



HASTINGS
Technology Metals Limited

APPENDIX 1-1

Flora and Vegetation Report



YANGIBANA PROJECT BIOLOGICAL ASSESSMENT: FLORA AND VEGETATION

Hastings Rare Metals Ltd

ecoscape

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Yangibana Project Biological Assessment: Flora and Vegetation

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TABLE OF CONTENTS

Acknowledgements	1
Acronyms and Abbreviations	1
Summary	2
1.0 Introduction	3
1.1 ... Project Overview	3
1.1.1.... Study Area Location.....	3
1.2 ... Project Objectives	3
1.3 ... Legislation and Policies.....	5
1.4 ... Permits	5
1.5 ... Previous Surveys	5
2.0 Existing Environment	6
2.1 ... Physical Environment.....	6
2.1.1.... Climate	6
2.1.2.... Geology	7
2.1.3.... Land Systems.....	7
2.1.4.... Drainage.....	8
2.2 ... Land Use	9
2.3 ... Biological Environment.....	9
2.3.1.... Biogeographical Region	9
2.3.2.... Flora	9
2.3.3.... Vegetation	12
3.0 Methods	16
3.1 ... Flora and Vegetation Assessment	16
3.1.1.... Reconnaissance Survey.....	16
3.1.2.... Level 2 Flora and Vegetation Survey	16
3.2 ... Flora and Vegetation Significance.....	20
3.2.1.... Determination of Flora Significance	20
3.2.2.... Conservation Significant Flora Likelihood Assessment	20
3.2.3.... Determination of Vegetation Significance	20
3.3 ... Adequacy of Sampling	21
4.0 Results	22
4.1 ... Flora Assessment.....	22
4.1.1.... Flora Inventory	22
4.1.2.... Conservation Significant Flora	22
4.1.1.... Other Significant Flora.....	28
4.1.2.... Introduced Flora	30
4.2 ... Vegetation Types	40
4.2.2.... Vegetation Significance.....	53
4.2.3.... Vegetation Condition	54

4.3 ... Adequacy of Sampling	55
4.3.1.... Species Accumulation Curve	55
4.4 ... Botanical Limitations	56
5.0 .Discussion	57
5.1 ... Flora Significance	57
5.1.1.... Conservation Significant Flora	57
5.1.2.... Other Significant Flora.....	60
5.1.3.... Introduced Flora	60
5.2 ... Vegetation Significance.....	61
5.2.1.... Vegetation Types	61
5.2.2.... Threatened Ecological Communities	61
5.2.3.... Priority Ecological Communities.....	61
5.2.4.... Groundwater Dependent Ecosystems	61
5.2.5.... 'Ecosystems at Risk'	61
5.2.1.... Other Significant Vegetation	62
5.2.2.... Vegetation Similarity to Nearby Areas	62
5.2.3.... Floristic Analysis.....	62
5.3 ... Vegetation Condition.....	63
6.0 .Conclusions	64
References	65
Maps.....	70
Appendix One: Definitions and Criteria	87
Appendix Two: Desktop Assessment Results	97
Appendix Three: Floristic Quadrat Data.....	103
Appendix Four: Flora Inventory	330
Appendix Five: Site x Species Table	336
Appendix Six: Conservation Significant Flora	353
Appendix Seven: Threatened and Priority Flora Report Forms	360
Appendix Eight: Floristic Analysis Dendrogram.....	400
Appendix Nine: Conservation Significant Flora Likelihood Assessment	402

TABLE OF FIGURES

Figure 1: Regional location.....	4
Figure 2: Monthly rainfall and daily maxima and minima for Mt Phillip (BoM 2015b)	7
Figure 3: 2014/2015 rainfall preceding the survey phases at Mount Phillip (BoM 2015b).....	19
Figure 4: Species accumulation curve.....	55

Figure 5: <i>NatureMap</i> (DPaW 2007-2015) search area	100
Figure 6: <i>Atlas of Living Australia Spatial Search</i> (ALA 2015b); search area and threatened species results	101

TABLE OF TABLES

Table 1: Land system descriptions (Wilcox & McKinnon 1972)	8
Table 2: Extent of land systems within the study area and regional representation (Wilcox & McKinnon 1972)	8
Table 3: Vegetation associations within the Gascoyne bioregion (Government of Western Australia 2013)	13
Table 4: Summary of conservation significant flora	23
Table 5: Range extensions recorded in the study area	28
Table 6: Weed classification categories	31
Table 7: Vegetation types and their extents within the study area	40
Table 8: Vegetation condition summary	55
Table 9: Botanical limitations	56
Table 10: <i>EPBC Act 1999</i> categories for flora and fauna (Commonwealth of Australia 1999)	87
Table 11: Conservation codes for Western Australian flora and fauna (DPaW 2015; Jones 2015)	88
Table 12: IUCN Red List Categories and Criteria (IUCN 2012)	90
Table 13: <i>EPBC Act</i> categories for TECs (Commonwealth of Australia 1999)	91
Table 14: DPaW definitions and criteria for TECs and PECs (DEC 2010)	92
Table 15: NVIS structural formation (terrestrial vegetation) (NHT 2003)	95
Table 16: NVIS height classes (NHT 2003)	96
Table 17: Trudgen (1991) Vegetation Condition Scale	96
Table 18: Geological units within the study area (Department of Mines and Petroleum 2002; 2007)	97
Table 19: Combined flora database search results	99
Table 20: Conservation significant flora details	102
Table 21: Site x species table	337
Table 22: Conservation significant flora locations (GDA 94, Zone 50K)	353
Table 23: Conservation Significant Flora likelihood assessment	403

TABLE OF MAPS

Map 1: Geology	71
Map 2: Land systems	71
Map 3: Database search results	71

Map 4: Pre-European vegetation.....	71
Map 5: Survey effort	71
Map 6: Conservation significant flora	71
Map 7: Introduced flora.....	71
Map 8: Vegetation types	71
Map 9: Vegetation condition	71

TABLE OF PLATES

Plate 1: <i>Acacia curryana</i> foliage and old flowers.....	24
Plate 2: <i>Acacia curryana</i> form	24
Plate 3: <i>Goodenia berringbinensis</i> form	24
Plate 4: <i>Goodenia berringbinensis</i> flowers	24
Plate 5: <i>Goodenia nuda</i>	25
Plate 6: <i>Gymnanthera cunninghamii</i> foliage.....	25
Plate 7: <i>Gymnanthera cunninghamii</i> form	25
Plate 8: <i>Rhodanthe frenchii</i> form	26
Plate 9: <i>Rhodanthe frenchii</i> flower.....	26
Plate 10: <i>Solanum octonum</i> flower and foliage	26
Plate 11: <i>Solanum octonum</i> form	26
Plate 12: <i>Sporobolus blakei</i> form.....	27
Plate 13: <i>Sporobolus blakei</i> inflorescence	27
Plate 14: <i>Wurmbea fluviatilis</i> form	27
Plate 15: <i>Wurmbea fluviatilis</i> flower.....	27
Plate 16: <i>Elacholoma</i> sp. 'Showy Flowers' flowering plant	30
Plate 17: <i>Elacholoma</i> sp. 'Showy Flower' habitat.....	30
Plate 18: * <i>Acetosa vesicaria</i>	32
Plate 19: * <i>Argemone ochroleuca</i>	32
Plate 20: * <i>Asphodelus fistulosus</i>	33
Plate 21: * <i>Bidens subalternans</i> var. <i>simulans</i>	33
Plate 22: * <i>Cenchrus ciliaris</i>	34
Plate 23: * <i>Cenchrus setiger</i>	34
Plate 24: * <i>Citrullus lanatus</i>	35
Plate 25: * <i>Cynodon dactylon</i>	35

Plate 26: * <i>Datura leichhardtii</i>	36
Plate 27: * <i>Flaveria trinervia</i>	37
Plate 28: * <i>Malvastrum americanum</i>	37
Plate 29: * <i>Setaria verticillata</i>	38
Plate 30: * <i>Sisymbrium erysimoides</i>	38
Plate 31: * <i>Vachellia farnesiana</i>	39

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS	
ALA	Atlas of Living Australia
BAM Act	Western Australian <i>Biosecurity and Agriculture Management Act 2007</i>
BoM	Bureau of Meteorology
C1, C2, C3	Declared Pest categories under the <i>BAM Act 2007</i>
CALM	Department of Conservation and Land Management (prior to becoming DEC)
DEC	Department of Environment and Conservation (now, in part, DPaW)
DPaW	Western Australian Department of Parks and Wildlife
DoE	Commonwealth Department of the Environment
DRF	Declared Rare Flora (now TF)
Ecologia Environment	Ecologia
Ecoscope	Ecoscope (Australia) Pty Ltd
EP Act	Western Australian Environmental Protection Act
EPA	Western Australian Environmental Protection Authority
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDA 94	Geographic Datum of Australia 1994
GDE	Groundwater Dependent Ecosystem
GPS	Global Positioning System
Hastings	Hastings Technology Metals Limited
IBRA	Interim Biogeographic Regionalisation for Australia
IDE	Inflow Dependent Ecosystem
MGA	Map Grid of Australia
NHT	Natural Heritage Trust
NVIS	National Vegetation Inventory System
OEPA	Office of the Environmental Protection Authority
PEC	Priority Ecological Community
PF	Priority-listed Flora, Priority Flora
PMST	Protected Matters Search Tool
P1, P2, P3, P4	Priority Flora species rankings
sp.	Species (generally referring to an unidentified taxon or when a phrase name has been applied)
subsp.	Subspecies (infrataxon)
TEC	Threatened Ecological Community
TF	Threatened Flora (formerly termed Declared Rare Flora, DRF, in Western Australia)
var.	Variety (infrataxon)
WAH	Western Australian Herbarium
WAOL	Western Australian Organism List
WC Act	Western Australian <i>Wildlife Conservation Act 1950</i>
WONS	Weeds of National Significance
*	Introduced species

SUMMARY

Hastings Technology Metals Ltd (Hastings) are proposing to develop sections of its Yangibana Project tenement area as a Rare Metals mining project. In 2015, Hastings conducted a Pre-Feasibility Study (PFS). Ecoscape (Australia) Pty Ltd (Ecoscape) was appointed to undertake biological assessments including a Level 2 flora and vegetation assessment of the 550 km² Yangibana tenement area. The flora and vegetation assessment included two phases of field survey during May and August 2015.

The desktop assessment identified:

- with the exception of a reconnaissance survey in 2014, the study area had not been subject to previous environmental surveys, nor were any detailed surveys available for nearby areas
- the combined database searches identified eight conservation significant flora species as having been previously recorded from the surrounding area
- four pre-European vegetation associations are mapped within the study area, all with greater than 99% extent remaining
- there are no Threatened Ecological Communities (TECs) known from the search area; none are listed for the Gascoyne bioregion
- one Priority Ecological Community (PEC) corresponds with a significant portion of the study area, though it is defined by invertebrate assemblages rather than flora and vegetation. No other PECs were identified from the search area

The flora and vegetation field survey included establishment and scoring of 103 quadrats and detailed relevés, mapping and describing the vegetation types and vegetation condition, and conducting targeted searches for conservation significant flora. Conditions during both phases of field survey were considered excellent for conducting flora surveys due to above average rainfall during early 2015.

The Level 2 flora and vegetation assessment identified:

- 472 vascular flora taxa including:
 - eight Priority Flora; P1 taxon *Acacia curryana*, P2 taxon *Rhodanthe frenchii*, *Solanum octonum* and *Wurmbia fluvialis*, P3 taxa *Gymnanthera cunninghamii* and *Sporobolus blakei*, P4 taxa *Goodenia berrinbinensis* and *Goodenia nuda*. Two of these taxa were recorded within the proposed development footprint
 - 58 taxa having significant range extensions or filling substantial range gaps in species distribution
 - one potentially new to science undescribed species, known as *Elacholoma* sp. 'Showy Flowers' and likely to be formally listed as a phrase name species in the future
 - 24 introduced species, two of which are Declared Pests
 - species accumulation curve indicates that the majority of flora species likely to occur within the study area were recorded
- 20 vegetation types including one vegetation type that represents a Groundwater Dependent Ecosystem, being characterised by *Eucalyptus camaldulensis* (vegetation type **EcMgCc**) and vegetation that may represent a GDE, characterised by or containing *Eucalyptus victrix* (vegetation types **EvCc**, **EvReMg**, **AcEt** and **AcAsCc**)
- the majority (70.87%) of the floristic quadrats were assessed as being in Excellent condition, with areas mapped in lesser condition impacted by cattle grazing and weed invasion.

The most significant botanical limitation was considered to be the lack of available biological surveys from the surrounding region. The surrounding region has not been subject to detailed biological surveys that are publicly available. Several significant results such as the substantial number of significant range extensions (12% of flora species recorded) and number of PF that were recorded but were not identified by the desktop assessment highlight the lack of flora and vegetation data available for the region.

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Hastings Technology Metals Limited (Hastings) is a rare earths resources development company that is currently looking to develop two projects; the Brockman Project in the East Kimberley Region and the Yangibana Project in the northern Gascoyne Region. The Yangibana project is currently progressing through feasibility studies with the goal of developing sections of its Yangibana Project tenement area into a rare metals mining project. The Yangibana deposit contains a predominance of Neodymium, Praseodymium, Dysprosium and Europium which are used in the growing permanent magnets and phosphors markets.

Ecoscape has undertaken a series of biological surveys of the Yangibana tenements. These biological surveys included a Level 2 Flora and Vegetation Assessment that is documented in this report.

1.1.1 Study Area Location

Hastings has established a significant tenement package covering approximately 550 km². The Yangibana Project tenement area (the 'study area') is located 270km east-northeast of Carnarvon on Wanna Station in the Gascoyne Region. The study area is shown below in **Figure 1**. Since the field surveys, a proposed development footprint has been identified, shown in **Map 5**.

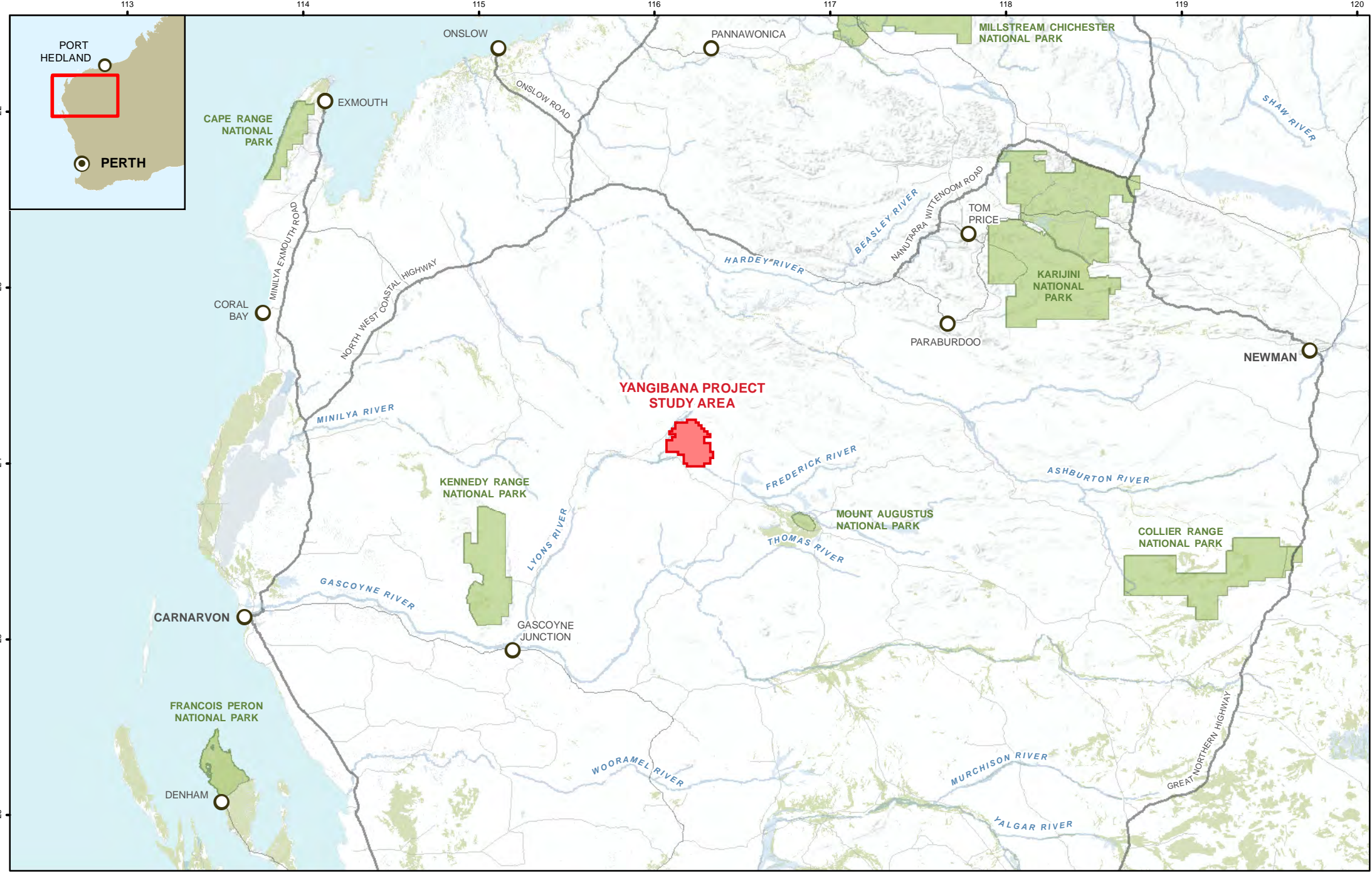
1.2 PROJECT OBJECTIVES

The flora and vegetation assessment, that incorporated targeted conservation significant flora searches, was conducted to:

- be compliant with an Environmental Protection Authority (EPA) Level 2 survey
- provide sufficient information to allow for an assessment of potential impacts
- follow *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia* (EPA 2004)
- follow *Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002).

The assessment consisted of:

- a desktop assessment identifying the physical and biological attributes of the study area
- a two phase Level 2 flora and vegetation field survey, resulting in an understanding of flora species and vegetation types present, and their representation over a broader area
- targeted searches for significant flora species and vegetation, including Threatened Ecological Communities (TECs), Threatened Flora (TF), Priority Ecological Communities (PECs), Priority-listed Flora (PF), other flora and vegetation of conservation interest and Declared Pests
- a report including figures and maps showing field survey (floristic quadrat) locations, significant flora species, introduced flora species, vegetation types and vegetation condition.

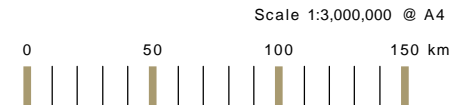


Coordinate System: GCS GDA 1994
Datum: GDA 1994



LEGEND

-  Populated Places
-  Survey Area
-  Principal Road
-  Secondary Road
-  Minor Road
-  Rivers
-  National Parks



REGIONAL LOCATION

FIGURE 1

1.3 LEGISLATION AND POLICIES

This assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Western Australian *Environmental Protection Act 1986* (EP Act)
- Western Australian *Wildlife Conservation Act 1950* (WC Act)
- Department of Environment Water Heritage and the Arts (2009) *Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999*.

In addition to those listed above, the assessment complied with the Office of the Environmental Protection Authority (OEPA) requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA (2000) *Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia*
- EPA (2002) *Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection*
- EPA (2006) *Guidance Statement No. 10: Level of Assessment for Proposals Affecting Natural Areas within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region*, known as *Guidance Statement No. 10*
- EPA (2008) *Guidance Statement No. 33: Environmental Guidance for Planning and Development*
- EPA (2004) *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia*, known as *Guidance Statement No. 51*
- EPA (2003) *Guidance Statement No. 55: Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process*.

1.4 PERMITS

The flora and vegetation survey was conducted under the following permits issued by the Department of Parks and Wildlife (DPaW):

- flora collecting permit SL011316 (Stephen Kern)
- flora collecting permit SL011329 (Jared Nelson)
- flora collecting permit SL011507 (Andrew Craigie)
- flora collecting permit SL011322 (Andrew Fry).

1.5 PREVIOUS SURVEYS

The study area was subject to a reconnaissance survey in November 2014 by Ecologia Environment (Ecologia Environment 2014a). There are no other flora and vegetation surveys known to have been undertaken within the nearby surrounding areas.

Other survey reports relating to areas in the broader region were reviewed to gather background information relating to the study area. These reports included:

- Ecoscape (2014) *Indibiddy West and East Flora and Vegetation Assessment* (approximately 200 km east northeast but partly within the same IBRA subregion)
- Ecologia (2014b) *Prairie Heights Flora and Vegetation Assessment*
- Western Botanical (2011) *Prairie Heights targeted rare flora and fauna survey*.

Other literature reviewed for background information were the relevant subregional summaries included in:

- Desmond *et. al.* (2001) *Gascoyne 3 (GAS3 – Augustus subregion)*
- Kendrick (2002) *Gascoyne 1 (GAS1 – Ashburton subregion)*.

2.0 EXISTING ENVIRONMENT

The results of the desktop assessment are as follows.

2.1 PHYSICAL ENVIRONMENT

2.1.1 Climate

According to the Köppen-Geiger climate classification, the study area is located in the BWh climate zone (Peel *et al.* 2007), considered to be dry (arid and semiarid) climates, desert with an average annual temperature above 18°C.

The study area is within an area impacted by a number of different climate influences including the west coast trough, northwest cloudbanks, tropical cyclones, frontal systems and subtropical ridge (Bureau of Meteorology [BoM] 2010).

The west coast trough is a semi-permanent feature that is the dominant influence on weather conditions during the warmer months in the southwest of Western Australia. It is a zone of low pressure that develops at the boundary of between the warm continental easterly winds driven by the sub-tropical ridge to the south and cooler maritime air from the Indian Ocean. The development of the trough depends on the prevailing conditions, however in general areas to the east of the trough experience hot days in excess of 40°C, possibly with thunderstorms that at times have heavy rainfall, with areas to the west of the trough experiencing milder conditions (*ibid.*).

The northwest cloudbanks are also active during the warmer months and are formed when warm, moist tropical air originating over the Indian Ocean moves southeastward, and is forced to rise over the colder mid-latitude air. Widespread heavy rain is sometimes associated with the northwest cloudbanks (*ibid.*).

The study area is located in an area that may also be affected by tropical cyclones. The cyclone season is officially from November to April although there tends to be fewer cyclones early in the season. Destructive winds and high rainfall can be associated with tropical cyclones (*ibid.*).

Frontal systems can also impact on the study area. Cold fronts, most frequently in winter, can also bring rainfall, at times for extended periods of up to a week. The subtropical ridge suppresses frontal activity during the warmer months when it is located to the south of the continent; in the winter the ridge moves over central Australia, permitting cold fronts to extend further northwards (*ibid.*).

Given the number of climate influence that may be active and affecting the study area, it is unsurprising that the rainfall is erratic and bimodal (i.e. occurring in both winter and summer) (Desmond *et al.* 2001; Kendrick 2002).

BoM rainfall zone mapping places the study area in the Arid low rainfall (less than 350 mm) zone and Warm humid summer climate zone based on temperature and humidity (BoM 2012).

Rainfall and temperature data for the nearest BoM station with long-term rainfall data (Mt Phillip, active from 1902 (BoM 2015b), approximately 70 km south of the study area; data accessed on 4 March 2015) is shown in **Figure 2**. **Figure 2** shows the bimodal nature of the rainfall, with two periods of higher rainfall; January to March and May-July, the latter corresponding with the southern (frontal) influences.

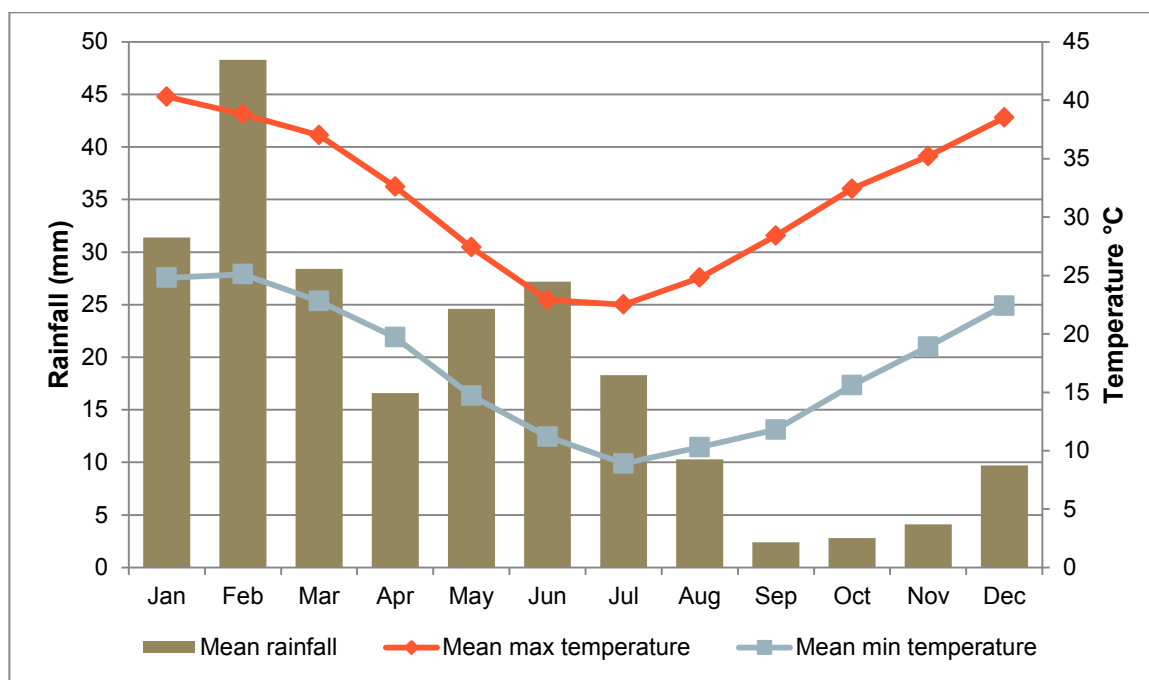


Figure 2: Monthly rainfall and daily maxima and minima for Mt Phillip (BoM 2015b)

2.1.2 Geology

Table 18 in Appendix Two shows the 61 geological units mapped within the study area (Department of Mines and Petroleum 2002; 2007). Map 1 outlines the distribution of these geological units across the study area. The most widespread geological units, in order of area, are PLgpi (granite), A3ti (sand and gravel), A1 (silt, sand and gravel in drainage channels), PLgynx (biotite-muscovite) and PLgpix (biotite-muscovite granodiorite to syenogranite).

2.1.3 Land Systems

The Pastoral Board of Western Australia commissioned the first joint Department of Land Administration-Agriculture Western Australia rangeland survey of the Gascoyne River catchment in 1969. The rangeland resource surveys, comprehensively described and mapped the biophysical resources of the Gascoyne River catchment, together with an evaluation of the condition of the soils and vegetation (from an agricultural perspective) (Wilcox & McKinnon 1972).

As part of this process an inventory of land systems and land units with particular use capabilities were established to assist in land use planning. According to this mapping, 10 land systems (grouped according to land type on the basis of a combination of landform, soil, vegetation, and drainage characteristics) intersect with the study area (Wilcox & McKinnon 1972).

The land systems are described in Table 1 and their extents within the study area and Gascoyne bioregion is shown in Table 2 and on Map 2.

Table 1: Land system descriptions (Wilcox & McKinnon 1972)

LAND SYSTEM	DESCRIPTION
Agamemnon System	Rocky hills, with peaks and ridges above extensive stony slopes, supporting scattered tall shrublands of mulga and other acacias
Augustus System	Rugged ranges, hills, ridges and plateaux with skeletal soils supporting mulga and other acacia shrublands in southern parts or hard spinifex grasslands in northern parts
Collier System	Undulating stony uplands, low hills, ridges, stony plains and drainage floors supporting mulga shrublands and some spinifex
Gascoyne System	River channels and associated narrow alluvial plains and inclusions, supporting river redgum fringing woodlands, also mulga and other acacias, <i>Senna</i> spp. and buffel grass
Glenburgh System	Rugged granite hills, stony uplands and lower plains supporting scattered tall shrublands of mulga and other acacias
James System	Low hills, ridges and tors of granite and quartz, with stony lower plains, rises and drainage floors, supporting scattered tall shrublands of mulga and other acacias
Jamindie System	Stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey
Nadarra System	Plains and calcrete rises with chenopod shrublands and hard spinifex grasslands
Phillips System	Low hills and undulating uplands on gneiss and quartz supporting mulga and other acacia tall shrublands
Yinnietharra System	Scattered granite tors and domes above stony slopes, broad sandy plains with groved vegetation and wide drainage tracts; supporting tall shrublands of mulga and other acacias

Table 2: Extent of land systems within the study area and regional representation (Wilcox & McKinnon 1972)

LAND SYSTEM	EXTENT WITHIN STUDY AREA (km ²)	PROPORTION OF STUDY AREA (%)	GASCOYNE EXTENT (km ²)	REPRESENTATION WITHIN THE STUDY AREA (%)
Agamemnon System	31.23	5.8	4304.58	0.73
Augustus System	6.77	1.3	19190.25	0.04
Collier System	0.39	0.1	4822.86	0.01
Gascoyne System	17.84	3.3	2152.81	0.83
Glenburgh System	50.93	9.5	702.05	7.25
James System	167.32	31.2	2029.33	8.24
Jamindie System	33.88	6.3	9952.62	0.34
Nadarra System	95.04	17.7	1156.70	8.22
Phillips System	115.92	21.7	8082.93	1.43
Yinnietharra System	16.12	3.0	1413.37	1.14
TOTAL	535.43	100.0	53807.50	

2.1.4 Drainage

The study area is located within the Gascoyne River catchment. A tributary of the Gascoyne River, the Lyons River, is associated with the southern portion of the study area, and flows in a general northwestern direction. The Edmund River, considered to represent a tributary of the Lyons River, is associated with the western edge of the study area and flows in a general southern direction. Both rivers are considered as ephemeral, and only flow after rainfall although permanent or semi-permanent waterholes are likely to occur along their length and along tributaries.

Several tributaries of these rivers traverse the study area; Yangibana and Fraser Creeks are tributaries of the Lyons River, occupy the southern portion of the study area and flow in a generally southern direction, whilst Rock Hole and Dingo Creeks are tributaries of the Edmund River, flow in a general western direction

and occur in the northern portion of the study area. There are also several unnamed tributaries within the study area.

Map 2 shows the rivers and creeks of the study area.

2.2 LAND USE

Historically the Gascoyne Bioregion has been used extensively for grazing of sheep, goats and cattle on pastoral stations. The *Rangelands-Taking the pulse report* (Department of the Environment 2008) describes the Gascoyne bio region as being grazed at between 70- 80 % from 1992 to 2005. Current pastoral practices are trending towards grazing of cattle, rangelands goats and meat sheep.

2.3 BIOLOGICAL ENVIRONMENT

2.3.1 Biogeographical Region

Biogeographic regions are delineated on the basis of similar climate, geology, landforms, vegetation and fauna and are defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Department of the Environment [DoE] 2014a).

The study area is located within the Gascoyne IBRA region that consists of three major subregions; Ashburton, Augustus and Carnegie (Thackway & Cresswell 1995). The majority of the study area is included in the Augustus (GAS3) subregion, described in the 2002 Biodiversity Audit of Western Australia's 53 Biogeographical Subregions (Desmond *et al.* 2001) as:

Rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys. Also includes the Narryera Complex and Bryah Basin of the Proterozoic Capricorn Orogen (on northern margin of the Yilgarn Craton), as well as the Archaean Marymia and Sylvania Inliers. Although the Gascoyne River System provides the main drainage of this subregion, it is also the headwaters of the Ashburton and Fortescue Rivers. There are extensive areas of alluvial valley-fill deposits. Mulga woodland with Triodia occur on shallow stony loams on rises, while the shallow earthy loams over hardpan on the plains are covered by Mulga parkland. A desert climate with bimodal rainfall. The subregional area for GAS3 is 10,687,739 ha.

There is a small section near the northern edge of the study area located within the Ashburton (GAS1) subregion, described by Kendrick (2002) as:

Mountainous range country divided by broad flat valleys, associated with Ashburton River Catchment of the Ashburton Basin (shales, sandstones and conglomerates), and the north-western part of Bangemall Basin (sandstone, shale, carbonates). Mulga/snakewood low woodlands occur on shallow earthy loams over hardpan on the plains, with mulga scrub and Eremophila shrublands on the shallow stony loams of the ranges. Low mixed shrublands on hills with other areas supporting large areas of Triodia. Arid (desert) climate with bimodal (winter and summer) rainfall, with tropical monsoon influences. The subregional area of GAS1 is 4,039,387 ha.

2.3.2 Flora

2.3.2.1 Previous Surveys

Aside from a reconnaissance survey conducted in 2014, there are no known previous botanical surveys of the study area. There are also few known botanical surveys conducted in the vicinity of the study area; those that have been reviewed are listed in **Section 1.5**.

2.3.2.2 Conservation Significant Flora

For the purposes of this report, conservation significant flora species are those that are listed by the DPaW as TF and PF. Flora species are classified as TF or listed as PF where populations are geographically restricted or threatened by local processes.

TF species (previously known in Western Australian as Declared Rare Flora (DRF)) are listed by the DPaW and are protected under the Western Australian WC Act. Rare flora species, as they are termed in the WC Act, are gazetted under Sub-section 2 of Section 23F, thereby making it an offence to remove or damage rare flora without Ministerial approval.

Some TF species have additional legislative protection by being listed under the Commonwealth EPBC Act. Definitions of the Commonwealth EPBC Act categories are provided in **Table 10** in **Appendix One**.

There are four categories covering State-listed TF and four categories cover PF species (DPaW 2015; Jones 2015), which are outlined in **Table 11** in **Appendix One**. PF for Western Australia are regularly reviewed by the DPaW whenever new information becomes available, with species status altered or removed from the list when data indicates that they no longer meet the requirements outlined in **Table 11**.

