

Reconnaissance Flora/ Vegetation Survey and Basic Fauna Survey L25/62



September 2020
Version 1

Prepared by:
Botanica Consulting Pty Ltd
PO Box 2027
Boulder WA 6432

Disclaimer

This document and its contents are to be treated as confidential and are published in accordance with and subject to an agreement between Botanica Consulting (BC) and the client for whom it has been prepared and is restricted to those issues that have been raised by the client in its engagement of BC. Neither this document nor its contents may be referred to or quoted in any manner (report or other document) nor reproduced in part or whole by electronic, mechanical or chemical means, including photocopying, recording or any information storage system, without the express written approval of the client and/or BC.

This document and its contents have been prepared utilising the standard of care and skill ordinarily exercised by Environmental Scientists in the preparation of such documents. All material presented in this document is published in good faith and is believed to be accurate at the time of writing. Any person or organisation who relies on or uses the document and its contents for purposes or reasons other than those agreed by BC and the client without primarily obtaining the prior written consent of BC, does so entirely at their own risk. BC denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be endured as a consequence of relying on this document and its contents for any purpose other than that agreed with the client.

Quality Assurance

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

Document Job Number: 2020/164

Prepared by: Kelby Jennings
Senior Environmental Consultant

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

Contents

Executive Summary	1
1 INTRODUCTION	3
1.1 Project Description	3
1.2 Objectives	3
2 BIOPHYSICAL ENVIRONMENT	5
2.1 Regional Environment	5
2.2 Land Use	6
2.3 Soils and Landscape Systems	6
2.4 Regional Vegetation	8
2.5 Conservation Values	9
2.5.1 Great Western Woodlands	9
2.6 Climate	11
2.7 Hydrology	12
3 SURVEY METHODOLOGY	14
3.1 Desktop Assessment	14
3.2 Field Assessment	15
3.2.1 Flora Assessment	15
3.2.2 Fauna Assessment	16
3.2.3 Scientific Licences	16
3.3 Survey Limitations and Constraints	16
4 RESULTS	18
4.1 Desktop Assessment	18
4.1.1 Flora	18
4.1.2 Vegetation	21
4.1.3 Fauna	23
4.1.4 Conservation Areas	27
4.2 Field Assessment	29
4.2.1 Flora	29
4.2.2 Vegetation Communities	29
4.2.3 Vegetation Condition	34
4.2.4 Significant Vegetation	36
4.2.5 Fauna Habitat	36
4.3 Matters of National Environmental Significance	39
4.3.1 Significant Fauna	39
4.3.2 <i>Environment Protection and Biodiversity Conservation Act 1999</i>	39
4.4 Matters of State Environmental Significance	40
4.4.1 <i>Environmental Protection Act WA 1986</i>	40
4.4.2 <i>Biodiversity Conservation Act 2016</i>	40
4.5 Native Vegetation Clearing Principles	41
5 BIBLIOGRAPHY	44
Appendix 1: Conservation Ratings BC Act and EPBC Act	46
Appendix 2: Significant Flora Likelihood Assessment	50
Appendix 3: Potentially Occurring Introduced (Weed) Flora Species	51
Appendix 4: Vegetation Condition Rating	54
Appendix 5: List of species identified within each vegetation type	55

Tables

Table 2-1: Soil Landscape Systems within the survey area.....	6
Table 3-1: Scientific Licences of Botanica Staff coordinating the flora survey.....	16
Table 3-2: Limitations and constraints associated with the survey	17
Table 4-1: Potentially occurring Declared Pasts.....	18
Table 4-2: Pre-European Vegetation Associations within the survey area.....	21
Table 4-3: Potentially Occurring Introduced Fauna	23
Table 4-4: Likelihood of Occurrence – Fauna Species of Conservation Significance.....	25
Table 4-5: Vegetation Community Descriptions and Extent.....	30
Table 4-6: Vegetation Condition within the survey area	34
Table 4-7: Terrestrial Fauna Habitats	37
Table 4-8: Assessment against native vegetation clearing principles	42

Figures

Figure 1-1: Regional map of the survey area.....	4
Figure 2-1: Map of Soil Landscape Systems within the survey area.....	7
Figure 2-2: Location of survey area within the Great Western Woodlands.....	10
Figure 2-3: Hydrology of the survey area.....	13
Figure 4-1: DBCA significant flora records.....	20
Figure 4-2: Pre-European Vegetation Associations within the survey area.....	22
Figure 4-3: Conservation Areas.....	28
Figure 4-4: Vegetation Communities	33
Figure 4-5: Vegetation Condition within the survey area	35
Figure 4-6: Terrestrial Fauna Habitats.....	38

Glossary

Acronym	Description
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i> , WA Government.
BC Act	<i>Biodiversity Conservation Act 2016</i> , WA Government.
Botanica	Botanica Consulting Pty Ltd.
BoM	Bureau of Meteorology.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DAWE	Department of the Agriculture, Water and Environment (formerly known as DotEE), Australian Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DEC	Department of Environment and Conservation (now DBCA), WA Government.
DER	Department of Environment Regulation (now DWER), WA Government.
DMIRS	Department of Mines, Industry Regulation and Safety (formerly DMP), WA Government
DotEE	Department of the Environment and Energy (now known as DAWE), Australian Government.
DoW	Department of Water (now DWER), WA Government.
DPaW	Department of Parks and Wildlife (now DBCA), WA Government.
DPIRD	Department of Primary Industries and Regional Development, WA Government
DWER	Department of Water and Environmental Regulation (formerly EPA, DER and DoW), WA Government
EP Act	Environmental Protection Act 1986, WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority, WA Government.
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> , Australian Government.
ESA	Environmentally Sensitive Area.
Ha	Hectare (10,000 square meters).
IBRA	Interim Biogeographic Regionalization for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
JAMBA	<i>Japan Australia Migratory Bird Agreement 1981</i> .
Km	Kilometer (1,000 meters).
NVIS	National Vegetation Information System.
PEC	Priority Ecological Community.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WAM	Western Australian Museum, WA Government.

Executive Summary

Botanica Consulting (Botanica) was commissioned by Black Cat Syndicate Ltd. (Black Cat) to undertake a reconnaissance flora/ vegetation survey and basic fauna survey within Miscellaneous Lease L25/62, including a 500m radius of L25/62 (referred to as the 'survey area'). The survey area occupies approximately 1025 ha and is located approximately 30 km east of Kalgoorlie-Boulder, Western Australia. The field survey was conducted on the 10th September 2020, with the area traversed on foot and 4WD by Jim Williams (Director/Principal Botanist, Diploma of Horticulture). The survey was conducted to support a Native Vegetation Clearing Permit (NVCP) application and mining proposal with regards to the development of the Bulong Project.

The reconnaissance flora and vegetation survey and basic fauna survey was conducted in two stages: a desktop assessment to identify significant environmental values potentially occurring in the survey area, followed by a field survey to provide ground-truthed environmental data.

Prior to the field assessment a literature review was undertaken of previous flora and fauna assessments conducted within the local region. Documents reviewed included:

- Botanica Consulting (2019): *Reconnaissance Flora/Vegetation & Fauna Survey Bulong Gold Project, version 1*. Unpublished report prepared on behalf of Black Cat Syndicate Ltd. August 2019.

In addition to the literature review, searches of the following databases were undertaken to aid in the compilation of a list of significant flora within the survey area:

- DBCA Threatened/ Priority Flora Database Search (DBCA, 2019);
- DBCA NatureMap database (DBCA, 2020); and
- EPBC Protected Matters search tool (DAWE, 2020a).

The desktop review identified 521 vascular flora species as occurring within 40 km of the survey area, including 80 introduced (weed) species. The most diverse families were Asteraceae (82 species), Chenopodiaceae (72 species) and Fabaceae (58 species). Significant genera were *Acacia* (28 species), *Eucalyptus* (26 species) and *Eremophila* (25 species).

The desktop review identified 80 introduced flora (weed) species as potentially occurring in the vicinity of the survey area. Of these, nine are listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007*. No species are listed as a Weed of National Significance (WoNS).

The desktop assessment identified 15 significant flora species potentially occurring in the survey area, consisting of one Threatened, six Priority 1, one Priority 2, five Priority 3 and two Priority 4 taxa. These taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area. The assessment did not identify any significant flora species as likely to occur in the survey area. Four taxa were assessed as possibly occurring in the survey area, consisting of three Priority 1 and one Priority 2.

The desktop assessment identified 11 fauna species of conservation significance as potentially occurring in the region. Habitat and distribution data was used to determine the likelihood of occurrence, with the assessment identifying two significant fauna species as potentially occurring in

the survey area including one Threatened species: Malleefowl (*Leipoa ocellata*) (VU) and one other specially protected species; Peregrine Falcon (*Falco peregrinus*) (OS).

No Threatened or Priority Ecological Communities were identified as likely or possibly occurring within the survey area.

There are no proposed or vested Conservation Reserve located within the survey area.

There are no DBCA managed or interest land located within the survey area.

There are no Environmentally Sensitive Areas located within the survey area.

There are no Nationally Important or RAMSAR wetlands located within the survey area.

The field survey identified 89 flora taxa within the survey area, including one introduced (weed) species. These taxa represented 47 genera across 24 families, with the most diverse genera being *Eucalyptus* and *Eremophila* (9 species) followed by *Acacia* (7 species) and *Maireana* (7 species).

One introduced flora species was recorded within the survey area: *Carrichtera annua* (Wards Weed). This species is not a Weed of National Significance or a Declared Pest in Western Australia and is common throughout the Goldfields region.

No Threatened or Priority flora species were recorded within the survey area.

Five vegetation communities were identified within the survey area. The survey found CLP-EW1 to be the most diverse community, with 58 flora species, and OD-EW1 the least with 19 species. CLP-EW1 was the most widespread community in the survey area, occupying 692 ha (67.5%), while CLP-EW2 was the most restricted, occupying 20 ha (1.9%).

Native vegetation within the survey area was rated as 'good', with impacts to vegetation structure and composition such as low levels of grazing and/or slightly aggressive weeds.

No significant vegetation, including representatives of Threatened or Priority Ecological Communities, was identified within the survey area.

Two broad-scale terrestrial fauna habitats were identified within the survey area. No evidence of significant fauna species were observed during the survey, including no evidence of Malleefowl nesting mounds or other activity.

The results of the desktop assessment and field survey were assessed with regards to the native vegetation clearing principles listed under Schedule 5 of the EP Act. The assessment found that the proposed vegetation clearing activities may be at variance with clearing principle (f).

1 **INTRODUCTION**

1.1 **Project Description**

Botanica Consulting (Botanica) was commissioned by Black Cat Syndicate Ltd. (Black Cat) to undertake a reconnaissance flora/ vegetation survey and basic fauna survey within Miscellaneous Lease L25/62, including a 500m radius of L25/62 (referred to as the 'survey area'). The survey area occupies approximately 1025 ha and is located approximately 30 km east of Kalgoorlie-Boulder, Western Australia (Figure 1-1). The survey was conducted to support a Native Vegetation Clearing Permit (NVCP) application and mining proposal with regards to the development of the Bulong Project.

1.2 **Objectives**

The flora assessment was conducted in accordance with the requirements of a reconnaissance flora survey as defined in *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016* (EPA, 2016a). The objectives of the assessment were to:

- gather background information on flora and vegetation in the target area (literature review, database and map-based searches);
- identify significant flora, vegetation and ecological communities and assess the potential sensitivity to impact;
- conduct a field survey to verify / ground truth the desktop assessment findings;
- undertake floristic community mapping to a scale appropriate for the bioregion and described according to the National Vegetation Information System (NVIS) structure and floristics;
- undertake vegetation condition mapping;
- assess the project area's plant species diversity, density, composition, structure and weed cover, using NVIS classification system for vegetation description;
- assess Matters of National Environmental Significance (MNES) and indicate whether potential impacts on MNES as protected under the EPBC Act are likely to require referral of the project to the Commonwealth DAWE; and
- determine the State legislative context of environmental aspects required for the assessment.

The fauna assessment was conducted in accordance with the requirements for a basic terrestrial fauna survey as defined in *Technical Guidance - Terrestrial Fauna Surveys for Environmental Impact Assessment – June 2020* (EPA, 2020). The objectives of the assessment were to:

- Gather background information on fauna in the survey area (literature review, database and map-based searches);
- Delineate and characterise the faunal assemblages and fauna habitats present in the survey area; and
- Assess the likelihood of significant fauna occurring within the survey area.

