainsona rostellata	●	●								
	Templetonia ceracea	●	●								
	Templetonia egena		●								
	Templetonia incrassata	●	●								
	Vicia monantha		●								Y
	Vicia monantha subsp. *triflora*	●									Y
Frankeniaceae	*Frankenia cinerea*	●	●								
	Frankenia desertorum	●	●								
	Frankenia georgei			●				P1			
	Frankenia glomerata	●	●	●				P4			
	Frankenia interioris	●	●								
	Frankenia interioris var. *interioris*	●									
	Frankenia interioris var. *parviflora*	●									
	Frankenia setosa	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Frankenia tetrapetala	●									
Gentianaceae	*Schenkia clementii*	●	●								
Geraniaceae	*Erodium aureum*		●								Y
	Erodium cicutarium	●	●								Y
	Erodium crinitum	●	●								
	Erodium cygnorum	●	●								
Goodeniaceae	*Anthotium rubriflorum*		●								
Goodeniaceae cont.	*Brunonia australis*	●	●								
	Brunonia sp. Goldfields (K.R. Newbey 6044)	●									
	Coopernookia strophiolata	●	●								
	Dampiera eriocephala	●	●								
	Dampiera latealata	●	●								
	Dampiera lavandulacea	●	●								
	Dampiera linearis		●								
	Dampiera luteiflora	●	●								
	Dampiera oligophylla		●								
	Dampiera plumosa	●	●	●				P1			
	Dampiera roycei		●								
	Dampiera stenostachya	●	●								
	Dampiera tenuicaulis		●								
	Dampiera tenuicaulis var. *curvula*	●									
	Dampiera tenuicaulis var. *tenuicaulis*	●									
	Dampiera tomentosa		●								
	Goodenia concinna	●	●								
	Goodenia cycnopotamica		●								
	Goodenia elderi	●	●								
	Goodenia havilandii	●	●								
	Goodenia mimuloides	●	●								
	Goodenia pinnatifida		●								
	Goodenia pusilliflora	●	●								
	Goodenia salina	●	●	●				P2			
	Goodenia xanthosperma	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Lechenaultia biloba		●								
	Lechenaultia brevifolia	●	●								
	Lechenaultia tubiflora		●								
	Scaevola canescens		●								
	Scaevola restiacea		●								
	Scaevola spinescens	●	●								
	Scaevola striata		●								
Goodeniaceae cont.	*Velleia daviesii*		●								
	Velleia discophora		●								
	Velleia rosea	●	●								
	Verreauxia dyeri		●								
Gyrostemonaceae	*Codonocarpus cotinifolius*	●	●								
	Gyrostemon racemiger	●	●								
Haemodoraceae	*Anigozanthos manglesii*		●								
	Conostylis petrophiloides		●								
	Conostylis serrulata		●								
Haloragaceae	*Glischrocaryon angustifolium*	●	●								
	Glischrocaryon aureum		●								
	Glischrocaryon flavescens	●	●								
	Gonocarpus confertifolius		●								
	Gonocarpus confertifolius var. *helmsii*	●									
	Haloragis maierae	●	●								
	Haloragis trigonocarpa	●	●								
	Myriophyllum petraeum			●	●			P4			
Hemerocallidaceae	*Stypandra glauca*		●								
Iridaceae	*Moraea flaccida*						●				Y
	Moraea miniata						●				Y
	Patersonia occidentalis		●								
Isoetaceae	*Isoetes brevicula*			●				P3			
Juncaginaceae	*Triglochin hexagona*		●								
Lamiaceae	*Brachysola coerulea*		●								
	Cyanostegia angustifolia	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Cyanostegia microphylla	●	●								
	Dasymalla terminalis	●	●								
	Dicrastylis brunnea	●									
	Dicrastylis corymbosa		●								
	Dicrastylis parvifolia	●	●								
	Hemiandra pungens		●								
	Hemigenia dielsii		●								
Lamiaceae cont.	*Hemigenia loganiacea*		●								
	Hemiphora elderi	●	●								
	Lachnostachys bracteosa		●								
	Lachnostachys coolgardiensis	●	●								
	Lachnostachys verbascifolia		●								
	Marrubium vulgare	●	●								Y
	Newcastelia insignis		●					P2			
	Physopsis viscida	●	●								
	Pityrodia lepidota	●	●								
	Pityrodia scabra subsp. *dendrotricha*			●	●			P3			
	Prostanthera althoferi		●								
	Prostanthera althoferi subsp. *althoferi*	●									
	Prostanthera campbellii	●	●								
	Prostanthera grylloana	●	●								
	Prostanthera incurvata	●	●								
	Prostanthera splendens			●	●			P1			
	Salvia reflexa	●	●								Y
	Salvia verbenaca	●	●								Y
	Teucrium disjunctum		●								
	Teucrium sessiliflorum	●	●								
	Westringia cephalantha	●	●								
	Westringia rigida	●	●								
Lauraceae	*Cassytha glabella*		●								
Loganiaceae	*Phyllangium sulcatum*	●	●								
Loranthaceae	*Amyema benthamii*	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Amyema fitzgeraldii		●								
	Amyema gibberula		●								
	Amyema gibberula var. *gibberula*	●									
	Amyema linophylla		●								
	Amyema linophylla subsp. *linophylla*	●									
	Amyema miquelii	●	●								
	Amyema preissii	●	●								
Loranthaceae cont.	*Lysiana casuarinae*	●	●								
	Nuytsia floribunda		●								
Lythraceae	*Lythrum hyssopifolia*	●	●								Y
Malvaceae	*Abutilon cryptopetalum*	●	●								
	Adansonia gregorii		●								
	Alyogyne hakeifolia		●								
	Alyogyne pinoniana		●								
	Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)			●				P3			
	Androcalva aphrix	●	●								
	Androcalva loxophylla		●								
	Androcalva luteiflora	●	●								
	Brachychiton gregorii	●	●								
	Commersonia craurophylla	●	●								
	Guichenotia macrantha		●								
	Hannafordia bissillii		●								
	Hannafordia bissillii subsp. *latifolia*	●									
	Hibiscus solanifolius	●	●								
	Lawrencia diffusa		●								
	Lawrencia glomerata	●	●								
	Lawrencia helmsii	●	●								
	Lawrencia repens	●	●								
	Lawrencia squamata	●	●								
	Malva parviflora	●	●								Y
	Malva preissiana		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Malva weinmanniana	●	●								
	Radyera farragei	●	●								
	Seringia exastia^							T^	CR	CR	
	Seringia velutina	●	●								
	Sida ammophila		●								
	Sida calyxhymenia	●	●								
	Sida intricata	●	●								
	Sida petrophila		●								
Malvaceae cont.	*Sida spodochroma*	●	●								
Meliaceae	*Melia azedarach*	●	●								Y
Molluginaceae	*Hypertelis cerviana*	●	●								
Montiaceae	*Calandrinia calyptrata*	●	●								
	Calandrinia eremaea	●	●								
	Calandrinia lefroyensis	●	●	●				P1			
	Calandrinia polyandra	●	●								
	Calandrinia quartzitica^							P1			
	Calandrinia schistorhiza		●								
	Calandrinia sculpta	●	●								
	Calandrinia translucens	●	●								
Myrtaceae	*Agonis flexuosa*		●								Y
	Aluta aspera		●								
	Aluta aspera subsp. *aspera*	●									
	Baeckea elderiana	●	●								
	Baeckea grandibracteata		●								
	Baeckea muricata		●								
	Baeckea sp. Koonadgin (B.L. Rye & M.E. Trudgen BLR 241137)	●									
	Balaustion pulcherrimum		●								
	Calothamnus gilesii	●	●								
	Calothamnus quadrifidus		●								
	Calytrix amethystina	●	●								
	Calytrix birdii	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Calytrix leschenaultii		●								
	Calytrix merrelliana		●								
	Chamelaucium sp. Parker Range (B.H. Smith 1255)			●				P1			
	Cyathostemon divaricatus	●	●	●	●			P1			
	Cyathostemon verrucosus	●	●	●				P3			
	Darwinia sp. Karonie (K. Newbey 8503)	●									
	Enekbatus clavifolius		●								
	Enekbatus cryptandroides		●								
Myrtaceae cont.	*Enekbatus eremaeus*	●									
	Ericomyrtus serpyllifolia	●	●								
	Eucalyptus calycogona		●								
	Eucalyptus calycogona subsp. *calycogona*	●									
	Eucalyptus campaspe	●	●								
	Eucalyptus carnei		●								
	Eucalyptus celastroides	●	●								
	Eucalyptus celastroides subsp. *celastroides*	●									
	Eucalyptus clelandiorum	●	●								
	Eucalyptus comitae-vallis	●	●								
	Eucalyptus concinna	●	●								
	Eucalyptus corrugata	●	●								
	Eucalyptus crucis		●								
	Eucalyptus cylindrocarpa	●	●								
	Eucalyptus delicata		●								
	Eucalyptus distuberosa		●								
	Eucalyptus distuberosa subsp. *distuberosa*	●									
	Eucalyptus educta			●				P2			
	Eucalyptus eremicola		●								
	Eucalyptus eremophila	●	●								
	Eucalyptus eremophila subsp. *eremophila*	●									
	Eucalyptus erythronema		●								
	Eucalyptus exigua			●	●			P3			