2.3.2.3 Commonwealth Protected Matters Search

A Commonwealth DoE online database search (*Protected Matters Search Tool*, Australian Government & DoE 2015) was conducted and Commonwealth *Species Profile and Threats Database* (DoE & Australian Government 2015) lists were reviewed to identify threatened flora with Commonwealth protection nearby.

The *PMST* search, conducted on 23 February 2015, of the study area and a 30 km buffer identified *Pityrodia augustensis* (TF) as occurring or having habitat likely to occur within the study area.

2.3.2.4 DPaW Threatened and Priority Flora Database Search

A DPaW Threatened Flora database search (DPaW reference 42-1114FL, conducted on behalf of Hastings in November 2014) of the study area and 50 km buffer identified eight conservation significant taxa (species, subspecies and varieties) with validated populations within the search area buffer, shown on **Map 3**. The conservation significant flora recorded from the database search were:

- *Pityrodia augustensis* (TF)
- *Acacia curryana* (P1); known as *Acacia* sp. Minnie Creek (B.R. Maslin 5217) at the time of the database search
- *Acacia petricola* (P2); known as *Acacia* sp. Mt Augustus (S.D. Hopper 3181) and P3 at the time the database search was conducted
- *Rhodanthe frenchii* (P2)
- *Solanum octonum* (P2); this was P3 at the time the database search was conducted
- *Lawrencia* sp. Anna Plains (N.T. Burbidge 1433) (P3)
- *Maireana prosthochaeta* (P3)
- *Lepidobolus densus* (P4); this was P3 at the time the database search was conducted.

Only one has been recorded from within (on the western edge) of the study area; *Acacia petricola*. However, a review of the corresponding specimen identified that it lists 'SW slope of Mount Augustus' as the collection location (WAH 1998-2015). Mount Augustus, where all other collections of this species have been made, is approximately 100 km southeast of this location. Therefore the mapped location of this specimen is considered most likely to be inaccurate.

Information regarding these species are included in **Table 19** (conservation status) and **Table 20** (biological details) in **Appendix Two**.

2.3.2.5 NatureMap Search

NatureMap (DPaW 2007-2015) was reviewed to identify conservation significant flora species that have been recorded from within and near the study area using a simplified version of the study area (see **Figure 5** in **Appendix Two**). The *NatureMap* search, conducted in February 2015, identified five conservation significant flora species, all of which were also identified by the DPaW database search (**Section 2.3.2.4** above). The *NatureMap* search results are incorporated in **Table 19** in **Appendix Two**.

2.3.2.6 IUCN Red List Search of Threatened Species

An International Union for Conservation of Nature (IUCN) *Red List* search (IUCN 2015) conducted on 3 March 2015 identified 43 plant species listed for Western Australia (excluding those of Least Concern that do not qualify as Critically Endangered, Endangered, Vulnerable or Near Threatened (IUCN 2012)), included in **Table 11** in **Appendix One**.

No vascular plants included on the Red List have been recorded from the vicinity of the study area.

2.3.2.7 Atlas of Living Australia

An *Atlas of Living Australia Area Search* (Atlas of Living Australia [ALA] 2015b) of the study area and 40 km buffer area was conducted on 23 February 2015. This database search identified 253 angiosperms from the search area, including two conservation significant flora; *Rhodanthe frenchii* and *Lawrencia* sp. Anna Plains (N.T. Burbidge 1433) (**Table 19** and **Figure 6** in **Appendix Two**).

2.3.2.8 Significant Flora

Flora can be significant for reasons other than having conservation significance (TF and PF, **Section 2.3.2.2**).

Guidance Statement No. 51 (EPA 2004) also lists a number of reasons why flora (species, subspecies, varieties, hybrids and ecotypes) may be significant, in addition to being listed as a TF or PF. Reasons include that the taxon:

- is considered to have a keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species
- has relic status
- displays anomalous features that indicate a potential new discovery
- is considered representative of the range of a species (particularly at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- is a restricted subspecies, variety or naturally occurring hybrid
- is a local endemic or is confined to a restricted distribution
- is poorly reserved.

Saunders *et al.* (1998), in the Commonwealth *State of the Environment* report, includes undescribed species as having significance as a biodiversity indicator, thus agreeing that potential new discoveries (i.e. undescribed, new to science, species) are significant.

2.3.2.9 Introduced Species

Introduced plant species, known as weeds, are plants that are not indigenous to an area and have been introduced either directly or indirectly (unintentionally) through human activity. Species are regarded as introduced if they are listed as 'alien' on *FloraBase* (Western Australian Herbarium [WAH] 1998-2015), and are referred to using an asterisk (*) prefix. *FloraBase* (WAH 1998-2015) lists 44 introduced species as

having been collected within the Gascoyne bioregion, 31 within the Augustus subregion and 28 within the Shire of Upper Gascoyne.

A *NatureMap* (DPaW 2007-2015) search using a central point within the study area and 30 km radius identified five introduced species occurring within the search area; **Cenchrus ciliaris* (Buffel Grass), **Cenchrus setiger* (Birdwood Grass), **Malvastrum americanum* (Spiked Malvastrum), **Sonchus oleraceus* (Common Sowthistle) and **Tribulus terrestris* (Caltrop).

The *PMST* search (DoE & Australian Government 2015) identified **Cenchrus ciliaris* and **Prosopis* spp. (Mesquite) as occurring or with habitat likely to occur within the search area. No **Prosopis* sp. was identified by any other database search as occurring in the vicinity.

The Western Australian Organism List (WAOL, Department of Agriculture and Food Western Australia [DAFWA] 2015) details organisms listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Under the BAM Act, Declared Pests are listed as one of three categories:

- C1 (exclusion), that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment: (GWA 1976; GWA 2007)
- C2 (eradication), that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- C3 (management), that applies to established pests where it is not feasible or desirable to manage them in order to limit their damage.

Nineteen Declared Pest species were identified by a search of the WAOL (DAFWA 2015) using the Shire of Upper Gascoyne as a search area. **Argemone ochroleuca* (Mexican Poppy) and **Datura leichhardtii* (Thornapple) are C3 Declared Pest plants identified by the WAOL search that were also identified by the *FloraBase* (WAH 1998-2015) search using the same area; none of the other Declared Pests identified by the WAOL search are currently known to occur in the Shire.

Some of the more invasive introduced species are also included in a number of other weed lists maintained by DoE and Weeds Australia, including Weeds of National Significance (WONS, Weeds Australia 2012b), the National Environmental Alert List (DoE 2012a), Sleeper Weeds (DoE 2012b), Species Targeted for Eradication (DoE 2014b) and Target Species for Biological Control (Weeds Australia 2012a).

Introduced species have also been ranked by a number of attributes, including ecological impact, invasiveness and feasibility of control, in the various DPaW regions (Department of Environment and Conservation [DEC] 2011), and ranked in priority for control by DPaW in the *Weed Prioritisation Process for DPaW; Midwest rankings summary* (DPaW 2013b).

2.3.3 Vegetation

2.3.3.1 Vegetation Association Mapping

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250 000 in the south-west and at a scale of 1:1 000 000 in less developed areas. The vegetation survey of Western Australia maps and explanatory memoirs (1974-1981) are credited to J.S. Beard (or Beard with various co-authors).

Beard's vegetation maps attempted to depict the native vegetation as it was presumed to be at the time of settlement, and is known as the pre-European vegetation type and extent and has since been developed in digital form by Shepherd *et al.* (2002), updated by DAFWA (2012).

The pre-European vegetation associations identified from the study area (DAFWA 2012) and their pre-European and current extents within the Gascoyne bioregion is shown in **Table 3** (Government of Western Australia 2013). The pre-European vegetation is shown on **Map 4**.

Table 3: Vegetation associations within the Gascoyne bioregion (Government of Western Australia 2013)

VEGETATION ASSOCIATION	GASCOYNE BIOREGION			EXTENT WITHIN THE STUDY AREA	
	PRE-EUROPEAN EXTENT (ha)	CURRENT EXTENT (ha)	% REMAINING	EXTENT (ha)	PROPORTION (%)
18 Low woodland; mulga (<i>Acacia aneura</i>)	3,273,579.71	3,271,339.12	99.93	21,555.74	0.66%
165 Low woodland; mulga and snakewood (<i>Acacia eremaea</i>)	697,447.83	697,445.48	100.00	30,841.06	4.42%
166 Low woodland; mulga & <i>Acacia victoriae</i>	309,650.29	309,645.58	100.00	286.69	0.09%
181 Shrublands; mulga & snakewood scrub	1,632,078.44	1,631,913.77	99.99	860.02	0.05%

2.3.3.2 Threatened and Priority Ecological Communities

TECs are categorised at both Commonwealth (Commonwealth of Australia 1999) and State (DEC 2010) level, whilst PECs are categorised at State level (DEC 2010). The definitions of Commonwealth and State categories are summarised in **Table 13** and **Table 14** respectively in **Appendix One**.

Review of DPaW TEC list (DPaW Species & Communities Branch 2014a) indicates that there are no TECs listed for the Gascoyne bioregion, nor are there any Commonwealth-listed TECs (DoE & Australian Government 2015).

There are 84 PECs known from the Midwest DPaW region (DPaW Species & Communities Branch 2014b).

2.3.3.3 DPaW Ecological Communities Database Search

A DPaW Ecological Communities database search (search reference 29-01114Ec) was conducted for the study area and a 50 km buffer in November 2014. This search identified the P1 'Gifford Creek, Mangaroon, Wanna calcrete groundwater assemblage type on Lyons palaeodrainage on Gifford Creek, Lyons and Wanna Stations' PEC as corresponding with a significant portion of the study area. This PEC comprises unique assemblages of invertebrates that have been identified in the groundwater calcretes (DPaW Species & Communities Branch 2014b). Invertebrates and their habitat are not covered in the scope of this report.

2.3.3.4 Groundwater Dependent Ecosystems

Groundwater Definition

Groundwater is water that is found in the saturated zone of the soil, where all soil pores are filled with water. It occurs below the water table in an unconfined aquifer or may be held under pressure in a confined aquifer. Groundwater may also occur as a perched aquifer where it is located above unsaturated rock formations as a result of a discontinuous permeable layer (Goulburn-Murray Water 2010).

Groundwater Dependent Ecosystems Definition

Groundwater Dependent Ecosystems (GDEs) have been defined as ecosystems that are dependent on groundwater for their survival at some stage or stages of their lifecycle, however groundwater use cannot be equated with groundwater dependence (Eamus 2009).

Hatton and Evans (1998) identified four types of GDEs based on their geographic setting: terrestrial vegetation (vegetation communities and dependent fauna that have seasonal or episodic dependence on groundwater); river base flow systems (aquatic and riparian ecosystems that exist in or adjacent to streams that are fed by groundwater base flow); aquifer and cave ecosystems; wetlands.

Eamus *et al.* (2006) identified three primary classes based on type of groundwater reliance: aquifer and cave ecosystems (class 1); ecosystems dependent on the surface expression of groundwater, including wetlands, swamplands, floodplains and riparian vegetation (class 2); ecosystems dependent on the subsurface presence of groundwater, including *Eucalyptus camaldulensis* forests (class 3).

Vegetation characterised by phreatophytic species, associated with riparian areas, that may be dependent on groundwater at some stages of their life cycle may occur within the study area (class 2 or class 3 GDEs).

Phreatophytic Species

Phreatophytic species rely on groundwater sources for water intake (e.g. Maunsell Australia Pty Ltd 2006); essentially the water requirements of phreatophytes are greater than can be provided from the surface soil profile (e.g. riparian vegetation) or they are dependent on free water availability (e.g. wetland species). They frequently show low tolerance to extended water stress due to a lack of physiological and/or morphological adaptation to drought, and respond to significant water deficit by a decline in health and eventual death (*ibid.*).

Obligate phreatophytes are dependent on free access to water (i.e. they are wetland species) whereas facultative phreatophytes can switch their water source between the soil surface profile in times of rain, to groundwater in times of drought when the soil surface profile (vadosphere) is depleted (Grierson 2010).

Atlas of Groundwater Dependent Ecosystems

The *Atlas of Groundwater Dependent Ecosystems* (BoM 2015a) was interrogated to determine the presence of known GDEs and Inflow Dependent Ecosystems (IDEs) within the study area to identify potential GDEs or IDEs.

An IDE is one in which the vegetation within the landscape is likely to be accessing water in addition to rainfall, from soil or surface water or groundwater, assessed using remotely sensed data. The likelihood of a landscape using additional water is rated from one to 10 (low to high), with a rating above six indicating that a landscape is likely to be inflow dependent (BoM 2015a).

Interrogation of the *Atlas* identified that the only surface GDE within the study area was associated with the Edmund River, on the western side of the study area. The associated geomorphology was parallel ranges and dissected plateaux with intervening hardpan was plains and stony plains, and is considered to be an ecosystem that relies on the surface expression of groundwater (i.e. class 2 GDE) and has a high potential for groundwater interaction.

Whilst not identified from within the study area, the *Atlas* also identified nearby areas of the Lyons River as a surface (i.e. class 2) GDE. Analysis of aerial imagery has identified the Lyons River and several tributaries (Rock Hole, Dingo, Yangibana and Fraser Creeks) as potentially representing GDEs.

2.3.3.5 Significant Vegetation

Guidance Statement No. 51 (EPA 2004) lists a number of reasons why vegetation may be significant, in addition to being listed as a TEC or PEC or because the extent is below a minimum threshold. These reasons, which may apply at a number of scales but are not defined in detail, include:

- scarcity
- unusual species
- novel combinations of species
- role as a refuge
- role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species
- being representative of the range of a unit (particularly a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extension or isolated outliers of the main range)
- restricted distribution.

3.0 METHODS

3.1 FLORA AND VEGETATION ASSESSMENT

The Yangibana survey was conducted as a two season Level 2 flora and vegetation assessment designed to comply with the guidelines listed in **Section 1.3**.

Level 2 surveys incorporate background research and a reconnaissance survey as preparation for a more intensive and detailed survey conducted over one or more visits in the main flowering season, followed by visits in other seasons. Level 2 surveys also involve replication of the survey, greater coverage than a Level 1 survey and displacement of plots over the target area.

Data collected during the field survey was used to:

- describe and map the vegetation types of the study area to indicate the distribution and relative abundance of each vegetation type
- document the vascular flora of the study area and provide a measure of the overall floristic richness
- identify species and vegetation types of particular conservation significance.

At the time of the field survey, several drilling targets had been identified and were assessed with higher survey intensity. The proposed development footprint displayed in several of the maps had not been defined and consequently this area was not surveyed at higher intensity than the rest of the study area.

3.1.1 Reconnaissance Survey

A reconnaissance survey, including flora, vegetation and fauna, was conducted by Ecologia during 17-20 November 2014 (Ecologia 2014a). This survey was to conduct preliminary site assessments and confirm access in preparation for more detailed surveys. The vegetation was described from 12 sites and opportunistic searches for conservation significant flora were undertaken.

3.1.2 Level 2 Flora and Vegetation Survey

The Phase 1 field survey was undertaken during 11-24 May 2015 by the following personnel:

- Stephen Kern B.Sc. (Plant Sc., Hons)
- Jared Nelson B.Sc (Agric., Hons)
- Dr. Andrew Craigie B.Sc (Hons, PhD)
- Andrew Fry B.Sc. (Env. Sc., Hons).

The Phase 2 field survey was undertaken during 4-15 August 2015 by Stephen Kern and Andrew Craigie (details as above).

The field surveys included:

- establishing and scoring floristic quadrats (abbreviated to 'quadrats') and some detailed relevés (unbounded areas) where the location was not appropriate for regularly-shaped quadrats
- collection of an opportunistic flora inventory (species within the study area that were not recorded in quadrats)
- vegetation type mapping
- vegetation condition assessment and mapping
- targeted conservation significant flora searches and recording opportunistic observations.

DPaW flora collecting permits are listed in **Section 1.4**.

3.1.2.1 Floristic Survey

Vegetation and floristic data were collected and described from 101 quadrats, 20 m x 20 m in dimension or equivalent area if linear (e.g. along a drainage line) [phase 1, phase 2]. Two detailed relevés were also recorded in areas where it was not possible to accurately measure area (e.g. a rocky knoll), however the survey intensity was comparable to quadrats thus the level of detail was equivalent.

Floristic, biological and physical data were collected and recorded from each of these quadrats and relevés. The flora records provide the names used in the vegetation descriptions and contribute to the flora species lists and frequency of occurrence data. Various parameters relating to the individual quadrats were used to assist in both the description of vegetation types and the determination of flora distribution, particularly in terms of defining associated landforms.

The quadrats and relevés were spatially distributed over the study area in areas of representative vegetation with additional quadrats and relevés added as necessary to represent less common vegetation types identified during the field survey.

The quadrats were not permanently marked, except with flagging tape on the north-west corner, however their area was accurately measured. Quadrats were oriented in a north-south and east-west direction, except where they were located in linear vegetation types (e.g. drainage lines). Quadrats and most relevés were numbered using the protocol of HY15xxx, where HY refers to Hastings Yangibana, 15 refers to 2015 and xxx represents the three digit quadrat number. Twelve of the quadrats were regional quadrats (outside the boundary of the study area), denoted by an 'R' at the beginning of the name.

The following parameters were recorded at each quadrat and relevé:

- MGA coordinates recorded in GDA 94 datum using a hand-held Global Positioning System (GPS), to an accuracy usually within 5 m
- National Vegetation Inventory System (NVIS) vegetation description based on the height and estimated cover of dominant species (Natural Heritage Trust [NHT] 2003); **Table 15** and **Table 16** in **Appendix One**
- an inventory of all species, with estimated maximum height and percent foliage cover
- description of landform and habitat
- broad description of surface soil type and stony surface mantle
- percentage of litter cover and depth
- percentage of bare ground
- evidence of grazing, mining exploration activities, weed invasion, frequent fires etc. Fire effects were only considered a negative impact if they were caused by repeated burning (e.g. for pastoral purposes).

Photographs of the vegetation at each site were taken from the north-west corner (or nearest equivalent for linear quadrats) of each quadrat.

Flora species were also opportunistically recorded on traverses between quadrat locations.

3.1.2.2 Flora Identification and Data Entry

Voucher specimens were collected of all species that could not be identified with confidence in the field and at least one specimen of each potential conservation significant flora species. Each voucher specimen was assigned a unique number to facilitate tracking of data, and pressed in the field. Specimens collected were dried and treated in accordance with the requirements of the WAH.

These voucher specimens were identified by Ecoscape (mostly Andrew Craigie and Udani Sirisena) to infrataxa (subspecies, variety, affinity or hybrid) level where possible, using appropriate publications, and

comparison with pressed specimens housed at the WAH. Relevant taxonomic specialists at the WAH were consulted as necessary.

Nomenclature was checked against the current listing of scientific names recognised by the WAH and listed on *FloraBase* (WAH 1998-2015) and updated as necessary.

All raw site data was entered into a Microsoft Access database, with species names entered following formal identification of the collected specimens.

3.1.2.3 Conservation Significant Flora Searches

Due to the size of the study area, no systematic grid search of the study area for conservation significant flora was undertaken. However, when traversing between sites, every opportunity was taken to search for conservation significant flora species, especially where preferred habitats were encountered. The search spacing between surveyors was approximately 20-30 m (i.e. when walking between sites, the two surveyors walked parallel lines, searching either side of the walked line for species identified by the database searches).

Targeted searches were also conducted in areas of interest such as hills, drainage lines and any niche habitats not represented by quadrat sampling.

In order to assist with identification in the field, survey teams had access to literature (including images) of conservation significant species identified by the database searches. Specimens of all PF species were collected for identification purposes. Locations and population estimates were recorded for all populations of PF identified during the field survey.

3.1.2.4 Significant Flora

TF and PF are considered to be conservation significant. Other significant flora are considered such according to *Guidance Statement No. 51* (EPA 2004). Significant flora includes species that are:

- a range extension, defined as a new population/s or occurrence/s more than 100 km from the nearest vouchered specimen included in the WAH, or where it occurs in a new IBRA subregion, irrespective of distance
- a range edge or end of the extreme continuous distribution limit of vouchered specimens
- a disjunct population or outlier that is more than 100 km from the outer limits of the main vouchered continuous distribution
- endemics that are confined to a particular area, in most case a Biogeographical region
- narrow endemics that are restricted to a range of less than 150 km
- new, undescribed taxa.

No specific searches for significant flora searches (other than for conservation significant flora) were conducted.

3.1.2.5 Introduced Species

No specific searches were conducted for introduced species; they were recorded as a cover value where they were recorded within quadrats, or recorded opportunistically.

Declared Pest plants listed under the BAM Act had their locations recorded.

3.1.2.6 Vegetation Descriptions

Vegetation was described from each of the quadrats using the height and estimated cover of dominant and characteristic species of each stratum based on NVIS (NHT 2003) (**Table 15** and **Table 16** in **Appendix One**), recorded at Level V. Up to three species per stratum from each stratum (upper, mid and ground) were used to formulate vegetation descriptions for each quadrat and each vegetation type.

Vegetation codes are formulated using initials for dominant and characteristic species in each strata. For example the (not real) vegetation code '**AxEcAc**' has *Acacia xiphophylla* ('Ax') as the most dominant species of the upper stratum, *Eremophila cuneifolia* ('Ec') as the most dominant species of the mid stratum and *Aristida contorta* ('Ac') as the most dominant species of the ground stratum. Not all strata may be present in all vegetation types.

3.1.2.7 Vegetation Condition

The vegetation condition at quadrats was assessed using the Trudgen (1991) Vegetation Condition Scale. This rating scale is outlined in **Table 17** in **Appendix One**.

The vegetation condition of the study area was assessed by extrapolating the value recorded for each quadrat and applying the condition to the vegetation type in the vicinity and from 'spot' evaluations recorded during traverses through the study area.

3.1.2.8 Field Survey Timing

The rainfall recorded from the Mount Phillip BOM station and mean rainfall (BoM 2015b) is shown in **Figure 3**. The field surveys were conducted during May and August 2015 (indicated by arrows). The May survey was approximately two months after significant rainfall, and the conditions were considered to be excellent for plant growth with the timing considered ideal as most plants were flowering at the time of survey. Rainfall between the two survey phases was close to average, and conditions remained excellent for botanical surveys.

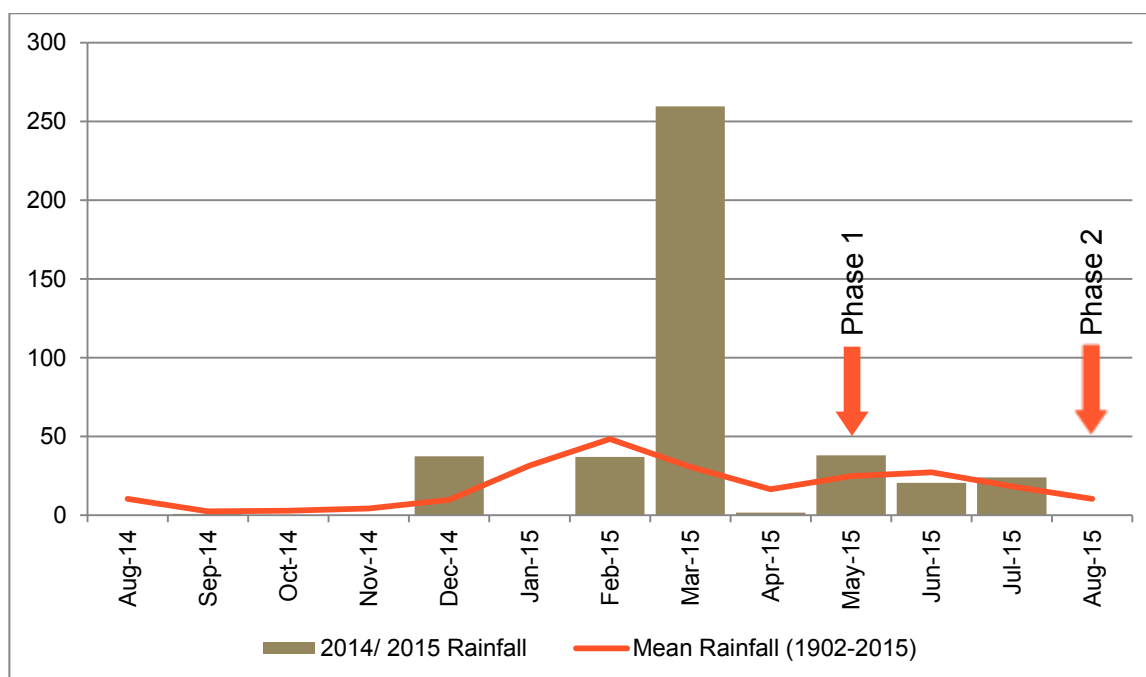


Figure 3: 2014/2015 rainfall preceding the survey phases at Mount Phillip (BoM 2015b)

3.2 FLORA AND VEGETATION SIGNIFICANCE

3.2.1 Determination of Flora Significance

Flora taxa are considered of significance if they are listed as TF or PF (conservation significance) or are significant according to *Guidance Statement No. 51* (EPA 2004), most commonly due to being a significant (greater than 100 km) range extension or an new (undescribed) species.

3.2.2 Conservation Significant Flora Likelihood Assessment

Whilst both targeted and opportunistic searches for conservation significant flora species were undertaken during the field survey, the study area is large and it was not possible to access all areas to carry out intensive searches. Therefore, whilst some species identified by the database searches (**Table 19** in **Appendix Two**) were recorded during the survey, some of the remaining listed potential species may occur. In order to achieve a better understanding of the likelihood of conservation significant species occurring within the study area, a likelihood assessment of possible taxa was undertaken (**Table 23** in **Appendix Nine**).

The likelihood of a species occurring in the study area is based on the following attributes, as listed on *FloraBase* (WAH 1998-2015) and tailored to Gascoyne populations and including information from recent nearby surveys. The attributes were:

- broad soil type usually associated with the species
- broad landform usually associated with the species
- usual vegetation (characteristic species) with which the species is usually associated
- species having previously been recorded from within approximately 50 km of the study area (considered as 'nearby').

The likelihood rating is assigned using the following categories:

- Known (recorded): it does occur within the study area and was recorded during the field survey or there are reliable historical records of it occurring in the study area
- Possible: it may occur within the study area (but was not recorded); broadly, 2-4 of the required attributes (but always including records from nearby) are present in the study area
- Unlikely: it could occur but is not expected; 1-3 of the required attributes are present in the study area but:
 - it is not known from nearby, or
 - it is known from nearby but has no other required attributes, or
 - it is known from nearby but has at least one well-defined attribute that does not occur in the study area (e.g. it is associated with a specific landform or soil type that does not occur in the study area)
- Highly Unlikely: the species characteristics include none of the required attributes of soil, landform, associated vegetation and having previously been recorded nearby, or a critical element (often landform) is not within the study area and as such it almost certainly does not occur within the study area.

3.2.3 Determination of Vegetation Significance

The significance of vegetation within the study area can be assessed in a number of ways including:

- assessing vegetation significance in relation to pre-European vegetation mapping and current representation
- representation of land systems
- comparing the vegetation with known TECs and PECs that are described in terms of their botanical component
- determining if the vegetation meets other criteria to be of conservation interest e.g. GDEs
- significance according to criteria listed in *Guidance Statement No. 51*

- comparison with those considered significant in other nearby, comparable flora and vegetation reports (i.e. a broad local and regional vegetation significance assessment)
- floristic analysis.

3.2.3.1 Floristic Analysis

To assess patterns in overall species composition among quadrats, a hierarchical cluster analysis was conducted in R (R Development Core Team 2015). The site by species matrix used included the 91 floristic quadrats and relevés assessed within the study area, as well as 12 regional quadrats located outside of the study area. For the purposes of this analysis, species were treated as either present or absent within each quadrat. A similarity matrix was calculated using the Jaccard similarity coefficient using the *vegdist* function of the *vegan* package. This coefficient is equivalent to the Bray-Curtis similarity coefficient for binary data, and is widely used for estimating ecological distances. Using the *hclust* function, a dendrogram was constructed from the similarity matrix using UPGMA (Unweighted Pair Group Method with Arithmetic Mean), where quadrats with more similar species composition cluster more closely together.

This analysis assists in delimiting vegetation types for mapping and, when sufficient regional quadrats are included, facilitates assessment of vegetation types of local significance. Ideally, quadrats that cluster together in the dendrogram form identifiable vegetation types; however, as presence-absence data have been used and there is no weighting given to dominant species, the clustering patterns do not always correspond to on-ground vegetation types. Vegetation types are therefore determined from consideration of both the clustering patterns in the dendrogram and the on-ground assessment of dominant and characteristic species.

3.3 ADEQUACY OF SAMPLING

In order to demonstrate adequacy of sampling, a species accumulation curve was generated by the computer programme *Species Diversity and Richness* (Pisces Conservation Ltd 2007) using five random selections of sample order, and using only quadrat data.

Adequacy of sampling is also assessed in terms of representation of various attributes, including vegetation types and representation of land systems.

4.0 RESULTS

4.1 FLORA ASSESSMENT

4.1.1 Flora Inventory

Quadrat and relevé details are included in **Appendix Three**, and the complete flora inventory is in **Appendix Four**. The quadrat and relevé species matrix (**Table 21**) is included in **Appendix Five**.

A total of 472 vascular flora taxa (including species, subspecies, varieties, hybrids, affinities and forms, including native and introduced species) were recorded from the 103 quadrats and relevés, opportunistic observations and conservation significant flora searches. Of these, eight were Priority-listed (conservation significant) (**Section 4.1.2**) and 24 were introduced (Table 6). Whilst there were 12 regional quadrats recorded, only four taxa included in the total were recorded only from outside of the study area.

Due to lack of reproductive material, 26 taxa could not be fully identified with confidence due to insufficient reproductive material available, totalling 5.5% of taxa. It is likely that some of the unidentified taxa are represented as a named taxon in the flora inventory. For example, '*Roebuckiella ?cuneata*' is likely to represent *Roebuckiella cuneata* (which was also recorded within the study area), however there was insufficient flowering material on the specimen to be certain of its identity. There were a total of 1008 flora collections made during the field survey.

Sixty three families and 212 genera are represented in the study area. The most commonly represented families are:

- Fabaceae; 71 taxa (one introduced)
- Poaceae; 60 taxa (seven introduced)
- Asteraceae; 43 taxa (three introduced).
- Chenopodiaceae; 34 taxa (one introduced)
- Malvaceae; 32 taxa (one introduced)
- Scrophulariaceae; 20 taxa.

The most commonly represented genera are *Acacia* (20 taxa), *Eremophila* (19 taxa), *Ptilotus* (13 taxa), *Senna* (11 taxa), *Calandrinia* (10 taxa) and *Maireana* (10 taxa).

The most commonly encountered taxa were *Aristida contorta*, recorded from 87 quadrats and relevés, *Goodenia tenuiloba* (72), *Gomphrena kanisii* (69), *Eriachne pulchella* subsp. *dominii* (62), *Polycarpaea corymbosa* (59), *Acacia tetragonophylla* (57), *Portulaca oleracea* (57), *Bulbostylis barbata* (50), *Senna artemisioides* subsp. *helmsii* (50) and *Paspalidium clementii* (50).

4.1.2 Conservation Significant Flora

4.1.2.1 Environment Protection and Biodiversity Conservation Act 1999

No plant taxon recorded in the study area is listed as Threatened under the EPBC Act.

4.1.2.2 Wildlife Conservation Act 1950

No plant taxon recorded in the survey is gazetted as a TF pursuant to Subsection 2 of Section 23F of the WC Act.

4.1.2.3 Priority Flora

There were eight PF recorded from the study area: one P1, three P2, two P3 and two P4, summarised in **Table 4** and described below. Their locations are included in **Table 22** in **Appendix Five** and shown on **Map 6**. Threatened and Priority Flora Report Forms are included in **Appendix Seven**. Only two of these species, *Acacia curryana* and *Rhodanthe frenchii*, were recorded within the proposed development footprint. The plant population counts listed in **Table 4** are based on numbers encountered during traverses and opportunistic searches, considered likely to be substantially lower than the total number of plants that may occur within the study area.

An additional PF, *Acacia atopa* (P3), was recorded approximately 2 km south of the study area boundary on a rocky ridge. This represents a significant range extension for the species, approximately 100 km. It is a distinctive tree with a weeping form visible from hundreds of metres away, and is considered highly unlikely to occur within the study area because of its habitat, and therefore is not discussed further in this report. The location is provided in **Appendix 5**.

Table 4: Summary of conservation significant flora

SPECIES	CONS. STATUS	VEGETATION TYPES	NO OF PLANTS RECORDED STUDY AREA	NO. OF PLANTS WITHIN DEVELOPMENT FOOTPRINT
<i>Acacia curryana</i>	P1	AcAc, EcMgCc, EeAc, EpAc	7,754	192
<i>Rhodanthe frenchii</i>	P2	AaEpDr, AxEcAc, EeAc, EpAc	1,690	53
<i>Solanum octonum</i>	P2	AcAsCc, ArPc, EcMgCc, EvCc	14	0
<i>Wurmbea fluviatilis</i>	P2	AcEt, EeAc, EpAc, EvCc	126	0
<i>Gymnanthera cunninghamii</i>	P3	EcMgCc	5	0
<i>Sporobolus blakei</i>	P3	AcEt, AxEcAc, EpAc, EvCc	666	0
<i>Goodenia berringbinensis</i>	P4	AaSaEs, AcEt, ArPc, EpAc	325	0
<i>Goodenia nuda</i>	P4	AxEcAc	1	0

Priority Flora Descriptions

***Acacia curryana* (P1)**

Acacia curryana is an obconic or rounded shrub to 2.5 m tall (**Plate 1, Plate 2**), typically known from low granite hills in skeletal soils (Maslin 2014; FloraBase, WAH 1998-2015). There are four records for this taxon listed on *NatureMap* (DPaW 2007-2015), all located to the southwest of the study area. The populations recorded within the study area therefore represent a range extension of up to 50 km.