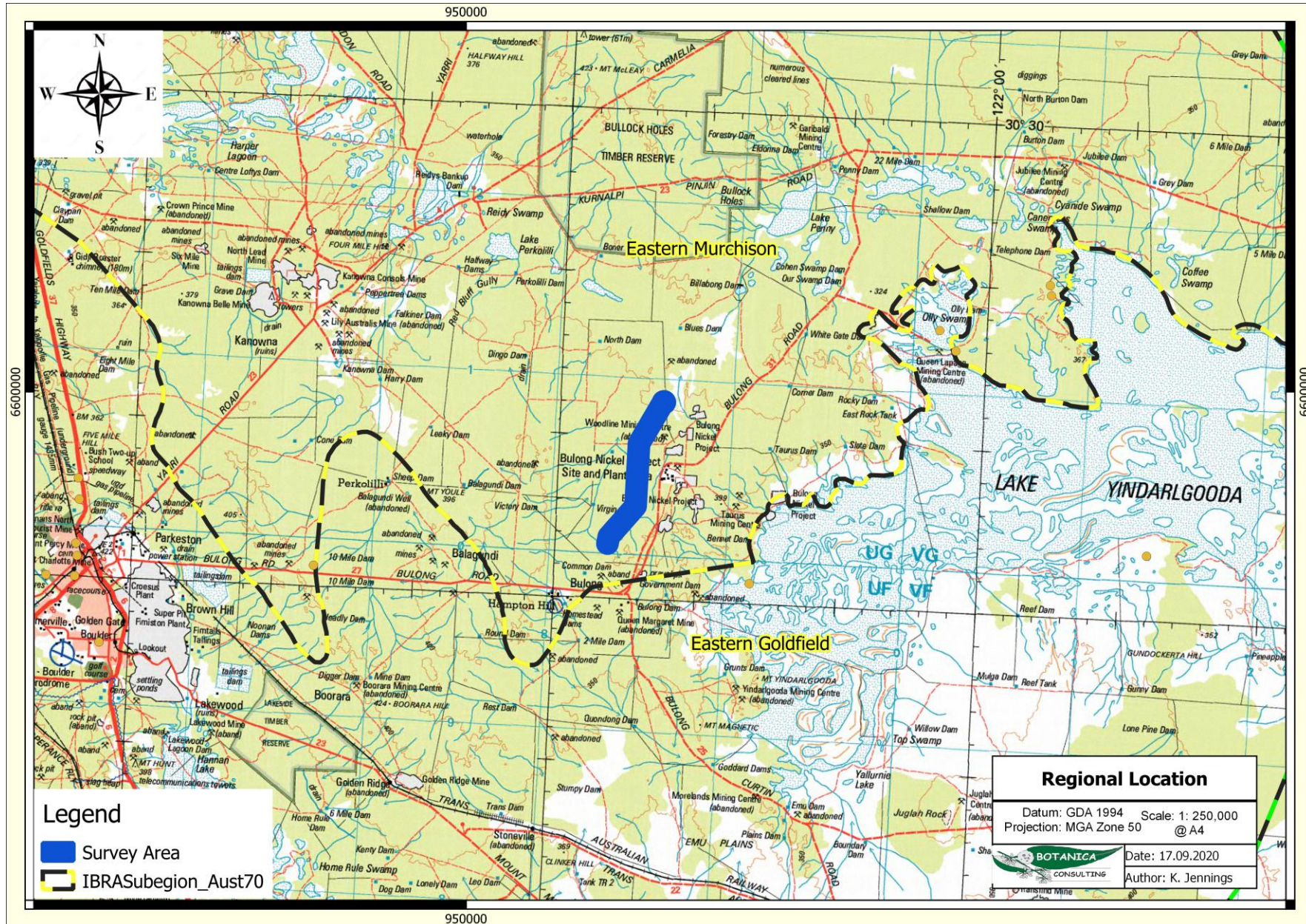


Figure 1-1: Regional map of the survey area

2 **BIOPHYSICAL ENVIRONMENT**

2.1 **Regional Environment**

The survey area lies within the Eastern Murchison subregion (MUR01) of the Murchison Bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). However, as the survey area is located less >2 km north of the boundary of the Eastern Goldfields subregion (COO3) of the Coolgardie Bioregion, the characteristics of both regions are described below (Figure 1-1).

The Eastern Murchison subregion (7,847,966 ha) comprises the northern parts of the craton's Southern Cross and Eastern Goldfields Terrains and is characterised by internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt Lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaways complexes as well as red sandplains are widespread. Vegetation is dominated by Mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands (Cowan, 2001a).

The Eastern Goldfields subregion (5,102,428 ha) lies on the Yilgarn Craton's Eastern Goldfields Terrain, which is described as gently undulating plains with a subdued relief, interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line. (Cowan, 2001b)

The vegetation consists of Mallees, Acacia thickets and shrub-heaths on sandplains, with diverse *Eucalyptus* woodlands occurring around salt lakes, on ranges, and in valleys. Salt lake support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrubland occur on basic granulites of the Fraser Range, and the area is rich in endemic Acacias.

In accordance with Beard (1990) the survey area is located in the Murchison region, located in the Austin Botanical District within the Eremaean Province of WA, which is defined by the vegetational expression of geological boundaries of the Yilgarn Block, described as Archaean granite with infolded volcanics and meta-sediments (greenstones) of a like age. The topography is undulating, with occasional ranges of low hills and extensive sandplains in the eastern half. The principal soil type is shallow earthy loam overlying red-brown hardpan, with shallow stony loams on hills and red earthy sands on sandplains. The western half of the region generally coincides with the basin of the Murchison River, the eastern half embraces the drainage of former rivers, now dry, draining towards the Eucla Basin. Vegetation is predominantly mulga low woodland (*Acacia aneura*) on plains, reduced to scrub on hills, with a tree steppe of *Eucalyptus* spp. and *Triodia basedowii* on sandplains. The climate is arid, with summer and winter rains and an average annual precipitation of 200 mm.

2.2 Land Use

The dominant land uses of the Eastern Murchison subregion include grazing native pastures (85.47%), unallocated crown reserves (11.34%), conservation (1.4%) and mining (1.79%) (Cowan, 2001a). The dominant land uses of the Eastern Goldfields subregion includes Unallocated Crown Land (UCL) and Crown reserves and pastoral grazing, with conservation areas and mining leases also present (Cowan, 2001b). The survey area is located within the Hampton Hill Station Pastoral Lease.

2.3 Soils and Landscape Systems

The survey area lies within the Kalgoorlie Province, located in the southern Goldfields between Paynes Find, Menzies, Southern Cross and Balladonia. The landscape consists of undulating plains (with some sandplains, hills and salt lakes) on the granitic rocks and greenstone of the Yilgarn Craton. Soils range from calcareous loamy earths and red loamy earths with some salt lake soils to red deep sands, yellow sandy earths, shallow loams and loamy duplexes. Vegetation communities are predominately Eucalypt woodlands with some acacia-casuarina thickets, mulga shrublands, halophytic shrublands and spinifex grasslands.

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

The Kambalda Zone is further divided into soil landscape systems, with the survey area located within four soil landscape systems, as shown in Table 2-1 and Figure 2-1, in accordance with soil landscape system mapping data (Government of Western Australia, 2019).

Table 2-1: Soil Landscape Systems within the survey area

Soil Landscape System	Description	Extent within survey area ha (%)
Bevon System	Irregular low ironstone hills with stony lower slopes supporting mulga shrublands.	145 ha (14.1%)
Bunyip System	Gilgaied drainage tract, draining greenstone hills supporting mixed halophytic shrublands occasionally with a black oak overstorey.	38 ha (3.7%)
Gumland System	Extensive pedepains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys.	686 ha (66.9%)
Moriarty System	Low greenstone rises and stony plains supporting chenopod shrublands with patchy eucalypt overstoreys.	156 ha (15.2 %)

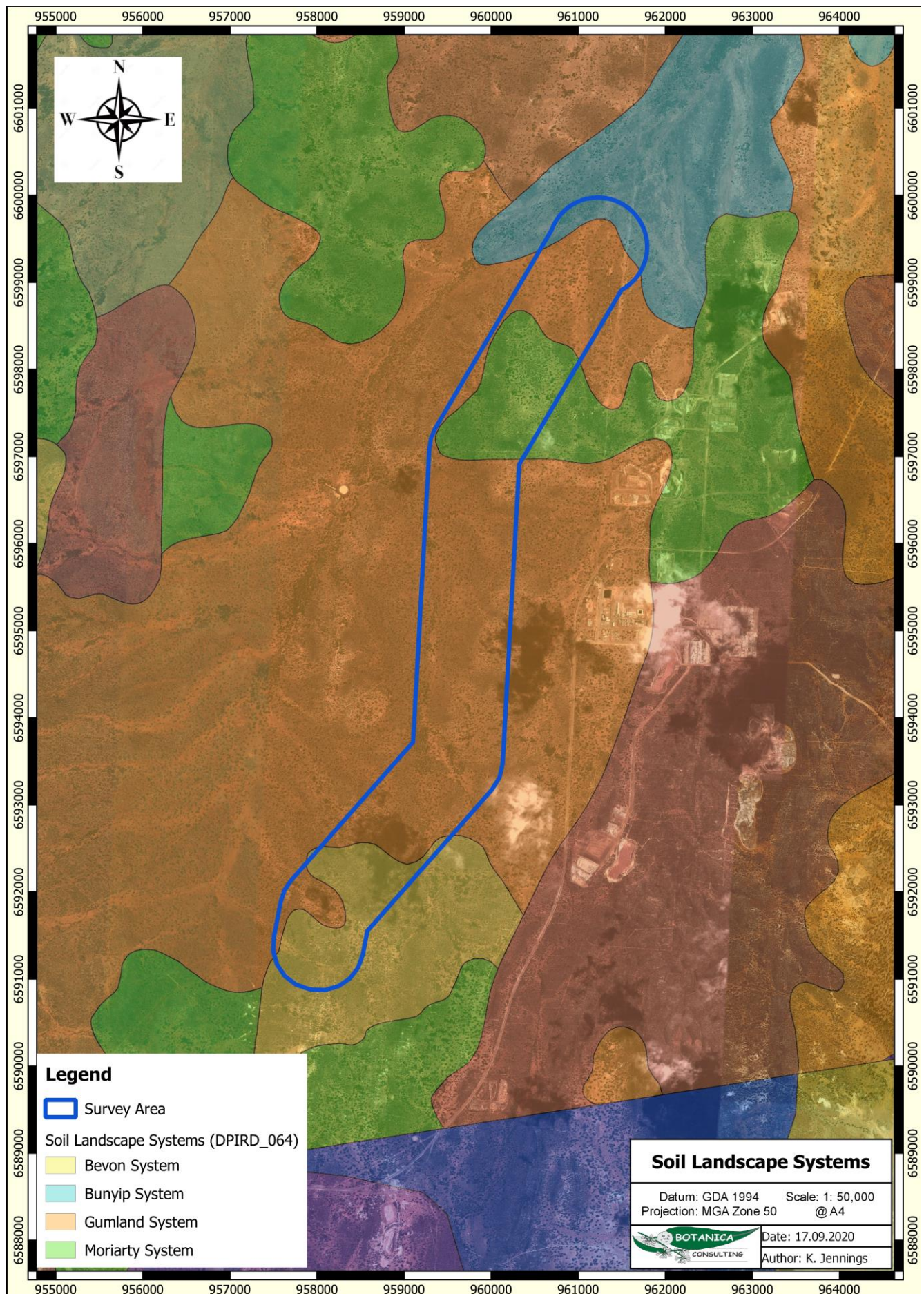


Figure 2-1: Map of Soil Landscape Systems within the survey area

2.4 Regional Vegetation

In accordance with Tille (2006), the vegetation of the Kambalda Zone is typified by the preponderance of stony plains with acacia shrublands and halophytic shrublands, low hills with eucalypt or acacia woodlands with halophytic undershrubs, stony plains with acacia shrublands and alluvial plains with eucalypt woodlands and halophytic undershrubs rangeland.

More broadly, the vegetation of the Kalgoorlie Province is described by Tille (2006) as woodlands of redwood (*Eucalyptus transcontinentalis*), red mallee (*E. oleosa*), Dundas blackbutt (*E. dundasii*), merri (*E. flocktoniae*) and salmon gum (*E. salmonophloia*), found on undulating plains over granite. There are also some hummock grasslands with red mallee over spinifex (*Triodia scariosa*) and thickets of *Acacia*, *Casuarina* and *Melaleuca* spp. Plains on greenstone have woodlands of York gum (*E. loxophleba*), salmon gum and gimlet (*E. salubris*). The valley plains have woodlands of salmon gum, red mallee, Goldfields blackbutt (*E. lesouefii*), gimlet, York gum and morrell (*E. longicornis*). These sometimes have an understorey of saltbush (*Atriplex* spp.), pearl bluebush (*Maireana sedifolia*), sago bluebush (*M. pyramidata*) and *Eremophila* spp. There are areas of spinifex grasslands with red mallee, mallees (e.g. *E. youngiana*) and marble gum (*E. gongylocarpa*). Low woodlands of mulga (*Acacia aneura*) and black sheoak (*Casuarina pauper*) over bluebush and saltbush are also present. Apart from the bare salt lake surfaces, saline valley floors have shrublands of samphire (*Tecticornia* spp.) and *Frankenia* spp. in lower areas, shrublands of saltbush and bluebush on red deep sandy duplexes, and woodlands of salmon gum, merri, red mallee, gimlet and York gum. *Acacia neurophylla*, *A. beauverdiana* and *A. resinomarginea* thickets grow on gently sloping uplands on granite, with thickets of acacia, casuarina and melaleuca. There are also scrub-heaths and York gum-salmon gum-gimlet woodlands on these uplands. The hilly terrain on greenstone supports woodlands of salmon gum, Goldfields blackbutt, coral gum (*E. torquata*), York gum, gimlet, morrell, Dundas blackbutt and black sheoak. Thickets of granite wattle (*Acacia quadrimarginea*) are also present. The stony plains support scattered woodlands of Goldfields blackbutt, gimlet and salmon gum, along with shrublands of saltbush and bluebush. Sandplains in the west have acacia (*A. coolgardiensis*, *A. ramulosa*, *A. aneura*, *A. burkittii* and *A. tetragonophylla*) shrublands, commonly with patchy native pine (*Callitris glaucophylla* *C. preissii*) and mallees (*E. leptopoda*, *E. longicornis* and *E. loxophleba*). Native box (*Bursaria occidentalis*), *Melaleuca uncinata* and *Hakea recurva* may also be present. Hard spinifex (*T. basedowii*) grasslands with mulga, marble gum and mallees (e.g. *E. kingsmillii*) are found on sandplains to the east. The sandy-surfaced plains support acacia, casuarina and melaleuca thickets; woodlands of York gum, cypress pine (*Callitris columellaris*), salmon gum, gimlet and mulga; and shrublands of bowgada (*A. ramulosa*).

2.5 Conservation Values

The Murchison Bioregion contains 41 vegetation associations (hummock grasslands, succulent steppe or low woodlands) that have at least 85 per cent of their total extent in the bioregion. The Bioregion is rich and diverse in flora and fauna but most species are wide ranging and usually occur in adjoining regions. A snake (*Pseudechis butleri*) is the only known regionally endemic vertebrate species.

There are six wetlands of national importance in the Bioregion, all of which are salt lakes: Ballard, Barlee, Marmion, Wooleen, Breberle and Anneen. There is one wetland of regional importance within the Murchison Bioregion; the Mungawolagudgi Claypan on Muggon Station.

No ecosystems are listed as threatened under WA State legislation occur within the Murchison Bioregion, but 52 communities and vegetation associations are thought to be at risk for a variety of reasons. Grazing from livestock, goats and rabbits and changed fire regimes are the main threatening processes in the region, with clearing, impacts of mining, erosion and sedimentation also causing significant impacts.

2.5.1 Great Western Woodlands

The survey area lies within the Great Western Woodlands, located approximately 2 km from the northern boundary. The Great Western Woodlands is considered by The Wilderness Society of WA to be of global biological and conservation importance as one of the largest and healthiest temperate woodlands on Earth, containing many endemic taxa. The region covers almost 16 million hectares (160,000 square kilometres), from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east.