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Eucalyptus flocktoniae	●	●								
	Eucalyptus foecunda		●								
	Eucalyptus fraseri		●								
	Eucalyptus fraseri subsp. *fraseri*	●									
	Eucalyptus frenchiana			●				P3			
	Eucalyptus gracilis	●	●								
	Eucalyptus griffithsii	●	●								
	Eucalyptus horistes	●	●								
	Eucalyptus incerata		●								
Myrtaceae cont.	*Eucalyptus incrassata*	●	●								
	Eucalyptus jutsonii		●								
	Eucalyptus jutsonii subsp. *jutsonii*	●		●				P4			
	Eucalyptus kingsmillii		●								
	Eucalyptus kruseana		●	●				P4			
	Eucalyptus leptophylla	●	●								
	Eucalyptus leptopoda		●								
	Eucalyptus leptopoda subsp. *subluta*	●									
	Eucalyptus lesouefii	●	●								
	Eucalyptus longicornis	●	●								
	Eucalyptus longissima	●	●								
	Eucalyptus loxophleba		●								
	Eucalyptus loxophleba subsp. *lissophloia*	●									
	Eucalyptus moderata		●								
	Eucalyptus oldfieldii		●								
	Eucalyptus oleosa	●	●								
	Eucalyptus oleosa subsp. *oleosa*	●									
	Eucalyptus petraea	●	●								
	Eucalyptus pileata	●	●								
	Eucalyptus planipes	●	●								
	Eucalyptus platycorys	●	●								
	Eucalyptus prolixa	●	●								
	Eucalyptus ravida	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Eucalyptus rigidula	●	●								
	Eucalyptus salicola	●	●								
	Eucalyptus salmonophloia	●	●								
	Eucalyptus salubris	●	●								
	Eucalyptus socialis		●								
	Eucalyptus sp. Mulga Rock (K.D. Hill & L.A.S. Johnson KH 2668)	●									
	Eucalyptus sp. Southern smooth-bark (D. Nicolle & M. French DN 6916)	●									
	Eucalyptus stricklandii	●	●								
Myrtaceae cont.	*Eucalyptus tenera*	●	●								
	Eucalyptus tenuis		●								
	Eucalyptus torquata	●	●								
	Eucalyptus transcontinentalis	●	●								
	Eucalyptus urna	●	●								
	Eucalyptus websteriana	●	●								
	Eucalyptus websteriana subsp. *norsemanica*			●	●			P1			
	Eucalyptus websteriana subsp. *websteriana*	●									
	Eucalyptus x *brachyphylla*	●	●	●				P4			
	Eucalyptus yilgarnensis	●	●								
	Euryomyrtus maidenii	●	●								
	Homalocalyx coarctatus		●								
	Homalocalyx pulcherrimus		●								
	Homalocalyx thryptomenoides	●	●								
	Hysterobaeckea petraea	●	●								
	Kunzea pulchella		●								
	Leptospermum fastigiatum	●	●								
	Leptospermum roei		●								
	Leptospermum subtenue	●	●								
	Malleostemon peltiger	●									
	Malleostemon roseus	●	●								
	Malleostemon tuberculatus	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Melaleuca acuminata		●								
	Melaleuca acuminata subsp. *acuminata*	●									
	Melaleuca calyptroides	●	●								
	Melaleuca coccinea	●	●	●				P3			
	Melaleuca concreta		●								
	Melaleuca cordata	●	●								
	Melaleuca eleuterostachya		●								
	Melaleuca elliptica	●	●								
	Melaleuca fulgens		●								
	Melaleuca fulgens subsp. *fulgens*	●									
Myrtaceae cont.	*Melaleuca halmaturorum*	●	●								
	Melaleuca hamata	●	●								
	Melaleuca huegelii		●								
	Melaleuca lanceolata	●	●								
	Melaleuca lateriflora	●	●								
	Melaleuca macronychia subsp. *macronychia*	●									
	Melaleuca macronychia subsp. *trygonoides*			●				P3			
	Melaleuca pauperiflora		●								
	Melaleuca pauperiflora subsp. *fastigiata*	●									
	Melaleuca scabra		●								
	Melaleuca sheathiana	●	●								
	Melaleuca thymoides		●								
	Melaleuca uncinata	●	●								
	Melaleuca xerophila		●								
	Melaleuca zeteticorum	●	●								
	Micromyrtus erichsenii	●	●								
	Micromyrtus monotaxis	●	●								
	Micromyrtus obovata		●								
	Micromyrtus stenocalyx	●	●								
	Rinzia carnosa	●	●								
	Rinzia triplex			●				P1			
	Thryptomene australis		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Thryptomene australis subsp. *brachyandra*	●									
	Thryptomene kochii	●	●								
	Thryptomene planiflora	●		●				P1			
	Thryptomene sp. Coolgardie (E. Kelso s.n. 1902)	●		●				P1			
	Thryptomene sp. Londonderry (R.H. Kuchel 1763)		●								
	Thryptomene urceolaris	●	●								
	Verticordia chrysantha	●	●								
	Verticordia picta	●	●								
	Verticordia pritzelii	●	●								
Nitrariaceae	*Nitraria billardierei*	●	●								
Nyctaginaceae	*Boerhavia coccinea*	●	●								
Orchidaceae	*Caladenia footeana*	●									
	Caladenia nobilis	●	●								
	Caladenia roei	●	●								
	Caladenia varians MS		●								
	Diuris hazeliae		●								
	Diuris longifolia		●								
	Oligochaetochilus exsertus		●								
	Pterostylis sp. inland (A.C. Beauglehole 11880)	●									
	Pterostylis tryphera	●	●								
	Pterostylis xerampelina			●				P1			
	Thelymitra antennifera	●	●								
	Thelymitra petrophila		●								
	Thelymitra stellata		●			●		T	EN	EN	
Oxalidaceae	*Oxalis bowiei*	●	●								Y
	Oxalis pes-caprae	●	●								Y
Papaveraceae	*Argemone ochroleuca*		●								Y
	Argemone ochroleuca subsp. *ochroleuca*	●									Y
	Papaver hybridum	●	●								Y
Pittosporaceae	*Billardiera fusiformis*	●	●								
	Marianthus bicolor	●	●								
	Pittosporum angustifolium	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
Plantaginaceae	*Plantago debilis*	●	●								
	Plantago drummondii	●	●								
	Plantago sp. Mt Magnet (A.S. George 6793)	●									
Plumbaginaceae	*Limonium sinuatum*	●	●								Y
	Psylliostachys suworowii		●								
Poaceae	*Amphipogon caricinus*		●								
	Amphipogon caricinus var. *caricinus*	●									
	Anthosachne scabra		●								
	Aristida contorta	●	●								
	Austrostipa blackii	●	●	●				P3			
Poaceae cont.	*Austrostipa drummondii*	●	●								
	Austrostipa elegantissima	●	●								
	Austrostipa eremophila	●	●								
	Austrostipa nitida	●	●								
	Austrostipa platychaeta	●	●								
	Austrostipa puberula		●								
	Austrostipa scabra	●	●								
	Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	●		●				P1			
	Austrostipa sp. Dowerin (G. Wiehl F 8004)	●		●				P2			
	Austrostipa trichophylla	●	●								
	Avena fatua		●								Y
	Bromus arenarius	●	●								
	Bromus catharticus	●									Y
	Bromus diandrus	●	●								Y
	Cenchrus ciliaris	●	●			●					Y
	Cenchrus longisetus		●								Y
	Cenchrus setaceus	●	●								Y
	Chloris gayana		●								Y
	Chloris truncata	●	●								
	Cymbopogon obtectus		●								
	Cynodon dactylon		●								Y

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Dactyloctenium radulans	●	●								
	Dichanthium sericeum		●								
	Dichanthium sericeum subsp. *sericeum*	●									
	Digitaria ammophila	●	●								
	Digitaria brownii	●	●								
	Ehrharta villosa	●	●								Y
	Enneapogon avenaceus	●	●								
	Enneapogon caerulescens	●	●								
	Enneapogon cylindricus	●	●								
	Enteropogon ramosus	●	●								
	Eragrostis curvula	●	●								
Poaceae cont.	*Eragrostis dielsii*	●	●								
	Eragrostis falcata	●	●								
	Eragrostis setifolia	●	●								
	Eragrostis xerophila	●									
	Eriachne pulchella	●									
	Hordeum glaucum	●	●								Y
	Hordeum leporinum	●	●								Y
	Hyparrhenia hirta		●								Y
	Leptochloa digitata	●	●								
	Monachather paradoxus	●	●								
	Panicum decompositum	●	●								
	Panicum effusum	●	●								
	Paspalidium constrictum	●	●								
	Paspalidium gracile	●	●								
	Paspalidium reflexum	●	●								
	Pentameris airoides		●								Y
	Pentameris airoides subsp. *airoides*	●									Y
	Phalaris minor		●								Y
	Phalaris paradoxa	●	●								Y
	Polypogon monspeliensis		●								Y
	Puccinellia ciliata		●								Y

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Rostraria pumila	●	●								Y
	Rytidosperma acerosum		●								
	Rytidosperma caespitosum	●	●								
	Rytidosperma setaceum	●	●								
	Schismus arabicus	●	●								Y
	Schismus barbatus	●	●								Y
	Setaria dielsii	●	●								
	Sorghum halepense	●	●								Y
	Thyridolepis mitchelliana		●								
	Triodia desertorum		●								
	Triodia irritans	●	●								
Poaceae cont.	*Triodia rigidissima*		●								
	Triodia scariosa	●	●								
	Urochloa panicoides	●	●								Y
Polygalaceae	*Comesperma drummondii*	●	●								
	Comesperma scoparium	●	●								
Polygonaceae	*Muehlenbeckia adpressa*		●								
	Persicaria prostrata	●	●								
	Polygonum aviculare	●	●								Y
	Rumex crystallinus			●				P3			
	Rumex vesicarius	●	●								Y
Pontederiaceae	*Pontederia crassipes*		●								Y
Portulacaceae	*Portulaca oleracea*	●	●								
Primulaceae	*Lysimachia arvensis*		●								Y
Proteaceae	*Banksia elderiana*	●	●								
	Conospermum stoechadis		●								
	Grevillea acacioides	●	●								
	Grevillea acuaria	●	●								
	Grevillea asteriscosa		●					P4			
	Grevillea beardiana	●	●								
	Grevillea cagiana	●	●								
	Grevillea didymobotrya		●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Grevillea didymobotrya subsp. *didymobotrya*	●									
	Grevillea eriostachya		●								
	Grevillea excelsior	●	●								
	Grevillea georgeana	●	●	●	●			P3			
	Grevillea haplantha		●								
	Grevillea haplantha subsp. *haplantha*	●									
	Grevillea hookeriana		●								
	Grevillea hookeriana subsp. *apiciloba*	●									
	Grevillea hookeriana subsp. *hookeriana*	●									
	Grevillea huegelii	●	●								
	Grevillea nematophylla		●								
Proteaceae cont.	*Grevillea nematophylla* subsp. *nematophylla*	●									
	Grevillea obliquistigma		●								
	Grevillea obliquistigma subsp. *obliquistigma*	●									
	Grevillea oligomera	●	●								
	Grevillea oncogyne	●	●								
	Grevillea paniculata	●	●								
	Grevillea paradoxa		●								
	Grevillea phillipsiana				●			P1			
	Grevillea pterosperma		●								
	Grevillea sarissa		●								
	Grevillea sarissa subsp. *bicolor*	●									
	Grevillea sarissa subsp. *sarissa*	●									
	Grevillea stenomera		●					P2			
	Grevillea teretifolia	●	●								
	Grevillea uncinulata	●	●								
	Hakea erecta	●									
	Hakea francisiana	●	●								
	Hakea gilbertii		●								
	Hakea meisneriana		●								
	Hakea minyma	●	●								
	Hakea rigida	●	●	●				P2			

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Hakea trifurcata		●								
	Isopogon dubius		●								
	Persoonia saundersiana	●	●								
	Persoonia scabra			●				P3			
	Petrophile arcuata	●	●								
	Petrophile stricta		●								
	Xylomelum angustifolium		●								
Pteridaceae	*Cheilanthes adiantoides*	●	●								
	Cheilanthes sieberi		●								
	Cheilanthes sieberi subsp. *sieberi*	●									
Ranunculaceae	*Myosurus australis*	●	●								
Resedaceae	*Reseda luteola*		●								Y
Restionaceae	*Lepidobolus chaetocephalus*	●	●								
	Lepidobolus deserti	●	●								
	Lepidobolus preissianus		●								
Rhamnaceae	*Cryptandra aridicola*	●	●								
	Cryptandra crispula		●	●				P3			
	Cryptandra intermedia		●								
	Cryptandra leucopogon		●								
	Cryptandra pungens	●	●								
	Pomaderris forrestiana	●	●								
	Stenanthemum stipulosum	●	●								
	Trymalium myrtillus		●								
	Trymalium myrtillus subsp. *myrtillus*	●									
	Ziziphus mauritiana						●				Y
Rosaceae	*Rubus anglocandicans*						●				Y
	Rubus laudatus						●				Y
	Rubus rugosus						●				Y
	Rubus ulmifolius						●				Y
Rubiaceae	*Opercularia vaginata*		●								
Ruppiaceae	*Ruppia polycarpa*	●	●								
Rutaceae	*Boronia coerulescens* subsp. *spinescens*	●									

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Boronia inornata		●								
	Boronia spathulata		●								
	Boronia ternata		●								
	Cyanothamnus coerulescens		●								
	Cyanothamnus ramosa		●								
	Diplolaena velutina		●								
	Drummondita hassellii	●	●								
	Phebalium appressum	●	●	●				P1			
	Phebalium canaliculatum	●	●								
	Phebalium clavatum	●	●	●	●			P2			
	Phebalium filifolium	●	●								
Rutaceae cont.	*Phebalium microphyllum*		●								
	Phebalium obovatum		●								
	Phebalium tuberculosum	●	●								
	Philotheca apiculata			●				P2			
	Philotheca brucei		●								
	Philotheca pachyphylla			●				P1			
	Philotheca tomentella	●	●								
Santalaceae	*Exocarpos aphyllus*	●	●								
	Leptomeria preissiana		●								
	Santalum acuminatum	●	●								
	Santalum murrayanum		●								
	Santalum spicatum	●	●								
Sapindaceae	*Alectryon oleifolius*		●								
	Alectryon oleifolius subsp. *canescens*	●									
	Dodonaea adenophora	●									
	Dodonaea amblyophylla	●	●								
	Dodonaea lobulata	●	●								
	Dodonaea microzyga	●	●								
	Dodonaea microzyga var. *acrolobata*	●									
	Dodonaea rigida		●								
	Dodonaea stenozyga	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Dodonaea viscosa		●								
	Dodonaea viscosa subsp. *angustissima*	●									
Scrophulariaceae	*Eremophila acutifolia*	●	●								
	Eremophila alternifolia	●	●								
	Eremophila annosicaulis			●				P3			
	Eremophila arachnoides		●					P3			
	Eremophila arachnoides subsp. *tenera*			●	●			P3			
	Eremophila caerulea		●								
	Eremophila caerulea subsp. *caerulea*	●									
	Eremophila caerulea subsp. *merrallii*	●		●	●			P4			
	Eremophila caperata	●	●								
Scrophulariaceae cont.	*Eremophila clarkei*	●	●								
	Eremophila clavata	●	●								
	Eremophila decipiens	●	●								
	Eremophila decipiens subsp. *decipiens*	●									
	Eremophila dempsteri	●	●								
	Eremophila deserti	●	●								
	Eremophila drummondii	●	●								
	Eremophila gibbosa	●	●								
	Eremophila glabra		●								
	Eremophila glabra subsp. *glabra*	●									
	Eremophila granitica	●	●								
	Eremophila interstans		●								
	Eremophila interstans subsp. *interstans*	●									
	Eremophila interstans subsp. *virgata*	●									
	Eremophila ionantha	●	●								
	Eremophila latrobei		●								
	Eremophila longifolia	●	●								
	Eremophila maculata		●								
	Eremophila maculata subsp. *brevifolia*	●									
	Eremophila microphylla^							P3			
	Eremophila miniata	●	●								