Acacia curryana was abundant and widespread within the study area (**Map 6**), frequently occurring as a dominant species of the vegetation (particularly the **AcAc** vegetation type). A total of 7 754 plants were recorded from traverses and opportunistic searches, of which 192 (1.18% of the total recorded population) were within the boundary of the proposed development footprint.



Plate 1: *Acacia curryana* foliage and old flowers



Plate 2: *Acacia curryana* form

***Goodenia berringbinensis* (P4)**

Goodenia berringbinensis is a herb to is 30 cm tall with yellow flowers (**Plate 3, Plate 4**), typically known from riparian habitats (*FloraBase*, WAH 1998-2015). There are 30 records for this taxon listed on *NatureMap* (DPaW 2007-2015); the nearest is located more than 100 km from the study area and as such the records within the study area fill a range gap.

Populations of *Goodenia berringbinensis* were scattered across the study area with nine locations recorded (**Map 6**). Several populations were also recorded outside the study area. A total of 325 plants were recorded during traverses, none of which are located within the proposed development footprint. This species typically occurred adjacent to seasonally inundated clay pans (inundated at the time of survey) mapped as **AaSaEs**, or occasionally drainage lines corresponding with vegetation types **AcEt** or **ArPc**. The mapping indicates that this species occurs within other vegetation types such as **EcBp** and **EpAc**, however these locations typically correspond with niche clay swamps that were too small to map.



Plate 3: *Goodenia berringbinensis* form



Plate 4: *Goodenia berringbinensis* flowers

***Goodenia nuda* (P4)**

Goodenia nuda is a herb to 50 cm high with yellow flowers (**Plate 5**), known from a variety of habitats (*FloraBase*, WAH 1998-2015). There are 89 records for this taxon listed on *NatureMap* (DPaW 2007-2015), almost exclusively within the Pilbara bioregion. As such, the record within the study area represents a significant southern range extension, approximately 150 km south of the nearest known population.

A single plant was recorded in the southern section of the study area (**Map 6**), south of Lyons River and outside of the proposed development footprint.



Plate 5: *Goodenia nuda*

***Gymnanthera cunninghamii* (P3)**

Gymnanthera cunninghamii is a shrub to 2 m high (**Plate 6, Plate 7**), known from sandy soils (*FloraBase*, WAH 1998-2015). There are 32 records for this taxon listed on *NatureMap* (DPaW 2007-2015), predominantly within the Pilbara and Carnarvon bioregions. *Gymnanthera cunninghamii* is also known from the Northern Territory and Queensland (ALA 2015a). This species has not previously been recorded from the Gascoyne bioregion and therefore fills a range gap, at least 150 km from the nearest known record.

A single population of five *Gymnanthera cunninghamii* plants was recorded in the southern section of the study area (**Map 6**), on the banks of a Lyons River tributary. This location is outside of the boundary of the proposed development footprint.



Plate 6: *Gymnanthera cunninghamii* foliage



Plate 7: *Gymnanthera cunninghamii* form

***Rhodanthe frenchii* (P2)**

Rhodanthe frenchii is an erect herb recorded as growing to 35 cm tall (though commonly recorded as 50-60 cm in the study area, **Plate 8**, **Plate 9**) with yellow flowers, typically known from stony hills or rocky river banks (*FloraBase*, WAH 1998-2015). There are 22 records for this taxon listed on *NatureMap* (DPaW 2007-2015), from the Gascoyne, Pilbara and Carnarvon bioregions.

Sub-populations of *Rhodanthe frenchii* are scattered throughout the study area with 50 locations (**Map 6**) recorded totalling 1690 plants. This species typically occupied niche rocky habitats around large boulders or outcrops.



Plate 8: *Rhodanthe frenchii* form



Plate 9: *Rhodanthe frenchii* flower

***Solanum octonum* (P2)**

Solanum octonum is an erect shrub to 1.5 m high with purple flowers (**Plate 10**, **Plate 11**), known from a variety of habitats including riparian areas, gorges and steep hillslopes (Bean 2013; *FloraBase*, WAH 1998-2015). There are four records for this taxon listed on *NatureMap* (DPaW 2007-2015), all located to the north of the study area. The populations recorded within the study area represent a minor southern range extension of 20-30 km.

Solanum octonum was recorded from seven isolated occurrences within the study area (all near the western or southern boundary, **Map 6**), totalling 14 plants. This species typically occurred within riparian vegetation types; it was not recorded within the proposed development footprint. *Solanum octonum* was difficult to distinguish in the field from the closely related *S. austropeum*, which was also recorded within the study area within riparian vegetation.



Plate 10: *Solanum octonum* flower and foliage



Plate 11: *Solanum octonum* form

***Sporobolus blakei* (P3)**

Sporobolus blakei is a perennial grass to 0.6 m high (**Plate 12**, **Plate 13**), typically recorded from creeks (*FloraBase*, WAH 1998-2015). It is known from 11 scattered records listed on *NatureMap* (DPaW 2007-2015), though it is also recorded from Northern Territory, South Australia, Queensland and New South Wales (ALA 2015a). The record within the study area fills a range gap for the species; the closest known record is 270 km away.

Populations of *Sporobolus blakei* were recorded within minor to mid-order drainage lines scattered throughout the study area (**Map 6**) totalling 666 plants. None were recorded within the proposed development footprint.



Plate 12: *Sporobolus blakei* form



Plate 13: *Sporobolus blakei* inflorescence

***Wurmbea fluviatilis* (P2)**

Wurmbea fluviatilis is herb to 55 cm tall with pink flowers, typically known from damp soils of riparian habitats (Macfarlane & Case 2011; *FloraBase*, WAH 1998-2015). There are four records for this taxon listed on *NatureMap* (DPaW 2007-2015), representing two distinct locations, both to the southeast of Mt Augustus. The populations recorded within the study area represent a north-western range extension of approximately 100 km.

Scattered populations of *Wurmbea fluviatilis* were recorded within the study area (**Map 6**) from nine locations totalling 126 plants. All populations were confined to minor to mid-order drainage lines, none recorded within the proposed development footprint.



Plate 14: *Wurmbea fluviatilis* form



Plate 15: *Wurmbea fluviatilis* flower

4.1.1 Other Significant Flora

4.1.1.1 Range Extensions

Based on the records included on *NatureMap* (DPaW 2007-2015), the taxa shown in **Table 5** are recorded as significant range extensions of greater than 100 km from the nearest record. Range extensions were assessed using the *NatureMap* (DPaW 2007-2015) distance measuring tool. Fifty eight taxa were recorded outside their known range of distribution (by at least 100 km) or filling a significant gap in the known distribution.

Table 5: Range extensions recorded in the study area.

TAXON	APPROXIMATE DISTANCE FROM THE NEAREST RECORD	BIOREGIONAL EXTENSION
<i>Abutilon malvifolium</i>	210 km SW	Yes
<i>Acacia craspedocarpa</i>	260 km N	-
<i>Blumea tenella</i>	130 km SW	-
<i>Bonamia media</i>	150 km SW	-
<i>Bonamia pilbarensis</i>	150 km S	Yes
<i>Calotis porphyroglossa</i>	100 km (range gap)	-
<i>Corchorus sidoides</i> subsp. <i>sidoides</i>	220 km S	Yes
<i>Corchorus tridens</i>	140 km SW	Yes
* <i>Cucumis myriocarpus</i>	240 km NW	-
<i>Cullen graveolens</i>	180 km (range gap)	-
<i>Dodonaea pinifolia</i>	270 km N	-
<i>Echinochloa colona</i>	170 km S	Yes
<i>Elacholoma hornii</i>	280 km SW	Yes
<i>Eragrostis amabilis</i>	1160 km SW	Yes
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	120 km S	Yes
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>	100 km W	-
<i>Eriochiton sclerolaenoides</i>	240 km NW	-
<i>Euphorbia coghlanii</i>	160 km (range gap)	-
<i>Goodenia berringbinensis</i>	130 km (range gap)	-
<i>Goodenia maideniana</i>	320 km N	-
<i>Goodenia nuda</i>	160 km SE	-
<i>Gymnanthera cunninghamii</i> (P3)	170 km (range gap)	Yes
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	240 km (range gap)	-
<i>Hibiscus verdcourtii</i>	200 km SW	Yes
<i>Hypericum gramineum</i>	200 km NW	-
<i>Ipomoea coptica</i>	170 km SE	Yes
<i>Ipomoea plebeia</i>	160 km SW	Yes
<i>Ipomoea polymorpha</i>	220 km S	Yes
* <i>Lolium multiflorum</i>	180 km W	-
<i>Lysiana exocarpi</i>	150 km NE	-
<i>Melhania oblongifolia</i>	220 km S	Yes
<i>Menkea sphaerocarpa</i>	350 km NW	-
<i>Najas tenuifolia</i>	190 km (range gap)	Yes
<i>Notoleptopus decaisnei</i>	140 km SW	Yes
<i>Oldenlandia galioides</i>	150 km (range gap)	-
<i>Podolepis kendallii</i>	160 km N	-
<i>Portulaca intraterranea</i>	170 km SW	Yes
<i>Portulaca pilosa</i>	180 km SW	Yes

TAXON	APPROXIMATE DISTANCE FROM THE NEAREST RECORD	BIOREGIONAL EXTENSION
<i>Ptilotus auriculifolius</i>	120 km SW	-
<i>Scaevola tomentosa</i>	180 km NE	-
<i>Schoenoplectus laevis</i>	170 km SW	-
<i>Setaria surgens</i>	250 km (range gap)	-
<i>Sida</i> sp. Supplejack Station (T.S. Henshall 2345)	210 km SW	Yes
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	160 km SW	-
<i>Sida spinosa</i>	180 km SW	-
<i>Sporobolus blakei</i>	270 km (range gap)	-
<i>Swainsona longipilosa</i>	130 km (range gap)	-
<i>Swainsona oroboides</i>	260 km NW	-
<i>Swainsona rotunda</i>	100 km NW	-
<i>Triglochin hexagona</i>	280 km (range gap)	-
<i>Urochloa occidentalis</i> var. <i>ciliata</i>	170 km (range gap)	-
<i>Urochloa subquadripara</i>	250 km W	-
<i>Vigna lanceolata</i>	150 km S	-
<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	190 km S	Yes
<i>Wurmbea fluviatilis</i>	100 km NW	-
<i>Zygophyllum aurantiacum</i> subsp. <i>aurantiacum</i>	160 km N	-
<i>Zygophyllum eichleri</i>	110 km W	-

4.1.1.2 New (Undescribed) Species

Elacholoma sp. 'Showy Flowers'

Elacholoma sp. 'Showy Flowers' is a prostrate annual herb with long, cream-coloured flowers (**Plate 16**) that was typically recorded from seasonally inundated clay swamps (**Plate 17**) corresponding with the **AaSaEs** and **EvReMg** vegetation types. It is understood that this taxon is soon to be recognised as a 'phrase name' taxon on FloraBase (M. Hislop¹, W.R. Barker² pers. comm.), and may be listed as Priority Flora.

Elacholoma sp. 'Showy Flowers' was recorded from five scattered locations within the study area (**Map 6**) totalling an estimated 1 251 plants. It was associated with seasonally inundated clay swamps (**Plate 17**), commonly co-occurring with *Elacholoma hornii*. These swampy areas were inundated during the both phases of survey (particularly phase one) due to heavy rainfall events during March 2015.



Plate 16: *Elacholoma* sp. 'Showy Flowers' flowering plant



Plate 17: *Elacholoma* sp. 'Showy Flower' habitat

4.1.1.3 Flora Having Anomalous Features

Hybanthus aurantiacus typically has orange flowers; the majority of records within the study area represented this typical form. A red flowered form of *Hybanthus aurantiacus* was also occasionally observed and collected within the study area. This form was also unusual in having erect flowers, compared with flowers drooping in the more typical *H. aurantiacus* plants observed within the study area and elsewhere. In all observed situations it was co-occurring with the typical orange flowered form and considered therefore likely to represent an unusual phenotypic variation of the species, rather than a distinctive (new) species.

4.1.2 Introduced Flora

Twenty four introduced (weed) species were recorded during the field survey. Their locations are shown on **Map 7**.

Two Declared Pest species **Argemone ochroleuca* (Mexican Poppy) and **Datura leichhardtii* (Native Thornapple) were recorded from the study area which are classified as C3 management for the Upper Gascoyne LGA, Western Australia. These species were typically observed in riparian areas. None of the

¹ M. Hislop: Western Australian Herbarium

² W.R. Barker: State Herbarium of South Australia

recorded species are included on any other weed lists maintained by DoE and Weeds Australia, including WONS, the National Environmental Alert List, Sleeper Weeds, Species Targeted for Eradication and Target Species for Biological Control.

The introduced species and their listing against the various weed classification categories (**Section 2.3.2.9**) are shown in **Table 6** below.

Table 6: Weed classification categories

SPECIES	COMMON NAME	DP	DEC WEED PRIORITIZATION RANK+			DPAW RANK++
			Ecol. Impact	Invasiveness	Control	
* <i>Acetosa vesicaria</i>	Ruby Dock	-	U	M	H	Negligible
* <i>Argemone ochroleuca</i>	Mexican Poppy	Y	U	R	L	Low
* <i>Asphodelus fistulosus</i>	Onion Weed	-	M	R	L	Low
* <i>Bidens subalternans</i> var. <i>simulans</i>		-	-	-	-	Unrated
* <i>Cenchrus ciliaris</i>	Buffel Grass	-	H	R	H	Low
* <i>Cenchrus setiger</i>	Birdwood Grass	-	H	R	M	Moderate
* <i>Chenopodium murale</i>	Nettle-leaf Goosefoot	-	L	R	U	Low
* <i>Citrullus lanatus</i>	Pie Melon	-	U	R	H	Moderate
* <i>Cucumis myriocarpus</i>	Prickly Paddy Melon	-	U	R	H	Moderate
* <i>Cuscuta planiflora</i>		-	U	R	L	Negligible
* <i>Cynodon dactylon</i>	Couch	-	H	R	M	Moderate
* <i>Datura leichhardtii</i>		Y	L	S	U	Low
* <i>Echinochloa colona</i>		-	-	-	-	Unrated
* <i>Eragrostis amabilis</i>		-	-	-	-	Unrated
* <i>Flaveria trinervia</i>		-	-	-	-	Unrated
* <i>Lolium multiflorum</i>	Italian Ryegrass		U	R	H	Low
* <i>Lysimachia arvensis</i>	Pimpernel	-	U	R	H	Low
* <i>Malvastrum americanum</i>		-	H	R	M	Very High
* <i>Setaria verticillata</i>		-	L	M	U	Negligible
* <i>Sisymbrium erysimoides</i>	Smooth Mustard		U	U	U	Low
* <i>Sisymbrium orientale</i>	Indian Hedge Mustard		U	U	U	Low
* <i>Sonchus oleraceus</i>	Common Sowthistle	-	U	R	L	Low
* <i>Tribulus terrestris</i>	Caltrop	-	L	R	H	Moderate
* <i>Vachellia farnesiana</i>	Needle Bush	-	H	R	L	Moderate

DP = Declared Pest plant; WONS = Weeds of National Significance

+DEC Weed Prioritization Rank (2008; 2011):

- Ecological Impact: High, Medium, Low, Unknown
- Invasiveness: Rapid, Moderate, Slow, Unknown
- Feasibility of Control: High, Medium, Low, Unknown.

++DPaW Weed Prioritisation Process Rank (DPaW 2013a; 2013b)

4.1.2.1 Introduced Flora Descriptions

****Acetosa vesicaria* (Ruby Dock)**

Acetosa vesicaria* (Ruby Dock) is a fleshy annual herb to 1 m high (*FloraBase*, WAH 1998-2015) but usually smaller, found over much of Western Australia except the far southern, far northern and desert regions. It is readily identified by its bright red fruit (Plate 18**). **Acetosa vesicaria* populations were recorded to be scattered across the study area (**Map 7**).



Plate 18: **Acetosa vesicaria*

****Argemone ochroleuca* (Mexican Poppy)**

Argemone ochroleuca* (Mexican Poppy) is a spiny, grey leaved annual herb to 1 m high (*FloraBase*, WAH 1998-2015) (Plate 19**). It occurs from near Perth northwards, particularly in the Gascoyne, Carnarvon and Pilbara bioregions. It was typically recorded from sandy creek beds of the largest drainage lines within the study area (e.g. Lyons and Edmund Rivers, **Map 7**).



Plate 19: **Argemone ochroleuca*

****Asphodelus fistulosus* (Onion Weed)**

Asphodelus fistulosus* (Onion Weed) is a short-lived perennial herb to 0.4 m high (*FloraBase*, WAH 1998-2015) (Plate 20**). It is widespread in Western Australia from the Pilbara southwards. This species was widespread across the study area (**Map 7**), typically occurring in drainage lines.



Plate 20: **Asphodelus fistulosus*

****Bidens subalternans var. simulans***

The genus *Bidens* has recently been the subject of a taxonomic revision. According to this treatment the taxon recorded within the study area is considered to be **Bidens subalternans var. simulans* based on distribution and morphology (Orchard 2015). This taxon was, until recently, referred to as **Bidens bipinnata* (Bipinnate Beggartick). *FloraBase* (WAH 1998-2015) lists only **B. bipinnata* and **B. pilosa* as occurring within Western Australia as it is presumably yet to integrate the updated taxonomy. Regardless of the nomenclature, the species recorded within the study area is considered to be an introduced taxon. It is an annual herb to 0.5 m high with narrow, black fruits that have barbed awns at one end. Scattered populations of **Bidens subalternans var. simulans* were recorded across the study area (Plate 21, Map 7), most prolific in the vicinity of drainage lines or the bases of large granite outcrops.



Plate 21: **Bidens subalternans var. simulans*

****Cenchrus ciliaris* (Buffel Grass)**

**Cenchrus ciliaris* (Buffel Grass) is a perennial tussock-forming grass to 1.5 m high (*FloraBase*, WAH 1998-2015) but usually grazed to a lower height. It is found throughout much of Western Australia. Within the study area it was widespread (Map 7), mostly confined to drainage lines where it was sometimes a dominant species in the ground stratum (Plate 22). **Cenchrus ciliaris* was historically either deliberately planted for pasture or accidentally introduced (Van Vreeswyk *et al.* 2004).



Plate 22: **Cenchrus ciliaris*

****Cenchrus setiger* (Birdwood Grass)**

Cenchrus setiger* (Birdwood Grass) is a perennial tussock-forming grass to 0.5 m high found throughout much of northern Western Australia (*FloraBase*, WAH 1998-2015). Within the study area it was occasionally recorded (Plate 23, Map 7**), typically from major drainage lines where it was generally growing with Buffel Grass.



Plate 23: **Cenchrus setiger*

****Chenopodium murale* (Nettle-leaf Goosefoot)**

Chenopodium murale* (Nettle-leaf Goosefoot) is an annual herb to 1 m high (*FloraBase*, WAH 1998-2015). It is widespread across Western Australia southwards of the Pilbara region. This species was recorded from a single location on the Lyons River at the southern boundary of the study area (Map 7**).

****Citrullus lanatus* (Pie Melon)**

Citrullus lanatus* (Pie Melon) is an annual creeping herb (*FloraBase*, WAH 1998-2015); it is a wild relative of the watermelon. This species is widespread across Western Australia. Within the study area it was recorded from four locations near the western and southern boundaries (Plate 24, Map 7**).



Plate 24: **Citrullus lanatus*

****Cucumis myriocarpus* (Prickly Paddy Melon)**

Cucumis myriocarpus* (Prickly Paddy Melon) is a prostrate annual herb (*FloraBase*, WAH 1998-2015) with large spikey fruits. It is widespread across southern Western Australia. This species was recorded from one location near the southern boundary of the study area (Map 7**). This record represents a substantial range extension for this weed, 240 km northwest of the nearest known location.

****Cuscuta planiflora***

Cuscuta planiflora* is a parasitic twining annual herb or climber with white flowers (*FloraBase*, WAH 1998-2015). This species is known to occur from Perth though the Mid-West region of Western Australia. Within the study area it was recorded from a single location (quadrat HY15051, **Map 7).

****Cynodon dactylon* (Couch)**

Cynodon dactylon* (Couch) is a stoloniferous, rhizomatous perennial grass (Plate 25**) found over much of Western Australia (*FloraBase*, WAH 1998-2015). It was recorded from the southern portion of the study area on the banks of the Lyons River (**Map 7**).



Plate 25: **Cynodon dactylon*

****Datura leichhardtii* (Native Thornapple)**

Datura leichhardtii* (Native Thornapple) is a stout annual herb to 1 m high with white flowers and distinctive spikey fruits (*FloraBase*, WAH 1998-2015) (Plate 26**). This species is known to occur within the Carnarvon,

Gascoyne and Pilbara bioregions of Western Australia. It was typically recorded within mid-order to major drainage lines across the study area (**Map 7**), where it was frequently a dominant species in the ground stratum.



Plate 26: **Datura leichhardtii*

****Echinochloa colona* (Awnless Barnyard Grass)**

Echinochloa colona* (Awnless Barnyard Grass) is an annual grass to 0.6 m high, recorded from northern Western Australia with a few records in the vicinity of Perth (*FloraBase*, WAH 1998-2015). It was recorded several locations across the study area (Map 7**), typically on the banks of mid-order to major drainage lines.

****Eragrostis amabilis***

Eragrostis amabilis* (Awnless Barnyard Grass) is an erect annual grass to 0.6 m high, known from the Kimberley region of Western Australia (*FloraBase*, WAH 1998-2015). A single population of this species was recorded from a mid-order drainage line in the northern section of the study area (Map 7**), representing a substantial range extension for this weed of approximately 1 160 km to the southwest.

****Flaveria trinervia* (Speedy Weed)**

Flaveria trinervia* (Speedy Weed) is an annual herb with distinctive red stems and three-veined leaves (Plate 27**), found over much of northern Western Australia (*FloraBase*, WAH 1998-2015). It was recorded from numerous locations across the study area (**Map 7**), typically associated with drainage lines. **Flaveria trinervia* is listed as 'alien' on *FloraBase* (*FloraBase*, WAH 1998-2015) however it is not included on the DPaW Weed Prioritization list (DPaW 2013b) nor any other list in **Section 2.3.2.9**, nor in Hussey *et al.* (2007) or the WAOL (DAFWA 2015), indicating there is doubt that it is introduced.



Plate 27: **Flaveria trinervia*

****Lolium multiflorum* (Italian Ryegrass)**

Lolium multiflorum* (Italian Ryegrass) is a short-lived perennial or annual grass to 1.2 m high (*FloraBase*, WAH 1998-2015). It has typically been recorded between Shark Bay and Albany (Hussey *et al.* 2007), with an outlier population in the northern Gascoyne. A single plant of this species was recorded on the banks of a Lyons River tributary, near the southern boundary of the study area (Map 7**).

****Lysimachia arvensis* (Pimpernel)**

Lysimachia arvensis* (Pimpernel) is an annual herb to 0.3 m high with blue or orange flowers (*FloraBase*, WAH 1998-2015). It is widespread across southern Western Australia. Three isolated locations of *Lysimachia arvensis* were recorded within the study area (Map 7**).

****Malvastrum americanum* (Spiked Malvastrum)**

Malvastrum americanum* (Spiked Malvastrum) is a perennial herb or shrub to 1.3 m high (*FloraBase*, WAH 1998-2015), although it was generally less than 0.5 m high in the study area (Plate 28**). It is found over much of northern Western Australia. **Malvastrum americanum* was recorded from numerous populations across the study area (**Map 7**), typically associated with drainage lines.



Plate 28: **Malvastrum americanum*

****Setaria verticillata* (Whorled Pigeon Grass)**

Setaria verticillata* (Whorled Pigeon Grass) is an annual grass to 1 m high although usually less, and is found over much of Western Australia (*FloraBase*, WAH 1998-2015). Numerous locations of **Setaria verticillata* were recorded across the study area (Plate 29, Map 7**), it was associated with drainage lines.



Plate 29: **Setaria verticillata*

****Sisymbrium erysimoides* (Smooth Mustard)**

Sisymbrium erysimoides* (Smooth Mustard) is an erect annual herb with yellow flowers to 0.8 m high (*FloraBase*, WAH 1998-2015) (Plate 30**), widespread across southern Western Australia. This species was recorded from a single population within the study area on the Lyons River (**Map 7**).



Plate 30: **Sisymbrium erysimoides*

****Sisymbrium orientale* (Indian Hedge Mustard)**

Sisymbrium orientale* (Indian Hedge Mustard) is an erect annual herb with yellow flowers to 1 m high (*FloraBase*, WAH 1998-2015), widespread south of the Pilbara in Western Australia. This species was recorded from two locations within the study area (Map 7**), both on the Edmund River near the western boundary.

****Sonchus oleraceus* (Common Sowthistle)**

Sonchus oleraceus* (Common Sowthistle) is an erect annual herb to 1.5 m high, found over much of Western Australia (*FloraBase*, WAH 1998-2015). Within the study area **Sonchus oleraceus* was recorded from six locations within the study area (Map 7**), associated with the Lyons and Edmund Rivers.

****Tribulus terrestris* (Caltrop)**

Tribulus terrestris* (Caltrop) is a prostrate annual herb with yellow flowers and spiny fruits (*FloraBase*, WAH 1998-2015) that is widespread across Western Australia. Six locations with **Tribulus terrestris* were recorded from the study area (Map 7**), all near the southern boundary.

****Vachellia farnesiana* (Mimosa Bush)**

Vachellia farnesiana* (Mimosa Bush) is a thorny shrub or tree to 4 m high (Plate 31**), found over much of Western Australia except southern and eastern parts (*FloraBase*, WAH 1998-2015). **Vachellia farnesiana* was recorded from several locations near the southern boundary of the study area (**Map 7**) where it was associated with drainage lines or clay swamps.



Plate 31: **Vachellia farnesiana*

4.2 VEGETATION TYPES

Twenty vegetation types were recorded from the study area; their extents are listed in **Table 7**, with detailed descriptions below. Ten of these vegetation types have not been mapped as occurring within the proposed development footprint. None of the mapped vegetation types are restricted to the proposed development footprint. Vegetation type **AtGc** has the highest proportion of its extent within the proposed development footprint; all other vegetation types are less than 10%. The **EeAc** and **EpAc** vegetation types occupy a total of 81.8% of the proposed development footprint.

Map 8 shows the distribution of the vegetation types within the study area. The floristics dendrogram that was used to inform the vegetation type groupings is included in **Appendix Eight**.


Table 7: Vegetation types and their extents within the study area


CODE	VEGETATION TYPE	QUADRATS	AREA (HA)	% OF STUDY AREA (%)	AREA IN DEV. FOOTPRINT (ha)	% OF VEG. TYPE	% OF DEV. FOOTPRINT
AaEpDr	<i>Acacia aptaneura</i> low open woodland over <i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> , <i>Acacia tetragonophylla</i> and <i>Dodonaea petiolaris</i> mid open shrubland over <i>Dysphania rhadinostachya</i> , <i>Bulbostylis barbata</i> and <i>Gomphrena cunninghamii</i> low open forbland/ sedgeland	HY15017, HY15018, HY15020, HY15087	516.9	0.97	18.61	3.60	1.93
AaSaEs	<i>Acacia aptaneura</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>oligophylla</i> low sparse shrubland over <i>Eragrostis setifolia</i> and <i>Eragrostis tenellula</i> low tussock grassland	HY15057	44.5	0.08	-	-	-
AcAc	<i>Acacia curryana</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila exilifolia</i> mid sparse shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland	HY15055, HY15076, HY15079, HY15082, HY15093, HY15095	3,337.0	6.23	-	-	-
AcAsCc	<i>Acacia citrinoviridis</i> and <i>Eucalyptus victrix</i> low open woodland over <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>A. cuthbertsonii</i> subsp. <i>cuthbertsonii</i> tall sparse shrubland over * <i>Cenchrus ciliaris</i> and * <i>C. setiger</i> mid tussock grassland	HY15023, HY15026, HY15058, HY15068	1,587.7	2.97	-	-	-
AcEt	<i>Acacia cyperophylla</i> var. <i>cyperophylla</i> low open woodland over <i>Eragrostis tenellula</i> , <i>Eragrostis cumingii</i> and <i>Eriachne aristidea</i> low tussock grassland	HY15001, HY15014, HY15037, HY15083	1,967.3	3.67	60.53	3.08	6.28
ApAsEp	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia sibirica</i> , <i>A. tetragonophylla</i> and <i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> mid sparse shrubland over <i>Eriachne pulchella</i> subsp. <i>dominii</i> low sparse tussock grassland	HY15042	159.2	0.30	-	-	-


CODE	VEGETATION TYPE	QUADRATS	AREA (HA)	% OF STUDY AREA (%)	AREA IN DEV. FOOTPRINT (ha)	% OF VEG. TYPE	% OF DEV. FOOTPRINT
ApSgAc	<i>Acacia pruinocarpa</i> and <i>Grevillea berrycana</i> low open woodland over <i>Senna glutinosa</i> subsp. x <i>luerssenii</i> and <i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> mid sparse shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland	HY15011, HY15039	2,649.4	4.95	67.33	2.54	6.99
ArPc	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A aptaneura</i> and <i>A. pruinocarpa</i> low woodland over <i>Paspalidium clementii</i> and <i>Dysphania rhadinostachya</i> low grassland/forbland	HY15045, HY15051, HY15052, HY15086	210.6	0.39	2.66	1.26	0.28
AsFh	<i>Acacia synchronicia</i> and <i>Eremophila cuneifolia</i> mid sparse shrubland over <i>Frankenia hispidula</i> and <i>Aristida contorta</i> low open shrubland/ grassland	HY15103	26.9	0.05	-	-	-
AtGc	<i>Acacia tetragonophylla</i> , <i>Dodonaea petiolaris</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> mid open shrubland over <i>Gomphrena cunninghamii</i> , <i>Aristida contorta</i> and <i>Cymbopogon ambiguus</i> low open forbland/grassland	HY15094, HY15102	21.9	0.04	6.77	30.96	0.70
AxEcAc	<i>Acacia xiphophylla</i> , <i>A. synchronicia</i> and <i>A. macraneura</i> low open woodland over <i>Eremophila cuneifolia</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>S. glutinosa</i> subsp. x <i>luerssenii</i> mid open shrubland over <i>Aristida contorta</i> and <i>Enneapogon caeruleus</i> low sparse tussock grassland	HY15004, HY15005, HY15007, HY15033, HY15040, HY15046, HY15047, HY15056, HY15069, HY15074, HY15097, HY15098, HY1509	8,079.1	15.09	16.74	0.21	1.74
EcBp	<i>Eremophila cuneifolia</i> and <i>Scaevola spinescens</i> mid sparse shrubland over <i>Brachyachne prostrata</i> and <i>Sclerolaena eriacantha</i> low sparse grassland/chenopod shrubland	HY15077, HY15089	1,062.6	1.98	-	-	-
EcMgCc	<i>Eucalyptus camaldulensis</i> mid woodland over <i>Melaleuca glomerata</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> tall shrubland over * <i>Cenchrus ciliaris</i> mid tussock grassland	HY15010, HY15024, HY15049, HY15078, HY15081	447.6	0.84	-	-	-
EeAc	<i>Eremophila exilifolia</i> , <i>Acacia tetragonophylla</i> and <i>A. kempeana</i> mid open shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low sparse tussock grassland	HY15003, HY15008, HY15027, HY15030, HY15032, HY15035, HY15038	4,175.4	7.80	413.69	9.91	42.93


CODE	VEGETATION TYPE	QUADRATS	AREA (HA)	% OF STUDY AREA (%)	AREA IN DEV. FOOTPRINT (ha)	% OF VEG. TYPE	% OF DEV. FOOTPRINT
EfAc	<i>Eremophila flaccida</i> , <i>Acacia tetragonophylla</i> and <i>E. phyllopoda</i> mid sparse shrubland over <i>Aristida contorta</i> , <i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO19/06), <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland/forbland	HY15041, HY15050, HY15054, HY15071, HY15072, HY15096	2,498.9	4.67	-	-	-
EpAc	<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> , <i>Acacia tetragonophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> mid open shrubland over <i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Portulaca oleracea</i> low grassland/forbland	HY15002, HY15006, HY15009, HY15012, HY15013, HY15015, HY15016, HY15019, HY15021, HY15028, HY15029, HY15031, HY15044, HY15060, HY15070, HY15075, HY15080, HY15084, HY15092, HY15100, HY15101	25,722.6	48.04	374.28	1.46	38.84
EvCc	<i>Eucalyptus victrix</i> and <i>Acacia citrinoviridis</i> mid open forest over * <i>Cenchrus ciliaris</i> and * <i>C. setiger</i> mid tussock grassland	HY15022, HY15034, HY15043	685.9	1.28	0.39	0.06	0.04
EvReMg	<i>Eucalyptus victrix</i> low open woodland over <i>Rhagodia eremaea</i> and * <i>Vachellia farnesiana</i> mid sparse shrubland over <i>Mimulus gracilis</i> , <i>Panicum laevinode</i> and <i>Ammannia multiflora</i> low forbland/grassland	HY15090, HY15091	42.5	0.08	-	-	-
Fs	<i>Frankenia setosa</i> , <i>Sclerolaena medicaginoides</i> and <i>Maireana georgei</i> low open shrubland	HY15085	28.6	0.05	-	-	-
Mp	<i>Maireana ?polypterygia</i> , <i>Lawrencina densiflora</i> and <i>Eremophea spinosa</i> low open chenopod shrubland/forbland	HY15036, HY15088	279.1	0.52	2.74	0.98	0.28
Total			53,544	100	963.7		100