The Great Western Woodlands provides a connection between southwest forests and inland deserts (Gondwana Link) as well as linking the north-west passage to Shark Bay. The majority of the Great Western Woodlands is unallocated crown land (61.1%) with other interests including pastoral leases (20.4%), conservation reserves (15.4%) unallocated crown land, ex pastoral (2%) managed by the Department of Biodiversity, Conservation and Attractions (DBCA) and private land (approximately 1%) (Watson *et. al.*, 2008).

No specific management strategy or formal conservation status applies to the Great Western Woodlands. The Great Western Woodlands currently includes towns, highways, roads, railways, private property, Crown Reserves, agricultural activities and mining tenements.

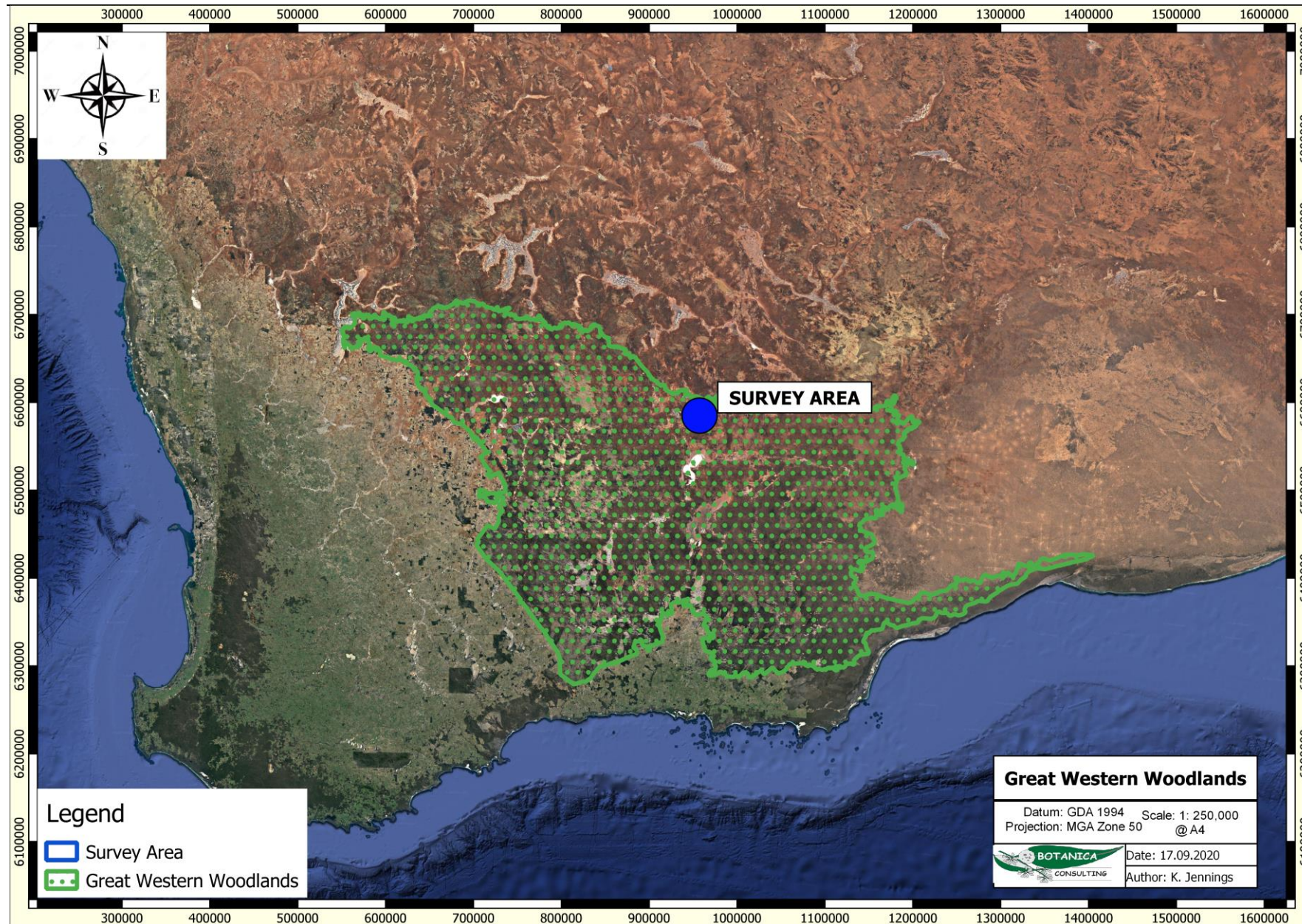
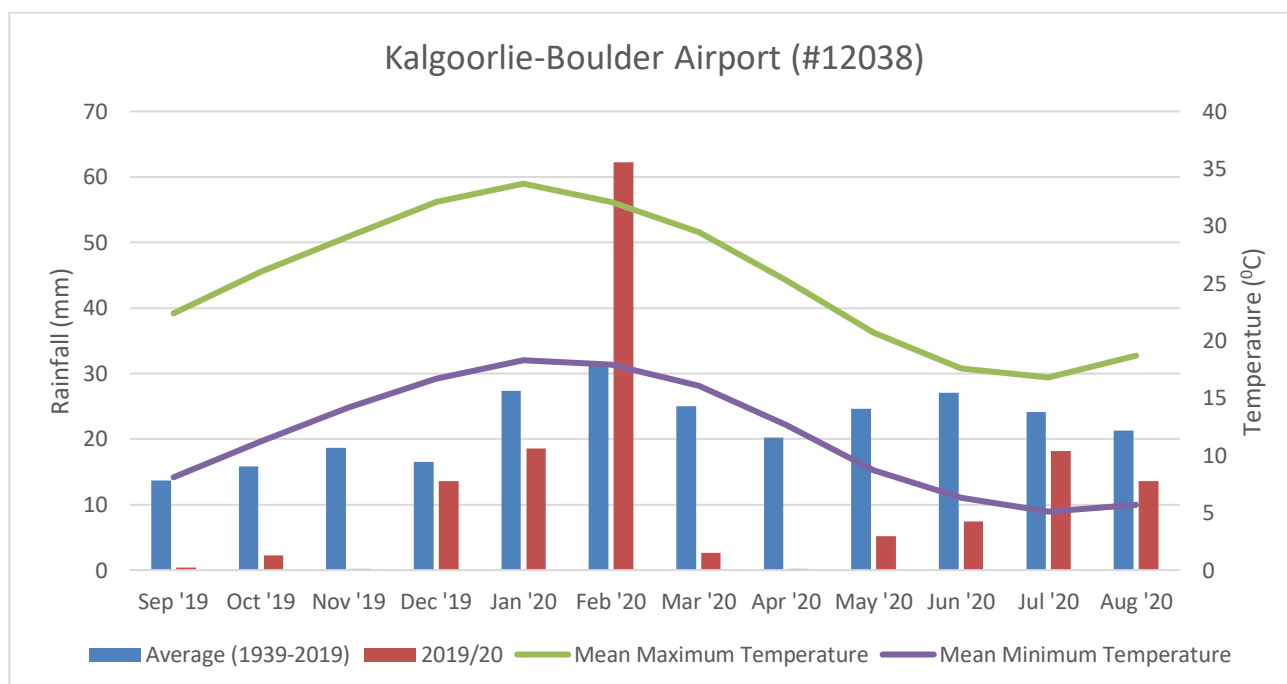


Figure 2-2: Location of survey area within the Great Western Woodlands

2.6 Climate

The climate of the Eastern Murchison subregion is described as an arid climate with mainly winter rainfall and annual rainfall of approximately 200 mm (Beard, 1990; Cowan, 2001 a), while the Eastern Goldfields subregion is characterised as arid to semi-arid with 200-300 mm of rainfall, sometimes in summer but usually in winter (Cowan 2001b). Rainfall data for Kalgoorlie-Boulder Airport weather station (#12038), located approximately 31 km west of the survey area, is shown in Graph 2-1: Average and recent rainfall and average temperature data of Kalgoorlie-Boulder Airport (BoM, 2020) Mean monthly rainfall ranges from 31.6 mm in February to 13.7 mm in September, with a mean annual rainfall of 266.1 mm. The survey was conducted in September 2020, with the preceding month (August) being characterised by two small rainfall events. Although climate conditions are not considered optimal for the presence of flowering material and ephemeral species, this is unlikely to be a major survey constraint.



Graph 2-1: Average and recent rainfall and average temperature data of Kalgoorlie-Boulder Airport (BoM, 2020)

2.7 Hydrology

According to the Geoscience Australia database (2015), there are no permanent water bodies present, but multiple minor ephemeral drainage lines intersect the southern region of the survey area (Figure 2-3).

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. In accordance with the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2020b) database, there are three low- to medium-potential terrestrial GDEs located within the survey area, described below in **Error! Reference source not found.** and spatially in Figure 2-3.

Table 2-2: Potential GDE's within the survey area

Region	Landscape	Geomorphology	Description	Potential
Salt Lakes	Low Lying	Undulating plains with some sandplains, ferruginous breakaways; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys.	Low greenstone rises and stony plains supporting chenopod shrublands with patchy eucalypt overstoreys.	Moderate
Salt Lakes	Low Lying	Extensive pedeplains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys.	Undulating plains with some sandplains, ferruginous breakaways; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys.	Moderate
Salt Lakes	Low Lying	Irregular low ironstone hills with stony lower slopes supporting mulga shrublands.	Undulating plains with some sandplains, ferruginous breakaways; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys.	Low

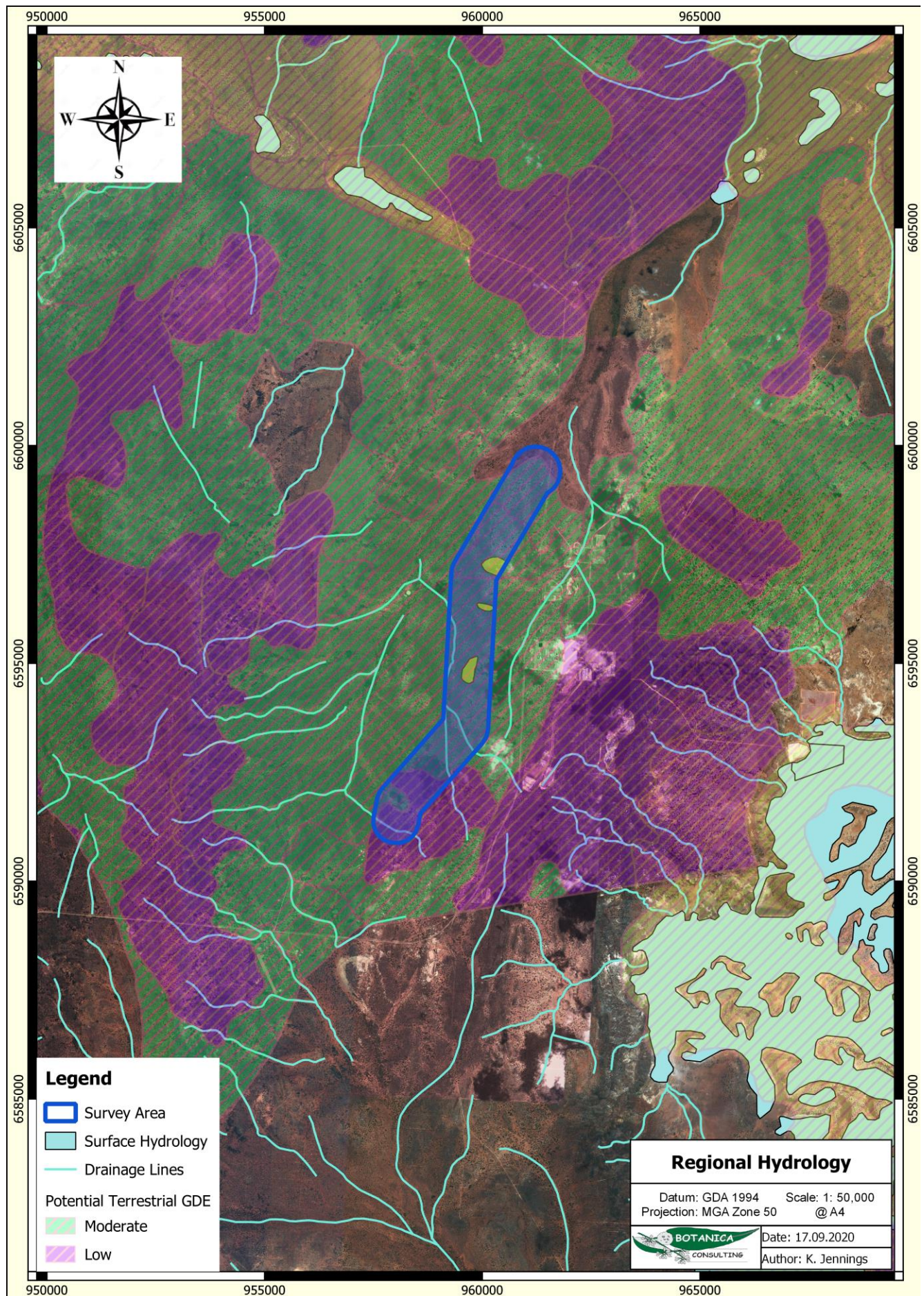


Figure 2-3: Hydrology of the survey area

3 **SURVEY METHODOLOGY**

The reconnaissance flora and vegetation survey and basic fauna survey was conducted in two stages: a desktop assessment to identify significant environmental values potentially occurring in the survey area, followed by a field survey to provide ground-truthed environmental data.

3.1 **Desktop Assessment**

Prior to the field assessment a literature review was undertaken of previous flora and fauna assessments conducted within the local region. Documents reviewed included:

- Botanica Consulting (2019): *Reconnaissance Flora/Vegetation & Fauna Survey Bulong Gold Project, version 1*. Unpublished report prepared on behalf of Black Cat Syndicate Ltd. August 2019.

In addition to the literature review, searches of the following databases were undertaken to aid in the compilation of a list of significant flora within the survey area:

- DBCA Threatened/ Priority Flora Database Search (DBCA, 2019);
- DBCA NatureMap database (DBCA, 2020); and
- EPBC Protected Matters search tool (DAWE, 2020a).

The NatureMap species search and EPBC Protected Matters search were conducted with a 40 km buffer from the survey area.