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Eremophila oblonga	●	●								
	Eremophila oldfieldii		●								
	Eremophila oldfieldii subsp. *angustifolia*	●									
	Eremophila oppositifolia		●								
	Eremophila oppositifolia subsp. *angustifolia*	●									
	Eremophila paisleyi		●								
	Eremophila pantonii		●								
	Eremophila parvifolia		●								
	Eremophila parvifolia subsp. *auricampa*	●									
	Eremophila perglandulosa			●	●			P1			
	Eremophila platythamnos		●								
Scrophulariaceae cont.	*Eremophila praecox*	●	●	●	●			P2			
	Eremophila psilocalyx	●	●								
	Eremophila pustulata	●	●								
	Eremophila rugosa	●	●								
	Eremophila saligna	●	●								
	Eremophila scoparia	●	●								
	Eremophila serrulata	●	●								
	Eremophila sp.	●									
	Eremophila sturtii		●								
	Eremophila subfloccosa		●								
	Eremophila subfloccosa subsp. *lanata*	●									
	Eremophila succinea		●					P3			
	Eremophila veronica		●	●				P3			
	Eremophila violacea	●	●								
	Eremophila xantholaema	●	●	●				P1			
	Myoporum montanum	●	●								
	Myoporum platycarpum		●								
	Myoporum platycarpum subsp. *platycarpum*	●									
Solanaceae	*Anthocercis genistoides*		●								
	Anthotroche pannosa	●	●								
	Datura ferox	●	●								Y

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Datura inoxia	●									Y
	Duboisia hopwoodii	●	●								
	Lycium australe	●	●								
	Lycium ferocissimum	●	●			●					Y
	Nicotiana glauca	●	●								Y
	Nicotiana occidentalis		●								
	Nicotiana occidentalis subsp. *obliqua*	●									
	Nicotiana rotundifolia	●	●								
	Solanum cleistogamum	●	●								
	Solanum coactiliferum		●								
	Solanum elaeagnifolium						●				Y
Solanaceae cont.	*Solanum esuriale*	●	●								
	Solanum hoplopetalum	●	●								
	Solanum lasiophyllum	●	●								
	Solanum linnaeanum						●				Y
	Solanum nigrum	●	●								Y
	Solanum nummularium	●	●								
	Solanum petrophilum	●	●								
	Solanum plicatile	●	●								
	Solanum simile	●	●								
	Solanum terraneum		●								
Stylidiaceae	*Stylidium arenicola*	●	●								
	Stylidium choreanthum	●	●	●				P3			
	Stylidium dielsianum	●	●								
	Stylidium induratum	●	●								
	Stylidium involucratum		●								
Tamaricaceae	*Tamarix aphylla*						●				Y
	Tamarix chinensis		●								Y
Thymelaeaceae	*Pimelea angustifolia*	●	●								
	Pimelea argentea		●								
	Pimelea microcephala		●								
	Pimelea microcephala subsp. *microcephala*	●									

Family	Taxon	Source						Conservation Status			Introduced
		NM	ALA	WAH	TPFL	EPBC	WAOL	DBCA	BC Act	EPBC Act	
	Pimelea spiculigera		●								
Typhaceae	*Typha orientalis*		●								
Urticaceae	*Urtica urens*	●	●								Y
Verbenaceae	*Glandularia aristigera*	●	●								Y
	Lantana camara	●	●				●				Y
	Phyla canescens	●	●								Y
Violaceae	*Hybanthus floribundus*		●								
	Hybanthus floribundus subsp. *curvifolius*	●									
Zamiaceae	*Macrozamia fraseri*		●								
Zygophyllaceae	*Roepera angustifolia*		●								
	Roepera apiculata		●								
Zygophyllaceae cont.	*Roepera aurantiaca*		●								
	Roepera aurantiaca subsp. aurantiaca	●									
	Roepera compressa	●	●								
	Roepera eremaea	●	●								
	Roepera glauca	●	●								
	Roepera ovata		●								
	Roepera reticulata	●	●								
	Roepera rowelliae		●								
	Roepera tetraptera	●	●								
	Tribulus terrestris	●	●								Y