4.2.1.1 Vegetation Descriptions


Vegetation Code	AaEpDr
Vegetation type description	<i>Acacia aptaneura</i> low open woodland over <i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> , <i>Acacia tetragonophylla</i> and <i>Dodonaea petiolaris</i> mid open shrubland over <i>Dysphania rhadinostachya</i> , <i>Bulbostylis barbata</i> and <i>Gomphrena cunninghamii</i> low open forbland/sedgeland
Quadrats/relevés	HY15017, HY15018, HY15020, HY15087
Vegetation Condition	Excellent
Associated landform(s)	Hills, upper slope
Soil	Red brown clay loam
Geology	Granite
Conservation significant flora	<i>Rhodanthe frenchii</i> (P2)
Floristic notes	Quadrats representing AaEpDr (with the exception of HY15087) formed a distinct cluster in the dendrogram. These quadrats are floristically similar to quadrats belonging to AxEcAc and AtGc
Photograph	


Vegetation Code	AaSaEs
Vegetation type description	<i>Acacia aptaneura</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>oligophylla</i> low sparse shrubland over <i>Eragrostis setifolia</i> and <i>Eragrostis tenellula</i> low tussock grassland
Quadrats/relevés	HY15057
Vegetation Condition	Very Good
Associated landform(s)	Minor depression
Soil	Red brown clay
Geology	Quartz
Conservation significant flora	<i>Goodenia berringbinensis</i> (P4), <i>Elacholoma</i> sp. 'Showy Flowers'
Floristic notes	AaSaEs is distinctive vegetation type represented by a single quadrat. It is floristically most similar to the two quadrats representing EvReMg
Photograph	


Vegetation Code	AcAc
Vegetation type description	<i>Acacia curryana</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila exilifolia</i> mid sparse shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland
Quadrats/relevés	HY15055, HY15076, HY15079, HY15082, HY15093, HY15095
Vegetation Condition	Excellent
Associated landform(s)	Low hills, gentle slopes
Soil	Brown sandy loam or clay loam
Geology	Granite
Conservation significant flora	<i>Acacia curryana</i> (P1)
Floristic notes	Quadrats representing AcAc are characterised by <i>Acacia curryana</i> but do not form a distinct cluster in the dendrogram. This vegetation is part of a variable group of intergrading vegetation types occurring primarily on flats, undulating plains and hill slopes that are usually characterised by <i>Eremophila phyllopada</i> , <i>E. exilifolia</i> and/or <i>E. flaccida</i> (primarily vegetation types EpAc , EeAc , EfAc)
Photograph	


Vegetation Code	AcAsCc
Vegetation type description	<i>Acacia citrinoviridis</i> and <i>Eucalyptus victrix</i> low open woodland over <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>A. cuthbertsonii</i> subsp. <i>cuthbertsonii</i> tall sparse shrubland over * <i>Cenchrus ciliaris</i> and * <i>C. setiger</i> mid tussock grassland
Quadrats/relevés	HY15023, HY15026, HY15058, HY15068
Vegetation Condition	Good
Associated landform(s)	River, outwash
Soil	Red brown loam or loamy sand
Geology	Alluvial
Conservation significant flora	<i>Solanum octonum</i> (P2)
Floristic notes	Quadrats representing AcAsCc form a distinctive cluster in the dendrogram together with other floristically similar quadrats representing <i>Eucalyptus camaldulensis</i> and <i>E. victrix</i> dominated creek lines and rivers (EcMgCc and EvCc)
Other notes	Potential GDE
Photograph	


Vegetation Code	AcEt
Vegetation type description	<i>Acacia cyperophylla</i> var. <i>cyperophylla</i> low open woodland over <i>Eragrostis tenellula</i> , <i>Eragrostis cumingii</i> and <i>Eriachne aristidea</i> low tussock grassland
Quadrats/relevés	HY14001, HY15014, HY15037, HY15083
Vegetation Condition	Very Good, Excellent
Associated landform(s)	Creek
Soil	Sand, gravel
Geology	Alluvial
Conservation significant flora	<i>Goodenia berringbinensis</i> (P4), <i>Sporobolus blakei</i> (P3), <i>Wurmbea fluviatilis</i> (P2)
Floristic notes	Quadrats representing AcEt form a distinct cluster in the dendrogram, and are floristically most similar to vegetation type ArPc
Other notes	Potential GDE across a portion of the distribution (when containing <i>E. victrix</i>)
Photograph	


Vegetation Code	ApAsEp
Vegetation type description	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia sibirica</i> , <i>A. tetragonophylla</i> and <i>Eremophila phyllopada</i> subsp. <i>obliqua</i> mid sparse shrubland over <i>Eriachne pulchella</i> subsp. <i>dominii</i> low sparse tussock grassland
Quadrats/relevés	HY15042
Vegetation Condition	Excellent
Associated landform(s)	Low hills, gentle slopes
Soil	Red brown loam
Geology	Granite, quartz
Conservation significant flora	Nil
Floristic notes	Vegetation type ApAsEp is represented by a single quadrat that is floristically most similar to vegetation type AxEcAc
Other notes	The floristic quadrat is located in an area containing minimal <i>Acacia sibirica</i> . However this species is typical of the broader surrounding area.
Photograph	


Vegetation Code	ApSgAc
Vegetation type description	<i>Acacia pruinocarpa</i> and <i>Grevillea berryana</i> low open woodland over <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> and <i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> mid sparse shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland
Quadrats/relevés	HY14011, HY15039
Vegetation Condition	Excellent
Associated landform(s)	Flat
Soil	Red brown clay loam
Geology	Granite, gneiss
Conservation significant flora	Nil
Floristic notes	Quadrats representing vegetation type ApSgAc cluster together in the dendrogram, and are floristically most similar to quadrats representing vegetation types EfAc and EpAc . This vegetation type is part of a variable group of intergrading types occurring primarily on flats, undulating plains and hill slopes that are usually characterised by <i>Eremophila phyllopoda</i> , <i>E. exilifolia</i> and/or <i>E. flaccida</i> (primarily vegetation types EpAc , EeAc , EfAc)
Photograph	


Vegetation Code	ArPc
Vegetation type description	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. aptaneura</i> and <i>A. pruinocarpa</i> low woodland over <i>Paspalidium clementii</i> and <i>Dysphania rhadinostachya</i> low grassland/forbland
Quadrats/relevés	HY15045, HY15051, HY15052, HY15086
Vegetation Condition	Very Good, Excellent
Associated landform(s)	Flat, depression
Soil	Red brown clay loam
Geology	Alluvial
Conservation significant flora	<i>Goodenia berringbinensis</i> (P4), <i>Solanum octonum</i> (P2)
Floristic notes	Quadrats representing vegetation type ArPc form a distinct cluster in the dendrogram, and are floristically most similar to those representing vegetation type AcEt
Photograph	


Vegetation Code	AsFh
Vegetation type description	<i>Acacia synchronicia</i> and <i>Eremophila cuneifolia</i> mid sparse shrubland over <i>Frankenia hispidula</i> and <i>Aristida contorta</i> low open shrubland/grassland
Quadrats/relevés	HY15103
Vegetation Condition	Excellent
Associated landform(s)	Flat
Soil	Orange brown sandy loam
Geology	Quartz
Conservation significant flora	Nil
Floristic notes	Quadrats representing vegetation type ArPc form a distinct cluster in the dendrogram, and are floristically most similar to those representing vegetation type AcEt
Photograph	


Vegetation Code	AtGc
Vegetation type description	<i>Acacia tetragonophylla</i> , <i>Dodonaea petiolaris</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> mid open shrubland over <i>Gomphrena cunninghamii</i> , <i>Aristida contorta</i> and <i>Cymbopogon ambiguus</i> low open forbland/grassland
Quadrats/relevés	HY15094, HY15102
Vegetation Condition	Excellent
Associated landform(s)	Ironstone outcrops, crests
Soil	Skeletal loam or red brown clay loam
Geology	Ironstone
Conservation significant flora	<i>Rhodanthe frenchii</i> (P2)
Floristic notes	Quadrats representing vegetation type AtGc form a distinctive cluster in the dendrogram associated with ironstone outcrops and crests. These quadrats are nested within a larger cluster of quadrats belonging mostly to vegetation type AaEpDr
Photograph	


Vegetation Code	AxEcAc
Vegetation type description	<i>Acacia xiphophylla</i> , <i>A. synchronicia</i> and <i>A. macraneura</i> low open woodland over <i>Eremophila cuneifolia</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>S. glutinosa</i> subsp. <i>x luerssenii</i> mid open shrubland over <i>Aristida contorta</i> and <i>Enneapogon caerulescens</i> low sparse tussock grassland
Quadrats/relevés	HY14004, HY14005, HY14007, HY15033, HY15040, HY15046, HY15047, HY15056, HY15069, HY15074, HY15097, HY15098, HY1509
Vegetation Condition	Good, Very Good, Excellent
Associated landform(s)	Flat, low-lying
Soil	Brown, red brown clay loam
Geology	Mixed: calcrete, quartz, ironstone, granite
Conservation significant flora	<i>Goodenia nuda</i> (P4), <i>Rhodanthe frenchii</i> (P2, from isolated outcrops), <i>Sporobolus blakei</i> (P3, from minor drainage lines too small to map)
Floristic notes	Quadrats representing vegetation type AxEcAc (together with several quadrats representing vegetation types Mp , EcBp , ApAsEp , and AsFh) form a large, floristically variable cluster in the dendrogram
Photograph	


Vegetation Code	EcBp
Vegetation type description	<i>Eremophila cuneifolia</i> and <i>Scaevola spinescens</i> mid sparse shrubland over <i>Brachyachne prostrata</i> and <i>Sclerolaena eriacantha</i> low sparse grassland/chenopod shrubland
Quadrats/relevés	HY15077, HY15089
Vegetation Condition	Very Good, Excellent
Associated landform(s)	Flat
Soil	Brown loam
Geology	Granite, calcrete
Conservation significant flora	<i>Goodenia berringbinensis</i> (P4), <i>Elacholoma</i> sp. 'Showy Flowers' (both from isolated clay swamps within this vegetation type that are too small to map)
Floristic notes	Quadrats representing vegetation types EcBp and Mp together form a cluster that is floristically similar to the more widespread vegetation type AxEcAc
Photograph	


Vegetation Code	EcMgCc
Vegetation type description	<i>Eucalyptus camaldulensis</i> mid woodland over <i>Melaleuca glomerata</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> tall shrubland over * <i>Cenchrus ciliaris</i> mid tussock grassland
Quadrats/relevés	HY14010, HY15024, HY15049, HY15078, HY15081
Vegetation Condition	Poor, Good, Very Good
Associated landform(s)	River
Soil	Sand
Geology	Alluvial
Conservation significant flora	<i>Acacia curryana</i> (P1), <i>Gymnanthera cunninghamii</i> (P3), <i>Solanum octonum</i> (P2)
Floristic notes	Quadrats representing vegetation type EcMgCc form a distinctive cluster within the dendrogram together with other floristically similar quadrats representing <i>Acacia citrinoviridis</i> and <i>Eucalyptus victrix</i> dominated creek lines and rivers (vegetation types AcAsCc and EvCc)
Other notes	Considered a GDE
Photograph	


Vegetation Code	EeAc
Vegetation type description	<i>Eremophila exilifolia</i> , <i>Acacia tetragonophylla</i> and <i>A. kempeana</i> mid open shrubland over <i>Aristida contorta</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> low sparse tussock grassland
Quadrats/relevés	HY14003, HY14008, HY15027, HY15030, HY15032, HY15035, HY15038
Vegetation Condition	Excellent
Associated landform(s)	Low hills, gentle slopes
Soil	Brown sandy loam
Geology	Granite
Conservation significant flora	<i>Acacia curryana</i> (P1), <i>Rhodanthe frenchii</i> (P2), <i>Wurmbea fluviatilis</i> (P2, from minor drainage line too small to map)
Floristic notes	Quadrats representing vegetation type EeAc form a distinct cluster in the dendrogram, and are floristically similar to several quadrats representing vegetation type EpAc
Photograph	


Vegetation Code	EfAc
Vegetation type description	<i>Eremophila flaccida</i> , <i>Acacia tetragonophylla</i> and <i>E. phyllopoda</i> mid sparse shrubland over <i>Aristida contorta</i> , <i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO19/06), <i>Eriachne pulchella</i> subsp. <i>dominii</i> low grassland/forbland
Quadrats/relevés	HY15041, HY15050, HY15054, HY15071, HY15072, HY15096
Vegetation Condition	Excellent
Associated landform(s)	Flat
Soil	Red brown loam or clay loam
Geology	Granite, ironstone, quartz
Conservation significant flora	Nil
Floristic notes	Quadrats characterised by <i>Eremophila flaccida</i> representing vegetation type EfAc do not cluster together in the dendrogram, but form part of a broad group of intergrading vegetation types associated primarily with flats, undulating planes, and hill slopes that are usually characterised by <i>Eremophila</i> species (primarily vegetation types EpAc , EeAc , EfAc)
Photograph	

Vegetation Code	EpAc
Vegetation type description	<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i> , <i>Acacia tetragonophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> mid open shrubland over <i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Portulaca oleracea</i> low grassland/forbland
Quadrats/relevés	HY14002, HY14006, HY14009, HY14012, HY15013, HY15015, HY15016, HY15019, HY15021, HY15028, HY15029, HY15031, HY15044, HY15060, HY15070, HY15075, HY15080, HY15084, HY15092, HY15100, HY15101
Vegetation Condition	Very Good, Excellent
Associated landform(s)	Flat or Gently undulating landscape
Soil	Brown or red brown sandy loam or clay loam
Geology	Granite, quartz, ironstone
Conservation significant flora	<i>Acacia curryana</i> (P1), <i>Rhodanthe frenchii</i> (P2), <i>Wurmbea fluviatilis</i> (P2 drainage lines), <i>Goodenia berringbinensis</i> (P4, clay pans), <i>Sporobolus blakei</i> (P3, drainage lines), <i>Elacholoma</i> sp. 'Showy Flowers' (clay pans)
Floristic notes	Quadrats characterised by <i>Eremophila phyllopoda</i> representing vegetation type EpAc are floristically variable, not forming a distinct cluster in the dendrogram. This vegetation type forms a significant part of a variable group of intergrading vegetation types associated primarily with flats, undulating plains and hill slopes that are usually characterised by <i>Eremophila</i> species (primarily vegetation types EpAc , EeAc , EfAc)
Photograph	

Vegetation Code	EvCc
Vegetation type description	<i>Eucalyptus victrix</i> and <i>Acacia citrinoviridis</i> mid open forest over * <i>Cenchrus ciliaris</i> and * <i>C. setiger</i> mid tussock grassland
Quadrats/relevés	HY15022, HY15034, HY15043
Vegetation Condition	Good, Very Good
Associated landform(s)	Creek, river
Soil	Sand
Geology	Alluvial, granite
Conservation significant flora	<i>Solanum octonum</i> (P2), <i>Sporobolus blakei</i> (P3), <i>Wurmbea fluviatilis</i> (P2)
Floristic notes	Quadrats representing vegetation type EvCc form a distinctive cluster within the dendrogram together with other floristically similar quadrats representing <i>Eucalyptus camaldulensis</i> and <i>Acacia citrinoviridis</i> dominated creek lines and rivers (vegetation types EcMgCc and AcAsCc)
Other notes	Potential GDE
Photograph	

Vegetation Code	EvReMg
Vegetation type description	<i>Eucalyptus victrix</i> low open woodland over <i>Rhagodia eremaea</i> and * <i>Vachellia farnesiana</i> mid sparse shrubland over <i>Mimulus gracilis</i> , <i>Panicum laevinode</i> and <i>Ammannia multiflora</i> low forbland/grassland
Quadrats/relevés	HY15090, HY15091
Vegetation Condition	Very Good, Excellent
Associated landform(s)	Swamp
Soil	Brown clay
Geology	nil
Conservation significant flora	<i>Elacholoma</i> sp. 'Showy Flowers'
Floristic notes	Quadrats representing EvReMg cluster together as a floristically distinctive group in the dendrogram. They are most similar floristically to a quadrat associated with a Mulga dominated clay depression (vegetation type AaSaEs). Together, these quadrats are most similar floristically to quadrats associated with major creek lines and rivers (vegetation types AcAsCc , EcMgCc and EvCc)
Other notes	Potential GDE
Photograph	

Vegetation Code	Fs
Vegetation type description	<i>Frankenia setosa</i> , <i>Sclerolaena medicaginoidea</i> and <i>Maireana georgei</i> low open shrubland
Quadrats/relevés	HY15085
Vegetation Condition	Excellent
Associated landform(s)	Flat
Soil	Brown clayey sand
Geology	Nil
Conservation significant flora	Nil
Floristic notes	Fs is a floristically distinctive vegetation type represented by a single quadrat. In the dendrogram, this quadrat did not cluster closely with any other single quadrat
Photograph	

Vegetation Code	Mp
Vegetation type description	<i>Maireana ?polypterygia</i> , <i>Lawrencia densiflora</i> and <i>Eremophea spinosa</i> low open chenopod shrubland/forbland
Quadrats/relevés	HY15036, HY15088
Vegetation Condition	Excellent
Associated landform(s)	Flat
Soil	Brown loam or clay
Geology	Calcrete
Conservation significant flora	Nil
Floristic notes	Quadrats representing vegetation types Mp and EcBp together form a cluster that is floristically similar to the more widespread vegetation type AxEcAc
Photograph	

4.2.2 Vegetation Significance

4.2.2.1 Threatened Ecological Communities

None of the vegetation types recorded within the study area are considered likely to represent a TEC based on a comparison with current TEC listings for Western Australia (DPaW Species and Communities Branch 2015a). No TECs are currently listed for the Gascoyne bioregion (see **Section 2.3.3.2**), the nearest known TEC is approximately 360 km to the east.

4.2.2.2 Priority Ecological Communities

The PEC identified by the desktop assessment (**Section 2.3.3.3**) is based upon invertebrate assemblages and accordingly has not been assessed as part of the flora and vegetation survey. None of the mapped vegetation types are considered similar to PECs that are defined by flora and listed for the Midwest DPaW region (DPaW Species and Communities Branch 2015b).

4.2.2.3 Groundwater Dependent Ecosystems

Vegetation types with the phreatophytic species *Eucalyptus camaldulensis* are considered to represent a GDE. The **EcMgCc** vegetation type was dominated by *Eucalyptus camaldulensis* and is therefore considered as a GDE. This vegetation type occupied 447.6 ha (0.84% of the study area); it was not mapped within the proposed development footprint.

Vegetation characterised by *Eucalyptus victrix* that is considered either a vadophyte or only weakly phreatophytic (see **Section 2.3.3.4**) also occurred in the study area. The **EvCc** and **EvReMg** vegetation types were characterised by *Eucalyptus victrix* whilst the **AcEt** and **AcAsCc** occasionally contained this species and may therefore represent a GDE. These vegetation types occupied 685.9 ha (1.28%), 42.5 ha (0.08%), 1 967.3 ha (3.67%) and 1 587.7 ha (2.97%) of the study area respectively, collectively occupying 4 283.3 ha (8.0% of the study area), of which 60.9 ha is within the proposed development footprint.

4.2.2.4 Other Significant Vegetation

Significant according to *Guidance Statement No. 51*

There are very few comparable flora and vegetation survey reports available for the surrounding area and Gascoyne bioregion. Consequently it is difficult to assess with confidence the criteria listed in *Guidance Statement No. 51* (EPA 2004). The vegetation types that occupy less than 100 ha, and can be considered to have restricted distribution (at least within the study area), are:

- **AaSaEs** (44.49 ha; 0.08% of the study area)
- **AsFh** (26.88 ha; 0.05 % of the study area)
- **AtGc** (21.86 ha; 0.04% of the study area)
- **EvReMg** (42.51 ha; 0.08% of the study area)
- **Fs** (28.58 ha; 0.05% of the study area).

Land System Representation

Only one land system, Glenburgh, within the study area occupy less than 1 000 km² within the Gascoyne bioregion (**Table 2**) and could be considered as having a small regional extent (702.05 km²). The total extent of this land system within the study area (50.93 km²) represents 7.25% of the known Gascoyne extent, thus their significance within the study area is minimal.

Pre-European Vegetation Representation

All pre-European vegetation associations that occur within the study area have more than 99% of their original extent remaining in the Gascoyne bioregion (**Table 3**). Three of the four pre-European vegetation associations have an extent of <1% within the study area. Vegetation association 165 has the largest extent within the study area (30 841 ha) which represent 4.42% of the mapped extent.

4.2.2.5 Floristic Analysis

The dendrogram resulting from the hierarchical cluster analysis indicated a high degree of variation among quadrats in terms of their overall species composition. However, a number of broad floristic patterns were observed.

Supergroup 1 consisted of quadrats usually associated with rivers, major creek lines, swamps, and associated depressions, and included seven vegetation types. All of the quadrats characterised by *Eucalyptus camaldulensis*, *E. victrix*, and *Acacia citrinoviridis* that were associated with major creek lines and rivers (vegetation types **EcMgCc**, **EvCc**, and **AcAsCc**) formed a distinct cluster within this supergroup. Adjacent to this was a cluster consisting of quadrats characterised by *Acacia ramulosa* and *Acacia cyperophylla* var. *cyperophylla* (vegetation types **ArPc** and **AcEt**), that were usually associated with minor creek lines and depressions. A distinctive third group comprised three floristically similar quadrats associated with seasonally inundated swamps and clay depressions (vegetation types **EvReMg** and **AaSaEs**).

Supergroup 2 consisted of quadrats primarily associated with flats and undulating plains, and included five vegetation types. These were typically characterised by *Acacia xiphophylla* and/or *Acacia synchronicia* (vegetation types **AxEcAc**, **AsFh**), but several other distinctive vegetation types were nested within this variable cluster (vegetation types **Mp**, **EcBp**, and **ApAsEp**).

Supergroup 3 consisted of quadrats commonly associated with upper slopes and crests, and included three vegetation types. This group included quadrats characterised by *Acacia aneura* and *Eremophila phyllopoda* usually occurring on upper slopes (vegetation unit **AaEpDr**), as well as two quadrats characterised by *Acacia tetragonophylla*, *Dodonaea petiolaris*, and *Gomphrena cunninghamii* occurring on ironstone outcroppings (vegetation unit **AtGc**). A single quadrat representing vegetation unit **AxEcAc** (typical of supergroup 2) was included here.

Supergroup 4 consisted of quadrats usually associated with flats, undulating plains and hill slopes, and included four vegetation types. The vegetation types included in this group form part of a variable group of intergrading vegetation types usually characterised by *Acacia curryana* (**AcAc**), *Eremophila phyllopoda* (**EpAc**), *E. exillifolia* (**EeAc**) and/or *E. flaccida* (**EfAc**), none of which formed distinct clusters in the dendrogram.

Supergroup 5 consisted primarily of quadrats associated with granite boulders and outcroppings (vegetation type **EeAc**), but also included some quadrats representing units typical of supergroup 4 (**EpAc** and **AcAc**).

Supergroup 6 consisted of a single floristically distinctive quadrat representing vegetation type **Fs**. This quadrat did not cluster closely with any other single quadrat in the dendrogram.

4.2.3 Vegetation Condition

The vegetation condition recorded from 103 floristic quadrats ranged from Poor to Excellent within the study area, summarised in **Table 8** and shown in **Map 9**. The majority of sites (70.9%) were in Excellent condition. Completely Degraded areas occurred on tracks that intersect the study area, these were too small to map (at

the scale used) and were not represented by the flora sampling. In general, riparian vegetation types associated with drainage lines were in lesser condition than more upland sites due to impacts from weed infestations and grazing by cattle and other hooved mammals.

Table 8: Vegetation condition summary

VEGETATION CONDITION RATING	NUMBER OF FLORA QUADRATS	% OF QUADRATS
Excellent	73	70.87
Very Good	19	18.45
Good	10	9.71
Poor	1	0.97

4.3 ADEQUACY OF SAMPLING

4.3.1 Species Accumulation Curve

A species accumulation curve (**Figure 4**) was generated to display adequacy of sampling: if the curve has reached (or nearly reached) an asymptote, it is considered likely that most species have been recorded from the study area.

The species accumulation curve for the study area (not including regional quadrats) suggests that additional survey would increase the number of species recorded within the study area. The bootstrap estimate of species richness generated from this data indicates that 428.4 species could be expected from the study area. However, the total species count richness of the study area is 468 flora taxa, when opportunistic collections are included. Therefore Ecoscape considers that this survey has documented the vast majority of flora that may occur within the study area.

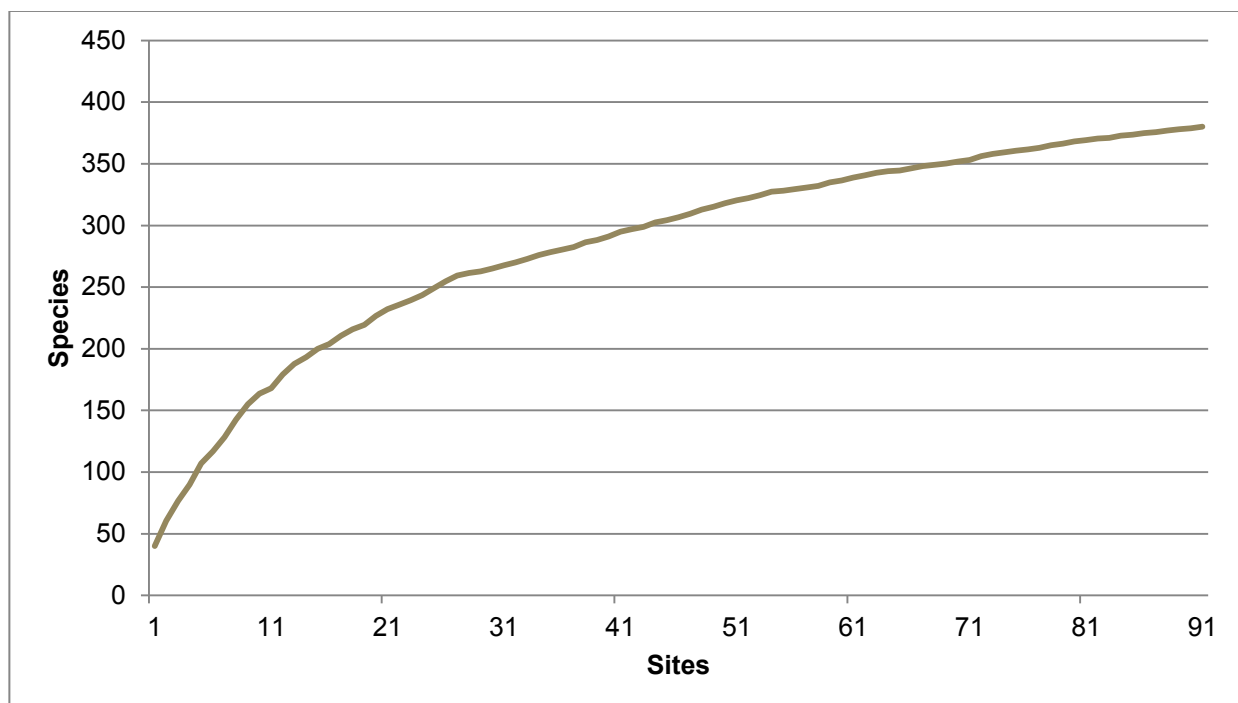


Figure 4: Species accumulation curve

4.4 BOTANICAL LIMITATIONS

There were few botanical limitations relevant to this survey, described in **Table 9**. The most significant limitation is the availability of other literature and survey reports relevant to the flora and vegetation of the region. This lack of information makes it difficult to accurately assess the significance of the flora and vegetation.

Table 9: Botanical limitations

POSSIBLE LIMITATIONS	CONSTRAINTS (YES/NO): SIGNIFICANT, MODERATE OR NEGLIGIBLE	COMMENT
Competency/experience of the consultant conducting the survey	No	The field team leaders conducting the field surveys have considerable experience conducting flora and vegetation surveys in the Eremaean Botanical Province of Western Australia. Stephen Kern has been conducting botanical surveys since 2005 (11 years) and Jared Nelson since 2008 (eight years).
Proportion of the flora identified	Yes: Negligible	468 flora taxa were recorded from the study area. Twenty six (5.6%) could not be identified to species level due to lack of reproductive material, however none were potentially of known conservation significance. Many of these specimens are likely to represent species already included in the inventory.
Proportion of the task achieved and further work that may need to be undertaken	Yes: Negligible	All areas targeted for flora sampling were accessible on foot during the field surveys. All vegetation types encountered have been represented by the flora sampling (quadrats). At the time of survey, potential development footprints had not been defined. Consequently this assessment documents the flora and vegetation of a large area. Future assessments (if required) may need to focus more on the area of direct impacts.
Timing/weather/season/cycle	No	The field surveys were conducted in May and August which is considered optimal for a two phase flora survey in the Gascoyne. The first phase (May) was conducted in the months following a period of exceptionally high rainfall in the region. The second phase (August) was conducted in late winter, during a period of heavy flowering for ephemeral flora species. Weather conditions during the field surveys were ideal to conduct botanical surveys, with no constraints.
Intensity of survey (e.g. In retrospect was the intensity adequate?)	Yes: Negligible	All areas targeted for flora sampling were accessible during the field surveys. All vegetation types considered present within the study area were sampled by floristic quadrats (typically at least 2 per vegetation type, occasionally a single quadrat for restricted vegetation types). The development footprint had not been defined when the field surveys were conducted (with the exception of specific drilling targets). The general development footprint has been surveyed at a slightly higher intensity, partly because of accessibility.
Completeness (e.g. Was relevant area fully surveyed?)	Yes: Negligible	As above.
Resources (e.g. Degree of expertise available for plant identification)	No	There is adequate information available to identify significant vegetation and flora of the area.
Remoteness and/or access problems	Yes: Negligible	The study area is relatively remote, with minimal vehicle access tracks traversing it. However, all areas are within 5 km distance of vehicle access and can be accessed on foot.
Availability of contextual (e.g. bioregional) information for the survey area	Yes: Moderate	There are no publicly available botanical reports for the surrounding region.

5.0 DISCUSSION

5.1 FLORA SIGNIFICANCE

A total of 472 vascular flora taxa were identified during the field survey, 5.5% of which could not be identified to species level. The proportion of taxa that could not be identified with certainty contains a significant number of taxa that are likely to be already represented in the flora inventory (for example *Roebuckiella ?cuneata*, *Calandrinia ?sp.* The Pink Hills).

The species accumulation curve, when taking into account opportunistic observations and plants collected during targeted searches for conservation significant flora, suggests that most species were likely to have been recorded during the field surveys. The heavy rainfall in the months prior to the phase one survey created excellent seasonal conditions, particularly evident in abundant flowering observed during phase two. Such excellent conditions increase the likelihood that the majority of species within the study area have been recorded.

Few botanical surveys have been conducted in nearby areas. It is therefore difficult to compare the study area species richness with comparable areas. In Ecoscape's experience, 472 species in an excellent season within a large study area is considered a moderate to high species diversity for the regions including the Gascoyne, Murchison and Pilbara.

5.1.1 Conservation Significant Flora

There were no flora taxa listed as TF under either the Commonwealth EPBC Act or Western Australian WC Act recorded from the study area.

Eight PF taxa were recorded from the study area:

- P1 - *Acacia curryana*
- P2 - *Rhodanthe frenchii*, *Solanum octonum* and *Wurmbea fluviatilis*
- P3 - *Gymnanthera cunninghamii* and *Sporobolus blakei*
- P4 - *Goodenia berringbinensis* and *Goodenia nuda*

Whilst there is no statutory protection for PF, in general, for clearing applications in Western Australia, proponents may be expected to minimise impacts on populations of these species. The potential impacts on each of these are discussed below. The proposed development footprint had not been identified at the time of survey and was therefore not searched at greater intensity than elsewhere. Consequently, it is considered possible that other conservation significant flora listed below may occur within this footprint.

***Acacia curryana* (P1)**

Acacia curryana was widespread and abundant within the study area, frequently a dominant component of the vegetation. A total of 7 754 plants were recorded during traverses of which 192 are mapped within the proposed development footprint (which has not been intensively surveyed). It is expected that the total population within the study area would be substantially higher than these numbers as only a small proportion of the study area was traversed. This species is poorly known, recorded from only four other locations. Additional new populations were also recorded opportunistically outside the study area during the field survey, particularly along the Cobra-Dairy Creek Road up to 85 km south of the study area (locations provided in **Appendix Six**).

Acacia curryana is clearly a poorly known species from few locations with a narrow geographic range. However, the potential impact from the current proposed development footprint is considered negligible, considering it is only likely to impact a small proportion the total population within the study area.

***Rhodanthe frenchii* (P2)**

Rhodanthe frenchii was widespread across the study area, though typically restricted to niche rocky habitats around boulders and outcrops. It was mainly detected during phase two when the plants were in flower. The excellent season is considered likely to have contributed to the number of plants/locations recorded. A total of 1 690 plants were recorded from traverses within the study area with 53 mapped within the proposed impact area. Both numbers are considered an under-estimate of the population size due to the small proportion of the study area that was traversed.

Considering the number of known populations of *Rhodanthe frenchii* (22), its geographic distribution (Gascoyne, Pilbara and Carnarvon bioregions; (DPaW 2007-2015)) and the small proportion of the population likely to be impacted by the proposed development footprint, the impact to this species is likely to be negligible.

***Solanum octonum* (P2)**

Scattered plants of *Solanum octonum* were recorded from seven locations near the western and southern boundaries of the study area. There are only four records of this species documented on *NatureMap* (DPaW 2007-2015).

There were no *Solanum octonum* plants recorded within the proposed development footprint, though it is possible that they could be scattered in riparian vegetation types mapped across that area. However, based on the low number of plants likely to be present within the development footprint (possibly none), the potential impact to this species is considered negligible.

***Wurmbea fluviatilis* (P2)**

Wurmbea fluviatilis was recorded from nine locations within the study area totalling 126 plants. It is considered likely that other isolated occurrences could occur throughout the study area within the extensive network of drainage lines. This is a poorly known species from four previously recorded locations with a narrow geographic range in the vicinity of Mount Augustus (DPaW 2007-2015).