Significant flora and fauna species identified by the desktop review were assessed with regards to their population extent and distribution and preferred habitat to determine their likelihood of occurrence within the survey area. Identified flora species with no populations within 100 km were not considered in the assessment. The assessment categorised each species as follows:

- Unlikely- Suitable habitat is not expected to occur and/or the survey area is outside the known range of the species.
- Possible- Suitable habitat may be present, and the area is within the known range of the species. This option is also used when there is insufficient information to determine the preferred habitat of a species.
- Likely- Suitable habitat is expected to occur and there are records within 10 km of the survey area.
- Known to Occur- Species has previously been recorded within the survey area.

It should be noted that these lists are based on observations from a broader area than the assessment area (40-100 km radius) and therefore may include taxa not present. The databases also often include very old records that may be incorrect or in some cases the taxa in question have become locally or regionally extinct. Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

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

- *Environment Protection and Biodiversity and Conservation (EPBC) Act 1999*. Administered by the Australian Government (DAWE);
- *Biodiversity Conservation (BC) Act 2016*. Administered by the WA Government (DBCA);

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

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

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

Most but not all migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as Matters of National Environmental Significance (MNES) under the EPBC Act. Descriptions of conservation significant species and communities are provided in Appendix 1.

3.2 Field Assessment

Botanica conducted a reconnaissance flora/ vegetation and basic fauna survey covering an area of 1025.6 ha. The survey was conducted on the 10th September 2020, with the area traversed on foot and 4WD by Jim Williams (Director/Principal Botanist, Diploma of Horticulture).

3.2.1 Flora Assessment

Prior to the commencement of field work, aerial photography was inspected and obvious differences in the vegetation assemblages were identified. The different vegetation communities identified were then inspected during the field survey to assess their validity. A handheld GPS unit was used to record the coordinates of the boundaries between existing vegetation communities. At each sample point, the following information was recorded:

- GPS location;
- Photograph of vegetation;
- Dominant taxa for each stratum;
- All vascular taxa (including annual taxa);
- Landform classification;
- Vegetation condition rating;
- Collection and documentation of unknown plant specimens; and
- GPS location, photograph and collection of flora of conservation significance if encountered.

Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Herbarium and Western Australian Herbarium. Vegetation was classified in accordance with NVIS classifications.

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

3.2.2 Fauna Assessment

Vegetation and landform units identified during the flora assessment have been used to define broad fauna habitat types across the site. This information has been supplemented with observations made during the fauna assessment.

The main aim of the fauna habitat assessment was to determine if it was likely that any species of conservation significance would be utilizing the areas that maybe impacted on as a consequence of development at the site. The habitat information obtained was also used to aid in finalizing the overall potential fauna list.

As part of the desktop literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the field survey, the habitats within the study area were assessed and specific elements identified, if present, to determine the likelihood of listed threatened species utilizing the area and its significance to them.

Opportunistic observations of fauna species were made during all field survey work which involved a series of transects across the study area during the day including observations of bird species with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

3.2.3 Scientific Licences

The flora and vegetation survey was conducted in accordance with the licence listed in Table 3-1.

Table 3-1: Scientific Licences of Botanica Staff coordinating the flora survey

Licensed staff	Permit Number	Valid Until
Jim Williams	FB62000108 (Licence to flora for scientific purposes)	27/05/2022

3.3 Survey Limitations and Constraints

It is important to note that flora surveys will entail limitations notwithstanding careful planning and design. Potential limitations are listed in Table 3-2.

The conclusions presented in this report are based upon field data and environmental assessments and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also, it should be recognised that site conditions can change with time. Information not available at the time of this assessment which may subsequently become available may alter the conclusions presented.

Some species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the survey area or immediately adjacent. The habitat requirements and ecology of many of the species known to occur in the wider area are however often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitats or microhabitats within the survey area. As a consequence of this limitation, the potential species list produced is most likely an overestimation of those species that actually utilise the survey area for some purpose.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any flora and fauna species that would possibly occur within the survey area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the author, has been listed as having the potential to occur.

Table 3-2: Limitations and constraints associated with the survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD and on foot. Numerous tracks were located within the survey area, providing ease of access.
Competency/ Experience	Not a constraint	The BC personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Botanist/ Zoologist: Jim Williams Data Interpretation: Jim Williams, Kelby Jennings and Greg Harewood.
Timing of survey, weather & season	Minor constraint	Fieldwork was undertaken within EPA's recommended primary survey time period for the Eremaean Province (i.e., 6-8 weeks following winter rainfall) but was conducted during the EPA recommended timing for the South-West Interzone (i.e. September to November) and during optimal flowering period for Eucalypt Woodland vegetation. Rainfall for the Kalgoorlie-Boulder region has been below average since February 2020.
Area disturbance	Not a constraint	The area has been disturbed from exploration, cattle grazing and fire; however, vegetation was mostly intact and comprised of native vegetation.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a reconnaissance flora/ vegetation survey and basic fauna survey completed to identify vegetation types/fauna habitats and conservation significant species/communities.
Availability of contextual information at a regional and local scale	Not a constraint	Threatened flora database searches provided by the DBCA were used to identify any potential locations of Threatened/Priority taxa. BoM, DWER, DPIRD, DBCA and DAWE databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region. Previous Flora/ Fauna surveys within the local area have been assessed for pertinent information and environmental context of the regional area.
Completeness	Not a Constraint	In the opinion of Botanica, the survey area was covered sufficiently in order to identify vegetation assemblages. Annual species were present during the survey and all flora was able to be identified to species level. The vegetation types for this study were based on visual descriptions of locations in the field. The distribution of these vegetation communities/ fauna habitats outside the study area is not known, however vegetation types identified were categorised via comparison to vegetation distributions throughout WA specified in the NVIS Major Vegetation Groups (DotEE, 2017b).

4 RESULTS

4.1 Desktop Assessment

4.1.1 Flora

The desktop review identified 521 vascular flora species as occurring within 40 km of the survey area, including 80 introduced (weed) species. The most diverse families were Asteraceae (82 species), Chenopodiaceae (72 species) and Fabaceae (58 species). Significant genera were *Acacia* (28 species), *Eucalyptus* (26 species) and *Eremophila* (25 species).

4.1.1.1 Introduced Flora

The desktop review identified 80 introduced flora (weed) species as potentially occurring within 40 km the survey area. Of these, nine are listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* (Table 4-1).

No species are listed as a Weed of National Significance (WoNS).

The full list of potential weed species is contained in Appendix 3.

Table 4-1: Potentially occurring Declared Pests

Family	Taxon	Common Name	WAOL Status	Control Category	WoNS
Boraginaceae	<i>Echium plantagineum</i>	Paterson's Curse	Declared Pest - s22(2)	No Control Category, Whole of State	No
Cactaceae	<i>Cylindropuntia fulgida</i> var. <i>mamillata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Cylindropuntia imbricata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Cylindropuntia kleiniae</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Eolophus roseicapillus</i>	-	Declared Pest - s22(2)	Exempt, Whole of State	No
	<i>Opuntia elata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Opuntia ficus-indica</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
Fabaceae	<i>Alhagi maurorum</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
Martyniaceae	<i>Proboscidea louisianica</i>	Purple Flower Devil's Claw	Declared Pest, Prohibited - s12	C1 Exclusion, Whole of State	No

4.1.1.2 Conservation Significant Flora

The assessment of the DBCA Priority/ Threatened Flora Database Search (DBCA, 2019a), NatureMap (DBCA, 2020) and Protected Matters searches (DAWE, 2020a) and previous relevant literature identified 15 significant flora species recorded within a 40 km radius of the survey area. These consist of one Threatened, six Priority 1, one Priority 2, five Priority 3 and two Priority 4 taxa (Appendix 2).

These taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area. The assessment did not identify any significant flora species as likely to occur in the survey area. Four taxa were assessed as possibly occurring in the survey area, consisting of three Priority 1 and one Priority 2 (Appendix 2). The locations of the DBCA database records are illustrated spatially in Figure 4-1.

4.1.1.3 Significant Ecological Communities

The Protected Matters search (DAWE, 2020a) did not identify any Threatened Ecological Communities recorded within 40 km of the survey area. Analysis of the Priority Ecological Communities within the Goldfields region (DBCA, 2017) did not identify any significant vegetation assemblages as likely or possibly occurring within the survey area.

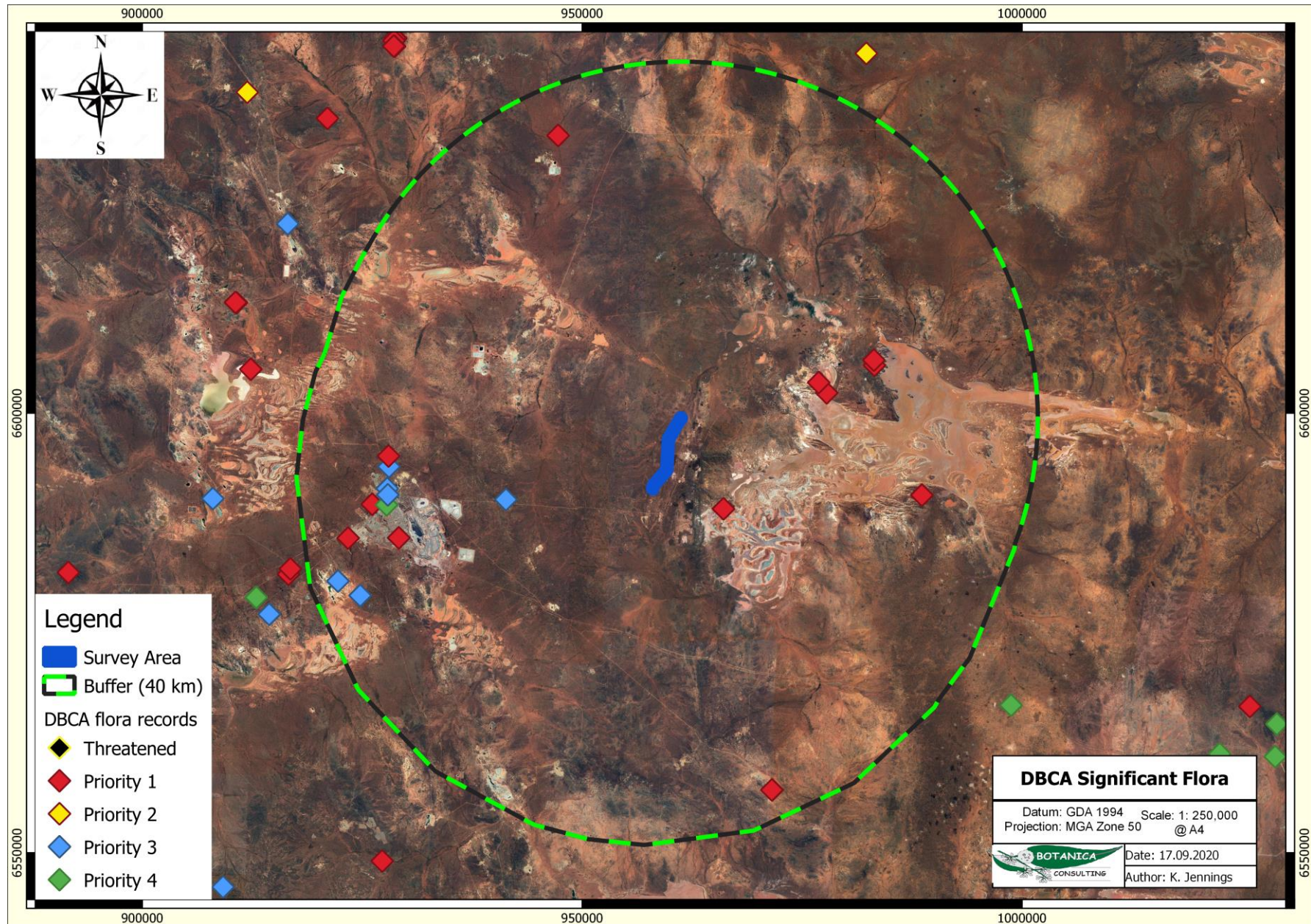


Figure 4-1: DBCA significant flora records

4.1.2 Vegetation

The Pre-European vegetation association dataset (DPIRD, 2018) indicates that the survey area is located completely within the Barlee 20 vegetation association (Figure 4-2). The association description and its remaining extent, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2018) is provided in Table 4-2. Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered” (EPA, 2000). Barlee 20 retains 99.8% of their pre-European extent, of which 13.3% is located within conservation reserves. Development within the survey area will not significantly reduce the extent of pre-European vegetation.