Appendix F – Assessment of conservation significant flora likelihood

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Lepidosperma sp. Kambalda (A.A. Mitchell 5156)	P2			Tussocking sedge, to 0.3 m high. Lower footslope of basalt hill.	No	No	42 km SSE	Highly Unlikely	Possible
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.	Yes	Yes	1.6 km N	Highly Likely	Unlikely
Eremophila praecox	P2			Broom-like shrub, 1.5-3 m high. Fl. purple, Oct or Dec. Red/brown sandy loam. Undulating plains.	Yes	Yes	1.2 km NE	Highly Likely	Unlikely
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.	Yes	Yes	1.5 km W	Likely	Unlikely
Isolepis australiensis	P3			Annual, grass-like or herb (sedge), 0.03-0.055 m high. Fl. Jun or Sep. Silty sand, sandy clay. Lake margins, pools.	Yes	Yes	1.6 km WSW	Likely	Unlikely
Notisia intonsa	P3			Prostrate, clumping annual herb, to 0.1 m high. Fl. grey-pink-brown, Sept-Nov. Red clay, ironstone/quartz gravel, cracking clay. Floodplains, slopes, salt lakes.	Yes	Yes	1.2 km S	Likely	Unlikely
Acacia websteri	P1			Shrub, 1.2-5 m high, bark fibrous. Fl. Yellow, Jan, June. Red sand, clay or loam. Low-lying areas, flats.	Possible	Adjacent	19.7 km SW	Possible	Unlikely
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)	P3			Erect shrub, 0.3-2 m high. Fl. pink/purple, Aug to Dec. Red/orange loamy sand. Flats and sandplains.	Possible	Yes	19.7 km SW	Possible	Unlikely
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	P3			Perennial tussock grass up to 0.4 m tall. Fl. Sept-Nov. Cracking clay, red rocky loam, sandy clay. Slopes and claypans.	Possible	Adjacent	11.7 km SE	Possible	Unlikely
Chrysocephalum apiculatum subsp. norsemanense	P3			Upright, spreading, herbaceous annual, to 0.4 m high. Fl. Yellow, Aug-Oct. Loamy sand. Gentle undulating plain, granite hills, sandplain.	Possible	Yes	19.1 km SW	Possible	Unlikely
Cyathostemon verrucosus	P3			Low spreading shrub, to 0.4 m tall. Fl. White, Mar-Apr, Sept-Dec. Yellow sand. Sandplain, flat or undulating.	Possible	Adjacent	10.3 km NNE	Possible	Unlikely
Elachanthus pusillus	P2			Ascending or decumbent annual, herb, to 0.15 m high. Fl. yellow-green, Aug to Oct.	Possible	Adjacent	8.2 km NE	Possible	Unlikely
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.	Yes	Adjacent	11.1 km WSW	Possible	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Gastrolobium graniticum	T	VU	EN	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.	Possible	Adjacent	19.7 km SW	Possible	Unlikely
Goodenia salina	P2			Annual, herb, 0.02-0.2 m high. Well-drained, saline, grey or brown loamy clay. Low gypseous dunes near salt pans.	Yes	Adjacent	1.6 km WSW	Possible	Unlikely
Lepidium fasciculatum	P3			Erect annual, herb, (0.1-)0.3-0.6 m high.	Possible	Yes	7.8 km NE	Possible	Unlikely
Lepidium merrallii	P2			Erect to spreading annual (possibly ephemeral), herb, 0.03-0.15 m high. Clay loam.	Possible	Adjacent	19.7 km SW	Possible	Unlikely
Acacia coatesii	P1			Compact shrub to 1.5 m wide x 0.4 m high. Fl. yellow, Aug-Oct. Laterite/quartz, sandy clay. Gentle lower slopes, flats.	Possible	No	29 km SW	Unlikely	Unlikely
Acacia crenulata	P3			Bushy shrub or tree, 0.7-3 m high. Fl. Yellow, Mar, Oct-Nov. Clay, sandy clay, yellow sand. Rocky rises, granite outcrops, breakaways.	No	No	35.6 km S	Unlikely	Unlikely
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.	No	No	39.7 km S	Unlikely	Unlikely
Acacia sclerophylla var. teretiuscula	P1			Spreading, much-branched shrub, 0.25-2.5 m high. Fl. yellow, Sep to Oct. Clay & loamy soils.	No	No	34.8 km WSW	Unlikely	Unlikely
Angianthus prostratus	P3			Prostrate annual, herb. Fl. white-yellow, Jul to Sep. Red clay or loamy soils. Saline depressions.	Possible	No	28.8 km NNE	Unlikely	Unlikely
Atriplex lindleyi subsp. conduplicata	P3			Monoecious, short-lived annual or perennial, herb, ca 0.2 m high. Crabhole plains.	Possible	Yes	64.7 km NW	Unlikely	Unlikely
Austrostipa blackii	P3			Tufted perennial, grass-like or herb, 1 m high. Fl. Sep to Nov. Sandy clay loam, Winter-wet depression, BIF or basalt outcropping, hills.	Possible	No	24.8 km SW	Unlikely	Unlikely
Austrostipa sp. Dowerin (G. Wiehl F 8004)	P2			Perennial tussock grass 0.4 m high x 0.2 m wide. Fl. Brown/green, Oct-Nov. Red sandy clay, clay-loam, calcrete. Plains, basalt outcropping.	No	No	29.3 km SW	Unlikely	Unlikely
Calandrinia lefroyensis	P1			Slender erect perennial herb, to 0.25 m tall. Fl. Pink/purple, Apr, Oct-Nov. Clayey sand, sand. Slopes or flats ± near salt lakes, sand dunes.	Possible	Yes	35.1 km SSE	Unlikely	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Calandrinia quartzitica	P1			Perennial herb to 40cm. Fl. Pink, cream, Sept-Oct. Red-brown silty loam, quartz. Floodplain, lower slopes of quartz hills.	Possible	No	27.5 km NNW	Unlikely	Unlikely
Chamelaucium sp. Parker Range (B.H. Smith 1255)	P1			Erect shrub, 0.5-1.8 m high. Fl. white or pink. Yellow sand over laterite. Sandplains.	No	No	34.9 km W	Unlikely	Unlikely
Cyathostemon divaricatus	P1			Low, rigid shrub, to 1 m. Fl. White/pink, Apr to Aug, Nov. Red sandy clay loam, gravelly loam. Rocky hillslopes, outcrops.	No	No	36 km SSE	Unlikely	Unlikely
Dampiera plumosa	P1			Erect perennial, herb, 0.15-0.2 m high. Fl. blue, Oct. Red sandy soils.	Possible	No	27.5 km SW	Unlikely	Unlikely
Eremophila annosicaulis	P3			Small, upright, spreading shrub, to 0.8 m high. Fl. Purple, July, Sept. Red sand or loam. Rocky slopes, rocky/sandy plain.	Possible	Yes	71.9 km SSE	Unlikely	Unlikely
Eremophila arachnoides subsp. tenera	P3			Broom-like shrub, to 3 m high, branches with tubercules often elongated & coalescing. Fl. white/blue-purple. Low undulating plains, flats.	Possible	No	40.3 km E	Unlikely	Unlikely
Eremophila microphylla	P3			Rounded shrub, 0.45-0.9 m high, to 1 m wide. Fl. White, red, Nov to Dec. Red-brown clay loam.	Yes	No	37.0 km S	Unlikely	Unlikely
Eremophila veronica	P3			Spreading, erect shrub, 0.5-1 m high. Fl. purple, Apr to May. Stony clay, clay loam. Lateritic breakaways.	No	No	21.2 km SW	Unlikely	Unlikely
Eremophila xantholaema	P1			Erect shrub, up to 3m high. Fl. Mauve (inner corolla tube yellow with orange). Stoney brown loam. Hills and upper slopes.	Possible	No	22.5 km NE	Unlikely	Unlikely
Eucalyptus websteriana subsp. norsemanica	P1			(Spreading mallee), to 3 m high, bark 'minni-ritchi'. Fl. yellow, Sep to Nov. Rocky rises.	Possible	No	30.9 km SW	Unlikely	Unlikely
Frankenia glomerata	P4			Prostrate shrub. Fl. pink-white, Nov. White sand.	No	Adjacent	8.2 NE	Unlikely	Unlikely
Gompholobium cinereum	P3			Shrub, to 0.3 m high. Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides.	No	No	32.2 km WNW	Unlikely	Unlikely
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.	No	No	22.7 km SW	Unlikely	Unlikely
Hakea rigida	P2			Shrub, 0.6-2.7 m high. Fl. Sep to Oct. Sandy soils, yellow sand.	No	No	22.3 km WNW	Unlikely	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Lepidosperma sp. Parker Range (N. Gibson & M. Lyons 2094)	P1			Perennial sedge to 0.4 m high. Sandy loam. Rocky hills with ironstone outcropping.	Possible	No	31.2 km SW	Unlikely	Unlikely
Phebalium appressum	P1			Rounded shrub, ca 1 m high, leaves cordate-ovate, ca 2 mm long; flowers usually solitary; pedicels short, thick, ca 1 mm long. Fl. white, Jul. Yellow sandplain.	No	No	20.8 km WNW	Unlikely	Unlikely
Phebalium clavatum	P2			Upright shrub, 0.5-1.5 m high. Fl. white, Aug to Sep. Sandy soils. Sandplains.	No	No	32.7 km SW	Unlikely	Unlikely
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.	Possible	Yes	20.4 km SW	Unlikely	Unlikely
Pterostylis xerampelina	P1			Tuberous perennial herb to 0.15 m high. Fl. Brown, Sept-Oct. Granite with pockets of sandy grit. Banded ironstone hills.	No	Yes	26.8 km SSW	Unlikely	Unlikely
Ptilotus procumbens	P1			Spreading procumbent annual, herb, ca 0.1 m high. Fl. pink-white, Nov. Red clay.	No	Adjacent	5.8 km NE	Unlikely	Unlikely
Ptilotus sp. Kalgoorlie (J. Jackson & B. Moyle 260)	P1			Erect herb, to 0.3 m high. Rocky low hills, quartz outcrops.	Possible	No	29.1 km NNW	Unlikely	Unlikely
Rhodanthe uniflora	P1			Erect, woolly annual, herb, 0.02-0.1(-0.3) m high. Fl. yellow, Aug to Oct. Brown earth. Open eucalyptus woodland.	Possible	Adjacent	28.8 km NNE	Unlikely	Unlikely
Ricinocarpos digynus	P1			Erect shrub 2m x 2m. Fl. Yellow, March. Red sandy loam on sandy/stony plains, rocky hillslopes.	No	Yes	40 km SSE	Unlikely	Unlikely
Seringia exastia	T	CR	CR	Shrub to 1m tall. Fl. Pink. Red sand, ironstone gravel, brown loam. Flats, sandplain, dunes, ridges.	No	No	37.0 km S	Unlikely	Unlikely
Sowerbaea multicaulis	P4			Tufted perennial, herb, 0.075-0.25 m high. Fl. purple-violet, Oct to Dec or Jan. Yellow-brown sand.	Possible	Yes	48.7 km SSE	Unlikely	Unlikely
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.	No	Adjacent	37.5 km S	Unlikely	Unlikely
Styphelia rectiloba	P3			Compact shrub up to 1.5 m high x 1.5 m wide. Fl. cream, Jan, May. Calcretic sand, pale brown laom. Granitic breakaways, ridge.	No	No	32.2 km S	Unlikely	Unlikely
Tecticornia flabelliformis	P1			Erect shrub, to 0.2 m high. Clay. Saline flats.	Possible	Adjacent	38 km ENE	Unlikely	Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Tecticornia mellarium	P1			Perennial samphire shrub, to 0.5 m high. Brown sandy clay. Edges of salt lakes, undulating saline dunes.	Possible	Yes	54.7 km SSE	Unlikely	Unlikely
Thryptomene planiflora	P1			Erect to spreading shrub, to 1.5 m high. Fl white/pink, Jun to Nov. Yellow sand, sandy loam. Sandplains, gentle hillslopes.	Possible	No	20.4 km SW	Unlikely	Unlikely
Thryptomene sp. Coolgardie (E. Kelso s.n. 1902)	P1			No available information.	No	No	19.7 km SW	Unlikely	Unlikely
Acacia epedunculata	P1			Low spreading, becoming rounded, multi-stemmed shrub, 0.5-0.65 m high. Fl. yellow, Aug. Yellow sand. Sandplains.	No	No	47.8 km N	Highly Unlikely	Highly Unlikely
Allocasuarina eriochlamys subsp. grossa	P3			Dioecious or monoecious shrub, 1-3 m high, bracteoles prominently exceeding cone. Stony loam, laterite clay. Granite outcrops.	No	No	42 km SSE	Highly Unlikely	Highly Unlikely
Andersonia carinata	P2			Erect slender shrub, 0.1-0.45(-0.8) m high. Fl. pink/pink-white/pink-purple, Aug to Oct. White sand, gravelly lateritic soils. Plains.	No	No	> 350 km SW	Highly Unlikely	Highly Unlikely
Bossiaea celata	P3			Compact, intricately-branched shrub, to 0.8 m high. Fl. yellow-red-orange, Sep to Oct. Deep sand. Open mallee.	No	No	43.1 km SSW	Highly Unlikely	Highly Unlikely
Bossiaea laxa	P2			Lax, open, spreading shrub, to 2 m high. Fl. yellow-green, May. Brown loam over deep granite. Sheltered positions around outcrops.	No	No	60.9 km S	Highly Unlikely	Highly Unlikely
Cratystylis centralis	P3			Much-branched, brittle, greyish shrub, to 1 m high. Red sandy loam with ironstone gravel. Flat plains, breakaway country.	No	Yes	43.6 km S	Highly Unlikely	Highly Unlikely
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.	No	No	58.4 km WSW	Highly Unlikely	Highly Unlikely
Cymbonotus preissianus	P3			Stemless perennial herb. Fl. yellow. Sandy clay. Flats.	No	No	> 500 km SW	Highly Unlikely	Highly Unlikely
Eremophila perglandulosa	P1			Low, spreading, viscid shrub, ca 0.25 m high. Fl. blue-purple, Jan. Orange sand/sandy loam. Plains, riverbanks.	No	No	72.4 km SSE	Highly Unlikely	Highly Unlikely
Eremophila succinea	P3			Erect shrub, 1.2-3 m high. Fl. blue-purple, Sep. Clay, sand over clay.	No	No	> 160 km S	Highly Unlikely	Highly Unlikely
Eucalyptus educta	P2			(Straggling & spreading mallee), 3-5 m high, bark rough, 'minni-ritchi'. Fl. cream-yellow, Apr. Shallow soils. Granite rocks.	No	No	43.7 km WNW	Highly Unlikely	Highly Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Eucalyptus exigua	P3			(Mallee), 2-5 m high, bark smooth. Fl. white-cream, Mar. Sandy loam, white sand. Sandplains.	No	No	67.2 km SW	Highly Unlikely	Highly Unlikely
Eucalyptus frenchiana	P3			Mallet, to 10 m high. Pale brown, smooth bark. Red/brown sandy loam. Flat/undulating plains, rocky outcrop.	No	No	69.8 km SSW	Highly Unlikely	Highly Unlikely
Eucalyptus kruseana	P4			(Straggly mallee), 2-3.5 m high, bark smooth. Fl. yellow, Jun to Sep. Sandy loam. Granite outcrops & hills.	No	No	60.3 km ESE	Highly Unlikely	Highly Unlikely
Eucalyptus x brachyphylla	P4			(Mallee) or tree, to 4 m high, bark rough, flaky. Fl. white, Jun. Sandy loam. Granite outcrops.	No	No	46 km SSE	Highly Unlikely	Highly Unlikely
Frankenia georgei	P1			Small shrub. Fl. pink, Dec. Rocky slopes.	No	No	96.7 km SSE	Highly Unlikely	Highly Unlikely
Grevillea asteriscosa	P4			Divaricately branched shrub, 0.3-2.6 m high. Fl. red, May or Jul to Nov. Gravelly or granitic soils. Gravel rises, granite outcrops.	No	No	> 270 km WSW	Highly Unlikely	Highly Unlikely
Grevillea phillipsiana	P1			Prickly shrub, 0.8-1.5 m high. Fl. red/red & orange, Jul to Sep. Red sand, stony loam. Granite hills.	No	No	79.2 km SSE	Highly Unlikely	Highly Unlikely
Grevillea stenomera	P2			Grey, lignotuberous shrub, 0.9-2.2 m high. Fl. orange & red & pink, May to Jun or Aug to Oct or Dec. Red or yellow sand on limestone. Coastal areas.	No	No	> 750 km NW	Highly Unlikely	Highly Unlikely
Hibbertia pachyphylla	P3			Shrub, to 0.5 m high. Fl. yellow, Sep to Nov. White to yellow sand, brown sandy gravel, gravelly loam, laterite, granite, quartz. Undulating plains, low rises, valley floors.	No	No	62.4 km SSW	Highly Unlikely	Highly Unlikely
Isoetes brevicula	P3			Cormous, perennial, herb or (fern ally), to 0.01 m high, stock 3-lobed; leaves 4-8 mm long; mature megaspores greyish white when dry. Submerged in rock pools on granitic outcrops.	No	No	62.2 km SSW	Highly Unlikely	Highly Unlikely
Lepidosperma lyonsii	P1			Tufted rhizomatous, perennial, herb (sedge), leaves 0.31-0.53 m high. Pale orange skeletal sandy loam with banded ironstone gravel & rock, well-drained shallow stony loamy with quartz. Gentle hill slopes, upper slopes of large hill.	No	Yes	93.8 km SE	Highly Unlikely	Highly Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Melaleuca coccinea	P3			Much branched shrub, 1.5-2.6 m high, leaf blade elliptic to ovate. Fl. red, Sep to Nov or Jan. Sandy loam over granite. Granite outcrops, sandplain, river valleys.	No	No	47.6 km SSE	Highly Unlikely	Highly Unlikely
Melaleuca macronychia subsp. trygonoides	P3			Multi-stemmed, spreading shrub, 1-4 m high, leaves broadly elliptic. Fl. red, Feb or Jul to Aug or Oct. Sandy soils. Granite outcrops.	No	No	62 km S	Highly Unlikely	Highly Unlikely
Melichrus sp. Coolgardie (K.R. Newbey 8698)	P1			Low, compact, perennial shrub, to 0.5 m high. Yellow loamy sand. Low hillsides, sandplains.	No	No	52.8 km SW	Highly Unlikely	Highly Unlikely
Myriophyllum petraeum	P4			Aquatic annual, herb, stems 0.15-0.3 m long. Fl. white, Aug to Dec. Strictly confined to ephemeral rock pools on granite outcrops.	No	No	60.3 km WSW	Highly Unlikely	Highly Unlikely
Persoonia scabra	P3			Erect, spreading, lignotuberous shrub, 0.3-0.9 m high. Fl. yellow, Nov to Dec or Jan. White sand or sandy loam.	No	No	51.9 km NE	Highly Unlikely	Highly Unlikely
Philotheca apiculata	P1			Erect shrub, 0.5-1.5 m high. Fl. white-pink, Aug to Nov. Stony clay loam. Rocky outcrops, hillsides.	No	No	63.7 km S	Highly Unlikely	Highly Unlikely
Philotheca pachyphylla	P1			Erect shrub, 0.3-1.5 m high. Fl. white, May or Sep. Sand, red loam, clay loam. Sandplains, hill tops.	No	No	51.6 km WSW	Highly Unlikely	Highly Unlikely
Pityrodia scabra subsp. dendrotricha	P3			Upright, viscid perennial shrub, to 1 m high. Fl. white. Yellow sand, sandy loam. Flat, drainage lines, upslope lake edge.	No	No	70.1 km SSE	Highly Unlikely	Highly Unlikely
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.	No	No	67.3 km SSE	Highly Unlikely	Highly Unlikely
Ptilotus rigidus	P1			Rounded shrub 0.15-0.3 m high. Fl. Pink, Sept-Nov. Quartz, ironstone outcrops or low hills on edge of salt lakes.	No	Yes	69.3 km SSE	Highly Unlikely	Highly Unlikely
Rinzia triplex	P3			Erect shrub, to 1.5 m high. Fl. pink. Yellow sandy clay loam. Sandplains.	No	No	52.3 km WSW	Highly Unlikely	Highly Unlikely
Rumex crystallinus	P2			Annual, herb, 0.06-0.4 m high. Fl. green. Red clay. Edges of clay pan. Arid & semi-arid areas.	No	No	65.1 km NW	Highly Unlikely	Highly Unlikely
Styphelia saxicola	P3			Erect, open shrub, to 1 m high. Fl. white/cream. Red/brown loamy clay. Laterite/ duricrust outcropping.	No	No	46.4 km WSW	Highly Unlikely	Highly Unlikely