Wurmbea fluviatilis was not recorded from traverses that were conducted within the proposed development footprint, though it is considered likely to be present within the riparian vegetation. Considering the limited geographic range and number of known populations, any impact to this species could potentially be considered significant. However, based on field observations and available literature it is likely that this species may only be detectable during favourable (above average) conditions which may explain its poorly known status within a region that has not been the subject of many detailed surveys.

***Gymnanthera cunninghamii* (P3)**

Gymnanthera cunninghamii was recorded from a single location on the banks of a large tributary of the Lyons River. It is the first known record of this species within the Gascoyne bioregion, however it has been recorded across a large geographic range over northern Australia. The location is outside of the proposed development footprint. It is considered unlikely that this species could occur within the proposed development footprint because the **EcMgCc** vegetation type (charactered by *Eucalyptus camaldulensis* on

large drainage lines) does not occur there. Therefore potential impact to *Gymnanthera cunninghamii* is considered likely to be nil.

***Sporobolus blakei* (P3)**

Sporobolus blakei was recorded from numerous locations associated with drainage lines of the study area. Whilst it was not recorded within the proposed development footprint, is considered likely to occur there based on the network of drainage lines that are habitat for this species that run through the area. However, any impact to this species is considered negligible based on the extensive geographic range of the species across Central Australia and the likely low proportion (if any) of the population within the proposed development footprint in relation to the total study area.

***Goodenia berringbinensis* (P4)**

Goodenia berringbinensis was recorded from nine isolated locations (325 plants) scattered across the study area, always associated with niche habitats of seasonally inundated clay pans or occasionally drainage lines. It is likely that additional populations may be scattered elsewhere within suitable habitat of the study area. Three locations were also recorded less than 1 km outside of the study area boundary.

Goodenia berringbinensis was not recorded within the proposed development footprint and is considered unlikely to occur due to lack of suitable habitat. Any impacts to *Goodenia berringbinensis* are considered negligible (possibly nil) based on the known geographic range of the species and likely low number of plants (if any) within the development footprint.

***Goodenia nuda* (P4)**

A single plant of *Goodenia nuda* was recorded, representing a range extension for the species. It is possible that this species could occur within the proposed development footprint based on vegetation type mapping. However any impacts to the total population of *Goodenia nuda* would be considered negligible as it is widespread in the Pilbara bioregion.

5.1.1.1 Conservation Significant Flora Likelihood Assessment

A conservation significant likelihood assessment was conducted for species identified by the desktop assessment and reviewed following the field survey (**Table 23**). Five of the conservation significant flora identified by the desktop assessment were not recorded within the study area during the field assessment. Their likelihood assessment is as follows:

- *Pityrodia angustissimus* (TF) is considered 'highly unlikely' as it has predominantly been recorded on the steep elevated slopes of Mount Augustus, therefore its known habitat is considered substantially different to any occurring within the study area.
- *Acacia petricola* (P2) is considered as 'unlikely' for the same reasons as *Pityrodia angustissimus*. Whilst a historical location is mapped on the western boundary of the study area, this location is considered inaccurate based on the documented description for the collection (see **Section 2.3.2.4**).
- *Lawrencia* sp. Anna Plains (N.T. Burbidge 1433) (P3) is considered 'possible' based on proximity and known habitat. The mapped location, to the east of the study area, is a significant outlier from most collections of this species (from close to the coast, south of Broome in the Kimberley bioregion). There is minimal information regarding the preferred habitat and, in the absence of such data, it is considered possible that this taxon could occur within the study area.
- *Maireana prosthochaeta* (P3) is considered 'possible' on the basis that the known habitat may occur within the study area and its scattered distribution across the Gascoyne and Murchison bioregions. However, there is limited information available regarding the specific preferred habitat of this species.

- *Lepidobolus densus* (P4) is considered 'highly unlikely'. The mapped location is a significant outlier from the general distribution of the species, approximately 60 km from the study area. However the description for the collection lists Yandanooka as the nearest town which is approximately 600 km south of the study area. Therefore the closest record for this species is considered inaccurate and it is highly unlikely that this species would occur within the study area.

There were five conservation significant flora recorded within the study area that were not identified by the desktop assessment, therefore located a considerable distance (at least 50 km) from known populations. These included *Wurmbea fluviatilis* (P2), *Gymnanthera cunninghamii*, *Sporobolus blakei* (both P3), *Goodenia berringbinensis* and *G. nuda* (both P4). This substantial number of additional conservation significant taxa is considered indicative of the absence of detailed flora and vegetation surveys that have been conducted in the surrounding region. Consequently, it is considered possible that further conservation significant flora (not identified by the desktop assessment) may have the potential to occur within the study area in areas not accessed during the field survey.

5.1.2 Other Significant Flora

5.1.2.1 Range Extension and Outlier Populations

The flora taxa that are considered to represent a significant range extension (of 100 km or greater) or filling a significant gap in the known distribution are listed in (Table 5). Fifty eight taxa were identified, representing 12.3% of the total flora inventory. This is considered by Ecoscape to be a high proportion, and is reflective of the absence of detailed flora surveys conducted in the surrounding area and Gascoyne bioregion. There were 20 flora taxa that have not been previously documented (by *NatureMap*) as occurring within the Gascoyne bioregion.

5.1.2.2 New (Undescribed) Species

A potentially new (undescribed) *Elacholoma* species was recorded from numerous populations within the study area. There have been previous collections made from Western Australia, though the taxon is yet to receive formal recognition with a 'phrase name'. It is understood that this species is in the process of being listed under the phrase name *Elacholoma* sp. 'Showy Flowers'. Within the study area it was recorded from isolated, seasonally inundated clay swamps (typically mapped as vegetation types **AaSaEs** and **EvReMg**). This species is an annual herb that is most likely only detectable following a good season of rainfall. Potential impacts to this taxon cannot easily be assessed due to the lack of available. However, populations were not recorded within the proposed development footprint, nor were the associated vegetation types. Consequently this potential new taxon is unlikely to be significantly impacted.

5.1.2.3 Significant According to Guidance Statement No. 51

Hybanthus aurantiacus (red-flowered form) is considered to be an unusual form/variant of the species which typically has drooping orange flowers. The red-flowered form was observed to be co-occurring with the typical form and is therefore unlikely to warrant any formal taxonomic recognition. It was collected or observed from several locations in the study area, and may be considered significant according to the criteria listed in *Guidance Statement No. 51* (EPA 2004). Whilst of interest, it is unlikely that this species is of conservation or any other significance.

5.1.3 Introduced Flora

Twenty four introduced flora (weeds) were recorded in the study area. Two of these, **Argemone ochroleuca* (Mexican Poppy) and **Datura leichhardtii* (Native Thornapple) are Declared Pest species classified as C3 (management) for the Upper Gascoyne LGA. Under the *BAM Act 2007*, C3 organisms should have some

form of management applied that will alleviate the harmful impact, reduce the numbers or distribution, or prevent/contain the spread.

None of the introduced species recorded in the study area are included on any of the weed lists maintained by DoE and Weeds Australia (see **Section 2.3.2.9**). **Malvastrum americanum* is the only introduced species that rates above 'moderate' according to the *Weed Prioritisation Process for DPaW; Midwest rankings summary*, (DPaW 2013b), it is classified as 'very high'.

5.2 VEGETATION SIGNIFICANCE

5.2.1 Vegetation Types

Twenty vegetation types were recorded within the study area. Four of these vegetation types had only one quadrat recorded from them, largely as a result of having small spatial extents. Ten of the vegetation types are mapped within the proposed development footprint, with the **EaAc** and **EpAc** vegetation types occupying 81.8% of this area.

The significance of the vegetation types are discussed below.

5.2.2 Threatened Ecological Communities

There were no TECs recorded from within the study area, there are none currently listed for the Gascoyne bioregion and the closest mapped TEC is approximately 360 km from the study area.

5.2.3 Priority Ecological Communities

None of the mapped vegetation types are considered similar to PECs defined by flora and listed for the Midwest DPaW region (DPaW Species and Communities Branch 2015b).

5.2.4 Groundwater Dependent Ecosystems

The **EcMgCc** vegetation type is considered to represent a GDE as it is dominated by *Eucalyptus camaldulensis*. This vegetation type largely corresponds with the Lyons and Edmund Rivers and major tributaries of these, typically areas that contained large permanent pools. It occupies 447.6 ha (0.84%) of the study area, none of which is mapped within the proposed development footprint. This vegetation type may represent a Class 2 GDE that are dependent on the surface expression of groundwater (i.e. vegetation associated with pools) (Eamus et al. 2006).

The **EvCc** and **EvReMg** vegetation types were characterised by *Eucalyptus victrix* and may be considered a GDE. *Eucalyptus victrix* may be phreatophytic however this has not been determined absolutely and is likely to be dependent on local factors (see **Section 2.3.3.4**). **EvCc** corresponds with mid-order drainage lines (rarely or never permanent pools) within the study area whilst the **EvReMg** corresponds with a single large clay swamp near the southern boundary of the study area. These vegetation types may represent Class 3 GDEs, dependent on the subsurface expression of groundwater (Eamus et al. 2006). Therefore vegetation types that may represent Class 3 GDEs could occupy up to 4 283.3 ha (8.0%) of the study area (the combined total of the various vegetation types);60.9 ha of this total has been mapped within the proposed development footprint.

5.2.5 'Ecosystems at Risk'

Numerous 'ecosystems at risk' are listed for the Augustus (Desmond *et al.* 2001) and Ashburton (Kendrick 2002) IBRA subregions, though these have no statutory protection. The Ashburton summary lists '*Wetland systems of the Ashburton and Lyons drainage (including permanent and semi-perm pools and springs)*' as

an 'ecosystem at risk'. The riparian vegetation within the study area around the Lyons River could be considered to represent this 'ecosystem at risk'.

None of the other listed 'ecosystems at risk' characterised by flora and vegetation are considered to occur within the study area, based on the available descriptions.

5.2.1 Other Significant Vegetation

Vegetation having a restricted distribution can be significant according to *Guidance Statement No. 51* (EPA 2004). This is problematic to accurately assess due to the limited available literature and survey reports for the region. On a local scale, five vegetation types (**AaSaEs**, **AsFh**, **AtGc**, **EvReMg**, **Fs**) occupied less than 100 ha and may have a restricted distribution. Of these, only **AtGc** was mapped within the proposed development footprint where 30.96% (6.77 ha) of its extent occurs. This vegetation type is associated with small ironstone outcrops that frequently correspond with areas subject to intensive geological exploration drilling.

Vegetation types can have significance if they are confined to or largely confined to poorly represented land systems. Representation of vegetation within the study area in relation to land systems is not considered of significance, and of no specific conservation interest.

Vegetation types can also have significance if they are confined to or largely confined to poorly represented pre-European vegetation associations. All pre-European vegetation associations that occur within the study area have more than 99% of their original extent remaining in the Gascoyne bioregion and none have a particularly high proportion restricted to the study area (all are less than 5% of the total).

5.2.2 Vegetation Similarity to Nearby Areas

Ecoscape is not aware of any previous flora and vegetation surveys within the surrounding areas. Twelve quadrats were established in adjacent regional areas indicating that at least some of the vegetation types extend beyond the boundary of the study area. Whilst difficult to assess, it is considered unlikely that any of the vegetation types are particularly unique to the study area.

5.2.3 Floristic Analysis

No regional floristic analysis was conducted as Ecoscape is not aware of any available data to enable such an analysis.

The clustering patterns resulting from the hierarchical cluster analysis corresponded to several broad floristic groups present within the study area. Supergroup 1 included vegetation types associated with rivers, major creek lines and depressions, typically characterised by *Eucalyptus camaldulensis*, *E. victrix*, *Acacia citrinoviridis*, and/or *A. cyperophylla* var. *cyperophylla*. Supergroup 3 primarily included vegetation types associated with upper slopes and ridges. The remaining vegetation types making up supergroups 2, 4, and 5 were usually associated with flats, undulating plains, and hill slopes; supergroup 2 was primarily comprised of quadrats characterised by *Acacia xiphophylla* and/or *A. synchronicia*; supergroup 4 by *Eremophila phyllopora*, *E. exilifolia* and/or *E. flaccida*; and supergroup 5 by *Frankenia setosa*.

Overall, the floristic analysis indicated reasonable correspondence between vegetation types observed during the field survey and clustering patterns in the dendrogram. In some cases, clusters corresponded perfectly with vegetation types (e.g. **ArPc** and **AcEt**), while in other cases clusters included quadrats belonging to multiple vegetation types. In these latter cases, the lack of correspondence is likely to arise due to quadrats with similar overall species composition differing in the dominant species that characterised the vegetation type.

5.3 VEGETATION CONDITION

Vegetation condition was assessed within each floristic quadrat. There were 73 quadrats (70.8% of the total) rated in Excellent condition, therefore the majority of the study area can be considered to be in this condition category. Those areas assessed in lesser condition were generally impacted by cattle grazing and perhaps to some degree feral animal grazing (e.g. horses and donkeys), and weed invasion. Because of these impacts, riparian vegetation types were typically in lesser condition (Good or Very Good) than other vegetation types.

6.0 CONCLUSIONS

Ecoscope considers that this survey has fully satisfied the requirements of a Level 2 Flora and vegetation survey, according to *Guidance Statement No. 51* (EPA 2004), specifically:

- two phases of field survey were conducted
- the survey phases were conducted during an excellent flora season in the region
- all vegetation types considered to occur within the study area are described and mapped. Vegetation types represented by a single quadrat were spatially restricted in distribution.
- the flora inventory is considered to be comprehensive, recording the vast majority of species likely to occur within the study area (both annual and perennial).

The vast majority of the study area is not considered conservation significant in terms of flora and vegetation. The most significant aspect is likely to be conservation significant flora, particularly P1 and P2 flora taxa that are known from few locations. However potential impact to these within the proposed development footprint is likely to be negligible.

A number of other vegetation types may be significant according to other attributes, including representing a GDE or significant according to *Guidance Statement No. 51* (generally of a restricted distribution). Vegetation significance is difficult to assess due to the lack of comparable surveys from the region.

The region surrounding the Yangibana Project has not been the subject of many previous botanical surveys that are publicly available. The high number of range extensions recorded is considered particularly indicative of a poorly surveyed region. The Level 2 flora and vegetation surveys conducted by Ecoscope have gone some way to improving the knowledge of native vegetation distribution and abundance in the region. As a result, Ecoscope considers that any potential impacts on native flora and vegetation from the Yangibana Project are unlikely to be significant.

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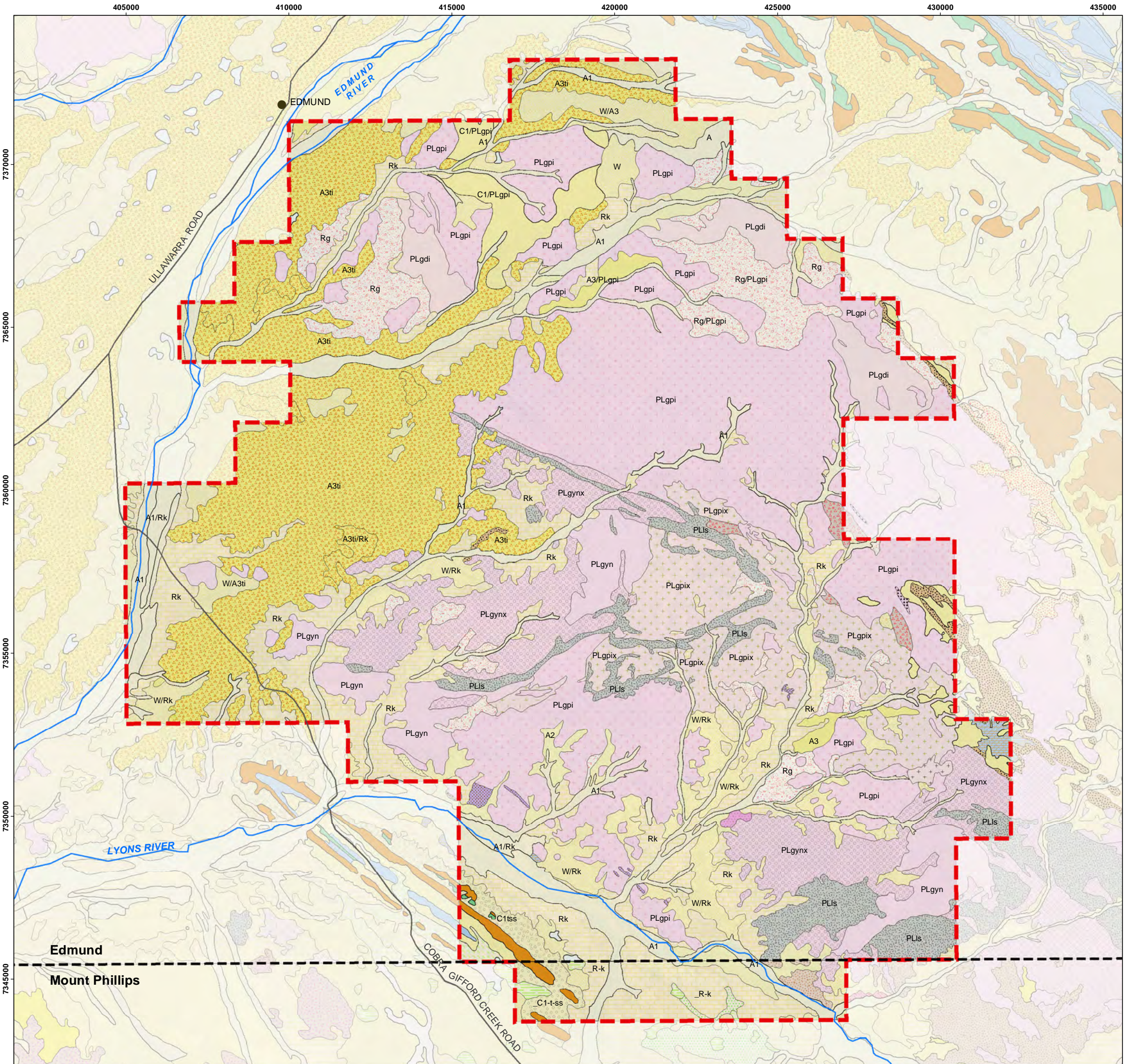
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MAPS

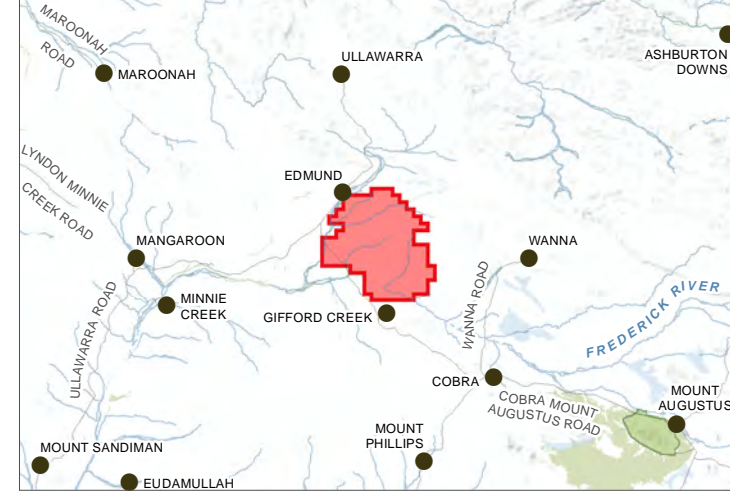


LEGEND

- Homesteads
 - Roads
 - Rivers
 - Geological Survey of WA (GSWA) 1:100,000 Geological Map Sheet Boundaries
 - ▭ Survey Area
- GSWA 1:100,000 Geological Map***
- Edmund Sheet
 - C
 - C1
 - A1f
 - PLgpit
 - C1tss
 - PLMEi
 - PLgpi
 - W/A3
 - A
 - Rk/PLgpi
 - PLMEy
 - A1c
 - W/PLgpi
 - C1q
 - Rg/PLgpi
 - PLge
 - PLgyn
 - A3ti/PLgpi
 - PLMEd
- PLgdi
 - A3ti
 - A3ti/Rk
 - L
 - A3/PLgpi
 - Rk
 - PLgynx
 - A3ti/PLgyn
 - C1/Rk
 - A3ti/Rg
 - Rg
 - W/A3ti
 - A1/Rk
 - A3
 - Rf
 - PLd12
 - PLgpix
 - PLIs
 - PLngo
 - W
 - W/Rk
 - A2
 - A2/Rk
 - PLu
 - C1/PLgpi
 - C1f
 - A1
 - A3/Rk
 - PLMEk
 - PLgto
- Mount Phillips Sheet**
- P_-DUyn-gmi
 - P_-MEk-sf
 - P_-MOgo-mgn
 - P_-PO-mtsf
 - _A1
 - _A1-cb
 - _A1c
 - _A2
 - _Ad
 - _C1-t-ss
 - _R-k
 - _W

* Data and symbology downloaded from Department of Mines and Petroleum <http://geodownloads.dmp.wa.gov.au/datacentre/datacentreDb.asp>

OVERVIEW



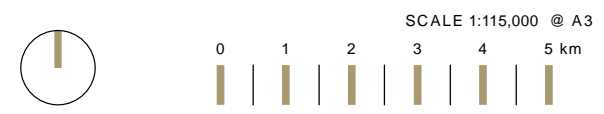
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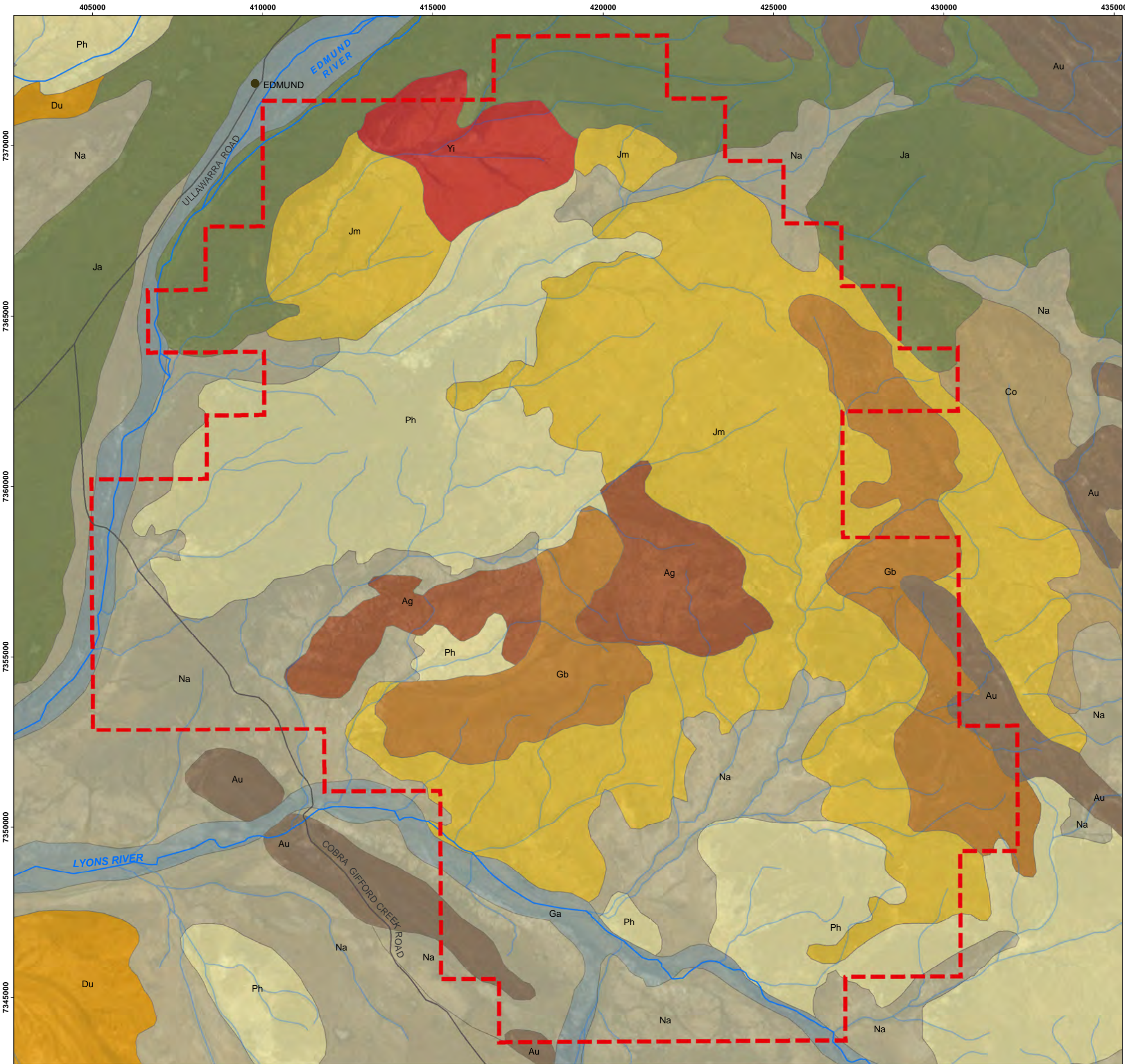
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

GEOLOGY

MAP 1





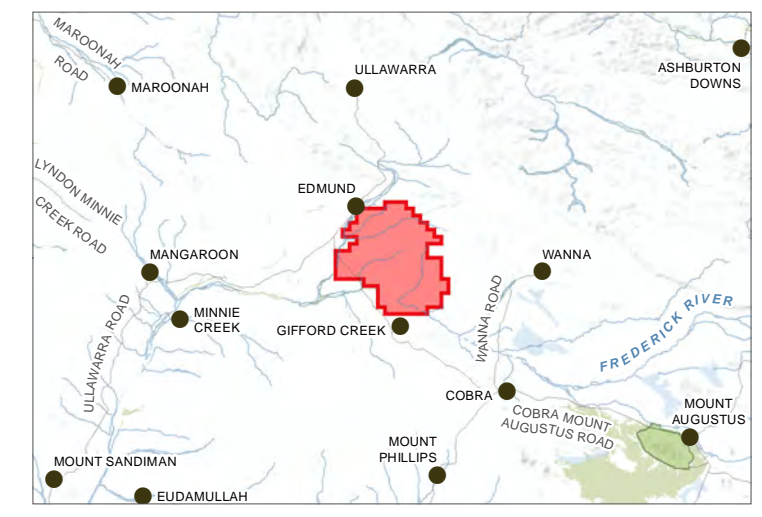
LEGEND

- Homesteads
- Roads
- Rivers
- Creeks
- ▭ Survey Area

Land Systems (DAFWA, 2012)

- Agameenon System (Ag): Rocky hills, with peaks and ridges above extensive stony slopes, supporting scattered tall shrublands of mulga and other acacias.
- Augustus System (Au): Rugged ranges, hills, ridges and plateaux with skeletal soils supporting mulga and other acacia shrublands in southern parts or hard spinifex grasslands in northern parts.
- Collier System (Co): Undulating stony uplands, low hills, ridges, stony plains and drainage floors supporting mulga shrublands and some spinifex.
- Durlacher System (Du): Stony plains, lower tributary drainage plains and low stony rises, supporting scattered tall shrublands of mulga, other acacias and chenopod low shrubs.
- Gascoyne System (Ga): River channels and associated narrow alluvial plains and inclusions, supporting river redgum fringing woodlands, also mulga and other acacias, Senna spp. and buffel grass.
- Glenburgh System (Gb): Rugged granite hills, stony uplands and lower plains supporting scattered tall shrublands of mulga and other acacias.
- James System (Jm): Low hills, ridges and tors of granite and quartz, with stony lower plains, rises and drainage floors, supporting scattered tall shrublands of mulga and other acacias.
- Jamindie System (Ja): Stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey.
- Nadarra System (Na): Plains and calcrete rises with chenopod shrublands and hard spinifex grasslands.
- Phillips System (Ph): Low hills and undulating uplands on gneiss and quartz supporting mulga and other acacia tall shrublands.
- Yinnietharra System (Yi): Scattered granite tors and domes above stony slopes, broad sandy plains with groved vegetation and wide drainage tracts; supporting tall shrublands of mulga and other acacias.

OVERVIEW

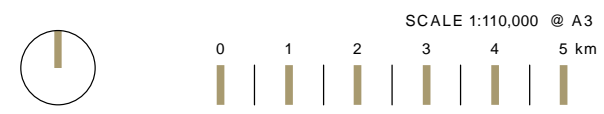


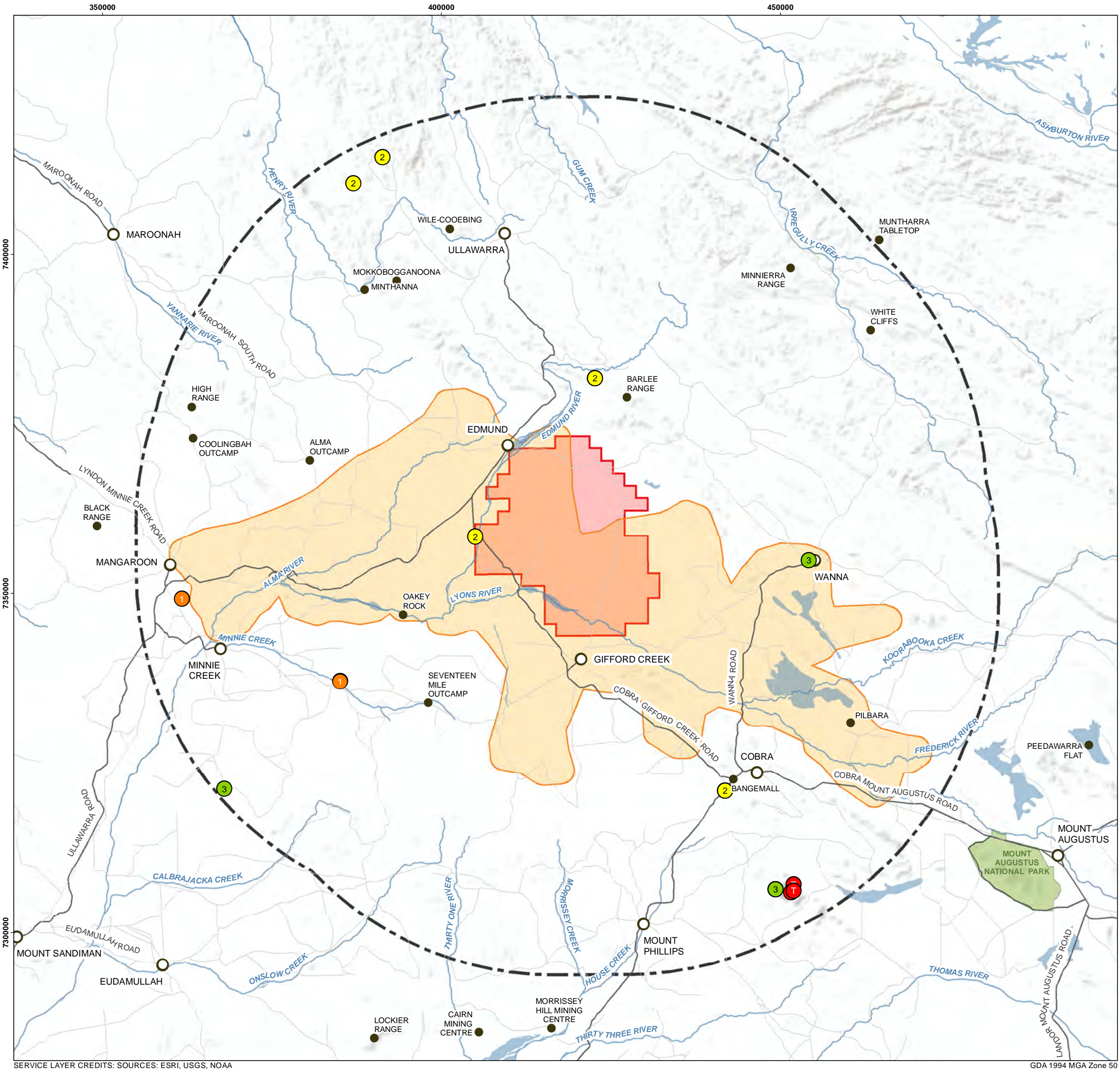
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YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

**LAND SYSTEMS
 MAP 2**





LEGEND

- Place Names
- Homesteads
- Minor Road
- Track
- Rivers
- Flats/Inundation areas
- National Parks
- Survey Area
- ⬡ DPaW databases search area

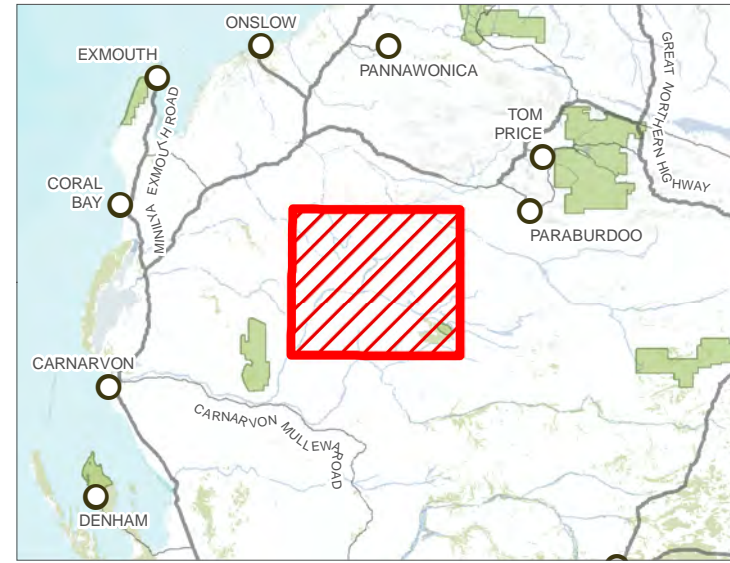
DPaW Flora Databases

- Conservation Code
- T - Threatened Flora
 - 1 - Priority 1
 - 2 - Priority 2
 - 3 - Priority 3