Table 4-2: Pre-European Vegetation Associations within the survey area

Vegetation Association	Current Extent (ha)	Pre-European extent remaining (%)	% in DBCA managed lands	Vegetation Description (Beard, 1990)	Extent within survey area ha (%)
Barlee 20	1,292,475	99.8	13.3	Low woodland; mulga mixed with <i>Casuarina pauper</i> & <i>Eucalyptus</i> sp.	1025 ha (100%)

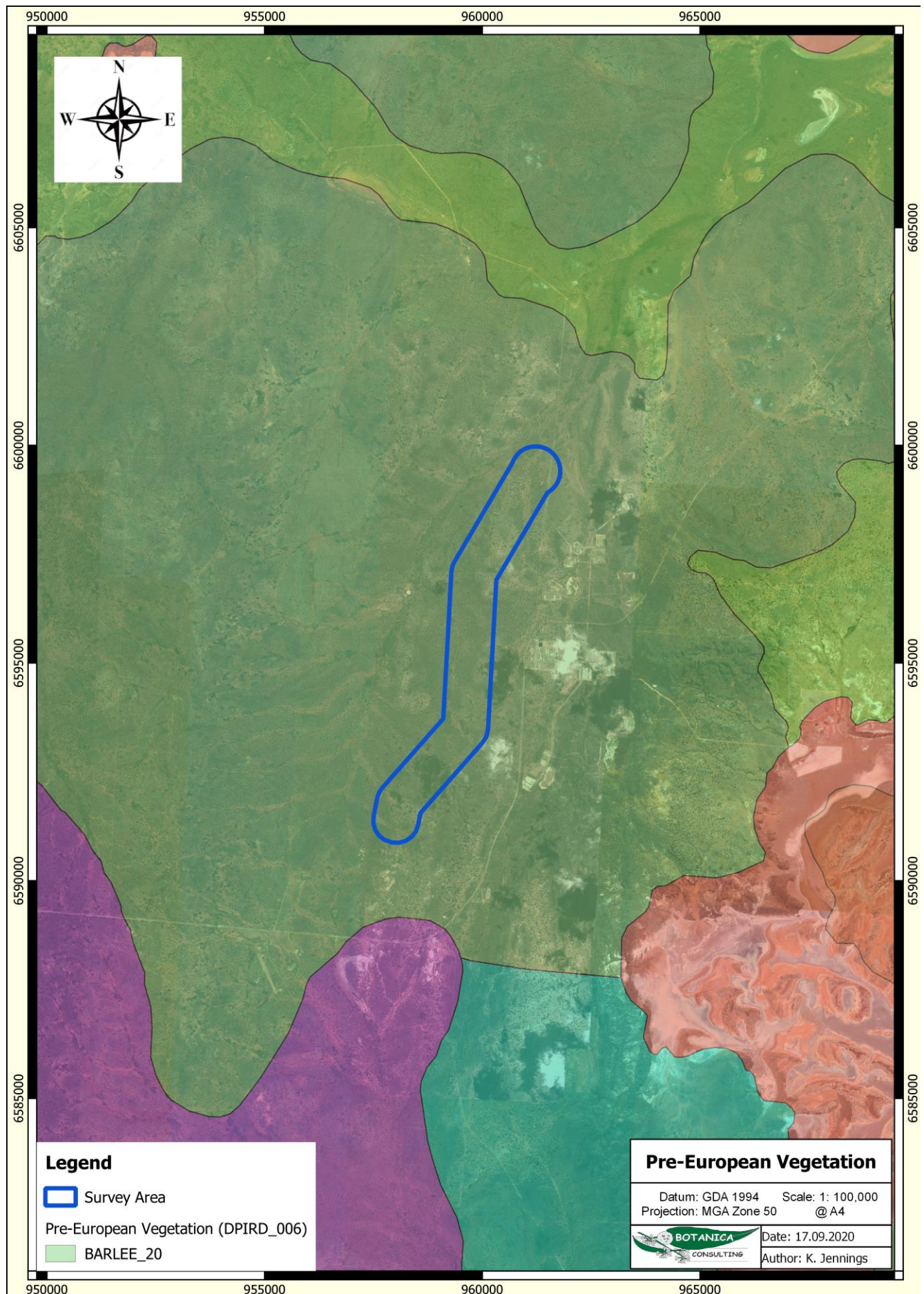


Figure 4-2: Pre-European Vegetation Associations within the survey area

4.1.3 Fauna

According to the results of the NatureMap search (DBCA, 2020), a total of 292 fauna taxa have been recorded within a 40 km radius of the survey area, consisting of 131 bird, 30 mammal, 72 reptile, five amphibian, one fish and 53 invertebrate taxa. This total includes nine introduced (feral) species.

4.1.3.1 Introduced Fauna

The NatureMap and EPBC database searches identified 14 feral species as potentially occurring in the survey area (Table 4-3).

Table 4-3: Potentially Occurring Introduced Fauna

Family	Taxa	Common Name
Bovidae	<i>Bos taurus</i>	European Cattle
	<i>Capra hircus</i>	Goat
	<i>Ovis aries</i>	Sheep
Canidae	<i>Canis lupus familiaris</i>	Domestic Dog
	<i>Vulpus vulpus</i>	Red Fox
Columbidae	<i>Columba livia</i>	Domestic Pigeon
	<i>Streptopelia senegalensis</i>	Laughing Turtle-Dove
Equidae	<i>Equus asinus</i>	Donkey, Ass
	<i>Equus caballus</i>	Horse
Felidae	<i>Felis catus</i>	Cat
Gekkonidae	<i>Hemidactylus frenatus</i>	Asian House Gecko
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit
Motacillidae	<i>Anthus australis</i>	Australian Pipit
Muridae	<i>Mus musculus</i>	House Mouse

4.1.3.2 Conservation Significant Fauna

The desktop review identified 11 fauna species of conservation significance as potentially occurring in the region. In addition, numerous migratory shorebirds were assessed collectively due to their similar habitat requirements. Habitat and distribution data was used to determine the likelihood of occurrence with the assessment identifying two significant fauna species as potentially occurring in the survey area (Table 4-4), including one Threatened species: Malleefowl (*Leipoa ocellata*) (VU) and one other specially protected species; Peregrine Falcon (*Falco peregrinus*) (OS).

The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the survey area and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the survey area. Populations do however persist outside of this area.

- Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the Goldfields region. Populations do however persist outside of this area.
- Unlikely to Occur: The survey area is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the site itself would not support a population or part population of the species.
- Possibly Occurs: Survey area is within the known distribution of the species in question and habitat of at least marginal quality was identified as likely to be present during the field survey and literature review, supported in some cases by recent records being documented in literature from within or near the survey area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- Known to Occur: The species in question has been positively identified as being present (for sedentary species) or as using the survey area as habitat for some other purpose (for non-sedentary/mobile species) during field surveys within or near the survey area. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. tracks, foraging debris, scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

Table 4-4: Likelihood of Occurrence – Fauna Species of Conservation Significance

Species	Conservation Status			Habitat Description	Assessment	Likelihood
	EPBC Act	BC Act	DBCA Priority			
Arid Bronze Azure Butterfly <i>Ogyris subterrestris petrina</i>	CR	CR	-	At the two known extant locations within the Wheatbelt Region, vegetation is mature mixed <i>Eucalyptus salubris</i> / <i>E. salmonophloia</i> woodlands on red-brown loam soils, with an open understorey. In addition to gimlet and salmon gum, other smooth-barked eucalyptus at these sites which have basal ant colonies include <i>E. capilosa</i> subsp. <i>wandoo</i> , <i>E. loxophleba</i> subsp. <i>lissophloia</i> and <i>E. sheathiana</i> . The habitat at the locally extinct Lake Douglas site located within the Goldfields Region differs from the other sites but is also dominated by mature smooth-barked eucalypt woodland, particularly <i>E. concinna</i> . The most critical factor for habitat occupancy by the butterfly is the presence of large colonies of the host ant, <i>Camponotus</i> sp. nr. <i>terebrans</i> (DBCA, 2020b).	Unlikely to occur. Only known to be extant at two locations within the Wheatbelt Region and is presumed extinct at another location within the Goldfields Region (Lake Douglas-approximately 40km south-west of the survey area). Suitable habitat for host ant unlikely to be present. Survey area has been subject to previous mining/ exploration and pastoral disturbance and is unlikely to provide floristically diverse habitat. The survey areas has been subject to soil disturbance which adversely affects the host ant (DotEE, 2015).	Unlikely
Inland Hairstreak/Desert Blue Butterfly <i>Jalmenus aridus</i>	-	-	P4	Acacia shrubland in the eastern goldfields and wheatbelt of WA, favouring young shrubs of the Senna food plant up to 1.5m high and old mature trees of the Acacia food plant up to 4m high, growing in shallow gullies and gentle slopes (Braby, 2016). The larvae feed on the leaves and flowers of <i>Senna nemophila</i> and <i>Acacia tetragonophylla</i> . The caterpillars are attended by the ant species <i>Froggattella kirbii</i> . (ALA, 2020).	Unlikely to occur. Only known from one location near Kalgoorlie (Lake Douglas-approximately 40km south-west of the survey area). Suitable habitat unlikely to be present.	Unlikely
Night Parrot <i>Pezoporus occidentalis</i>	EN	CR	-	Most habitat records are of Triodia (Spinifex) grasslands and/or chenopod shrublands in the arid and semi-arid zones, or <i>Astrebla</i> spp. (Mitchell grass), shrubby samphire and chenopod associations, scattered trees and shrubs, <i>Acacia aneura</i> (Mulga) woodland, treeless areas and bare gibber are associated with sightings of the species. Roosting and nesting sites are consistently reported as within clumps of dense vegetation, primarily old and large Spinifex (<i>Triodia</i>) clumps, but sometimes other vegetation types (DAWE, 2020b).	Would not occur. Very marginal habitat.	Unlikely
Malleefowl <i>Leipoa ocellata</i>	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DAWE, 2020b).	Possibly Occurs. Habitat likely marginal and unsuitable for breeding. Occasional transients only.	Possible
Fork-tailed Swift <i>Apus pacificus</i>	MI	MI	-	Low to very high airspace over varied habitat from rainforest to semi desert (Birdlife Australia, 2019).	Unlikely to occur. Very occasional transients only.	Unlikely

Species	Conservation Status			Habitat Description	Assessment	Likelihood
	EPBC Act	BC Act	DBCA Priority			
Migratory Shorebirds (Various species)	MI	MI		Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland (DAWE, 2020b).	Would not occur. No Suitable Habitat.	Would Not Occur
Peregrine Falcon <i>Falco peregrinus</i>	-	OS	-	The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings (Birdlife Australia, 2018).	Possibly Occurs. Survey area may form part of larger home range but unlikely to breed in area	Possible
Grey Wagtail <i>Motacilla cinerea</i>	MI	MI	-	Running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Morecombe 2004).	Would Not Occur. No suitable habitat.	Would Not Occur
Chuditch, Western Quoll <i>Dasyurus geoffroii</i>	VU	VU		Previously occurred throughout arid and semi-arid Australia but is now restricted to south-west Western Australia. (DAWE, 2020b).	Unlikely to Occur. Considered to be locally extinct.	Unlikely
Central Long-eared Bat <i>Nyctophilus major tor</i>	-	-	P3	<i>Nyctophilus major</i> occurs in the high rainfall southwest region of Western Australia. The trees of the upperstory of its habitat are the large to very tall eucalypt species, karri <i>Eucalyptus diversicolor</i> , jarrah <i>E. marginata</i> , tuart <i>E. gomphocephala</i> , and marri <i>Corymbia calophylla</i> . Other woodland types inhabited by the bat include stands of melaleuca, banksia and sheoak trees of genus <i>Allocasuarina</i> , and include a dense understory.	Unlikely to Occur. Suitable habitat unlikely to be present.	Unlikely
Western Spiny-tailed Skink <i>Egernia stokesii</i> subsp. <i>badia</i>	EN	EN		Occurs in open eucalypt woodlands and Acacia-dominated shrublands in semi-arid to arid areas of south-western WA (Geraldton Sandplains and Yalgoo IBRA) (DEC, 2012)	Would not occur. (current distribution indicates this record is a database error). Never recorded in this area of Goldfields.	Would Not Occur

4.1.4 Conservation Areas

There are no proposed or vested Conservation Reserve located within the survey area.

There are no DBCA managed or interest land located within the survey area.

There are no Environmentally Sensitive Areas located within the survey area.

There are no Nationally Important or RAMSAR wetlands located within the survey area.

The closest significant environmental feature is the Bullock Holes Timber Reserve, which is DBCA-managed land located approximately 7.4 km north of the survey area. Disturbances within the survey area are unlikely to impact this area. A map showing areas of proposed and vested Conservation Reserves and ESA's in relation to the survey area is provided in Figure 4-3.

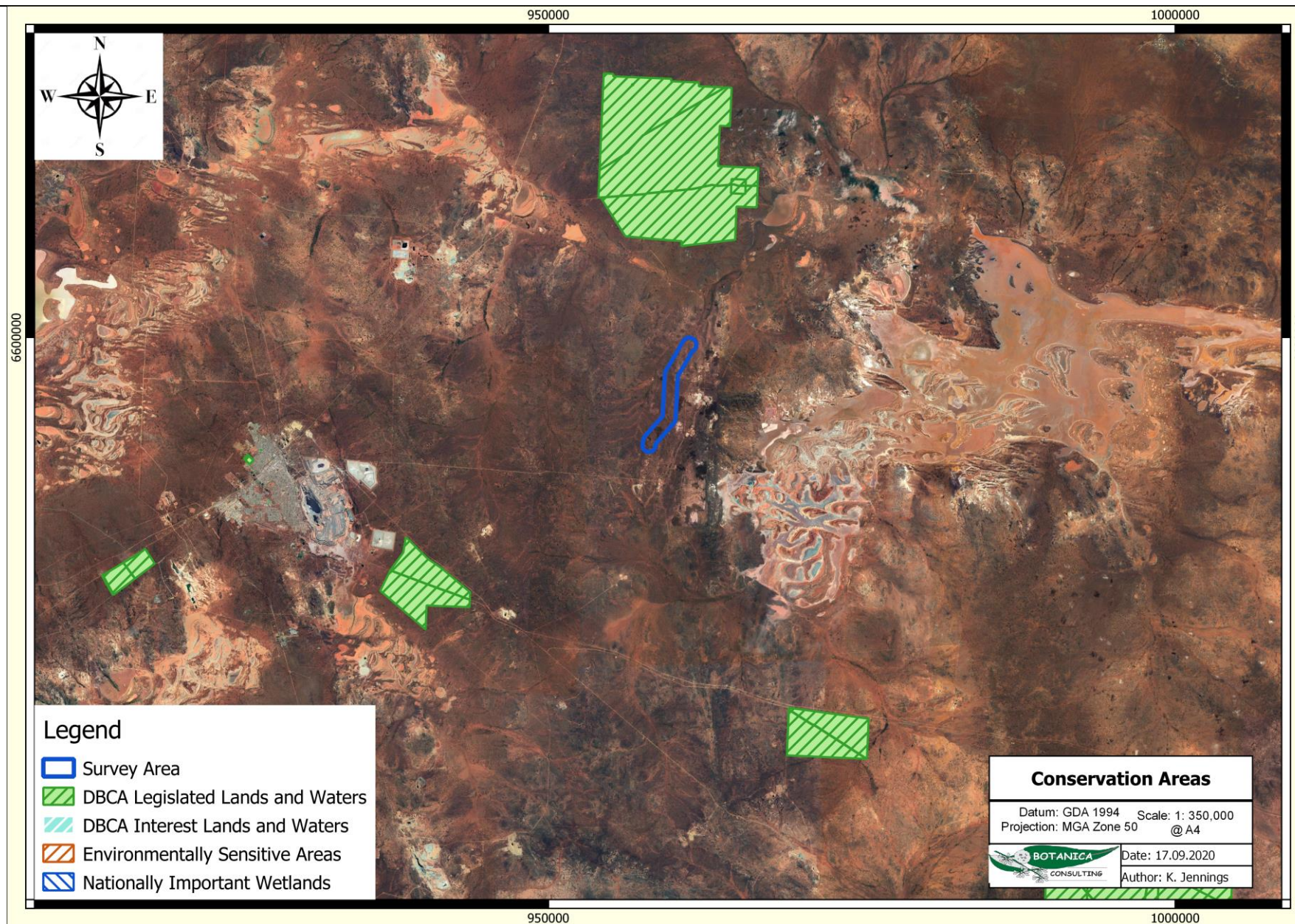


Figure 4-3: Conservation Areas

4.2 Field Assessment

4.2.1 Flora

The field survey identified 89 flora taxa within the survey area, including one introduced (weed) species. These taxa represented 47 genera across 24 families, with the most diverse genera being *Eucalyptus* and *Eremophila* (9 species) followed by *Acacia* (7 species) and *Maireana* (7 species). A list of all species recorded is provided in Appendix 5.