Taxon	Conservation Status			Habit and Habitat	Habitat within Study Area	Within Current Known Distribution	Distance to Nearest Record	Likelihood of Pre-Survey	Likelihood Post-Survey
	DBCA	BC Act	EPBC Act						
Tetratheca spenceri	T			Small shrub. Fl. dark pink. Lateritic soils. Gentle slope on duricrust breakaway.	No	No	43.2 km	Highly Unlikely	Highly Unlikely
Thelymitra stellata	T	EN	EN	Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow & brown, Oct to Nov. Sand, gravel, lateritic loam.	No	No	> 500 km W	Highly Unlikely	Highly Unlikely
Trachymene croniniana	P3			Annual, herb, 0.09-0.2 m high. Fl. white, Nov. Lateritic or loamy sand. Creek beds.	No	No	> 280 km WSW	Highly Unlikely	Highly Unlikely
Trachymene pyrophila	P2			Annual, herb, 0.1-0.5 m high, indumentum of patent glandular hairs. Fl. white, Nov to Dec or Jan to Mar. Yellow or orange sand. Sandplains; germinating after fire or other disturbances such as mining.	No	No	72.1 km SSE	Highly Unlikely	Highly Unlikely

Appendix G – Introduced flora desktop assessment

Family	Taxon	Source				DP	WoNS	Ecological Impact	Invasiveness
		NM	ALA	EPBC	WAOL				
Aizoaceae	*Aizoon pubescens*	●	●					Not assessed	Not assessed
	Mesembryanthemum crystallinum		●					Not assessed	Not assessed
	Mesembryanthemum nodiflorum		●					U	U
Alismataceae	*Sagittaria platyphylla*				●	Y	Y	Not assessed	Not assessed
Amaranthaceae	*Amaranthus viridis*	●	●					Not assessed	Not assessed
Anacardiaceae	*Schinus molle*		●					Not assessed	Not assessed
	Schinus molle var. *areira*	●						H	M
Apocynaceae	*Asclepias curassavica*	●	●					Not assessed	Not assessed
	Calotropis procera				●	Y		Not assessed	Not assessed
	Cryptostegia madagascariensis				●	Y		Not assessed	Not assessed
	Orbea variegata	●	●					Not assessed	Not assessed
Araceae	*Pistia stratiotes*				●	Y		Not assessed	Not assessed
	Zantedeschia aethiopica				●	Y		Not assessed	Not assessed
Araliaceae	*Hydrocotyle ranunculoides*				●	Y		Not assessed	Not assessed
Asparagaceae	*Agave americana*	●	●					Not assessed	Not assessed
	Asparagus asparagoides				●	Y	Y	Not assessed	Not assessed
Asteraceae	*Arctotheca calendula*	●	●					Not assessed	Not assessed
	Carthamus lanatus	●	●					Not assessed	Not assessed
	Centaurea melitensis	●	●					Not assessed	Not assessed
	Chondrilla juncea				●	Y		Not assessed	Not assessed
	Cichorium intybus	●	●					Not assessed	Not assessed
	Conyza bonariensis	●						Not assessed	Not assessed
	Conyza sumatrensis	●						Not assessed	Not assessed
	Erigeron bonariensis		●					Not assessed	Not assessed
	Erigeron sumatrensis		●					Not assessed	Not assessed
	Gazania linearis	●	●					Not assessed	Not assessed
	Helianthus annuus	●	●					Not assessed	Not assessed
	Lactuca serriola		●					Not assessed	Not assessed
	Lactuca serriola forma *serriola*	●						Not assessed	Not assessed
	Mesembryanthemum crystallinum	●						Not assessed	Not assessed
	Mesembryanthemum nodiflorum	●						U	U
	Monoculus monstrosus	●	●					U	U
	Oligocarpus calendulaceus	●	●					U	U

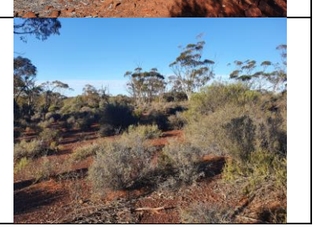
Family	Taxon	Source				DP	WoNS	Ecological Impact	Invasiveness
		NM	ALA	EPBC	WAOL				
Asteraceae cont.	*Oncosiphon suffruticosum*	●	●					Not assessed	Not assessed
	Onopordum acaulon				●	Y		Not assessed	Not assessed
	Silybum marianum				●	Y		Not assessed	Not assessed
	Sonchus oleraceus	●	●					Not assessed	Not assessed
	Symphyotrichum squamatum	●	●					Not assessed	Not assessed
	Verbesina encelioides		●					Not assessed	Not assessed
	Xanthium spinosum	●	●		●	Y		Not assessed	Not assessed
Bignoniaceae	*Jacaranda mimosifolia*		●					Not assessed	Not assessed
Boraginaceae	*Buglossoides arvensis*	●	●					Not assessed	Not assessed
	Echium plantagineum	●	●		●	Y		Not assessed	Not assessed
	Heliotropium europaeum	●	●					Not assessed	Not assessed
	Heliotropium supinum	●	●					Not assessed	Not assessed
Brassicaceae	*Alyssum linifolium*	●	●					Not assessed	Not assessed
	Brassica tournefortii	●	●					Not assessed	Not assessed
	Capsella bursa-pastoris	●	●					Not assessed	Not assessed
	Carrichtera annua	●	●	●				H	R
	Lepidium africanum	●	●					Not assessed	Not assessed
	Sisymbrium irio	●	●					Not assessed	Not assessed
	Sisymbrium orientale	●	●					Not assessed	Not assessed
Cactaceae	*Austrocylindropuntia cylindrica*				●	Y		Not assessed	Not assessed
	Austrocylindropuntia subulata				●	Y		Not assessed	Not assessed
	Cylindropuntia fulgida		●		●	Y		H	R
	Cylindropuntia fulgida var. *mamillata*	●						Not assessed	Not assessed
	Cylindropuntia imbricata	●	●		●	Y		Not assessed	Not assessed
	Cylindropuntia kleiniae	●	●		●	Y		Not assessed	Not assessed
	Cylindropuntia pallida				●	Y		Not assessed	Not assessed
	Cylindropuntia spp.			●				Not assessed	Not assessed
	Cylindropuntia tunicata	●	●		●	Y		Not assessed	Not assessed
	Opuntia elata	●	●		●	Y	Y	Not assessed	Not assessed
	Opuntia elatior				●	Y	Y	Not assessed	Not assessed
	Opuntia engelmannii				●	Y	Y	Not assessed	Not assessed
	Opuntia ficus-indica	●	●		●	Y	Y	Not assessed	Not assessed
	Opuntia microdasys				●	Y	Y	Not assessed	Not assessed

Family	Taxon	Source				DP	WoNS	Ecological Impact	Invasiveness
		NM	ALA	EPBC	WAOL				
Cactaceae cont.	*Opuntia monacantha*				●	Y	Y	Not assessed	Not assessed
	Opuntia polyacantha				●	Y	Y	Not assessed	Not assessed
	Opuntia puberula				●	Y	Y	Not assessed	Not assessed
	Opuntia stricta				●	Y	Y	Not assessed	Not assessed
	Opuntia tomentosa				●	Y	Y	Not assessed	Not assessed
Caryophyllaceae	*Silene gallica*		●					Not assessed	Not assessed
	Spergularia diandra	●	●					Not assessed	Not assessed
Chenopodiaceae	*Chenopodium album*	●	●					Not assessed	Not assessed
	Chenopodium murale	●	●					Not assessed	Not assessed
Crassulaceae	*Bryophyllum delagoense*	●	●					Not assessed	Not assessed
Cucurbitaceae	*Cucumis myriocarpus*		●					Not assessed	Not assessed
	Cucumis myriocarpus subsp. *myriocarpus*	●						Not assessed	Not assessed
Didiereaceae	*Portulacaria afra*	●	●					Not assessed	Not assessed
Euphorbiaceae	*Jatropha gossypiifolia*				●	Y		Not assessed	Not assessed
Fabaceae	*Acacia pycnantha*	●	●					Not assessed	Not assessed
	Alhagi maurorum	●	●		●	Y		Not assessed	Not assessed
	Erythrostemon gilliesii	●	●					Not assessed	Not assessed
	Medicago laciniata	●	●					Not assessed	Not assessed
	Medicago minima	●	●					Not assessed	Not assessed
	Medicago polymorpha	●	●					Not assessed	Not assessed
	Oxalis bowiei	●						Not assessed	Not assessed
	Oxalis pes-caprae	●						Not assessed	Not assessed
	Parkinsonia aculeata				●	Y	Y	Not assessed	Not assessed
	Prosopis glandulosa x *Prosopis velutina*				●	Y	Y	Not assessed	Not assessed
	Senna alata				●	Y		Not assessed	Not assessed
	Senna obtusifolia				●	Y		Not assessed	Not assessed
	Vicia monantha		●					Not assessed	Not assessed
	Vicia monantha subsp. *triflora*	●						Not assessed	Not assessed
Geraniaceae	*Erodium aureum*		●					U	U
	Erodium cicutarium	●	●					Not assessed	Not assessed
Iridaceae	*Moraea flaccida*				●	Y		Not assessed	Not assessed
	Moraea miniata				●	Y		Not assessed	Not assessed
Lamiaceae	*Marrubium vulgare*	●	●					Not assessed	Not assessed

Family	Taxon	Source				DP	WoNS	Ecological Impact	Invasiveness
		NM	ALA	EPBC	WAOL				
Lamiaceae cont.	*Salvia reflexa*	●	●					Not assessed	Not assessed
	Salvia verbenaca	●	●					Not assessed	Not assessed
Lythraceae	*Lythrum hyssopifolia*	●	●					Not assessed	Not assessed
Malvaceae	*Malva parviflora*	●	●					Not assessed	Not assessed
Meliaceae	*Melia azedarach*	●	●					Not assessed	Not assessed
Myrtaceae	*Agonis flexuosa*		●					Not assessed	Not assessed
Oxalidaceae	*Oxalis bowiei*		●					Not assessed	Not assessed
	Oxalis pes-caprae		●					Not assessed	Not assessed
Papaveraceae	*Argemone ochroleuca*		●					Not assessed	Not assessed
	Argemone ochroleuca subsp. *ochroleuca*	●						Not assessed	Not assessed
	Papaver hybridum	●	●					Not assessed	Not assessed
Plumbaginaceae	*Limonium sinuatum*	●	●					Not assessed	Not assessed
Poaceae	*Avena fatua*		●					Not assessed	Not assessed
	Bromus catharticus	●						Not assessed	Not assessed
	Bromus diandrus	●	●					Not assessed	Not assessed
	Cenchrus ciliaris	●	●	●				Not assessed	Not assessed
	Cenchrus longisetus		●					Not assessed	Not assessed
	Cenchrus setaceus	●	●					Not assessed	Not assessed
	Chloris gayana		●					Not assessed	Not assessed
	Cynodon dactylon		●					Not assessed	Not assessed
	Ehrharta villosa	●	●					Not assessed	Not assessed
	Hordeum glaucum	●	●					Not assessed	Not assessed
	Hordeum leporinum	●	●					Not assessed	Not assessed
	Hyparrhenia hirta		●					Not assessed	Not assessed
	Pentameris airoides		●					Not assessed	Not assessed
	Pentameris airoides subsp. *airoides*	●						Not assessed	Not assessed
	Phalaris minor		●					Not assessed	Not assessed
	Phalaris paradoxa	●	●					Not assessed	Not assessed
	Polypogon monspeliensis		●					Not assessed	Not assessed
	Puccinellia ciliata		●					Not assessed	Not assessed
	Rostraria pumila	●	●					Not assessed	Not assessed
	Schismus arabicus	●	●					Not assessed	Not assessed
	Schismus barbatus	●	●					Not assessed	Not assessed