DPaW Communities Database

- Priority 1 Ecological Community**
- Gifford Creek/Mangaroon/Wanna Calcrete: Gifford Creek, Mangaroon, Wanna calcrete groundwater assemblage type on Lyons palaeodrainage on Gifford Creek, Lyons and Wanna Stations

OVERVIEW



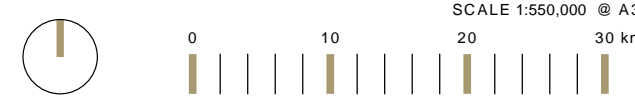
AUTHOR: CP/JN REVIEWED: SB
 DATE: MAR-15 PROJECT NO: 3397-15

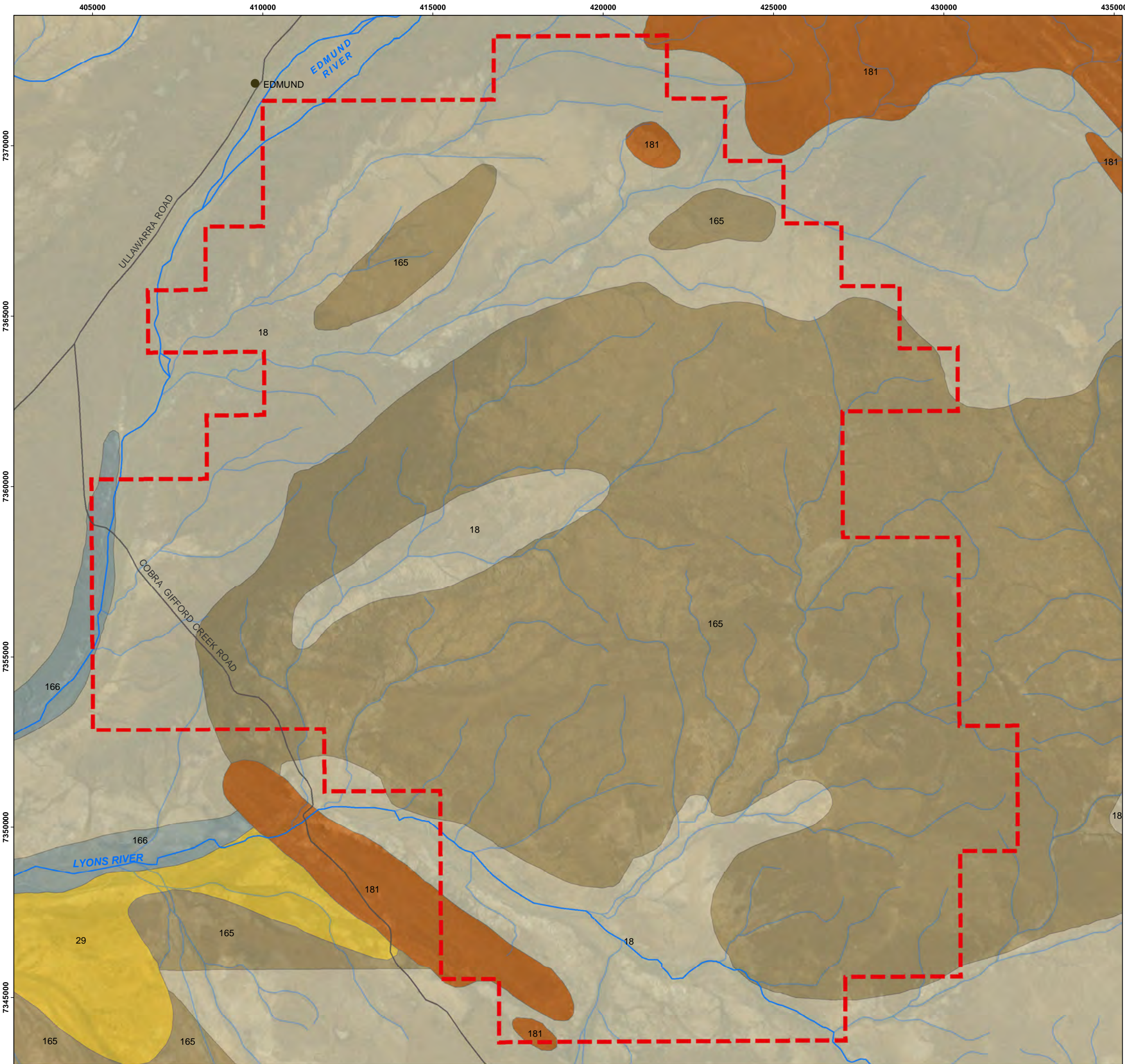
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

DATABASE SEARCH RESULTS

MAP 3





LEGEND

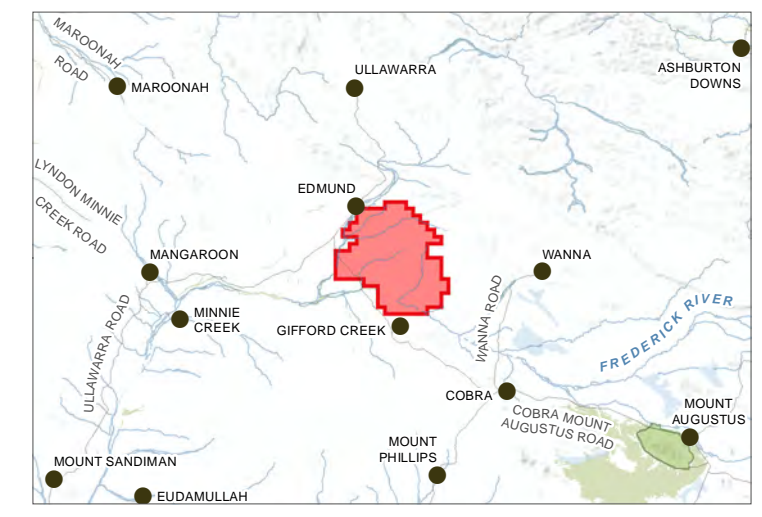
- Homesteads
- Roads
- Rivers
- Creeks
- ▭ Survey Area

Beard Pre-European Vegetation (DAFWA 2012)

Vegetation Association

- 18: Low woodland; mulga (*Acacia aneura*)
- 29: Sparse low woodland; mulga, discontinuous in scattered groups
- 165: Low woodland; mulga and snakewood (*Acacia eremaea*)
- 166: Low woodland; mulga and *Acacia victoriae*
- 181: Shrublands; mulga and snakewood scrub

OVERVIEW



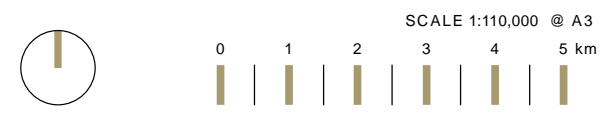
AUTHOR: CP/JN REVIEWED: SB
 DATE: MAR-15 PROJECT NO: 3397-15

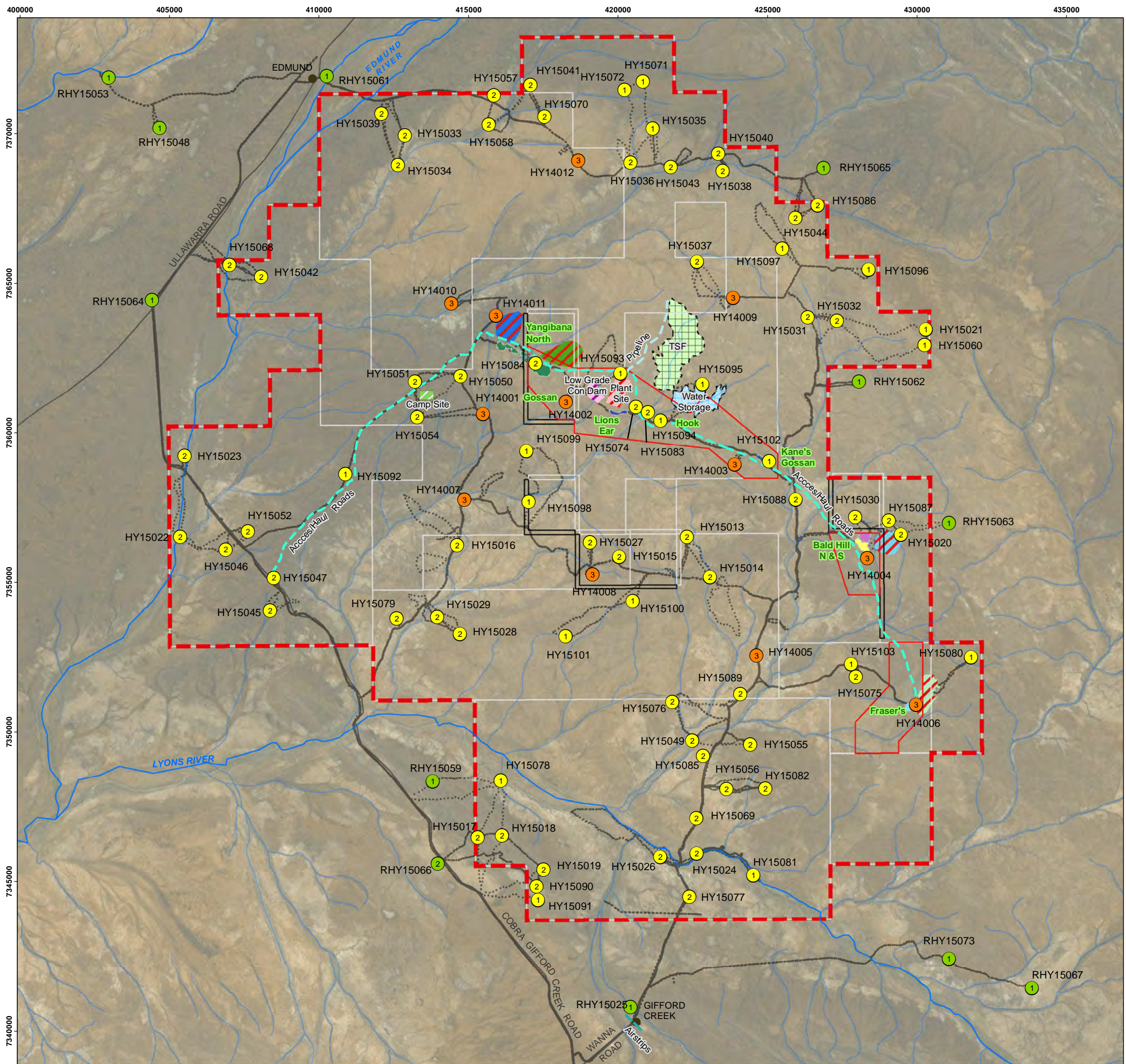
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

PRE EUROPEAN VEGETATION

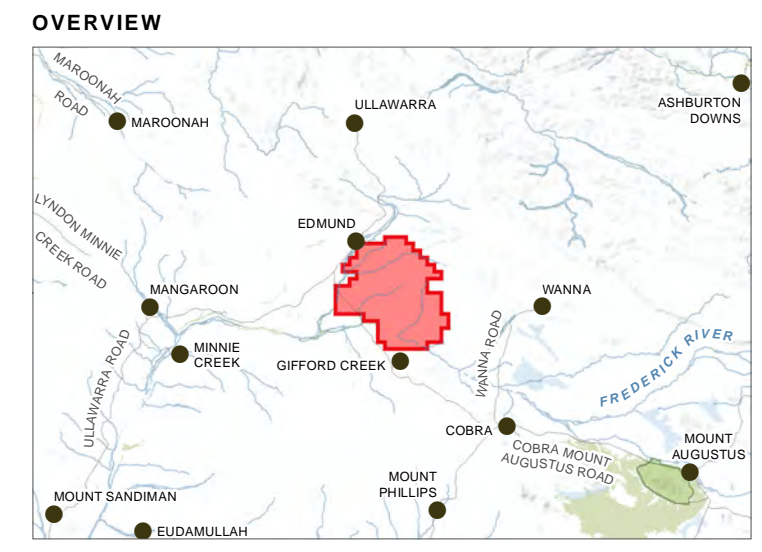
MAP 4





LEGEND

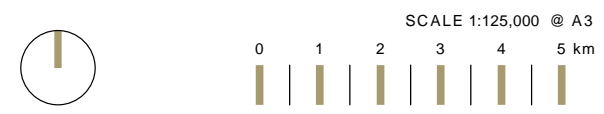
- Homesteads
- Roads
- Rivers
- Creeks
- Survey Tracks
- Tenements: Exploration Licence, Mining Lease, Prospecting Licence
- ▭ Survey
- Quadrat Locations: Established 2014, Established 2015, Regional 2015
- Access/Haul Roads
- Airstrips
- Pipeline
- Proposed Pits:** Bald Hill North Pit, Bald Hill South Pit, Fraser's Pit, Gossan Pit, Hook Pit, Kane's Gossan Pit, Lions Ear Pit, Yangibana North Pit
- Proposed Dumps (Snowden 2015):** Bald Hill Waste Dump, Fraser's Waste Dump, Yangibana North Waste Dump, Yangibana North Waste Dump 2
- Proposed Infrastructure:** Camp Site, Low Grade Con Dam, Plant Site, TSF, Water Storage

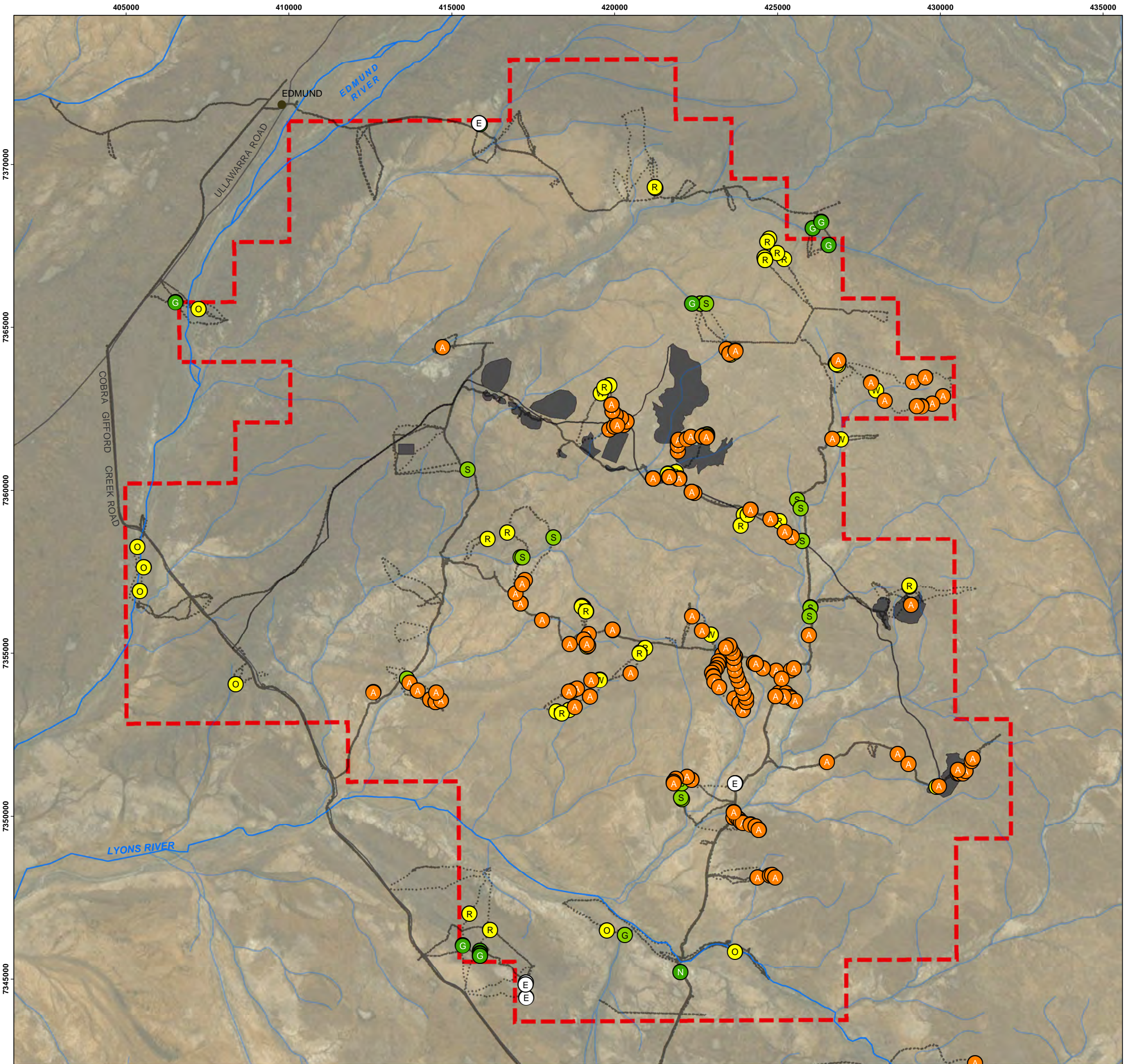


AUTHOR: CP/JN REVIEWED: SB
 DATE: AUG-15 PROJECT NO: 3397-15

YANGIBANA BIOLOGICAL ASSESSMENT
 CLIENT: HASTINGS

SURVEY EFFORT
MAP 5

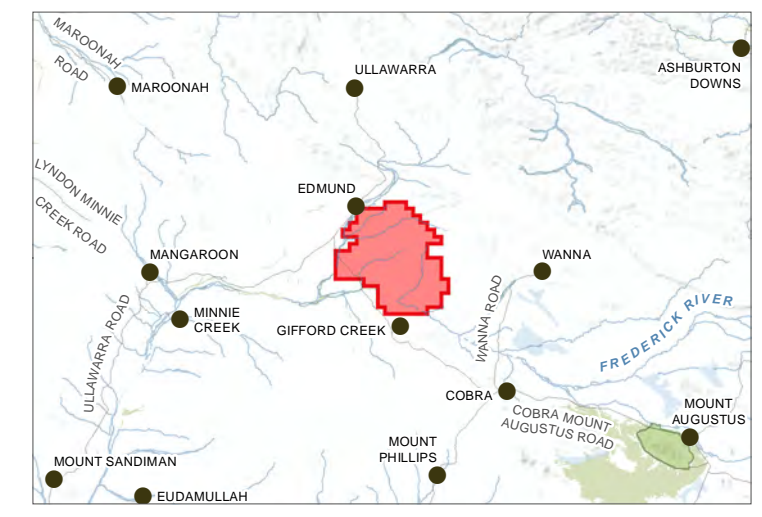




LEGEND

- Homesteads
- Roads
- Rivers
- Creeks
- Survey Tracks
- ▭ Survey Area
- ▭ Proposed Infrastructure Footprint
- Priority 1**
- Acacia curryana
- Priority 2**
- Rhodanthe frenchii
- Solanum octonum
- Wurmbea fluviatilis
- Priority 3**
- Gymnanthera cunninghamii
- Sporobolus blakei
- Priority 4**
- Goodenia berringbinensis
- Goodenia nuda
- Other Significant Flora**
- Elacholoma sp. Showy Flower

OVERVIEW



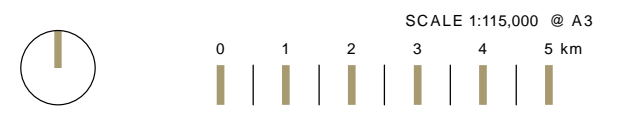
AUTHOR: CP/JN REVIEWED: SB
 DATE: AUG-15 PROJECT NO: 3397-15

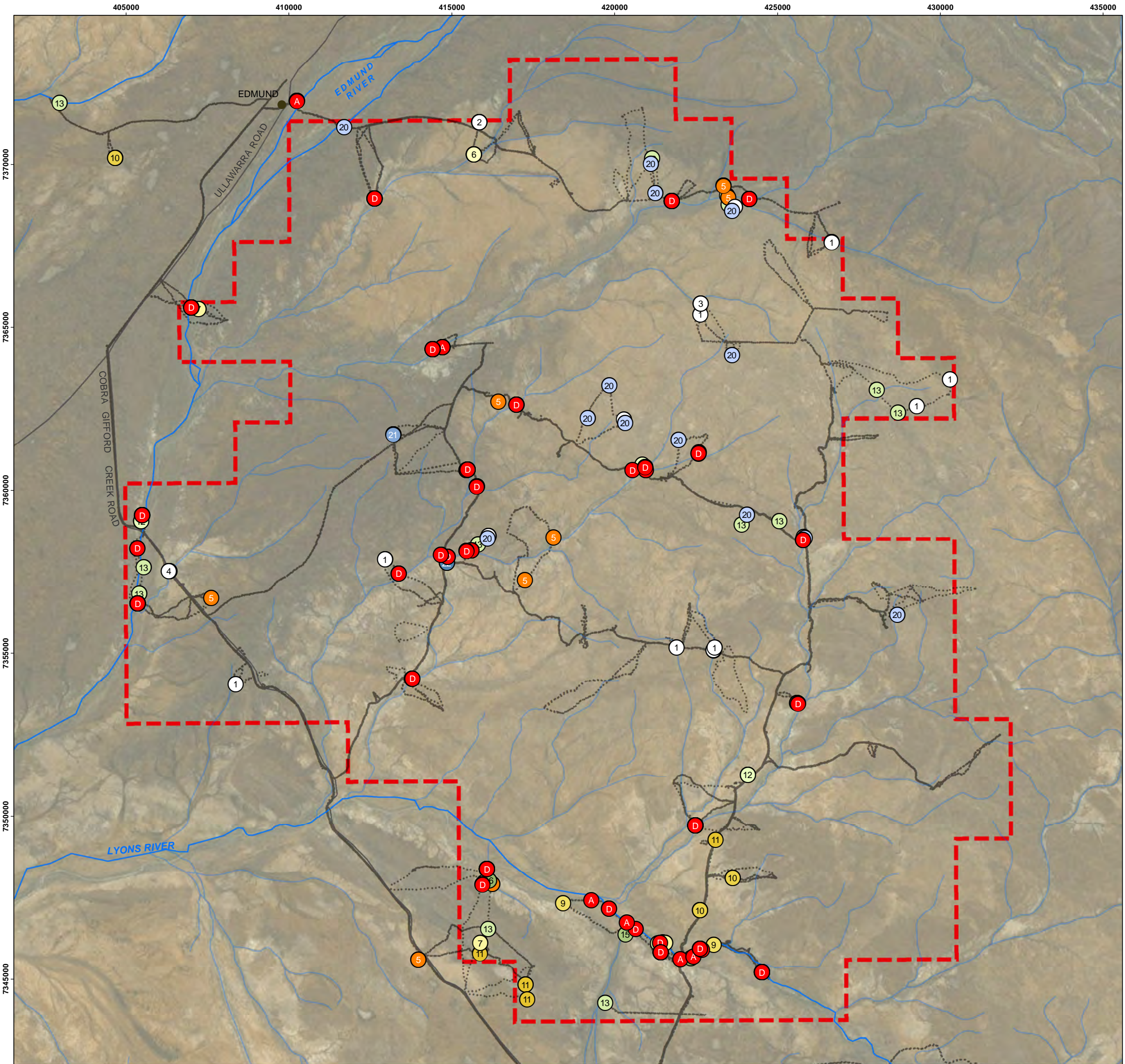
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

CONSERVATION SIG. FLORA

MAP 6

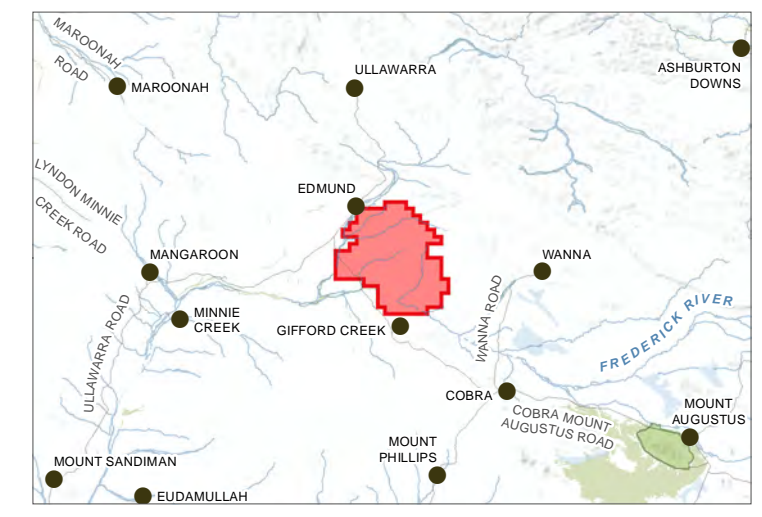




LEGEND

- Homesteads
 - Roads
 - Rivers
 - Creeks
 - Survey Tracks
 - ▭ Survey Area
- Declared Plants**
- A *Argemone ochroleuca*
 - D *Datura leichhardtii*
- Other Introduced Flora (DPaW Midwest Rating)**
- Unrated**
- 1 *Bidens subalternans* var. *simulans*
 - 2 *Echinochloa colona*
 - 3 *Eragrostis amabilis*
 - 4 *Flaveria trinervia*
- Very High**
- 5 *Malvastrum americanum*
- Moderate**
- 6 *Cenchrus setiger*
- 7 *Citrullus lanatus*
 - 8 *Cucumis myriocarpus*
 - 9 *Cynodon dactylon*
 - 10 *Tribulus terrestris*
 - 11 *Vachellia farnesiana*
- Low**
- 12 *Asphodelus fistulosus*
 - 13 *Cenchrus ciliaris*
 - 14 *Chenopodium murale*
 - 15 *Lolium multiflorum*
 - 16 *Lysimachia arvensis*
 - 17 *Sisymbrium erysimoides*
 - 18 *Sisymbrium orientale*
 - 19 *Sonchus oleraceus*
- Negligible**
- 20 *Acetosa vesicaria*
 - 21 *Cuscuta planiflora*
 - 22 *Setaria verticillata*

OVERVIEW



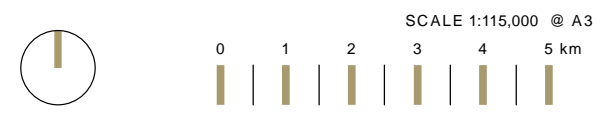
AUTHOR: CP/JN REVIEWED: SB
 DATE: MAR-15 PROJECT NO: 3397-15

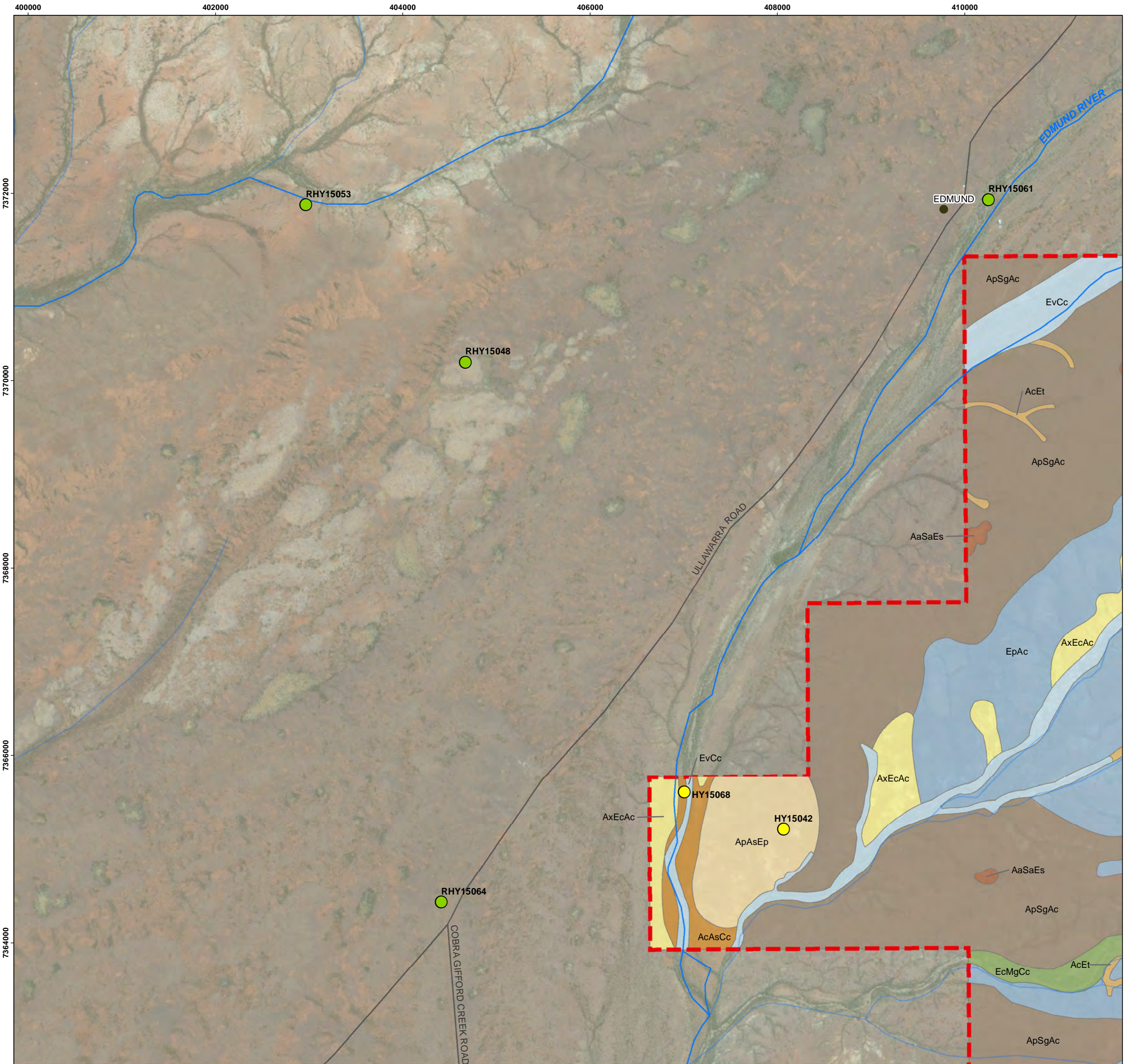
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

INTRODUCED FLORA

MAP 7

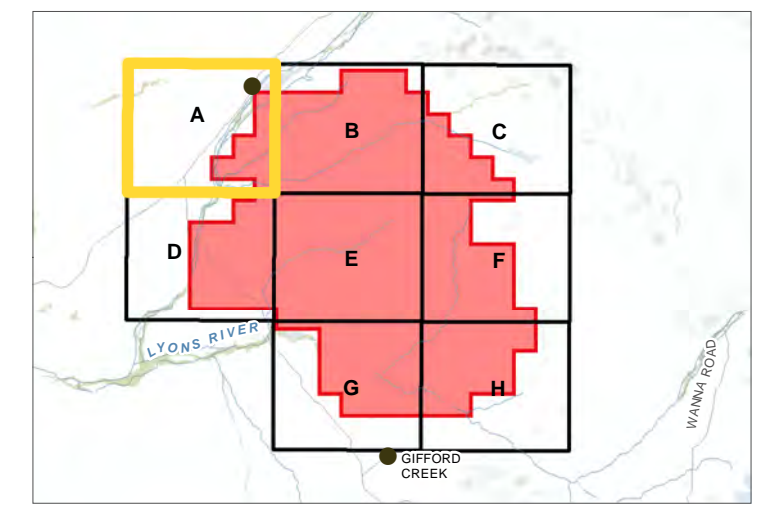




LEGEND

- Homesteads
- Quadrat Locations**
- Established 2015
- Regional
- Roads
- Rivers
- Creeks
- ▭ Survey Area
- Vegetation Types**
- AaSaEs
- AcAsCc
- AcEt
- ApAsEp
- ApSgAc
- AxEcAc
- EcMgCc
- EpAc
- EvCc

OVERVIEW



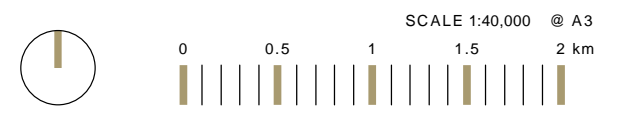
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