4.2.1.1 Introduced Flora

One species of introduced flora was recorded within the survey area: *Carrichtera annua* (Wards Weed). This species is not listed as a Weed of National Significance or a Declared Pest in Western Australia, and is common throughout the Goldfields region.

4.2.1.2 Significant Flora

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

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



No Threatened, Priority flora species or other significant flora (as described above) were recorded within the survey area.



4.2.2 Vegetation Communities


A total of five vegetation communities were identified within the survey area. Vegetation community description and extent are listed below in Table 4-5 and illustrated spatially in Figure 4-4. Vegetation community descriptions and extents were determined from field survey results, aerial imagery interpretation and extrapolation of the communities identified by Botanica (2019). Floristic species composition for each vegetation community is listed in Appendix 5.

The survey found CLP-EW1 to be the most diverse community, with 58 flora species, and OD-EW1 the least with 19 species. CLP-EW1 was the most widespread community in the survey area, occupying 692 ha (67.5%), while CLP-EW2 was the most restricted, occupying 20 ha (1.9%).

Table 4-5: Vegetation Community Descriptions and Extent

Vegetation Community	Broad Floristic Formation (NVIS III)	Vegetation Description (NVIS V)	Landform	Image
CLP-EW1 (691 ha, 67.4%)	<i>Eucalyptus</i> low open woodland	<i>Eucalyptus salmonophloia</i> low woodland over <i>Eremophila scoparia</i> mid shrubland over <i>Atriplex vesicaria</i> , <i>Olearia muelleri</i> low shrubland.	Clay/loam plain	
CLP-EW2 (20 ha, 2.0%)	<i>Eucalyptus</i> low open woodland	<i>Eucalyptus ravida</i> forest over <i>Atriplex nummularia</i> , <i>Eremophila scoparia</i> mid shrubland over <i>Atriplex vesicaria</i> low shrubland.	Clay/loam plain.	

Vegetation Community	Broad Floristic Formation (NVIS III)	Vegetation Description (NVIS V)	Landform	Image
HS-CFW1 (37 ha, 3.6%)	Casuarina forest.	<i>Casuarina pauper</i> forest over <i>Acacia tetragonophylla</i> mid open shrubland over <i>Dodonaea lobulata</i> low open shrubland.	Hill slope	
HS-EW2 (208 ha, 20.3%)	<i>Eucalyptus</i> mallee woodland	<i>Eucalyptus lesouefii</i> , <i>Eucalyptus griffithsii</i> low woodland over <i>Acacia kalgoorliensis</i> mid shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Westringia rigida</i> low open shrubland.	Hill slope	

Vegetation Community	Broad Floristic Formation (NVIS III)	Vegetation Description (NVIS V)	Landform	Image
OD-EW1 (69 ha, 6.7%)	<i>Eucalyptus</i> low open woodland-	<i>Eucalyptus salmonophloia</i> low open woodland over <i>Eremophila scoparia</i> mid shrubland over <i>Tecticornia</i> <i>disarticulata</i> low samphire shrubland.	Clay/loam plain	

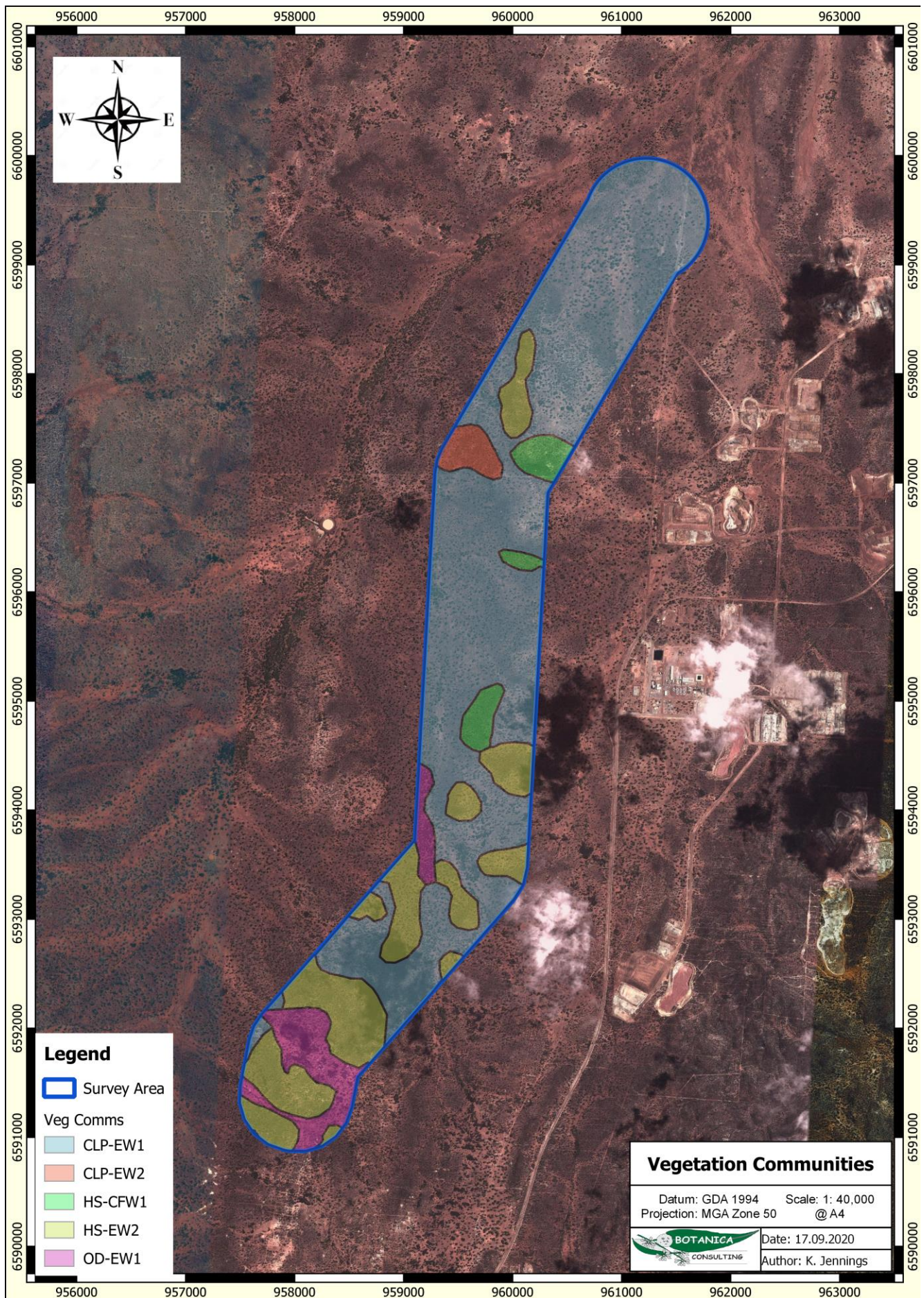


Figure 4-4: Vegetation Communities

4.2.3 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery (1994) and Trudgen, (1988), native vegetation within the survey area was rated as 'good' (Table 4-6; Figure 4-5). 'Good' condition depicts more obvious signs of damage caused by human activity since European settlement, including impacts to vegetation structure and composition such as low levels of grazing and/or slightly aggressive weeds.

Table 4-6: Vegetation Condition within the survey area

Condition Rating	Area (ha)	Area (%)
Good	1025	100.0
Total	1025	100.0

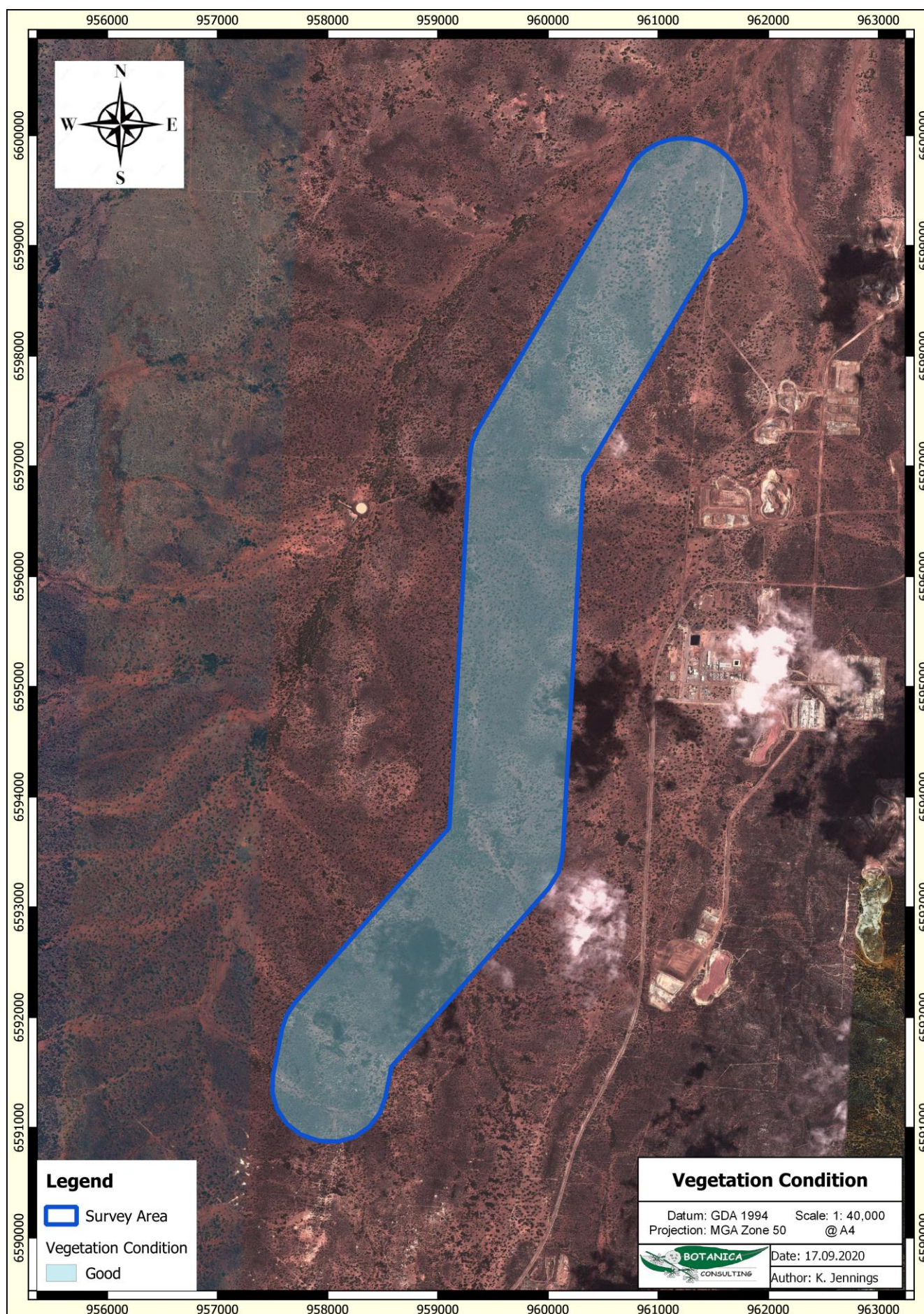


Figure 4-5: Vegetation Condition within the survey area

4.2.4 Significant Vegetation

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) significant vegetation includes:



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

No significant vegetation, including representatives of Threatened or Priority Ecological Communities, was identified within the survey area.

4.2.5 Fauna Habitat

Two broad-scale terrestrial fauna habitats were identified within the survey area, based on vegetation and associated landforms identified during the flora and vegetation assessment. The extent of the identified fauna habitats and a summary description of each are provided in Table 4-7 below. The extent of fauna habitat within the survey area is shown spatially in Figure 4-6.