Family	Taxon	Source				DP	WoNS	Ecological Impact	Invasiveness
		NM	ALA	EPBC	WAOL				
Poaceae cont.	*Sorghum halepense*	●	●					Not assessed	Not assessed
	Urochloa panicoides	●	●					Not assessed	Not assessed
Polygonaceae	*Polygonum aviculare*	●	●					Not assessed	Not assessed
	Rumex vesicarius	●	●					Not assessed	Not assessed
Pontederiaceae	*Pontederia crassipes*		●					Not assessed	Not assessed
Primulaceae	*Lysimachia arvensis*		●					U	R
Resedaceae	*Reseda luteola*		●					Not assessed	Not assessed
Rhamnaceae	*Ziziphus mauritiana*				●	Y		Not assessed	Not assessed
Rosaceae	*Rubus anglocandicans*				●	Y		Not assessed	Not assessed
	Rubus laudatus				●	Y		Not assessed	Not assessed
	Rubus rugosus				●	Y		Not assessed	Not assessed
	Rubus ulmifolius				●	Y		Not assessed	Not assessed
Solanaceae	*Datura ferox*	●	●					Not assessed	Not assessed
	Datura inoxia	●						Not assessed	Not assessed
	Lycium ferocissimum	●	●	●			Y	Not assessed	Not assessed
	Nicotiana glauca	●	●					Not assessed	Not assessed
	Solanum elaeagnifolium				●	Y	Y	Not assessed	Not assessed
	Solanum linnaeanum				●	Y		Not assessed	Not assessed
	Solanum nigrum	●	●					Not assessed	Not assessed
Tamaricaceae	*Tamarix aphylla*				●	Y	Y	H	R
	Tamarix chinensis		●					Not assessed	Not assessed
Urticaceae	*Urtica urens*	●	●					Not assessed	Not assessed
Verbenaceae	*Glandularia aristigera*	●	●					Not assessed	Not assessed
	Lantana camara	●	●		●	Y	Y	Not assessed	Not assessed
	Phyla canescens	●	●					Not assessed	Not assessed
Zygophyllaceae	*Tribulus terrestris*	●	●					Not assessed	Not assessed

Appendix H – Habitat assessments

Site ID	Location		Date	Habitat type	Aspect	Slope	Ground cover (%)				Outcropping		Soil		Water features	Hoolow Count	Vegetation condition	Disturbances	Time since last fire (years)	Photo
	Lat	Long					Rocks	Bare soil	Leaf litter	Perennial vegetation	Extent	Rock type	Type	Availability						
VKAL-27	-30.8666	121.4969	2021-09-08	Stony Plain	Flat	Flat	Gravel (1-4cm)	Many Large Patches	Many Small Patches	Eucalypt Woodland	Negligible	BIF	Clay Loam	Many Large Patches	None	0	Very Good	Road/ Access track	Old (6+ yr)	
VKAL-19	-30.8776	121.5014	2021-09-08	Stony Plain	Flat	Flat	Pebbles (5-10cm)	Few Small Patches	Many Small Patches	Senna tall shrubland	Negligible	Detritals	Clay Loam	Few Small Patches	None	0	Excellent	Road/ Access track	Old (6+ yr)	
VKAL-18	-30.8766	121.4977	2021-09-08	Stony Plain	South/ East	Low	Pebbles (5-10cm)	Few Small Patches	Many Small Patches	Eucalypt Woodland	Limited	Dolerite	Clay Loam	Few Small Patches	None	0	Excellent	None Discernible	Old (6+ yr)	
VKAL-31	-30.8800	121.4958	2021-09-08	Stony Plain	North/ East	Low	Pebbles (5-10cm)	Scarce	Many Small Patches	Eucalypt Woodland	Limited	Dolerite	Clay Loam	Scarce	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-15	-30.8769	121.4955	2021-09-08	Hillcrest/ Hillslope	South/ East	Low	Small Rocks (11-20cm)	Scarce	Few Small Patches	Eucalypt Woodland, Tall Allocasuarina shrubland	Negligible	Dolerite	Clay Loam	Scarce	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-21	-30.8744	121.4993	2021-09-09	Stony Plain	South	Low	Gravel (1-4cm)	Scarce	Many Small Patches	Eucalypt Woodland	Negligible	BIF	Clay Loam	Scarce	None	0	Very Good	Mining Exploration	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Aspect	Slope	Ground cover (%)				Outcropping		Soil		Water features	Hoolow Count	Vegetation condition	Disturbances	Time since last fire (years)	Photo
	Lat	Long					Rocks	Bare soil	Leaf litter	Perennial vegetation	Extent	Rock type	Type	Availability						
VKAL-22	-30.8723	121.4948	2021-09-09	Eucalypt Woodland	Flat	Flat	Gravel (1-4cm)	Evenly Spread	Many Large Patches	Eucalypt Woodland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-14	-30.8754	121.4939	2021-09-09	Hillcrest/ Hillslope	North	Low	Small Rocks (11-20cm)	Scarce	Many Small Patches	Tall Allocasuarina shrubland	Limited Outcropping	Dolerite	Clay Loam	Scarce	None	0	Very Good	None Discernible	Old (6+ yr)	
VKAL-24	-30.8721	121.4887	2021-09-09	Sand Plain	West	Flat	Negligible	Evenly Spread	Many Large Patches	Eucalypt Woodland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Exccellent	Mining Exploration	Old (6+ yr)	
VKAL-07	-30.8832	121.4775	2021-09-09	Sand Plain	Flat	Flat	Negligible	Evenly Spread	Many Large Patches	Eucalypt Woodland, Mid, patchy Senna shrubland, not much low understorey	Negligible		Clayey Sand	Evenly Spread	None	0	Very Good	Mining Exploration	Old (6+ yr)	
VKAL-13	-30.8824	121.4876	2021-09-09	Sand Plain	Flat	Flat	Negligible	Evenly Spread	Many Small Patches	Eucalypt Woodland,Spinifex Hummock Grassland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-11	-30.8762	121.4890	2021-09-09	Eucalypt Woodland	Flat	Flat	Negligible	Evenly Spread	Many Small Patches	Eucalypt Woodland,Spinifex Hummock Grassland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Very Good	Road/ Access Track	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Aspect	Slope	Ground cover (%)				Outcropping		Soil		Water features	Hoolow Count	Vegetation condition	Disturbances	Time since last fire (years)	Photo
	Lat	Long					Rocks	Bare soil	Leaf litter	Perennial vegetation	Extent	Rock type	Type	Availability						
VKAL-09	-30.8783	121.4813	2021-09-09	Sand Plain	Flat	Flat	Negligible	Evenly Spread	Many Small Patches	Eucalypt Woodland,Spinifex Hummock Grassland, mid Melaleuca and Senna shrubland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	0.8	Road/ Access Track	Old (6+ yr)	
VKAL-02	-30.8774	121.4744	2021-09-09	Saline Flats and Marsh	Flat	Flat	Negligible	Evenly Spread	Few Small Patches	Mixed Chenopod shrubland	Negligible		Clayey Sand	Evenly Spread	None	0	Very Good	Mining Exploration	Old (6+ yr)	
VKAL-30	-30.8668	121.4860	2021-09-09	Eucalypt Woodland	Flat	Flat	Gravel (1-4cm)	Evenly Spread	Few Large Patches	Eucalypt Woodland, Melaleuca and Eremophila shrubland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	0.8	Mining Exploration	Old (6+ yr)	
VKAL-28	-30.8666	121.4774	2021-09-09	Eucalypt Woodland	Flat	Flat	Negligible	Evenly Spread	Many Small Patches	Eucalypt Woodland,Spinifex Hummock Grassland, Senna Shrubland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-03	-30.8692	121.4741	2021-09-09	Sand Plain	Flat	Flat	Gravel (1-4cm)	Few Large Patches	Many Large Patches	Dense Melaleuca shrubland	Negligible		Sandy Clay Loam	Few Large Patches	None	0	0.8	Road/ Access Track	Old (6+ yr)	
VKAL-25	-30.8731	121.4917	2021-09-10	Rocky Hillslope	North/ East	Moderate	Pebbles (5-10cm)	Few Small Patches	Many Small Patches	Allocasuarina shrubland	Negligible		Clay Loam	Few Small Patches	None	0	0.8	Mining Exploration	Old (6+ yr)	

Site ID	Location		Date	Habitat type	Aspect	Slope	Ground cover (%)				Outcropping		Soil		Water features	Hoolow Count	Vegetation condition	Disturbances	Time since last fire (years)	Photo
	Lat	Long					Rocks	Bare soil	Leaf litter	Perennial vegetation	Extent	Rock type	Type	Availability						
VKAL-05	-30.8731	121.4717	2021-09-10	Saline Flats and Marsh	Flat	Flat	Negligible	Evenly Spread	Few Small Patches	Scattered Eucalypts, Senna Shrubland	Negligible		Clayey Sand	Evenly Spread	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-01	-30.8691	121.4693	2021-09-10	Saline Flats and Marsh	Flat	Flat	Gravel (1-4cm)	Evenly Spread	Scarce	Duma shrubland	Negligible		Clay Loam	Evenly Spread	Prone to Pooling	0	Very Good	None Discernable	Old (6+ yr)	
VKAL-29	-30.8629	121.4873	2021-09-10	Stony Plain	Flat	Flat	Pebbles (5-10cm)	Many Large Patches	Many Small Patches	Eucalypt Woodland,Spinifex Hummock Grassland, Allocasuarina Shrubland	Negligible		Clay Loam	Many Large Patches	None	0	Excellent	Road/ Access Track	Old (6+ yr)	
VKAL-34	-30.8654	121.4831	2021-09-10	Eucalypt Woodland	Flat	Flat	Gravel (1-4cm)	Evenly Spread	Many Small Patches	Eucalypt Woodland, Senna Shrubland	Negligible		Sandy Clay Loam	Evenly Spread	None	0	Excellent	Road/ Access Track	Old (6+ yr)	

Appendix I – Raw flora data

Kalgoorlie Nickel Smelter Site KAL-01

Date	10/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51
	353664 mE; 6583898 mN
	121.4693 E -30.869135 S
Veg Condition	Very Good
Soil	Red Medium Clay
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Claypan
Vegetation	Mid sparse *Duma florulenta* shrubland over herbs

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Calandrinia pumila				KAL01-01	
Centipeda crateriformis subsp. *compacta*				KAL01-02	
Cratystylis subspinescens				KAL01-06	
Duma florulenta				KAL01-05	
Eragrostis curvula				KAL01-03	
Eragrostis sp. indet					
Maireana glomerifolia				KAL01-07	
Melaleuca lateriflora				KAL01-04	