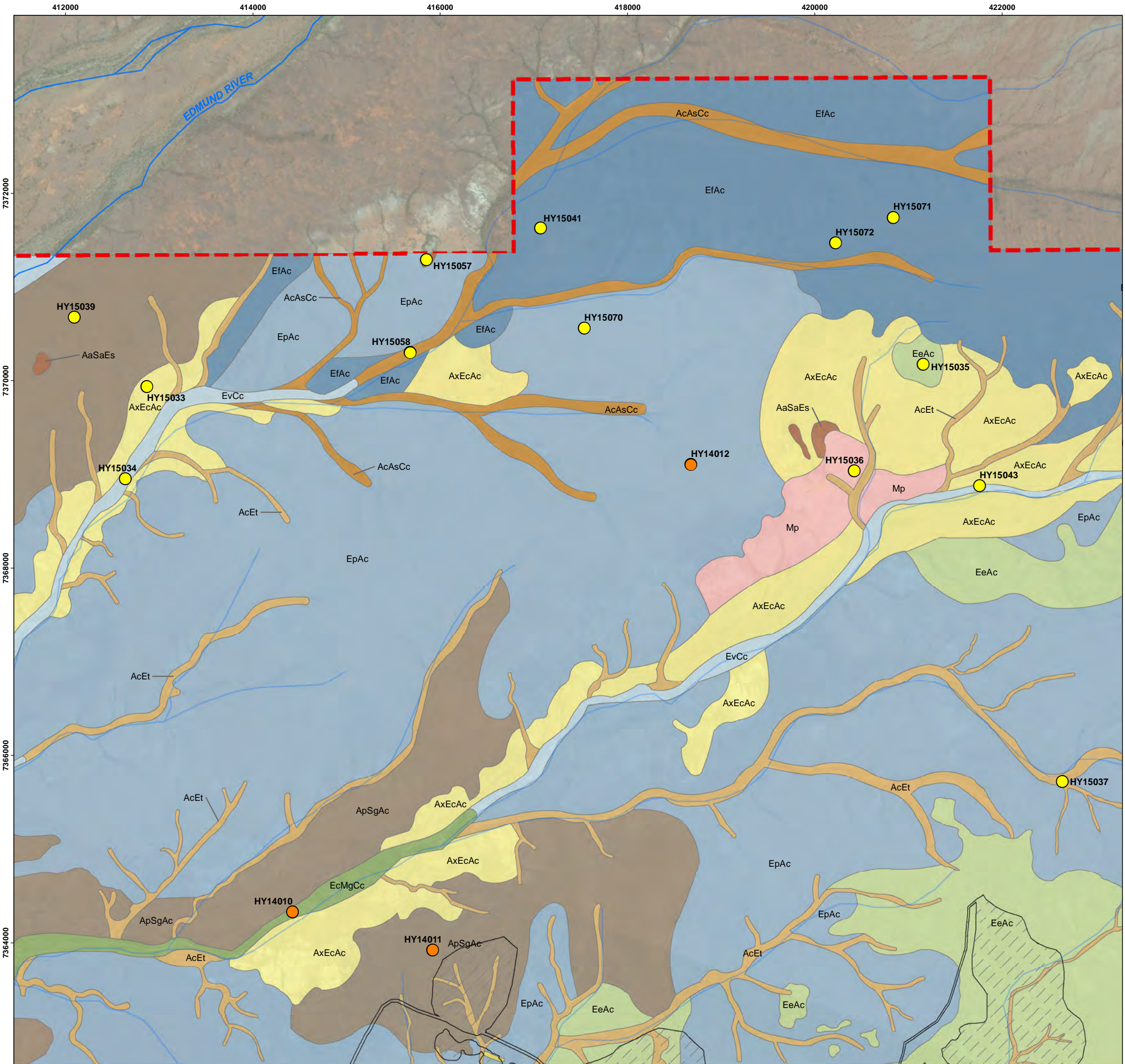
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - A





LEGEND

Quadrat Locations

- Established 2014
- Established 2015

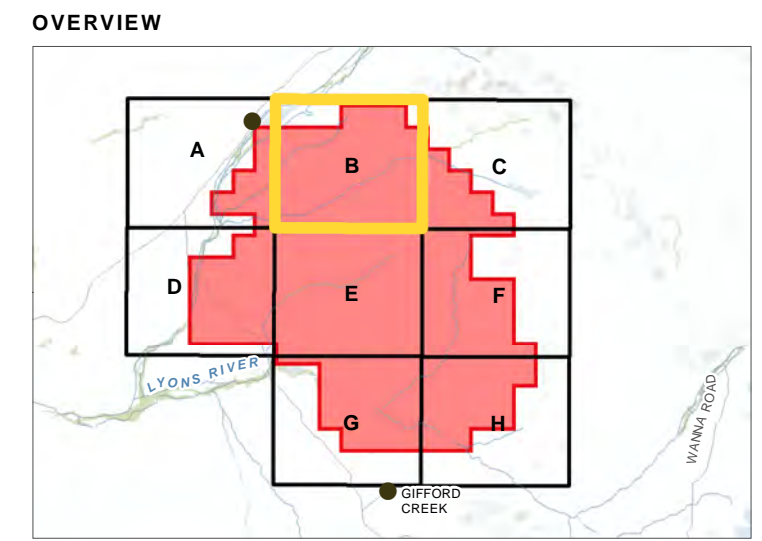
Rivers
Creeks

Proposed Infrastructure Footprint

Survey Area

Vegetation Types

- AaSaEs
- AcAsCc
- AcEt
- ApSgAc
- AtGc
- AxEcAc
- EcMgCc
- EeAc
- EfAc
- EpAc
- EvCc
- Mp

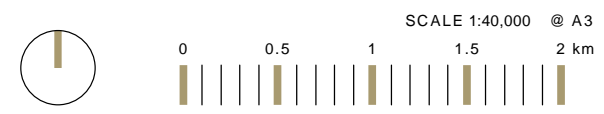


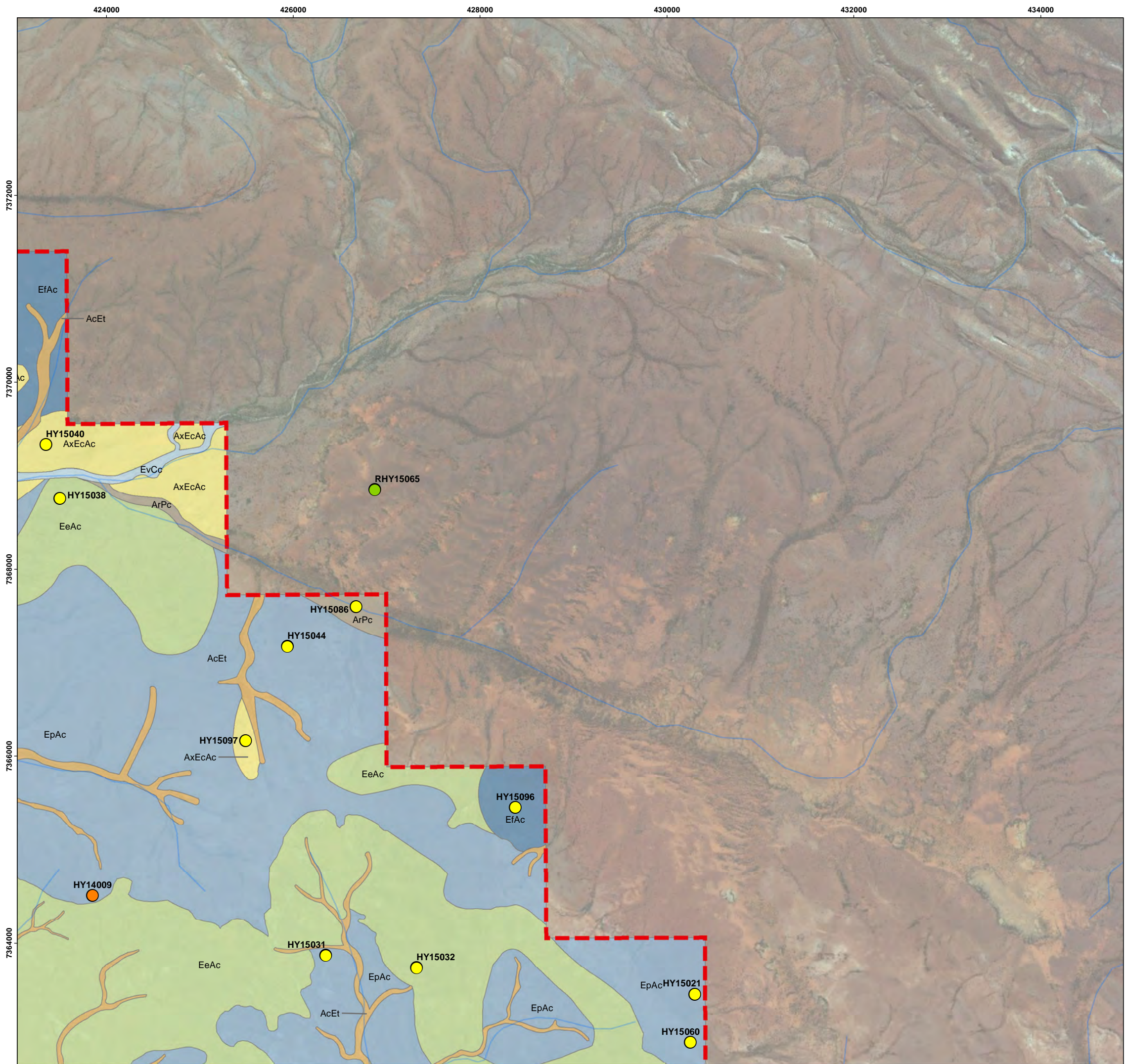
ecoscape

AUTHOR: JN REVIEWED: SB
DATE: JUL-15 PROJECT NO: 3397-15

YANGIBANA BIOLOGICAL ASSESSMENT
CLIENT: HASTINGS

VEGETATION TYPES
MAP 8 - B

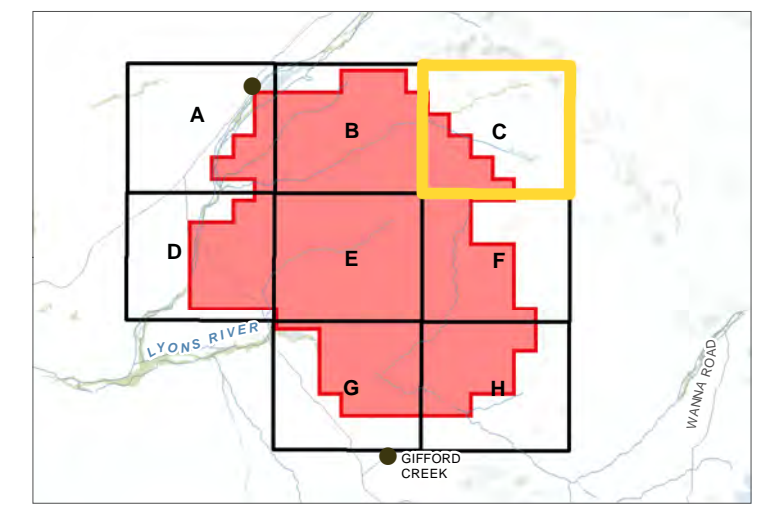




LEGEND

- Quadrat Locations**
- Established 2014
 - Established 2015
 - Regional
- Creeks
- Survey Area
- Vegetation Types**
- AcEt
 - ArPc
 - AxEcAc
 - EeAc
 - EfAc
 - EpAc
 - EvCc

OVERVIEW



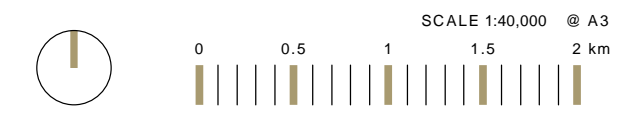
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

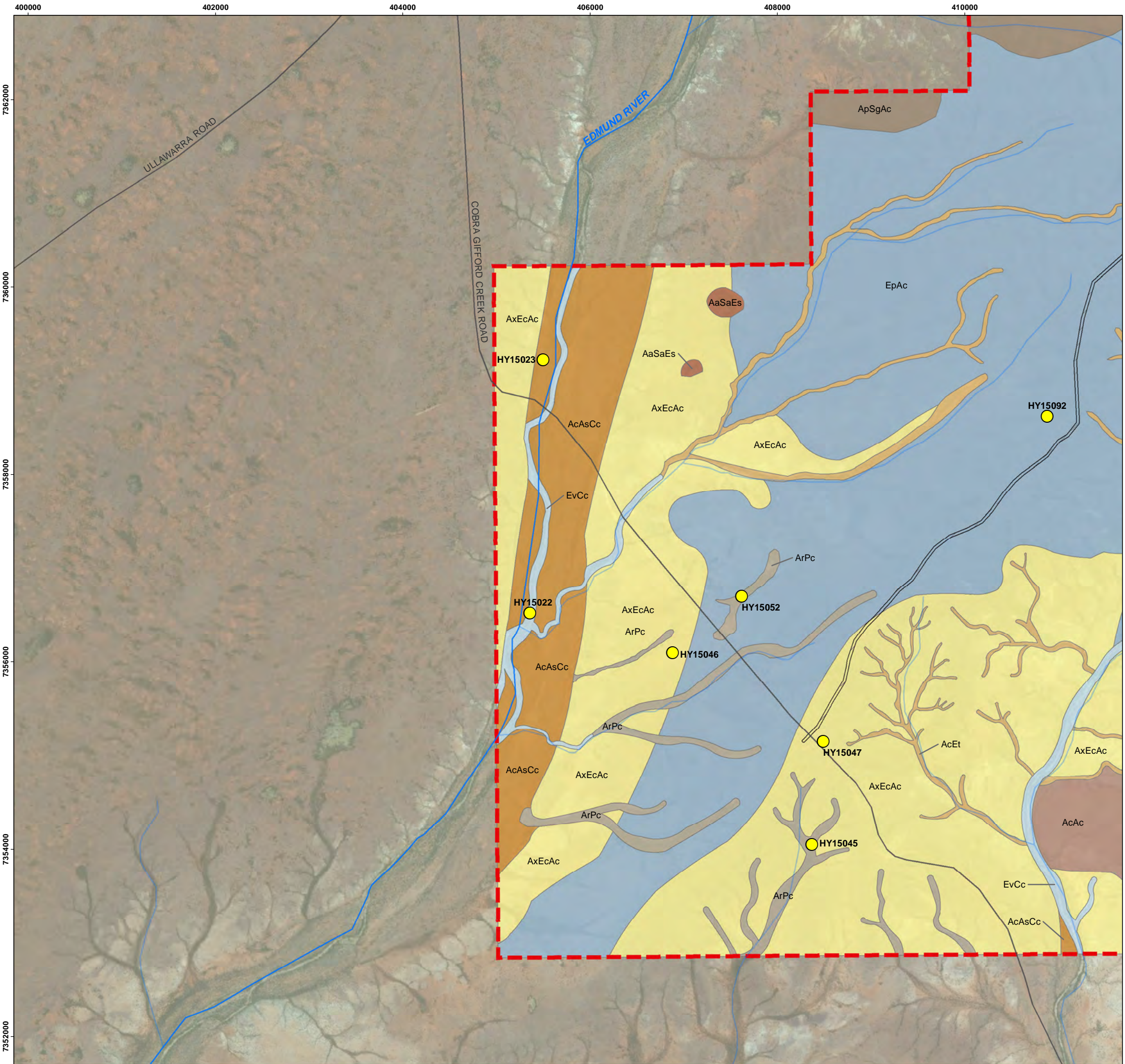
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - C





LEGEND

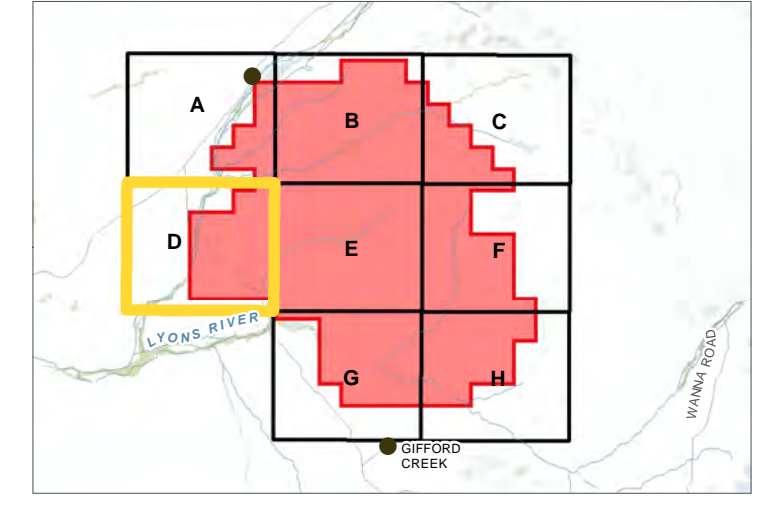
Quadrat Locations

- Established 2015 (Yellow circle)
- Roads (Black line)
- Rivers (Blue line)
- Creeks (Light blue line)
- Proposed Infrastructure Footprint (White area with black outline)
- Survey Area (Red dashed line)

Vegetation Types

- AaSaEs (Dark brown)
- AcAc (Medium brown)
- AcAsCc (Light brown)
- AcEt (Tan)
- ApSgAc (Greyish-brown)
- ArPc (Light grey)
- AxEcAc (Yellow)
- EpAc (Light blue)
- EvCc (Medium blue)

OVERVIEW



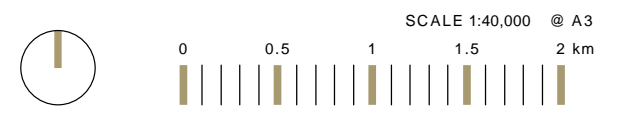
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

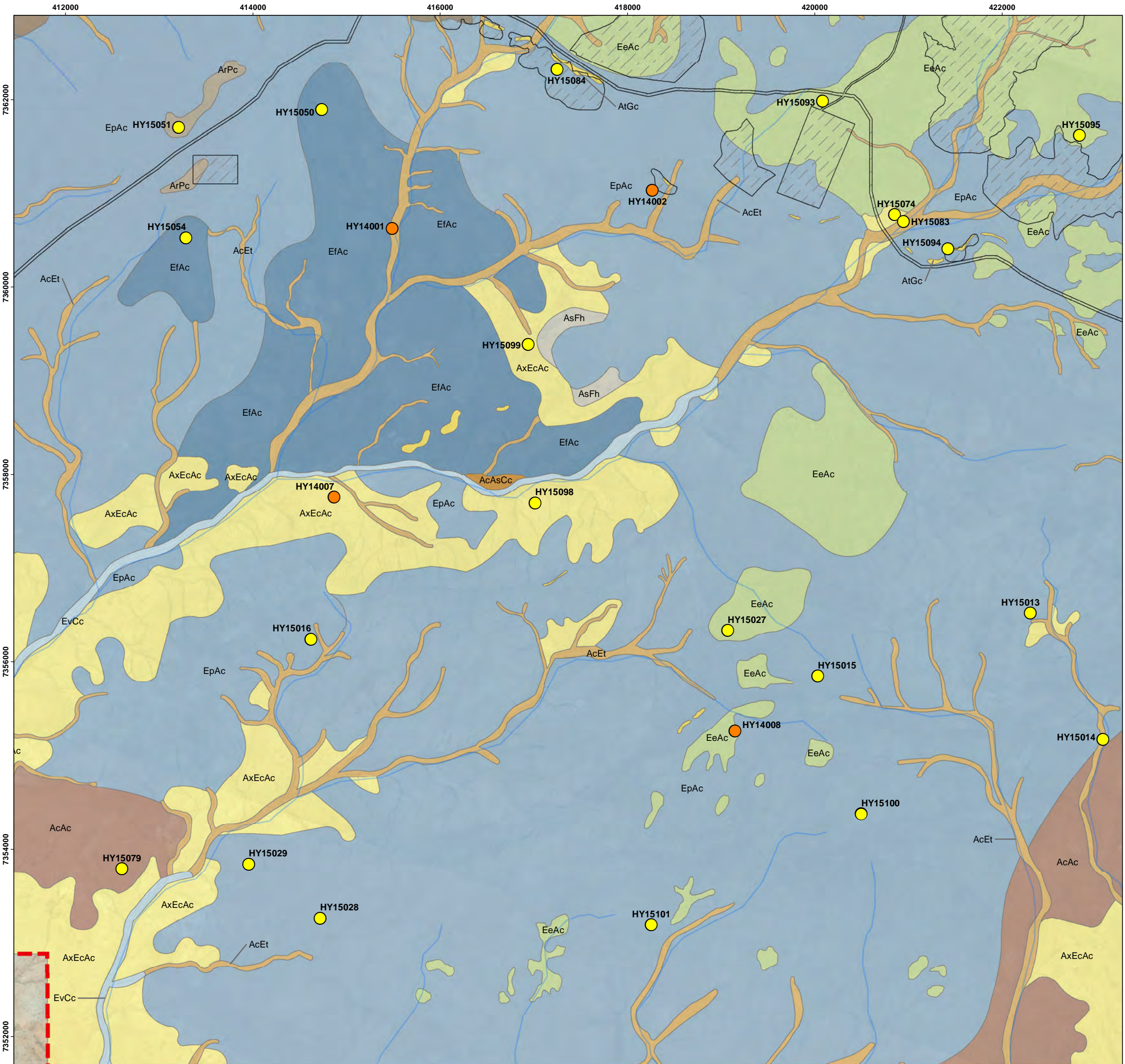
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - D





LEGEND

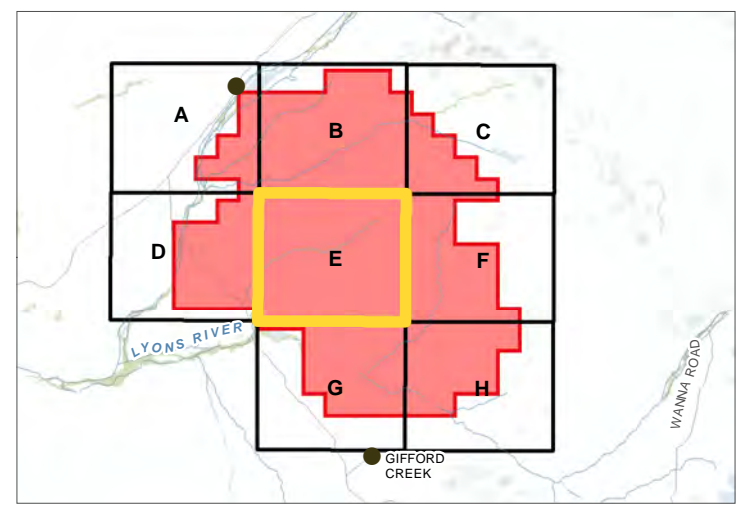
Quadrat Locations

- Established 2014 (Orange dot)
- Established 2015 (Yellow dot)
- Creeks (Blue line)
- Proposed Infrastructure Footprint (Hatched area)
- Survey Area (Red dashed line)

Vegetation Types

- AcAc
- AcAsCc
- AcEt
- ApSgAc
- ArPc
- AsFh
- AtGc
- AxEcAc
- EeAc
- EfAc
- EpAc
- EvCc

OVERVIEW



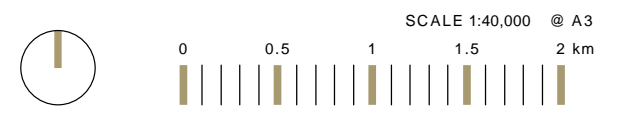
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

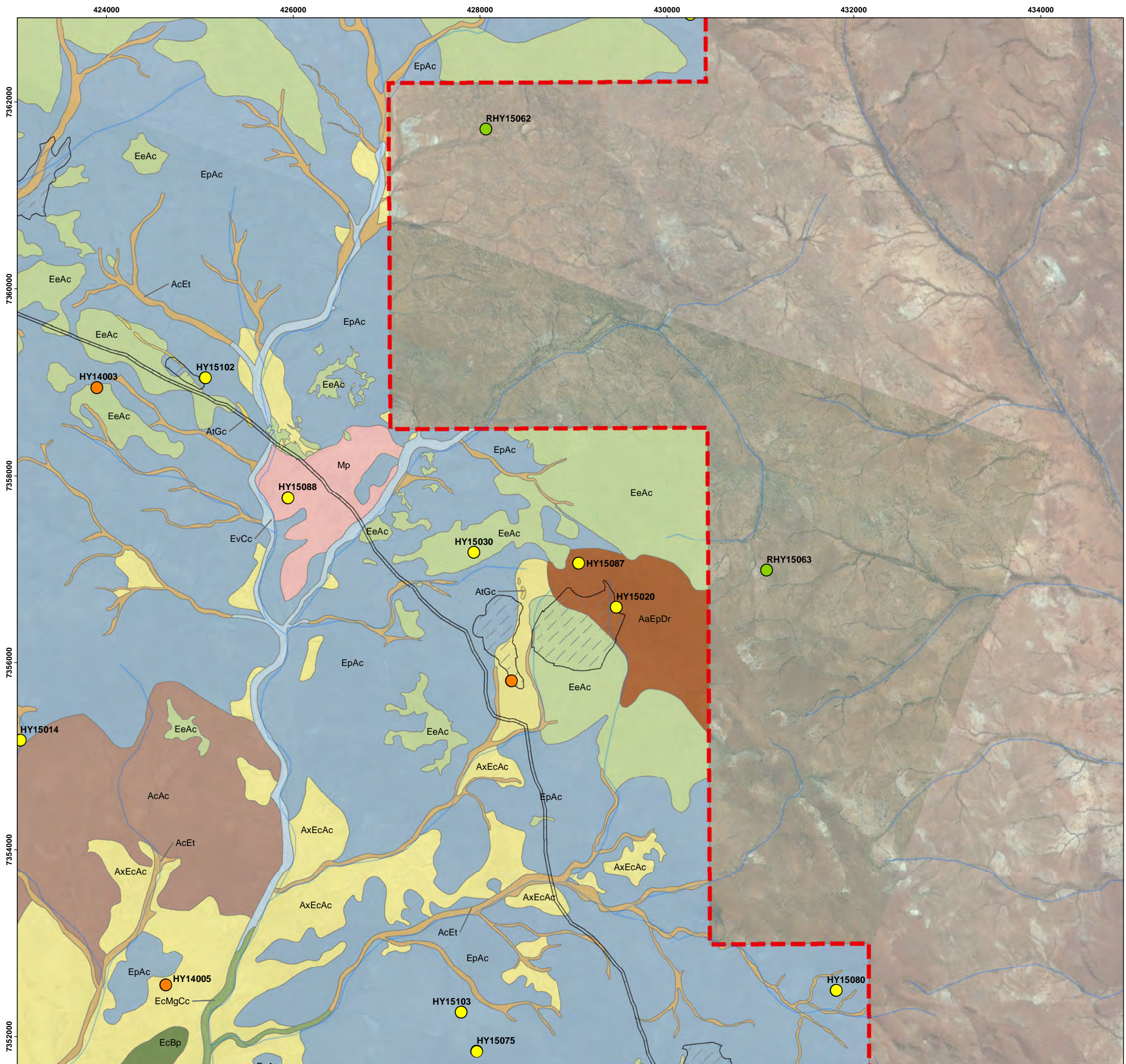
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - E





LEGEND

Quadrat Locations

- Established 2014
- Established 2015
- Regional

— Creeks

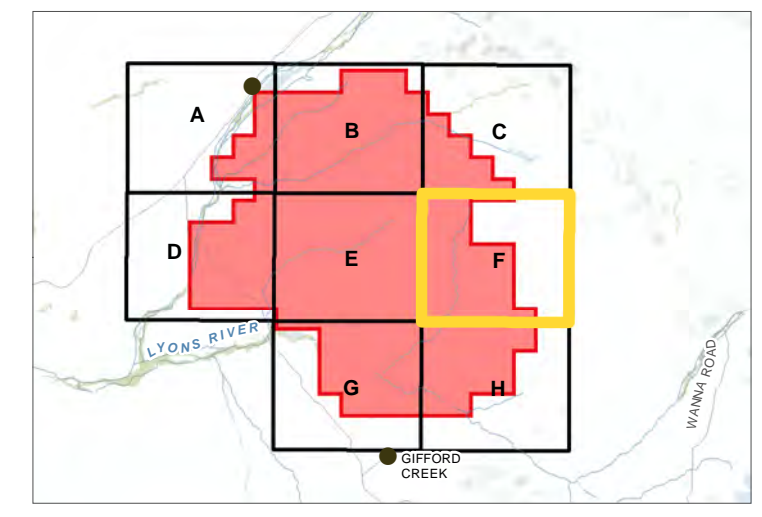
▨ Proposed Infrastructure Footprint

▭ Survey Area

Vegetation Types

- AaEpDr
- AcAc
- AcEt
- AtGc
- AxEcAc
- EcBp
- EcMgCc
- EeAc
- EpAc
- EvCc
- Mp

OVERVIEW



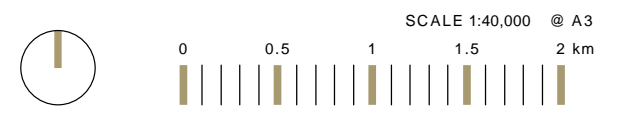
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

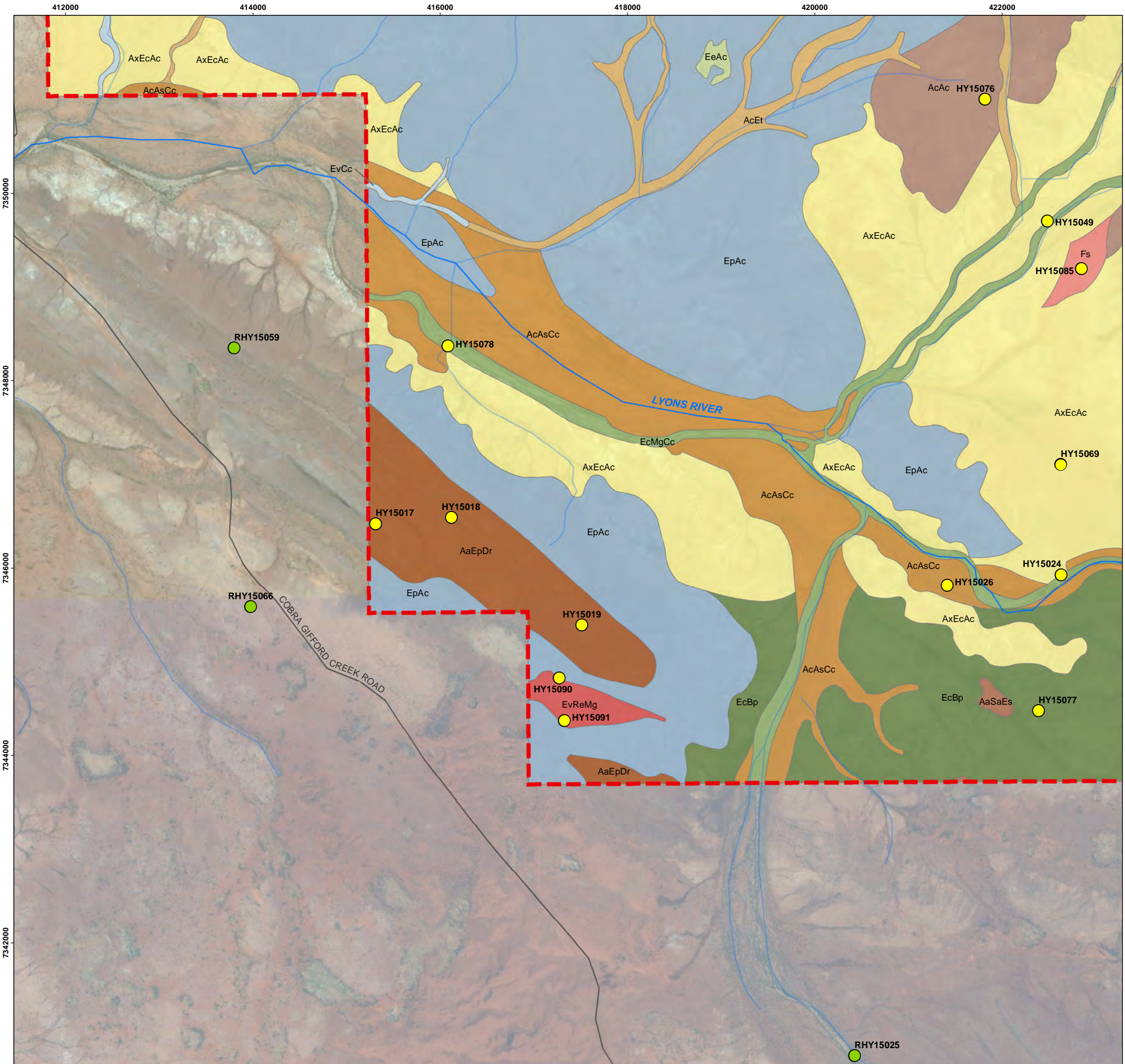
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - F

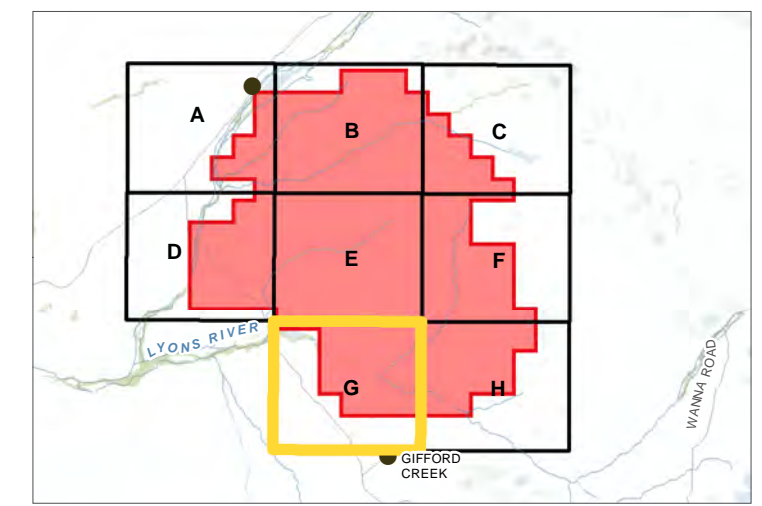




LEGEND

- Quadrat Locations**
- Established 2015
 - Regional
 - Roads
 - Rivers
 - Creeks
 - Survey Area
- Vegetation Types**
- AaEpDr
 - AaSaEs
 - AcAc
 - AcAsCc
 - AcEt
 - AxEcAc
 - EcBp
 - EcMgCc
 - EeAc
 - EpAc
 - EvCc
 - EvReMg
 - Fs