Table 4-7: Terrestrial Fauna Habitats

Fauna Habitat Description	Example Image
<p><i>Eucalyptus</i> Open Woodland</p> <p>(988 ha, 96.4%)</p>	
<p><i>Casuarina</i> Forest</p> <p>(37.0 ha, 3.6%)</p>	

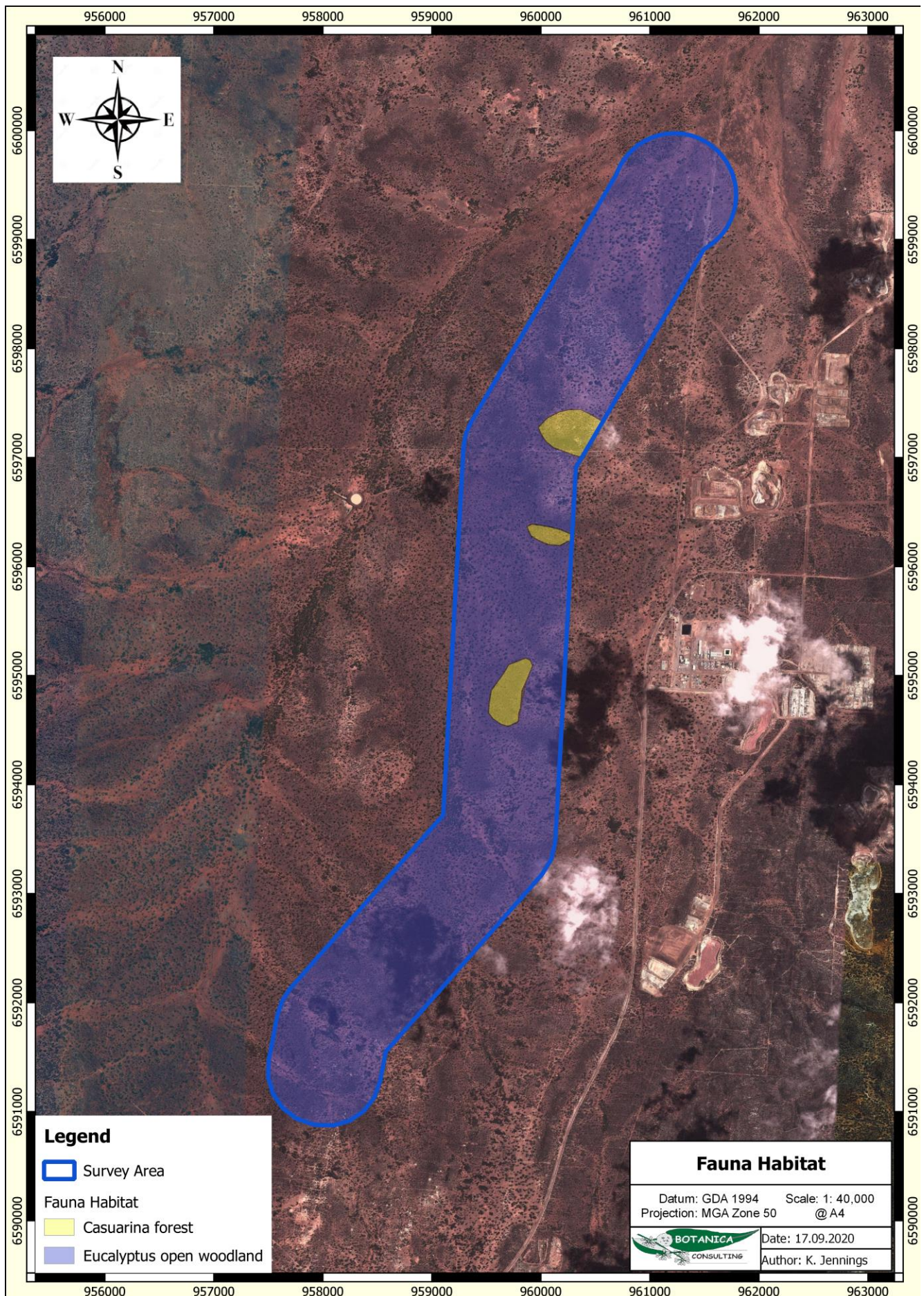


Figure 4-6: Terrestrial Fauna Habitats

4.3 Matters of National Environmental Significance

4.3.1 Significant Fauna

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

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

No evidence of significant fauna species were observed during the survey, including no evidence of Malleefowl nesting mounds or other activity.

The current status of some species on site and/or in the general area is difficult to determine, however, based on the habitats present and, in some cases, direct observations or recent nearby records, the following species of conservation significance can be regarded as possibly utilising the survey area for some purpose at times, these being:

- **Malleefowl *Leipoa ocellata* – Vulnerable (EPBC Act and BC Act)**
This species is occasionally recorded in the general area with the most recent record from 2018. Habitat appears marginal/or unsuitable for breeding, however occasional transients could potentially occur. No evidence of malleefowl activity (inactive or active mounds, tracks, feathers or bird observations etc.) were observed within the survey area. Significant impact unlikely.
- **Peregrine Falcon *Falco peregrinus* – OS (BC Act)**
This species potentially utilises some sections of the survey area as part of a much larger home range, though records in this area are uncommon. It is considered unlikely to breed within the survey area. Significant impact unlikely.

It should be noted that while habitats onsite for one or more of the species listed above are considered possibly suitable, some or all may be marginal in extent/quality and therefore the fauna species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants.

4.3.2 *Environment Protection and Biodiversity Conservation Act 1999*

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

- Nationally threatened flora species;
- World heritage properties;

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

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

4.4 Matters of State Environmental Significance

4.4.1 Environmental Protection Act WA 1986

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

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

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

4.4.2 Biodiversity Conservation Act 2016

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

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

- a) it is critical to the survival of a threatened species or a threatened ecological community; and

- b) its listing is otherwise in accordance with the ministerial guidelines.

No threatened species or critical habitat listed under the BC Act were recorded within the survey area.

4.5 Native Vegetation Clearing Principles

Based on the outcomes from the survey undertaken, Botanica assessed the results of the desktop and field survey with regards to the native vegetation clearing principles listed under Schedule 5 of the EP Act (

Table 4-8). The assessment found that the proposed vegetation clearing activities may be at variance with clearing principle (f).

Table 4-8: Assessment against native vegetation clearing principles

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
(a)	comprises a high level of biological diversity.	<p>The survey area is located within the Eastern Murchison subregion of the Murchison Bioregion and in close proximity to the Eastern Goldfields subregion of the Coolgardie Bioregion. The Eastern Murchison subregion comprises the northern parts of the craton's Southern Cross and Eastern Goldfields Terrains and is characterised by internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt Lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaways complexes as well as red sandplains are widespread. Vegetation is dominated by Mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and Samphire shrublands (McKenzie et. al., 2002).</p> <p>The Eastern Goldfields subregion comprises gently undulating plains interrupted in the west by low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying strata are eroded flat and covered with Tertiary sand and gravel soils, scattered exposures of bedrock, and plains of calcareous earths (Cowan, 2001). The region has an arid to semi-arid Warm Mediterranean climate (Cowan, 2001).</p> <p>The vegetation within the survey area is mapped as belonging to Beard vegetation associations Barlee 20 of the Eastern Murchison subregion which retains over 99% of the original vegetation extent within Western Australia and the Eastern Murchison subregion.</p> <p>A total of five vegetation types were identified within the area. Vegetation identified within the survey area is not considered to be of high biological diversity and is well represented outside of the survey area.</p> <p>The survey area does not occur within any mapped Priority Ecological Communities (PECs), Threatened Ecological Communities (TECs) or associated buffer zones and does not contain any Banded Ironstone Formations.</p> <p>No Threatened Flora taxa listed under the BC Act and EPBC Act are located within the survey area. No Priority Flora taxa were identified within the survey area.</p>	Clearing is unlikely to be at variance to this principle
(b)	comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	No significant fauna were observed within the survey area. Majority of the survey area comprises of broad fauna habitats that are typical of those in the wider region. No water bodies (both perennial/ non-perennial) occur within the survey area.	Clearing is unlikely to be at variance to this principle
(c)	includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act were identified within the survey area.	Clearing is not at variance to this principle

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
(d)	comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No TEC listed under the EPBC Act or by the BC Act occur within the survey area.	Clearing is not at variance to this principle
(e)	is significant as a remnant of native vegetation in an area that has been extensively cleared	The survey area occurs within the pre-European Beard vegetation association Barlee 20, which retains >99% of their original pre-European vegetation extent.	Clearing is unlikely to be at variance to this principle
(f)	is growing, in, or in association with, an environment associated with a watercourse or wetland	There are no inland waters (lakes/ playas) or permanent drainage lines within the survey area. Multiple minor ephemeral drainage lines intersect the survey area which were mostly associated with vegetation community OD-EW1, which accounts for 6.7% of the survey area.	Clearing may be at variance to this principle
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The survey area occurs within the pre-European vegetation association of Barlee 20, which retains >99% of its original pre-European vegetation extent. Clearing within the survey area is not likely to lead to land degradation issues such as salinity, water logging or acidic soils.	Clearing is unlikely to be at variance to this principle
(h)	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The survey area is not located within a conservation area. The closest conservation reserve is the Bullock Holes Timber Reserve, which located approximately 7.4 km of the survey area. Given the distance from the survey area, impacts to the environmental values of this conservation reserve are unlikely.	Clearing is unlikely to be at variance to this principle
(i)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	There are no inland waters (lakes/ playas) or permanent drainage lines within the survey area. Development is not expected to impact surface or groundwater quality.	Clearing is unlikely to be at variance to this principle
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding	Rainfall of the Eastern Murchison and Eastern Goldfields subregion has an average rainfall of 200-300mm and an evaporation rate of 2400 mm. The Murchison and Coolgardie region has an arid to semi-arid warm Mediterranean climate, receiving a majority of its rainfall during winter months. Rainfall data for Kalgoorlie-Boulder indicates that rainfall is spread throughout the year and rainfall events are unlikely to result in localised flooding. There are no permanent drainage lines within the survey area. Clearing within the survey area is not likely to increase the incidence or intensity of flooding within the survey area or surrounds.	Clearing is unlikely to be at variance to this principle

5 **BIBLIOGRAPHY**

- Atlas of Living Australia (2020b): *Jalmenus aridus: Inland Hairstreak*, <https://bie.ala.org.au/species/urn:lsid:biodiversity.org.au:afd.taxon:5551a54a-2ff6-49c7-9b26-62f2484449b5>, viewed 17/09/2020.
- Beard, J.S., (1990). *Plant Life of Western Australia*, Kangaroo Press Pty Ltd, NSW.
- BoM, (2020a). *Kalgoorlie-Boulder Airport Climate Data*, Bureau of Meteorology.
Available: <http://www.bom.gov.au/climate>
- BoM (2020b). *Groundwater Dependent Ecosystems Atlas*. Bureau of Meteorology
Available: <http://www.bom.gov.au/water/groundwater/gde/map.shtml>
- Botanica Consulting (2019): *Reconnaissance Flora/Vegetation & Fauna Survey Bulong Gold Project, version 1*. Unpublished report prepared on behalf of Black Cat Syndicate Ltd. August 2019.
- Cowan, M. (2001a). *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2001; Eastern Murchison (MUR1 –Eastern Murchison subregion) pp 466-479*, Department of Conservation and Land Management, September 2001
- Cowan, M. (2001b). *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2001; Coolgardie 3 (COO3 –Eastern Goldfields subregion) pp 156-169*, Department of Conservation and Land Management, August 2001
- DAFWA (2014). *Soil Landscape System of Western Australia*, Department of Agriculture and Food Western Australia
- DAWE (2020a). *Protected Matters Search Tool, Environment Protection and Biodiversity Conservation Act 1999*, Department of Agriculture, Water and Environment, Australian Government.
- DAWE (2020b). *Species Profile and Threats Database*, Department of Agriculture, Water and Environment, Australian Government.
- DBCA (2017). *Priority Ecological Communities for Western Australia Version 27*, Species and Community Branch, 30 June 2017.
- DBCA (2018). *2018 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis)*. Department of Biodiversity, Conservation and Attractions.
- DBCA (2019). *Priority/ Threatened Flora Database Search*. Obtained from Department of Biodiversity, Conservation and Attractions.
- DBCA (2020). *NatureMap Database search*, Department of Biodiversity, Conservation and Attractions.
- DBCA (2020b). *Guidelines for the survey of arid bronze azure butterfly (ABAB) in Western Australia*. Department of Biodiversity, Conservation and Attractions.
- DotEE (2012). *Interim Biogeographic Regionalisation for Australia (IBRA)*, Version 7, Department of the Environment and Energy.
- DotEE (2017). *National Vegetation Information System (NVIS) Major Vegetation Groups, Version 4.2*, Department of the Environment and Energy.
- DPIRD (2019). *Pre-European Vegetation (DPIRD_006)* Department of Primary Industries and Regional Development, Western Australia, 24 July 2019
- DPIRD (2020). *Declared Organism-database search*, Department of Primary Industries and Regional Development, Western Australia.
Available: <http://www.biosecurity.wa.gov.au/>
- EPA, (2000). *Position Statement No. 2 Environmental Protection of Native Vegetation in Western Australia*, Environmental Protection Authority

- EPA (2016a). *Technical Guide - Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016*. Environmental Protection Authority.
- EPA (2016b). *Environmental Factor Guideline for Flora and Vegetation – December 2016*. Environmental Protection Authority.
- EPA (2020). *Technical Guide – Terrestrial Fauna Surveys for Environmental Impact Assessment – June 2020*. Environmental Protection Authority.
- Geoscience Australia (2015). *Surface Hydrology GIS*. Australian Government.
- Government of Western Australia, (2019): *Soil Landscape Mapping – Systems (DPIRD-064)*, mapping shapefiles obtained from data.wa.gov.au, last updated June 27, 2019
- Keighery, B. J., (1994). *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands.
- Tille, P. (2006). *Soil Landscapes of Western Australia's Rangelands and Arid Interior*, Department of Agriculture and Food Western Australia
- WAHERB, (2020). *Florabase – Information on the Western Australian Flora*, Department of Biodiversity, Conservation and Attractions. Available: <https://florabase.dpaw.wa.gov.au/>

Appendix 1: Conservation Ratings BC Act and EPBC Act

Definitions of Conservation Significant Species

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

Code	Category
	Published as migratory birds protected under an international agreement under schedule 5 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
CD	Species of special conservation interest Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
OS	Other specially protected species Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> .
Priority species Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.	
P1	Priority 1: Poorly-known species Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Priority 2: Poorly-known species Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority 3: Poorly-known species Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	Priority 4: Rare, Near Threatened and other species in need of monitoring (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Commonwealth categories of threatened species	
EX	Extinct Taxa where there is no reasonable doubt that the last member of the species has died.
EW	Extinct in the Wild Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CR	Critically Endangered Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
EN	Endangered

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

Definitions of Conservation Significant Communities

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

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

Appendix 2: Significant Flora Likelihood Assessment

Taxon	Status			Habitat	Assessment	Likelihood
	EPBC Act	BC Act	DBCA			
<i>Tecticornia flabelliformis</i>	VU	VU	Priority 1	Salt Lake	Would not be present, no habitat expected.	Unlikely
<i>Austrostipa</i> sp. Carlingup Road	-	-		-	Little-known, sparse records in region.	Unlikely
<i>Eremophila arachnoides</i> subsp. <i>tenera</i>	-	-		-	Several records in region.	Possible
<i>Ptilotus procumbens</i>	-	-		Red Clay	Habitat may be present.	Possible
<i>Ptilotus rigidus</i>	-	-		-	Little-known, sparse records in region.	Unlikely
<i>Rhodanthe uniflora</i>	-	-		Brown earth. Open eucalyptus woodland.	Sparse records in region.	Unlikely
<i>Elachanthus pusillus</i>	-	-	Priority 2	-	Little-known, records in region.	Possible
<i>Eremophila praecox</i>	-	-		Red/brown sandy loam. Undulating plains.	Habitat may be present.	Possible
<i>Alyxia tetanifolia</i>	-	-	Priority 3	Sandy clay, loam, concretionary gravel. Drainage lines, near lakes.	Marginal habitat, sparse records in region.	Unlikely
<i>Angianthus prostratus</i>	-	-		Red clay or loamy soils. Saline depressions.	Would not be present, no habitat expected.	Unlikely
<i>Cyathostemon verrucosus</i>	-	-		Hillslopes of Red Hill, Kambalda	Would not be present, no habitat expected.	Unlikely
<i>Lepidium fasciculatum</i>	-	-		-	Little-known, sparse records in region.	Unlikely
<i>Melaleuca coccinea</i>	-	-		Sandy loam over granite. Granite outcrops, sandplain, river valleys.	Habitat unlikely to be present.	Unlikely
<i>Eucalyptus x brachyphylla</i>	-	-	Priority 4	Sandy loam. Granite outcrops.	Habitat unlikely to be present.	Unlikely
<i>Frankenia glomerata</i>	-	-		White sand. Creeklines.	Marginal habitat, sparse records in region.	Unlikely