Kalgoorlie Nickel Smelter Site KAL-02

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51
	354166 mE; 6582991 mN
	121.4744 E -30.877376 S
Veg Condition	Very Good
Soil	Orange Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Drainage Area/ Floodplain
Vegetation	Mid to low mixed chenopod shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Atriplex vesicaria					
Cratystylis microphylla					
Cratystylis subspinescens				KAL02-02	
Disphyma crassifolium subsp. *clavellatum*				KAL02-06	
Enchylaena tomentosa var. *tomentosa*					
Enneapogon caerulescens					
Eremophila scoparia					
Frankenia sp. indet				KAL02-03	
Lycium australe					
Maireana georgei				KAL02-09	
Maireana sedifolia				KAL02-13	
Maireana tomentosa subsp. *tomentosa*				KAL02-08	
Maireana trichoptera				KAL02-10	
Minuria cunninghamii					
Pimelea microcephala subsp. *microcephala*				KAL02-05	
Rhagodia drummondii				KAL02-01	
Roycea divaricata				KAL02-11	
Sclerolaena eurotioides				KAL02-07	
Solanum nummularium				KAL02-14	
Tecticornia disarticulata				KAL02-04	
Tecticornia sp. indet				KAL02-12	

Kalgoorlie Nickel Smelter Site KAL-04

Date	9/09/2021		
Described by	SC & KG		
Type	R		
Location	MGA Zone		
		mE;	mN
		E	S
Veg Condition			
Soil	Red Sandy Clay Loam		
Rock Type	None Discernible		
Fire Age			
Habitat	Sandy/ Stony Plain		
Vegetation	Low open woodland of *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* over occasional dense patches of *Melaleuca sheathiana* over *Santalum lanceolatum*, *Halgania andromedifolia*, *Senna artemisioides* subsp. *filifolia*, *Scaevola spinescens* and *Westringia rigida* over *Triodia scariosa*		

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Melaleuca sheathiana					
Santalum lanceolatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-05

Date	10/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 353849 mE; 6583446 mN 121.4711 E -30.873239 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Drainage Area/ Floodplain
Vegetation	Mid scattered *Eucalyptus salubris* trees over tall isolated *Exocarpos aphyllus* and *Acacia coolgardiensis* shrubs over mid to low mixed chenopod shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia inceana subsp. *inceana*					
Atriplex vesicaria					
Cratystylis conocephala					
Eucalyptus salubris					
Exocarpos aphyllus					
Maireana sedifolia					

Kalgoorlie Nickel Smelter Site KAL-06

Date	10/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 354291 mE; 6583439 mN 121.4758 E -30.873349 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Drainage Area/ Floodplain
Vegetation	Low scattered *Eucalyptus salubris* and *Eucalyptus salmonophloia* over tall *Senna artemisioides* subsp. *filifolia*, *Exocarpos aphyllus* and *Santalum acuminatum* over mid to low open *Cratystylis conocephala*, *Atriplex vesicaria* and *Scaevola spinescens* shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Atriplex vesicaria					
Cratystylis conocephala					
Eucalyptus salmonophloia					
Eucalyptus salubris					
Exocarpos aphyllus					
Santalum acuminatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					

Kalgoorlie Nickel Smelter Site KAL-07

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 354459 mE; 6582366 mN 121.4774 E -30.883048 S
Veg Condition	Excellent
Soil	Brown Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Hardpan Plain
Vegetation	Mid open *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland over tall *Senna artemisioides* subsp. *filifolia*, *Eremophila scoparia* and *Exocarpos aphyllus* shrubland over low scattered *Olearia muelleri* and *Scaevola spinescens* shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia hemiteles					
Atriplex vesicaria				KAL07-01	
Austrostipa elegantissima					
Cratystylis conocephala					
Eremophila parvifolia subsp. *auricampa*					
Eremophila scoparia					
Eucalyptus salmonophloia					
Eucalyptus salubris					
Exocarpos aphyllus					
Olearia muelleri					
Roepera eremaea					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					

Kalgoorlie Nickel Smelter Site KAL-08

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 354963 mE; 6582395 mN 121.4826 E -30.882851 S
Veg Condition	Very Good
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Mid mixed *Eucalyptus* woodland (mostly *E. salubris* and *E. salmonophloia*) over tall *Senna artemisioides* subsp. *filifolia*, *Eremophila scoparia* and *Santalum acuminatum* over mid to low *Scaevola spinescens* and *Olearia muelleri*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Cratystylis microphylla				KAL08-01	
Eremophila scoparia					
Eucalyptus salmonophloia					
Eucalyptus salubris					
Olearia muelleri					
Santalum acuminatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					

Kalgoorlie Nickel Smelter Site KAL-11

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 355553 mE; 6583152 mN 121.4889 E -30.876100 S
Veg Condition	Very Good
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Low mixed *Eucalyptus* woodland over tall *Senna artemisioides* subsp. *filifolia*, *Eremophila scoparia* and *Alyxia buxifolia* shrubland over mid to low *Halgania andromedifolia*, *Westringia rigida* and *Scaevola spinescens* shrubland with occasional patches of *Triodia scariosa* hummock grasses

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Alyxia buxifolia					
Eremophila scoparia					
Eucalyptus salmonophloia					
Eucalyptus salubris					
Halgania andromedifolia					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-12

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 355711 mE; 6582809 mN 121.4905 E -30.879212 S
Veg Condition	Excellent
Soil	Brown Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Mid *Eucalyptus loxophleba*, *Eucalyptus salubris* and *Eucalyptus longissima* woodland over tall scattered *Eremophila scoparia* shrubs over mid to low *Halgania andromedifolia*, *Senna artemisioides* subsp. *filifolia* and *Scaevola spinescens* shrubland with occasional patches of *Melaleuca sheathiana* and *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eremophila scoparia					
Eucalyptus longissima					
Eucalyptus loxophleba					
Eucalyptus salubris					
Halgania andromedifolia					
Melaleuca sheathiana					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					

Kalgoorlie Nickel Smelter Site KAL-14

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356023 mE; 6583233 mN 121.4938 E -30.875423 S
Veg Condition	Excellent
Soil	Brown Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillslope
Vegetation	Low isolated mallees (*Eucalyptus griffithsii* and *Eucalyptus longissima*) over tall *Allocasuarina helmsii*, *Acacia acuminata* and *Acacia tetragonophylla* shrubland over mid *Scaevola spinescens*, *Pomaderris forrestiana*, *Prostanthera incurvata* and *Melaleuca* sp. shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata					
Acacia andrewsii					
Acacia tetragonophylla					
Allocasuarina helmsii					
Alyxia buxifolia					
Eucalyptus griffithsii					
Eucalyptus longissima					
Grevillea nematophylla subsp. *nematophylla*					
Melaleuca sp. indet					
Pomaderris forrestiana					
Prostanthera incurvata					
Scaevola spinescens					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-15

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356180 mE; 6583077 mN 121.4955 E -30.876852 S
Veg Condition	Excellent
Soil	Red Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillcrest/ Upper Hillslope
Vegetation	Scattered low emergent mallees (*Eucalyptus griffithsii* and *Eucalyptus longissima*) over tall *Allocasuarina helmsii* shrubland over mid to low sparse *Scaevola spinescens*, *Prostanthera incurvata* and *Melaleuca* sp. over scattered patches of *Triodia scariosa* hummock grasses

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata				KAL15-03	
Allocasuarina helmsii					
Beyeria sulcata var. *sulcata*				KAL15-02	
Dodonaea microzyga var. *acrolobata*				KAL15-06	
Eremophila alternifolia				KAL15-05	
Eremophila clarkei				KAL-15	
Eucalyptus griffithsii					
Eucalyptus longissima					
Haloragis gossei				KAL15-04	
Melaleuca sp. indet					
Prostanthera incurvata					
Scaevola spinescens					
Thysanotus sp.					
Triodia scariosa					

Kalgoorlie Nickel Smelter Site KAL-16

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356338 mE; 6582812 mN 121.4971 E -30.879257 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillslope
Vegetation	Low open *Eucalyptus flocktoniae* subsp. *flocktoniae* and *Eucalyptus longissima* mallee woodland over tall open *Eremophila interstans*, *Senna artemisioides* subsp. *filifolia* and *Santalum acuminatum* shrubland over mid to low open *Halgania andromedifolia* and *Scaevola spinescens* shrubland over low open *Triodia scariosa* hummock grassland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus flocktoniae subsp. *flocktoniae*					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Melaleuca sheathiana					
Scaevola spinescens					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-17

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356009 mE; 6582945 mN 121.4936 E -30.878017 S
Veg Condition	Excellent
Soil	Brown Sandy Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillslope
Vegetation	Low mixed *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* woodland over mix *Halgania andromedifolia*, *Scaevola spinescens* and *Westringia rigida* over scattered patches of *Triodia scariosa* hummock grasses

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-18

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356387 mE; 6583104 mN 121.4976 E -30.876630 S
Veg Condition	Excellent
Soil	Brown Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillslope
Vegetation	Low mixed *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* woodland over occasional patches of tall *Melaleuca sheathiana* shrubs over mid *Scaevola spinescens*, *Halgania andromedifolia*, *Westringia rigida* over occasional patches of low *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia				KAL18-02	
Maireana radiata				KAL18-01	
Melaleuca sheathiana					
Scaevola spinescens					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-19

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356746 mE; 6582991 mN 121.5014 E -30.877692 S
Veg Condition	Excellent
Soil	Brown Clay Loam
Rock Type	Detritals
Fire Age	Old (6+ yr)
Habitat	Hillcrest/ Upper Hillslope
Vegetation	Low scattered *Casuarina pauper* over mid *Senna artemisioides* subsp. *filifolia*, *Acacia tetragonophylla* and *Scaevola spinescens* over low scattered *Westringia rigida* and *Ptilotus obovatus* var. *obovatus* shrubs

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia tetragonophylla					
Casuarina pauper				KAL19-04	
Eremophila alternifolia				KAL19-02	
Eremophila oldfieldii subsp. *angustifolia*				KAL19-03	
Maireana trichoptera				KAL19-01	
Ptilotus obovatus var. *obovatus*					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-20

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356535 mE; 6583338 mN 121.4992 E -30.874533 S
Veg Condition	Excellent
Soil	Red Clay Loam
Rock Type	BIF
Fire Age	Old (6+ yr)
Habitat	Hillcrest/ Upper Hillslope
Vegetation	Open scrub of *Allocasuarina helmsii* with emergent *Eucalyptus longissima* and *Eucalyptus griffithsii* over *Pomaderris forrestiana* and *Prostanthera incurvata* over *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina helmsii					
Eucalyptus griffithsii					
Eucalyptus longissima					
Pomaderris forrestiana					
Prostanthera incurvata					
Triodia scariosa					

Kalgoorlie Nickel Smelter Site KAL-21

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356577 mE; 6583399 mN 121.4997 E -30.873991 S
Veg Condition	Very Good
Soil	Red Clay Loam
Rock Type	BIF
Fire Age	Old (6+ yr)
Habitat	Stony Plain
Vegetation	Mid mixed *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* woodland over tall sparse *Melaleuca sheathiana* shrubland over mid to low *Scaevola spinescens*, *Halgania andromedifolia* and *Westringia rigida* shrubland

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Melaleuca sheathiana					
Phebalium canaliculatum				KAL19-01	
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-22

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356113 mE; 6583581 mN 121.4948 E -30.872297 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	Detritals
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland over tall *Eremophila scoparia*, *Exocarpos aphyllus* and *Santalum acuminatum* shrubland over mid *Senna artemisioides* subsp. *filifolia*, *Scaevola spinescens* and *Westringia rigida* shrubland with occasional patches of *Melaleuca sheathiana* and *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia merrallii				KAL22-01	
Austrostipa elegantissima					
Eremophila parvifolia subsp. *auricampa*				KAL22-01	
Eremophila scoparia					
Eucalyptus salmonophloia					
Eucalyptus salubris					
Exocarpos aphyllus					
Melaleuca sheathiana					
Olearia muelleri					
Santalum acuminatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-24

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 355523 mE; 6583597 mN 121.4887 E -30.872081 S
Veg Condition	Very Good
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sand Plain
Vegetation	Mid mixed *Eucalyptus woodland* over tall open *Alyxia buxifolia*, *Melaleuca sheathiana* and *Senna artemisioides* subsp. *filifolia* shrubland over mid open *Scaevola spinescens*, *Westringia rigida* and *Acacia erinacea* shrubland over scattered patches of *Triodia scariosa* hummock grasses

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
?*Santalum murrayanum*				KAL24-01	
Acacia erinacea					
Alyxia buxifolia					
Austrostipa elegantissima					
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Exocarpos aphyllus					
Melaleuca sheathiana					
Olearia muelleri					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-26

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356352 mE; 6583888 mN 121.4974 E -30.869555 S
Veg Condition	Very Good
Soil	Brown Sandy Clay Loam
Rock Type	Detritals
Fire Age	Old (6+ yr)
Habitat	Hillslope
Vegetation	Low open *Eucalyptus longissima* and *Eucalyptus griffithsii* mallee woodland over tall *Melaleuca sheathiana* shrubland over low scattered shrubs

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia erinacea					
Cratystylis conocephala				KAL26-03	
Eucalyptus griffithsii					
Eucalyptus longissima					
Maireana georgei				KAL26-04	
Melaleuca sheathiana				KAL26-01	
Santalum acuminatum					
Westringia rigida				KAL26-02	

Kalgoorlie Nickel Smelter Site KAL-27

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356299 mE; 6584210 mN 121.4969 E -30.866640 S
Veg Condition	Very Good
Soil	Red Sandy Clay Loam
Rock Type	BIF
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Mid *Eucalyptus salubris* and *Eucalyptus salmonophloia* woodland over mid *Acacia hemiteles*, *Senna artemisioides* subsp. *filifolia* and *Eremophila scoparia* shrubland over low scattered shrubs

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia hemiteles				KAL27-01	
Alyxia buxifolia					
Amyema miquelii				KAL27-06	
Austrostipa elegantissima					
Dodonaea microzyga var. *acrolobata*					
Eremophila glabra subsp. glabra				KAL27-09	
Eremophila oppositifolia subsp. *angustifolia*				KAL27-04	
Eremophila scoparia				KAL27-02	
Eriochiton sclerolaenoides				KAL27-08	
Eucalyptus salmonophloia					
Eucalyptus salubris					
Maireana trichoptera				KAL27-07	
Olearia muelleri				KAL27-03	
Ptilotus exaltatus					
Ptilotus obovatus var. *obovatus*					
Roepera eremaea				KAL27-05	
Santalum spicatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					

Kalgoorlie Nickel Smelter Site KAL-28

Date	9/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 354438 mE; 6584178 mN 121.4774 E -30.866701 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Low open woodland of *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* over occasional dense patches of *Melaleuca sheathiana* over *Santalum lanceolatum*, *Halgania andromedifolia*, *Senna artemisioides* subsp. *filifolia*, *Scaevola spinescens* and *Westringia rigida* over *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Dodonaea viscosa subsp. *angustissima*				KAL28-01	
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Melaleuca sheathiana					
Santalum lanceolatum					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-29

Date	10/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 355381 mE; 6584615 mN 121.4873 E -30.862879 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Undulating Low Hills
Vegetation	Low sparse *Eucalyptus* woodland over tall *Allocasuarina helmsii* and *Alyxia buxifolia* shrubland over mid to low *Pomaderris forrestiana*, *Melaleuca* sp. and *Westringia rigida* shrubland over scattered *Triodia scariosa* hummock grasses

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina helmsii					
Alyxia buxifolia					
Eremophila gibbosa				KAL29-01	
Eucalyptus griffithsii					
Eucalyptus longissima					
Melaleuca sp. indet					
Pomaderris forrestiana					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-31

Date	8/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 356211 mE; 6582724 mN 121.4957 E -30.880035 S
Veg Condition	Excellent
Soil	Brown Clay Loam
Rock Type	Dolerite
Fire Age	Old (6+ yr)
Habitat	Hillcrest/ Upper Hillslope
Vegetation	Low scattered *Eucalyptus torquata*, *Eucalyptus longissima* and *Eucalyptus griffithsii* over tall *Allocasuarina helmsii* over mid to low open *Pomaderris forrestiana*, *Melaleuca* sp. and *Westringia rigida* over scattered patches of *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia andrewsii					
Allocasuarina helmsii				KAL31-05	
Amyema gibberula var. *gibberula*				KAL31-02	
Cryptandra aridicola				KAL31-06	
Eucalyptus griffithsii					
Eucalyptus longissima					
Eucalyptus torquata				KAL31-01	
Grevillea nematophylla subsp. *nematophylla*					
Lepidosperma sp. indet				KAL31-07	
Melaleuca sp. indet					
Pomaderris forrestiana				KAL31-04	
Prostanthera incurvata				KAL31-03	
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site KAL-34

Date	10/09/2021
Described by	SC & KG
Type	R
Location	MGA Zone 51 354972 mE; 6584332 mN 121.4830 E -30.865378 S
Veg Condition	Excellent
Soil	Red Sandy Clay Loam
Rock Type	None Discernible
Fire Age	Old (6+ yr)
Habitat	Sandy/ Stony Plain
Vegetation	Low open woodland of *Eucalyptus griffithsii*, *Eucalyptus longissima* and *Eucalyptus lesouefii* over occasional patches of *Melaleuca sheathiana* shrubs over mid to low *Scaevola spinescens*, *Westringia rigida* and *Senna artemisioides* subsp. *filifolia* and *Halgania andromedifolia* shrubland with occasional patches of *Triodia scariosa*

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Eucalyptus griffithsii					
Eucalyptus lesouefii					
Eucalyptus longissima					
Halgania andromedifolia					
Melaleuca sheathiana					
Scaevola spinescens					
Senna artemisioides subsp. *filifolia*					
Triodia scariosa					
Westringia rigida					

Kalgoorlie Nickel Smelter Site Opps

Date	8/09/2021		
Described by	SC & KG		
Type			
Location	MGA Zone		
		mE;	mN
		E	S
Veg Condition			
Soil			
Rock Type			
Fire Age			
Habitat			
Vegetation			
Notes			

SPECIES LIST

Name	Cover	C Class	Height	Specimen	Notes
Acacia ?coolgardiensis				SCKGOPP23	
Acacia inceana subsp. *inceana*				SCKGOPP12	
Acacia nyssophylla				SCKGOPP07	
Amyema preissii					
Atriplex codonocarpa				SCKGOPP04	
Austrostipa scabra				SCKGOPP03	
Brachyscome ciliaris				SCKGopp21	
Calandrinia eremaea				SCKG-OPP01	
Cenchrus ciliaris					
Cymbopogon ambiguus					
Dianella revoluta					
Echium plantagineum					
Eragrostis curvula					
Eremophila alternifolia				SCKGOPP24	
Eremophila glabra subsp. *glabra*				SCKGOPP08	
Eremophila interstans subsp. *interstans*				SCKHOPP13	
Eremophila ionantha				SCKGOPP25	
Eremophila miniata				SCKGOPP22	
Exocarpos aphyllus					
Grevillea acuaria				SCKGOPP16	
Gunniopsis quadrifida				SCKGOPP19	
Halgania cyanea var. Charleville (R.W. Purdie +111)				SCKGopp26	
Leichhardtia australis					
Lycium australe				SCKHOPP09	
Minuria cunninghamii				SCKGopp14	
Olearia pimeleoides				SCKGOPP17	
Oligocarpus calendulaceus				SGKGOPP02	
Pimelea microcephala subsp. *microcephala*				SCKGOPP09	
Pittosporum angustifolium					
Ptilotus sp. indet				SCKGOPP10	
Salvia verbenaca				SCKGOPP11	
Sclerolaena diacantha				SCKGOPP05	
Senecio glossanthus				SCKGOPP21	
Senecio lacustrinus				SCKGOPP18	
Swainsona purpurea				SCKGOPP20	
Trichanthodium skirrophorum				SCKGOPP15	

Appendix J – Vegetation condition rating scale

Vegetation Condition	Definition
Pristine	Pristine or nearly so, no obvious signs of disturbance or 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 the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix K – Flora composition

128 Asparagaceae

Thysanotus sp.

130 Hemerocallidaceae

Dianella revoluta

156 Cyperaceae

Lepidosperma sp. indet

163 Poaceae

Austrostipa elegantissima
Austrostipa scabra
* *Cenchrus ciliaris*
Cymbopogon ambiguus
Enneapogon caerulescens
* *Eragrostis curvula*
Eragrostis sp. indet
Triodia scariosa

175 Proteaceae

Grevillea acuaria
Grevillea nematophylla subsp. *n*ematophylla

196 Haloragaceae

Haloragis gossei

199 Zygophyllaceae

Roepera eremaea

201 Fabaceae

Acacia ?coolgardiensis
Acacia acuminata
Acacia andrewsii
Acacia erinacea
Acacia hemiteles
Acacia inceana subsp. *inceana*
Acacia merrallii
Acacia nyssophylla
Acacia tetragonophylla
Senna artemisioides subsp. *filifol*ia
Swainsona purpurea

208 Rhamnaceae

Cryptandra aridicola
Pomaderris forrestiana

217 Casuarinaceae

Allocasuarina helmsii
Casuarina pauper

242 Euphorbiaceae

Beyeria sulcata var. *sulcata*

281 Myrtaceae

Eucalyptus flocktoniae subsp. *flo*cktoniae
Eucalyptus griffithsii
Eucalyptus lesouefii
Eucalyptus longissima

Eucalyptus loxophleba
Eucalyptus salmonophloia
Eucalyptus salubris
Eucalyptus torquata
Melaleuca lateriflora
Melaleuca sheathiana
Melaleuca sp. indet

299 Sapindaceae

Dodonaea microzyga var. *acrolo*bata
Dodonaea viscosa subsp. *angus*tissima

300 Rutaceae

Phebalium canaliculatum

311 Thymelaeaceae

Pimelea microcephala subsp. *mi*crocephala

338 Santalaceae

Exocarpos aphyllus
Santalum acuminatum
Santalum lanceolatum
?Santalum murrayanum
Santalum spicatum

339 Loranthaceae

Amyema gibberula var. *gibberula*
Amyema miquelii
Amyema preissii

342 Frankeniaceae

Frankenia sp. indet

345 Polygonaceae

Duma florulenta

357 Amaranthaceae

Ptilotus exaltatus
Ptilotus obovatus var. *obovatus*
Ptilotus sp. indet

358 Chenopodiaceae

Atriplex codonocarpa
Atriplex vesicaria
Enchylaena tomentosa var. *tomentosa*
Eriochiton sclerolaenoides
Maireana georgei
Maireana glomerifolia
Maireana radiata
Maireana sedifolia
Maireana tomentosa subsp. *tomentosa*
Maireana trichoptera
Rhagodia drummondii
Roycea divaricata
Sclerolaena diacantha
Sclerolaena eurotioides
Tecticornia disarticulata
Tecticornia sp. indet

364	**Aizoaceae**	
	Disphyma crassifolium subsp. *clavellatum*	
	Gunniopsis quadrifida	
374	**Portulacaceae**	
	Calandrinia eremaea	
	Calandrinia pumila	
413	**Apocynaceae**	
	Alyxia buxifolia	
	Leichhardtia australis	
415	**Boraginaceae**	
*	*Echium plantagineum*	
	Halgania andromedifolia	
	Halgania cyanea var. Charleville (R.W. Purdie +111)	
417	**Solanaceae**	
	Lycium australe	
	Solanum nummularium	
428	**Scrophulariaceae**	
	Eremophila alternifolia	
	Eremophila clarkei	
	Eremophila gibbosa	
	Eremophila glabra subsp. *glabra*	
	Eremophila interstans subsp. *interstans*	
	Eremophila ionantha	
	Eremophila miniata	
	Eremophila oldfieldii subsp. *angustifolia*	
	Eremophila oppositifolia subsp. *angustifolia*	
	Eremophila parvifolia subsp. *auricampa*	
	Eremophila scoparia	
432	**Lamiaceae**	
	Prostanthera incurvata	
*	*Salvia verbenaca*	
	Westringia rigida	
458	**Goodeniaceae**	
	Scaevola spinescens	
460	**Asteraceae**	
	Brachyscome ciliaris	
	Centipeda crateriformis subsp. *compacta*	
	Cratystylis conocephala	
	Cratystylis microphylla	
	Cratystylis subspinescens	
	Minuria cunninghamii	
	Olearia muelleri	
	Olearia pimeleoides	
	Oligocarpus calendulaceus	
	Senecio glossanthus	
	Senecio lacustrinus	
	Trichanthodium skirrophorum	
471	**Pittosporaceae**	
	Pittosporum angustifolium	