Appendix 3: Potentially Occurring Introduced (Weed) Flora Species

Family	Taxon	Common Name	WAOL Status	Control Category	WONS
Aizoaceae	<i>Aizoon pubescens</i>	-	Permitted - s11		No
	<i>Mesembryanthemum crystallinum</i>	Iceplant	Permitted - s11		No
	<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant	Permitted - s11		No
Apocynaceae	<i>Asclepias curassavica</i>	Redhead Cottonbush	Permitted - s11		No
	<i>Orbea variegata</i>	-	Permitted - s11		No
Asparagaceae	<i>Agave americana</i>	Century Plant	Permitted - s11		No
Asteraceae	<i>Arctotheca calendula</i>	Cape Weed, African Marigold	Permitted - s11		No
	<i>Carduus tenuiflorus</i>	Slender Thistle, Winged Slender Thistle, Sheep Thistle	Permitted - s11		No
	<i>Carthamus lanatus</i>	Saffron Thistle	Permitted - s11		No
	<i>Centaurea melitensis</i>	Maltese Cockspur, Malta Thistle	Permitted - s11		No
	<i>Cichorium intybus</i>	Chicory	Permitted - s11		No
	<i>Conyza bonariensis</i>	Flatleaf Fleabane	Permitted - s11		No
	<i>Gazania linearis</i>	-	Permitted - s11		No
	<i>Helianthus annuus</i>	Sunflower, Common Sunflower	Permitted - s11		No
	<i>Lactuca serriola</i> forma <i>serriola</i>	-	Permitted - s11		No
	<i>Leontodon rhagadioloides</i>	-	Permitted - s11		No
	<i>Monoculus monstrosus</i>	-	Permitted - s11		No
	<i>Oligocarpus calendulaceus</i>	-	Permitted - s11		No
	<i>Oncosiphon suffruticosus</i>	Calomba Daisy	Permitted - s11		No
	<i>Sonchus oleraceus</i>	Common Sowthistle	Permitted - s11		No
	<i>Symphytotrichum squamatum</i>	Bushy Starwort	Permitted - s11		No
Boraginaceae	<i>Buglossoides arvensis</i>	Corn Gromwell	Permitted - s11		No
	<i>Echium plantagineum</i>	Paterson's Curse	Declared Pest - s22(2)	No Control Category, Whole of State	No
	<i>Heliotropium europaeum</i>	Common Heliotrope	Permitted - s11		No
	<i>Heliotropium supinum</i>	Prostrate Heliotrope	Permitted - s11		No
Brassicaceae	<i>Alyssum linifolium</i>	Flax-leaf Alyssum	Permitted - s11		No
	<i>Brassica tournefortii</i>	Mediterranean Turnip	Permitted - s11		No

Family	Taxon	Common Name	WAOL Status	Control Category	WONS
	<i>Capsella bursa-pastoris</i>	Shepherd's Purse	Permitted - s11		No
	<i>Carrichtera annua</i>	Ward's Weed	Permitted - s11		No
	<i>Sisymbrium erysimoides</i>	Smooth Mustard	Permitted - s11		No
	<i>Sisymbrium irio</i>	London Rocket	Permitted - s11		No
	<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Permitted - s11		No
Cactaceae	<i>Cylindropuntia fulgida var mamillata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Cylindropuntia imbricata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Cylindropuntia kleiniae</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Eolophus roseicapillus</i>	-	Declared Pest - s22(2)	Exempt, Whole of State	No
	<i>Opuntia elata</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Opuntia ficus-indica</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
Caryophyllaceae	<i>Spergularia diandra</i>	Lesser Sand Spurry	Permitted - s11		No
Chenopodiaceae	<i>Chenopodium album</i>	Fat Hen	Permitted - s11		No
	<i>Chenopodium murale</i>	Nettle-leaf Goosefoot	Permitted - s11		No
Cucurbitaceae	<i>Citrullus colocynthis</i>	-	Permitted - s11		No
	<i>Cucumis myriocarpus</i> subsp. <i>myriocarpus</i>	-	Permitted - s11		No
Fabaceae	<i>Alhagi maurorum</i>	-	Declared Pest - s22(2)	C3 Management, Whole of State	No
	<i>Erythrostemon gilliesii</i>	-	Permitted - s11		No
	<i>Medicago laciniata</i>	Cut leaf Medic	Permitted - s11		No
	<i>Medicago minima</i>	Small Burr Medic	Permitted - s11		No
	<i>Medicago polymorpha</i>		Permitted - s11		No

Family	Taxon	Common Name	WAOL Status	Control Category	WONS
Geraniaceae	<i>Erodium cicutarium</i>	Common Storksbill	Permitted - s11		No
Lamiaceae	<i>Salvia reflexa</i>	Mintweed	Permitted - s11		No
	<i>Salvia verbenaca</i>	Wild Sage	Permitted - s11		No
Malvaceae	<i>Malva parviflora</i>	Marshmallow	Permitted - s11		No
Martyniaceae	<i>Proboscidea louisianica</i>	Purple Flower Devil's Claw	Declared Pest, Prohibited - s12	C1 Exclusion, Whole of State	No
Oxalidaceae	<i>Oxalis bowiei</i>	Bowie Wood Sorrel	Permitted - s11		No
	<i>Oxalis pes-caprae</i>	Soursob	Permitted - s11		No
Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	-	Permitted - s11		No
Poaceae	<i>Bromus catharticus</i>	Prairie Grass	Permitted - s11		No
	<i>Bromus diandrus</i>	Great Brome	Permitted - s11		No
	<i>Cenchrus ciliaris</i>	Buffel Grass	Permitted - s11		No
	<i>Cenchrus setaceus</i>	Fountain Grass	Permitted - s11		No
	<i>Ehrharta villosa</i>	Pyp Grass	Permitted - s11		No
	<i>Hordeum glaucum</i>	Northern Barley Grass	Permitted - s11		No
	<i>Hordeum leporinum</i>	Barley Grass	Permitted - s11		No
	<i>Rostraria pumila</i>	-	Permitted - s11		No
	<i>Schismus arabicus</i>	Araby Grass	Permitted - s11		No
	<i>Schismus barbatus</i>	Kelch Grass	Permitted - s11		No
	<i>Sorghum halepense</i>	Johnson Grass	Permitted - s11		No
Polygonaceae	<i>Polygonum aviculare</i>	Wireweed	Permitted - s11		No
	<i>Rumex vesicarius</i>	Ruby Dock	Permitted - s11		No
Primulaceae	<i>Lysimachia arvensis</i>	Pimpernel	Permitted - s11		No
Resedaceae	<i>Reseda luteola</i>	Wild Mingnonette	Permitted - s11		No
Solanaceae	<i>Datura ferox</i>	Fierce Thornapple	Permitted - s11		No
	<i>Datura inoxia</i>	Australian Boxthorn	Permitted - s11		No
	<i>Lycium australe</i>		Permitted - s11		No
	<i>Nicotiana glauca</i>	Tree Tobacco	Permitted - s11		No
	<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	-	Permitted - s11		No
	<i>Solanum nigrum</i>	Black Berry Nightshade	Permitted - s11		No
Urticaceae	<i>Urtica urens</i>	Small Nettle	Permitted - s11		No
Verbenaceae	<i>Phyla canescens</i>	-	Permitted - s11		No
Zygophyllaceae	<i>Tribulus terrestris</i>	Caltrop	Permitted - s11		No

Appendix 4: Vegetation Condition Rating

Vegetation Condition Rating	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	N/A
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.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
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.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
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.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	N/A	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
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.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
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.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix 5: List of species identified within each vegetation type

(A) denotes annual taxa; (W) denotes introduced taxa

Family	Taxon	CLP-EW1	CLP-EW2	OD-EW1	HS-CFW1	HS-MWS1
Amaranthaceae	<i>Ptilotus aeroides</i> (A)				*	*
	<i>Ptilotus holosericeus</i> (A)		*			*
	<i>Ptilotus obovatus</i>	*	*		*	*
	<i>Ptilotus exaltatus</i> (A)		*	*		*
Apocynaceae	<i>Alyxia buxifolia</i>	*				*
	<i>Marsdenia australis</i>		*			
Asparagaceae	<i>Thysanotus manglesianus</i>	*				
Asteraceae	<i>Erymophyllum ramosum</i> (A)	*	*			*
	<i>Waitzia fitzgibbonii</i> (A)	*			*	
	<i>Rhodanthe floribunda</i> (A)	*				*
	<i>Cratystylis conocephala</i>		*		*	
	<i>Cratystylis microphylla</i>	*				
	<i>Olearia muelleri</i>	*		*	*	*
	<i>Olearia pimeleoides</i>					*
	<i>Senecio glossanthus</i>	*		*		
Boraginaceae	<i>Halgania andromedifolia</i>	*			*	*
Brassicaceae	<i>Carrichtera annua</i> (W)	*	*	*		
Casuarinaceae	<i>Casuarina pauper</i>			*	*	*
Chenopodiaceae	<i>Atriplex nummularia</i> subsp. <i>spathulata</i>		*		*	*
	<i>Enchylaena lanata</i>	*			*	
	<i>Atriplex holocarpa</i>	*		*		
	<i>Atriplex vesicaria</i>	*	*			
	<i>Maireana amoena</i>	*	*		*	
	<i>Maireana georgei</i>	*	*			
	<i>Maireana oppositifolia</i>	*	*			
	<i>Maireana pentatropis</i>				*	
	<i>Maireana sedifolia</i>	*	*			
	<i>Maireana trichoptera</i>	*	*		*	*
	<i>Maireana triptera</i>	*		*		
	<i>Rhagodia eremaea</i>	*	*			
	<i>Sclerolaena diacantha</i>	*	*			
	<i>Sclerolaena drummondii</i>	*	*			
	<i>Sclerolaena eriacantha</i>			*		
	<i>Sclerolaena parviflora</i>		*			
	<i>Tecticornia disarticulata</i>	*				
Fabaceae	<i>Acacia acuminata</i>	*				
	<i>Acacia erinacea</i>		*		*	
	<i>Acacia hemiteles</i>	*	*			*
	<i>Acacia jennerae</i>	*				*
	<i>Acacia kalgoorliensis</i>				*	*
	<i>Acacia oswaldii</i>	*				*
	<i>Acacia tetragonophylla</i>	*	*		*	
	<i>Glycyrrhiza acanthocarpa</i>	*				*
	<i>Senna artemisioides</i> subsp. <i>filifolia</i>	*	*			*
Frankeniaceae	<i>Frankenia setosa</i>		*	*		
Goodeniaceae	<i>Scaevola spinescens</i>		*		*	*

Family	Taxon	CLP-EW1	CLP-EW2	OD-EW1	HS-CFW1	HS-MWS1
Lamiaceae	<i>Prostanthera grylloana</i>				*	
	<i>Westringia rigida</i>			*	*	*
Myrtaceae	<i>Eucalyptus celastroides</i>	*	*			*
	<i>Eucalyptus griffithsii</i>	*				*
	<i>Eucalyptus lesouefii</i>	*		*		*
	<i>Eucalyptus ravida</i>	*	*	*		
	<i>Eucalyptus salmonophloia</i>	*	*	*		
	<i>Eucalyptus salubris</i>	*	*			
	<i>Eucalyptus stricklandii</i>	*				*
	<i>Eucalyptus torquata</i>					*
	<i>Eucalyptus transcontinentalis</i>	*	*			*
	<i>Melaleuca sheathiana</i>					*
	<i>Melaleuca lateriflora</i>				*	*
Nyctaginaceae	<i>Boerhavia coccinea</i>					*
Pittosporaceae	<i>Pittosporum angustifolium</i>	*	*			
Poaceae	<i>Austrostipa elegantissima</i>	*	*			*
	<i>Aristida contorta</i> (A)					*
	<i>Triodia scariosa</i>					*
	<i>Enteropogon ramosus</i>	*			*	*
Portulacaceae	<i>Calandrinia eremaea</i>				*	
Proteaceae	<i>Grevillea acuaria</i>	*			*	
	<i>Grevillea nematophylla</i>	*	*			*
Rutaceae	<i>Philotheca brucei</i>					*
Santalaceae	<i>Exocarpos aphyllus</i>	*	*			*
	<i>Santalum spicatum</i>	*	*		*	*
	<i>Santalum acuminatum</i>	*	*			
Sapindaceae	<i>Alectryon oleifolius</i>	*				*
	<i>Dodonaea lobulata</i>				*	
Scrophulariaceae	<i>Eremophila clarkei</i>	*			*	*
	<i>Eremophila dempsteri</i>	*	*			*
	<i>Eremophila decipiens</i>	*	*	*		
	<i>Eremophila glabra</i>		*			
	<i>Eremophila interstans</i> subsp. <i>virgata</i>	*	*			*
	<i>Eremophila parvifolia</i>	*	*			*
	<i>Eremophila scoparia</i>		*	*		*
	<i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i>				*	*
Solanaceae	<i>Eremophila pustulata</i>				*	*
	<i>Lycium australe</i>	*		*		
	<i>Solanum nummularium</i>	*		*		
	<i>Solanum lasiophyllum</i>	*				
Thymelaeaceae	<i>Solanum plicatile</i>			*	*	
	<i>Pimelea microcephala</i>	*				
Zygophyllaceae	<i>Roepera eremaea</i> (A)	*	*	*		*
Total Species		58	42	19	28	47