OVERVIEW



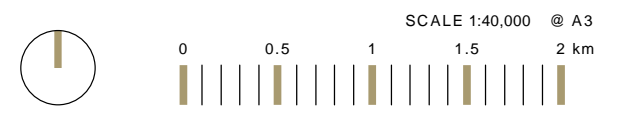
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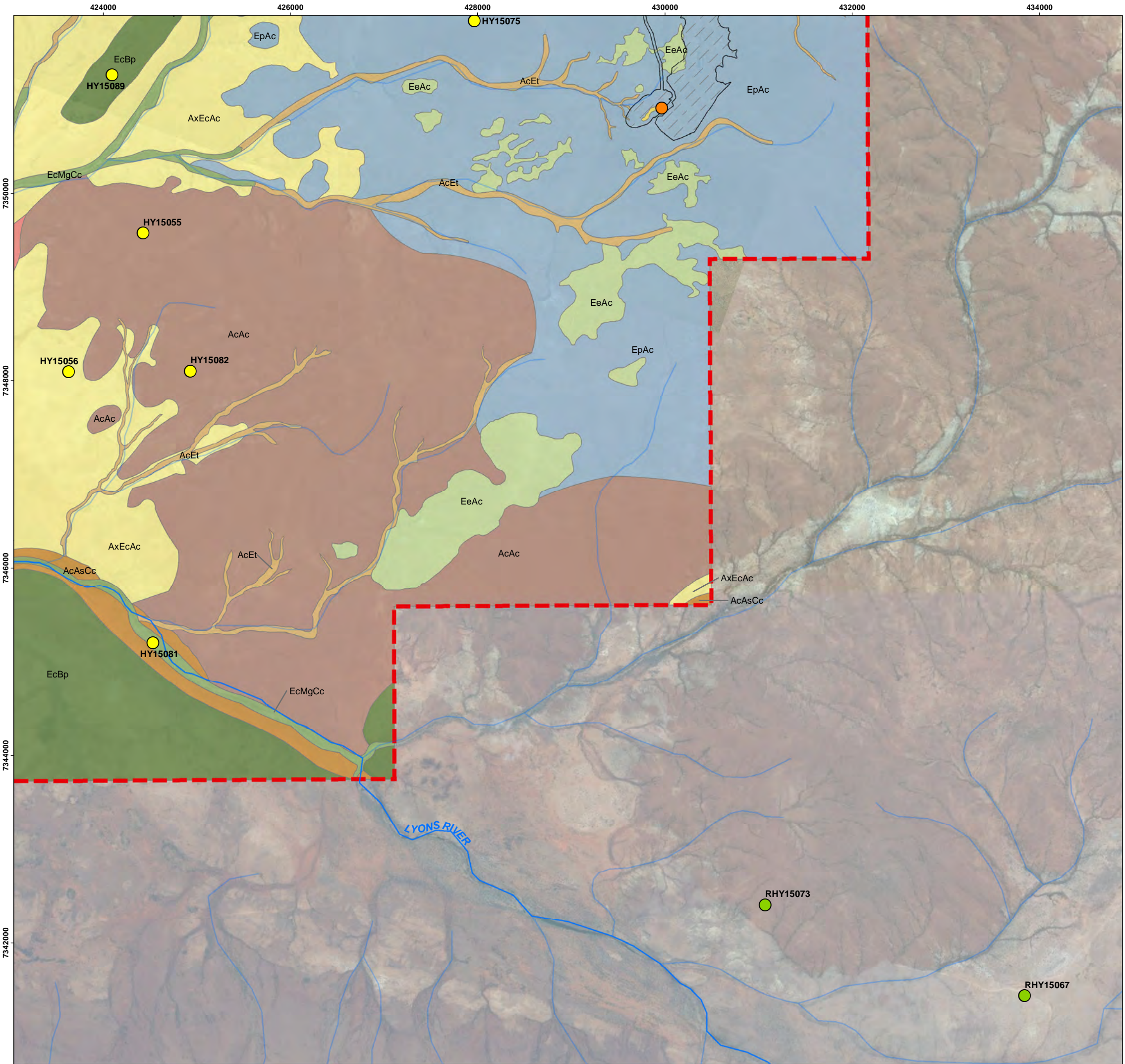
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - G





LEGEND

Quadrat Locations

- Established 2014
- Established 2015
- Regional

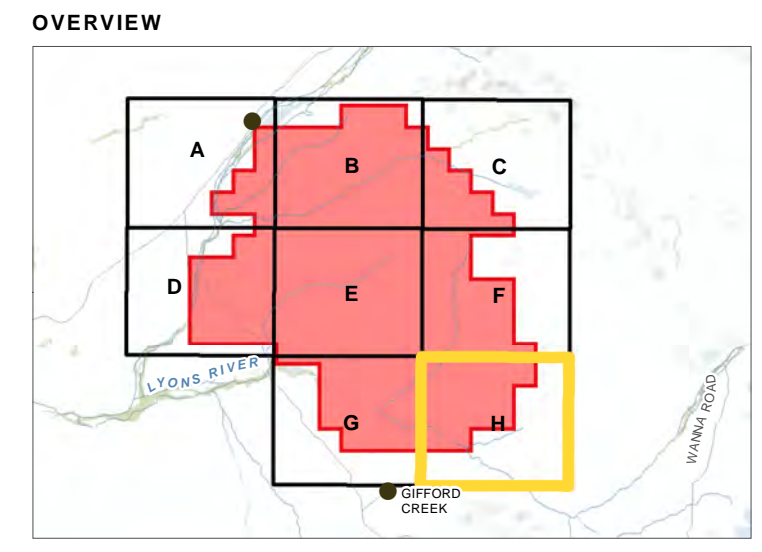
Rivers
Creeks

Proposed Infrastructure Footprint

Survey Area

Vegetation Types

- AcAc
- AcAsCc
- AcEt
- AtGc
- AxEcAc
- EcBp
- EcMgCc
- EeAc
- EpAc
- Fs



ecoscape

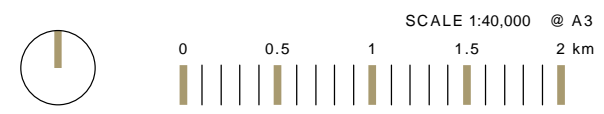
AUTHOR: JN REVIEWED: SB
DATE: JUL-15 PROJECT NO: 3397-15

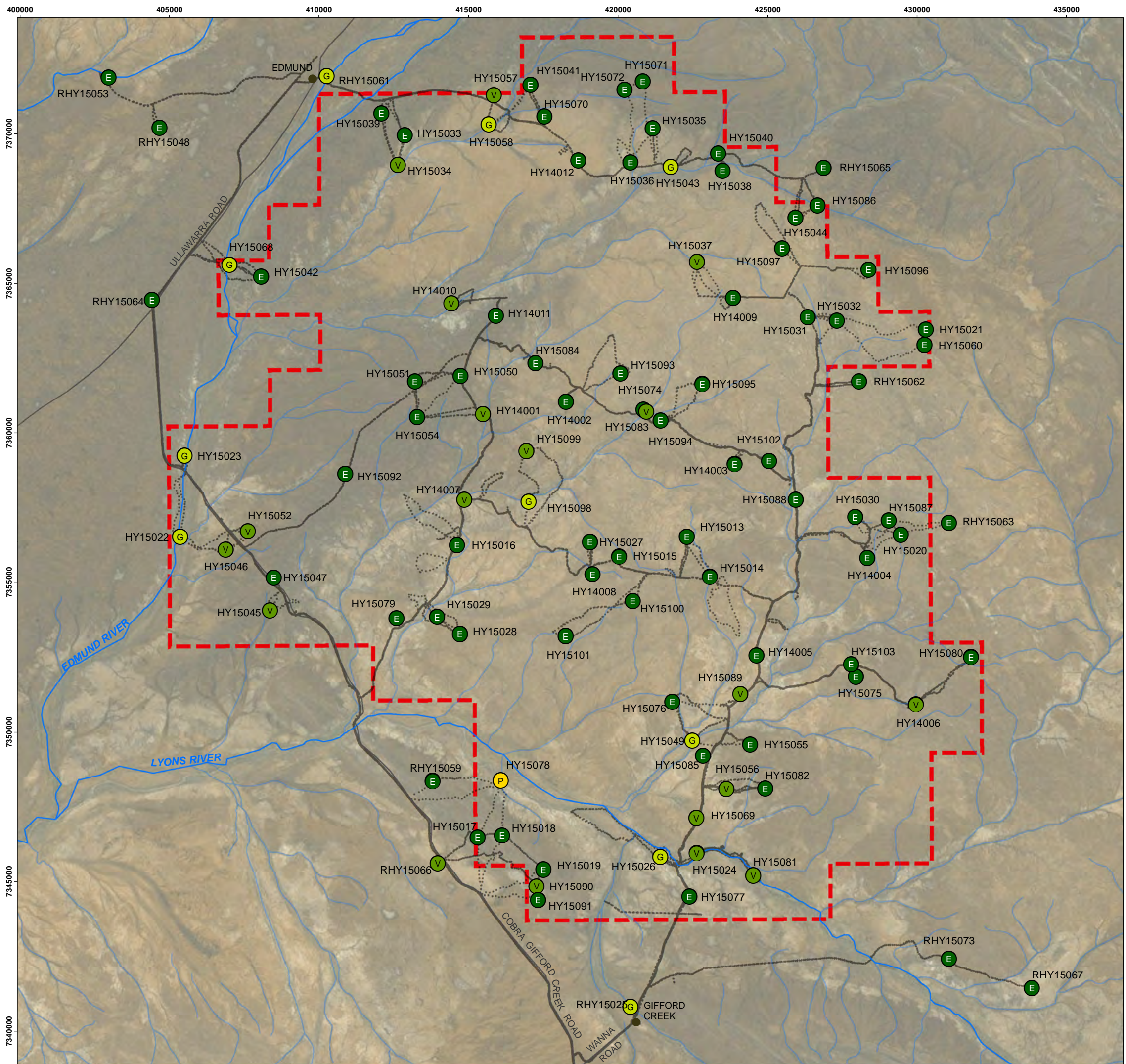
YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION TYPES

MAP 8 - H





LEGEND

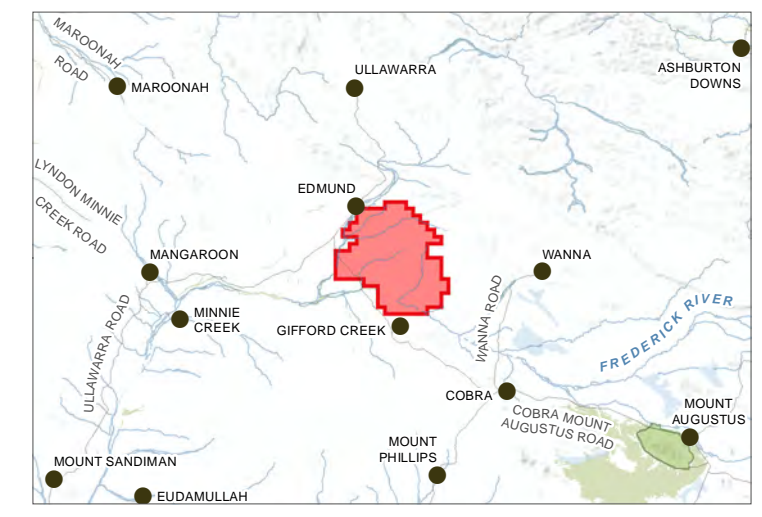
- Homesteads
- Roads
- Rivers
- Creeks
- Survey Tracks
- ▭ Survey Area

Quadrat Locations

Vegetation Condition (Trudgen 1991 Scale)

- Excellent (E)
- Very Good (V)
- Good (G)
- Poor (P)
- Very Poor (VP)
- Completely Degraded (C)

OVERVIEW



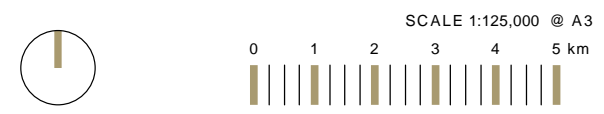
AUTHOR: JN REVIEWED: SB
 DATE: JUL-15 PROJECT NO: 3397-15

YANGIBANA BIOLOGICAL ASSESSMENT

CLIENT: HASTINGS

VEGETATION CONDITION

MAP 9



APPENDIX ONE: DEFINITIONS AND CRITERIA

Table 10: *EPBC Act 1999* categories for flora and fauna (Commonwealth of Australia 1999)

EPBC ACT CATEGORY	DEFINITION
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	<p>A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:</p> <p>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</p> <p>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	<p>A native species is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
Vulnerable (VU)	<p>A native species is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.</p>
Conservation Dependent	<p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <p>(i) the species is a species of fish;</p> <p>(ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;</p> <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>

Table 11: Conservation codes for Western Australian flora and fauna (DPaW 2015; Jones 2015)

CONSERVATION CODES FOR WESTERN AUSTRALIAN FLORA AND FAUNA	
T	<p>Threatened species – Listed as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, published under Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <ul style="list-style-type: none"> • Fauna that is rare or likely to become extinct are declared to be fauna that is need of special protection • Flora that are extant and considered likely to become extinct, or rare and therefore in need of special protection, are declared to be rare flora: species* which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such. <p>Threatened Fauna and Flora are ranked according to their level of threat using IUCN Red List categories and criteria. The number of Schedules published under the Wildlife Conservation Act has recently changed, with older Schedule 1 (all Threatened categories) replaced by Schedules 1-3.</p> <p>A list of the current rankings can be downloaded from the Parks and Wildlife Threatened Species and Communities webpage at http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities</p>
CR	<p>Critically Endangered (Schedule 1)</p> <ul style="list-style-type: none"> • Threatened fauna considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice as 'Fauna that is rare or is likely to become extinct as critically endangered fauna'. • Threatened flora taxa that are extant and considered likely to become extinct or rare, as critically endangered flora, and therefore in need of special protection
EN	<p>Endangered (Schedule 2) –</p> <ul style="list-style-type: none"> • Threatened fauna considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice as 'Fauna that is rare or is likely to become extinct as endangered fauna' • Threatened flora taxa that are extant and considered likely to become extinct or rare, as endangered flora, and therefore in need of special protection
VU	<p>Vulnerable (Schedule 3) –</p> <ul style="list-style-type: none"> • Threatened fauna considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice as 'Fauna that is rare or is likely to become extinct as vulnerable fauna' • Threatened flora taxa that are extant and considered likely to become extinct or rare, as vulnerable flora, and therefore in need of special protection
EX	<p>Presumed extinct (Schedule 4) –</p> <ul style="list-style-type: none"> • Fauna which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice as 'Fauna presumed to be extinct' • Flora species which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such. Listed as Specially Protected under the Wildlife Conservation Act 1950, published under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).
IA	<p>Migratory birds protected under an international agreement – (Schedule 5)</p> <p>Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice</p>
CD	<p>Conservation Dependent – (Schedule 6)</p> <p>Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice</p>
OS	<p>Other specially protected fauna – (Schedule 7)</p> <p>Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice</p>
<p>P Priority species</p> <p>Species that may be threatened or near threatened but are data deficient, have not yet been adequately surveyed to be listed under the Schedules of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened list 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.</p>	
P1	<p>Priority One: Poorly-known species (on threatened lands)</p> <p>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 or 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 localities 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 study.</p>

CONSERVATION CODES FOR WESTERN AUSTRALIAN FLORA AND FAUNA	
P2	<p>Priority Two: Poorly-known species (some on conservation lands) 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 localities 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 study.</p>
P3	<p>Priority Three: Poorly-known species (some on conservation lands) Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread localities 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 localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further study.</p>
P4	<p>Priority Four: 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 do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
<p>*Species includes all taxa (plural of taxon—a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies, variety or forma).</p>	

Table 12: IUCN Red List Categories and Criteria (IUCN 2012)

Additional detail is available in the quoted reference.

IUCN CATEGORY	DEFINITION
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	<p>A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see below), and it is therefore considered to be facing an extremely high risk of extinction in the wild. If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.</p> <p>A: Reduction in population size based on a defined criteria (including a reduction of $\geq 90\%$ or $\geq 80\%$ over the last 10 years, depending on other defined factors)</p> <p>B: Geographic range in the form of either B1 (extent of occurrence $< 100 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or B2 (area of occupancy $< 10 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or both</p> <p>C: Population size estimated to number fewer than 250 mature individuals and shows continuing decline or extreme fluctuations</p> <p>D: Population size estimated to number fewer than 50 mature individuals</p> <p>E: Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years)</p>
Endangered (EN)	<p>A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see below), and it is therefore considered to be facing a very high risk of extinction in the wild.</p> <p>A: Reduction in population size based on a defined criteria (including a reduction of $\geq 70\%$ or $\geq 50\%$ over the last 10 years, depending on other defined factors)</p> <p>B: Geographic range in the form of either B1 (extent of occurrence $< 5,000 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or B2 (area of occupancy $< 500 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or both</p> <p>C: Population size estimated to number fewer than 2,500 mature individuals and shows continuing decline or extreme fluctuations</p> <p>D: Population size estimated to number fewer than 250 mature individuals</p> <p>E: Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years)</p>

IUCN CATEGORY	DEFINITION
Vulnerable (VU)	<p>A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see below), and it is therefore considered to be facing a high risk of extinction in the wild.</p> <p>A: Reduction in population size based on a defined criteria (including a reduction of $\geq 50\%$ or $\geq 30\%$ over the last 10 years, depending on other defined factors)</p> <p>B: Geographic range in the form of either B1 (extent of occurrence $< 20,000 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or B2 (area of occupancy $< 2,000 \text{ km}^2$ and fragmented, continuing to decline or fluctuating) or both</p> <p>C: Population size estimated to number fewer than 10,000 mature individuals and shows continuing decline or extreme fluctuations</p> <p>D: Population size very small or restricted and estimated to number fewer than 1,000 mature individuals or occupy typically $< 20 \text{ km}^2$ or five or less locations</p> <p>E: Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years</p>
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

Table 13: EPBC Act categories for TECs (Commonwealth of Australia 1999)

EPBC ACT CATEGORY	DEFINITION
Critically Endangered (CR)	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	If, at that time, it is not critically endangered, and is facing a very high risk of extinction in the wild in the near future.
Vulnerable (VU)	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the medium-term future.

Table 14: DPaW definitions and criteria for TECs and PECs (DEC 2010)

CRITERIA	DEFINITION
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B. All occurrences recorded within the last 50 years have since been destroyed</p>
Critically Endangered (CR)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <ol style="list-style-type: none"> i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ol style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>

CRITERIA	DEFINITION
Endangered (EN)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ol style="list-style-type: none"> i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii. modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ol style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. <p>C. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
Vulnerable (VU)	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p>

CRITERIA	DEFINITION
Priority Ecological Communities	
Priority One	<p><i>Poorly known ecological communities</i></p> <p>Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
Priority Two	<p><i>Poorly known ecological communities</i></p> <p>Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and / or are not well defined, and appear to be under threat from known threatening processes.</p>
Priority Three	<p><i>Poorly known ecological communities</i></p> <ul style="list-style-type: none"> i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or; ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.</p>
Priority Four	<p>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.</p> <ul style="list-style-type: none"> i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority Five	<p><i>Conservation Dependent Ecological Communities</i></p> <p>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.</p>

Table 15: NVIS structural formation (terrestrial vegetation) (NHT 2003)

COVER CHARACTERISTICS								
	Foliage cover *	70-100	30-70	10-30	<10	» 0 (scattered)	0-5 (clumped)	unknown
	Cover code	d	c	i	r	bi	bc	unknown
Growth Form	Height Ranges (m)	Structural Formation Classes						
tree, palm	<10,10-30, >30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	tree, palm
tree mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	tree mallee
shrub, cycad, grass-tree, tree-fern	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrub, cycad, grass-tree, tree-fern
mallee shrub	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrub
heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrub
chenopod shrub	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrub
samphire shrub	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrub
hummock grass	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grass
tussock grass	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grass
other grass	<0.5,>0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grass
sedge	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedge
rush	<0.5,>0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rush
herb	<0.5,>0.5	closed herbland	herbland	open herbland	sparse herbland	isolated herbs	isolated clumps of herbs	herb
fern	<1,1-2,>2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	fern
bryophyte	<0.5	closed bryophyte-land	bryophyte-land	open bryophyteland	sparse bryophyteland	isolated bryophytes	isolated clumps of bryophytes	bryophyte
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichen
vine	<10,10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vine

Table 16: NVIS height classes (NHT 2003)

HEIGHT		GROWTH FORM				
Height Class	Height Range (m)	tree, vine (M & U), palm (single-stemmed)	shrub, heath shrub, chenopod shrub, ferns, samphire shrub, cycad, tree-fern, grass-tree, palm (multi-stemmed)	tree mallee, mallee shrub	tussock grass, hummock grass, other grass, sedge, rush, forbs, vine (G)	bryophyte, lichen, seagrass, aquatic
8	>30	tall	NA	NA	NA	NA
7	10-30	mid	NA	tall	NA	NA
6	<10	low	NA	mid	NA	NA
5	<3	NA	NA	low	NA	NA
4	>2	NA	tall	NA	tall	NA
3	1-2	NA	mid	NA	tall	NA
2	0.5-1	NA	low	NA	mid	tall
1	<0.5	NA	low	NA	low	low

Source: (based on Walker & Hopkins 1990)

Table 17: Trudgen (1991) Vegetation Condition Scale

CONDITION RATING	DESCRIPTION
Excellent	Pristine or nearly so; no obvious signs of damage caused by activities of European man.
Very Good	Some relatively slight signs of damage caused by activities of European man. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds such as <i>*Ursinia anthemoides</i> or <i>*Briza</i> spp., or occasional vehicle tracks.
Good	More obvious signs of damage caused by activities of European man, including some obvious signs of impact on the vegetation structure such as that caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones such as <i>*Ehrharta</i> spp.
Poor	Still retains basic vegetation structure or ability to regenerate to it after very obvious activities of European man, such as grazing, partial clearing (chaining) or frequent fires. Weeds as above, probably plus some aggressive ones such as <i>*Ehrharta</i> spp.
Very Poor	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 including very aggressive species.
Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; ie areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX TWO: DESKTOP ASSESSMENT RESULTS

Table 18: Geological units within the study area (Department of Mines and Petroleum 2002; 2007)

UNIT	DESCRIPTION	AREA IN STUDY AREA (HA)	AREA IN REGION (HA)
A1	Unconsolidated silt, sand, and gravel in active drainage channels and floodplains; includes ferruginous deposits	3,980	46,880
A1-cb	Swelling clay (gilgal) developed on alluvial flats	44	531
A1c	Clayey alluvium developed on alluvial flats	63	5,250
A2	Partly consolidated silt, sand, and gravel; partly dissected by present-day drainage	875	22,051
Ad	Unconsolidated, fine-grained deposits in alluvial drainage depressions, claypans, perennial lakes, and swamps; low-lying areas with internal drainage; typically thickly vegetated	69	1,109
C1-t-ss	Sandstone fragments in a silt and sand matrix; derived from sandstone	213	1,295
R-k	Calcrete, developed in and adjacent to alluvial channels; carbonate and vuggy opaline silica; dissected by major present-day drainage	894	15,426
W	Sandy and clayey distal sheetwash and slope deposits, no clearly defined drainage	599	29,171
A	Silt, sand, and gravel in drainage channels and adjacent to floodplains; includes ferruginous deposits	236	8,903
A1/Rk	Unconsolidated silt, sand, and gravel in active drainage channels; includes ferruginous deposits	350	676
A1f	Unconsolidated ferruginous silt, sand, and gravel	33	809
A2/Rk	Partly consolidated silt, sand, and gravel; partly dissected by present-day drainage	156	1,059
A3	Weakly cemented and compacted silt, sand, and gravel; deeply dissected by present-day drainage	152	6,263
A3/PLgpi	Weakly cemented and compacted silt, sand, and gravel; deeply dissected by present-day drainage	157	157
A3/Rk	Weakly cemented and compacted silt, sand, and gravel; deeply dissected by present-day drainage	27	347
A3ti	Sand and gravel with ferruginous cement; deeply dissected by present-day drainage	7,986	26,564
A3ti/PLgpi	Sand and gravel with ferruginous cement; deeply dissected by present-day drainage	44	44
A3ti/PLgyn	Sand and gravel with ferruginous cement; deeply dissected by present-day drainage	49	49
A3ti/Rg	Sand and gravel with ferruginous cement; deeply dissected by present-day drainage	249	331
A3ti/Rk	Sand and gravel with ferruginous cement; deeply dissected by present-day drainage	179	362
C	Quartz and rock fragments in a silt and sand matrix; includes ferruginous deposits	305	4,185
C1	Quartz and rock fragments in an unconsolidated silt and sand matrix; includes ferruginous deposits	67	20,505
C1/PLgpi	Quartz and rock fragments in an unconsolidated silt and sand matrix; includes ferruginous deposits	786	826
C1/Rk	Quartz and rock fragments in an unconsolidated silt and sand matrix; includes ferruginous deposits	3	11
C1f	Unconsolidated ferruginous rubble and scree	23	23
C1q	Quartz fragments in an unconsolidated silt and sand matrix, derived from quartz veins and quartzose rocks	21	595
C1tss	Sandstone fragments in an unconsolidated silt and sand matrix, derived from sandstone	217	701

UNIT	DESCRIPTION	AREA IN STUDY AREA (HA)	AREA IN REGION (HA)
L	Unconsolidated, fine-grained deposits in claypans, perennial lakes, and swamps; low-lying areas with internal drainage; typically thickly vegetated	30	699
P_ _{-DUyn-gmi}	Equigranular to locally weakly porphyritic, medium-grained biotite--muscovite monzogranite with abundant inclusions of metasedimentary rock or porphyritic granodiorite	44	720
P_ _{-MEk-sf}	Siltstone, mudstone, and thin- to very thick-bedded quartz sandstone; minor dolostone and conglomerate	54	2,614
P_ _{-MOgo-mgn}	Strongly foliated, porphyritic metagranodiorite and metamonzogranite, and augen gneiss	<0.01	33
P_ _{-PO-mtsf}	Psammitic schist and gneiss, and feldspathic metasandstone; includes interbedded pelite, quartzite, and granule metaconglomerate	97	1,255
PLd12	Dolerite and gabbro sills intruded into Edmund Group; oldest suite (PLd2) dated at c.1465 Ma 2 3 and youngest suite (PLd2) dated at c.1070 Ma 2 3	7	28,862
PLgdi	DINGO CREEK GRANITE: porphyritic biotite-muscovite granite; fine to medium grained with tabular feldspar phenocrysts; locally contains abundant broken phenocrysts of feldspar	1,255	1,633
PLge	Even-textured, medium-grained biotite monzogranite	11	15
PLgpi	PIMBYANA GRANITE: porphyritic, medium- to coarse-grained biotite-muscovite granodiorite to syenogranite, with abundant large tabular phenocrysts of K-feldspar; even-textured to porphyritic, fine- to	12,037	15,796
PLgpit	Even-textured, fine- to medium-grained biotite tonalite to quartz diorite	65	65
PLgpix	Porphyritic, medium- to coarse-grained biotite-muscovite granodiorite to syenogranite, with abundant xenoliths of metasedimentary and metamafic rocks; abundant large tabular phenocrysts of K-feldspar;	3,270	3,376
PLgto	Biotite-muscovite-cordierite tonalite with abundant inclusions of pelitic schist, biotite schist, and calc-silicate gneiss	28	28
PLgyn	YANGIBANA GRANITE: even-textured to locally weakly porphyritic, medium-grained biotite-muscovite monzogranite; locally contains tourmaline; may contain xenoliths of metasedimentary rock or porphyritic	1,988	2,151
PLgynx	Even-textured to weakly porphyritic, medium-grained biotite-muscovite(-tourmaline) monzogranite with abundant xenoliths of metasedimentary rock or porphyritic granodiorite	3,778	5,358
PLIs	Metasedimentary schist and gneiss, including psammite, calc-silicate rock, and quartzite; typically metamorphosed at medium grade	1,871	2,880
PLMEd	DISCOVERY FORMATION: massive or laminated chert, and carbonaceous mudstone and siltstone; locally sulfidic	9	5,628
PLMEi	IRREGULLY FORMATION: stromatolitic and non-stromatolitic dolostone, dolomitic siltstone, quartz sandstone, and conglomerate	98	366
PLMEk	KIANGI CREEK FORMATION: thin to very thick bedded quartz sandstone, and siltstone and mudstone; minor dolostone and conglomerate	92	9,507
PLMEy	YILGATHERRA FORMATION: sandstone, siltstone, and conglomerate	134	652
PLngo	GOOCHE GNEISS: strongly foliated, porphyritic granodiorite to augen gneiss	154	205
PLu	Ultramafic sills and dykes	59	59
Rf	Ferruginous deposits, including lateritic, ferruginous, and manganiferous duricrust	3	765
Rg	Weathered quartzofeldspathic rock with locally derived sand and sandy clays	1,750	1,901
Rg/PLgpi	Weathered quartzofeldspathic rock with locally derived sand and sandy clays	882	891
Rk	Calcrete, developed in and adjacent to alluvial channels; carbonate and vuggy opaline silica; dissected by major present-day drainage	5,353	16,008
Rk/PLgpi	Calcrete, developed in and adjacent to alluvial channels; carbonate and vuggy opaline silica; dissected by major present-day drainage	243	307
W/A3	Sandy and clayey distal sheetwash and slope deposits; no clearly defined drainage	490	1,142
W/A3ti	Sandy and clayey distal sheetwash and slope deposits; no clearly defined drainage	439	8,892

UNIT	DESCRIPTION	AREA IN STUDY AREA (HA)	AREA IN REGION (HA)
W/PLgpi	Sandy and clayey distal sheetwash and slope deposits; no clearly defined drainage	45	431
W/Rk	Sandy and clayey distal sheetwash and slope deposits; no clearly defined drainage	1,480	3,140
TOTAL			

Table 19: Combined flora database search results

1. = DPaW, 2 = *NatureMap* (Figure xx), 3 = PMST, 4 = *Atlas of Living Australia*

SPECIES NAME	DATABASE	EPBC ACT STATUS	DPaW STATUS	IUCN RED LIST STATUS
<i>Acacia curryana</i> (formerly <i>Acacia</i> sp. Minnie Creek (B.R. Maslin 5217))	1, 2		P1	
<i>Acacia petricola</i> (formerly <i>Acacia</i> sp. Mt Augustus (S.D. Hopper 3181), P3)	1, 2		P2	
<i>Lawrenzia</i> sp. Anna Plains (N.T. Burbidge 1433)	1, 2, 4	-	P3	
<i>Lepidobolus densus</i>	1	-	P4	
<i>Maireana prosthochaeta</i>	1	-	P3	
<i>Pityrodia augustensis</i>	1, 3	Vulnerable	TF	
<i>Rhodanthe frenchii</i>	1, 2, 4	-	P2	
<i>Solanum octonum</i>	1, 2	-	P2	

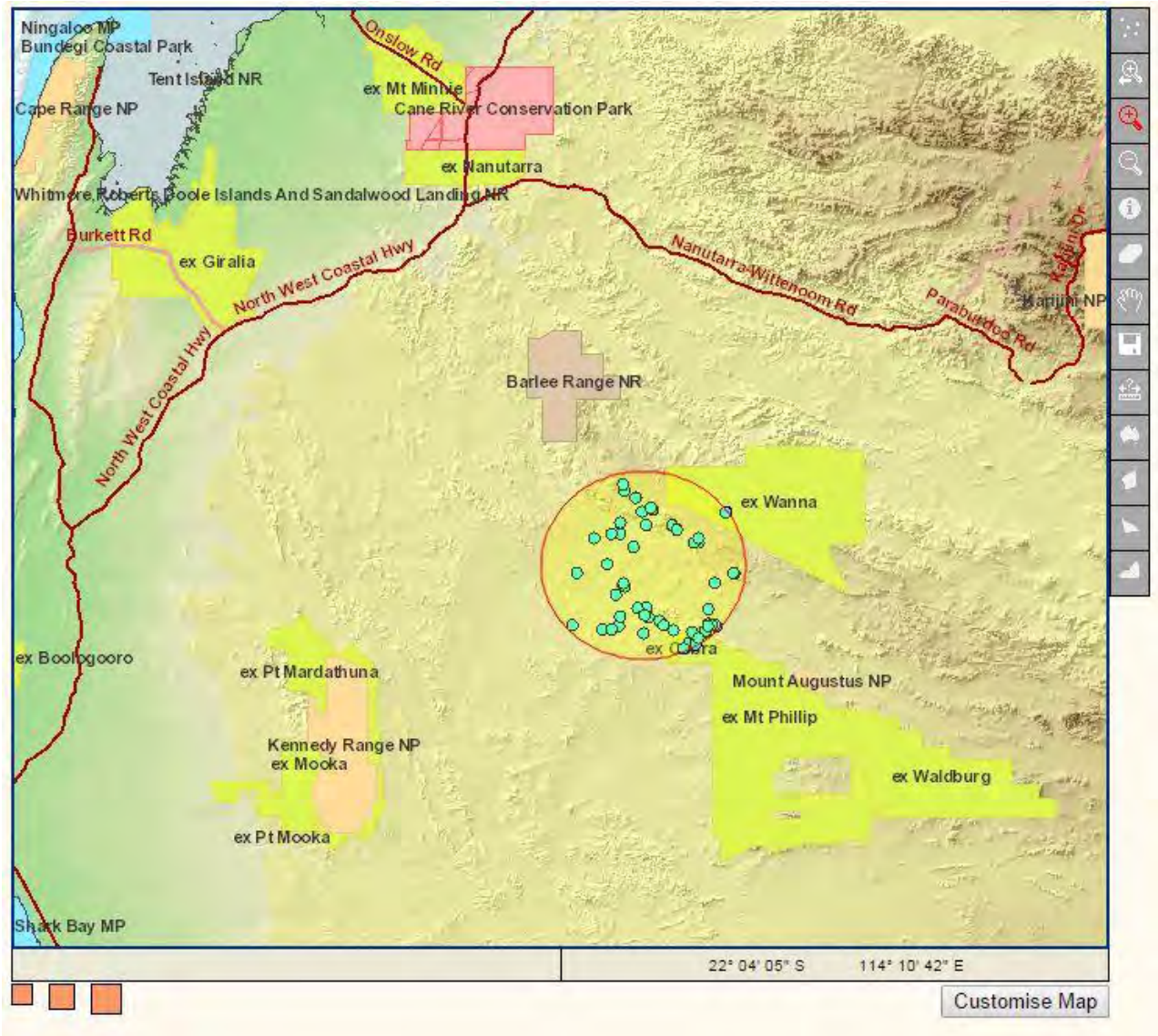


Figure 5: NatureMap (DPaW 2007-2015) search area

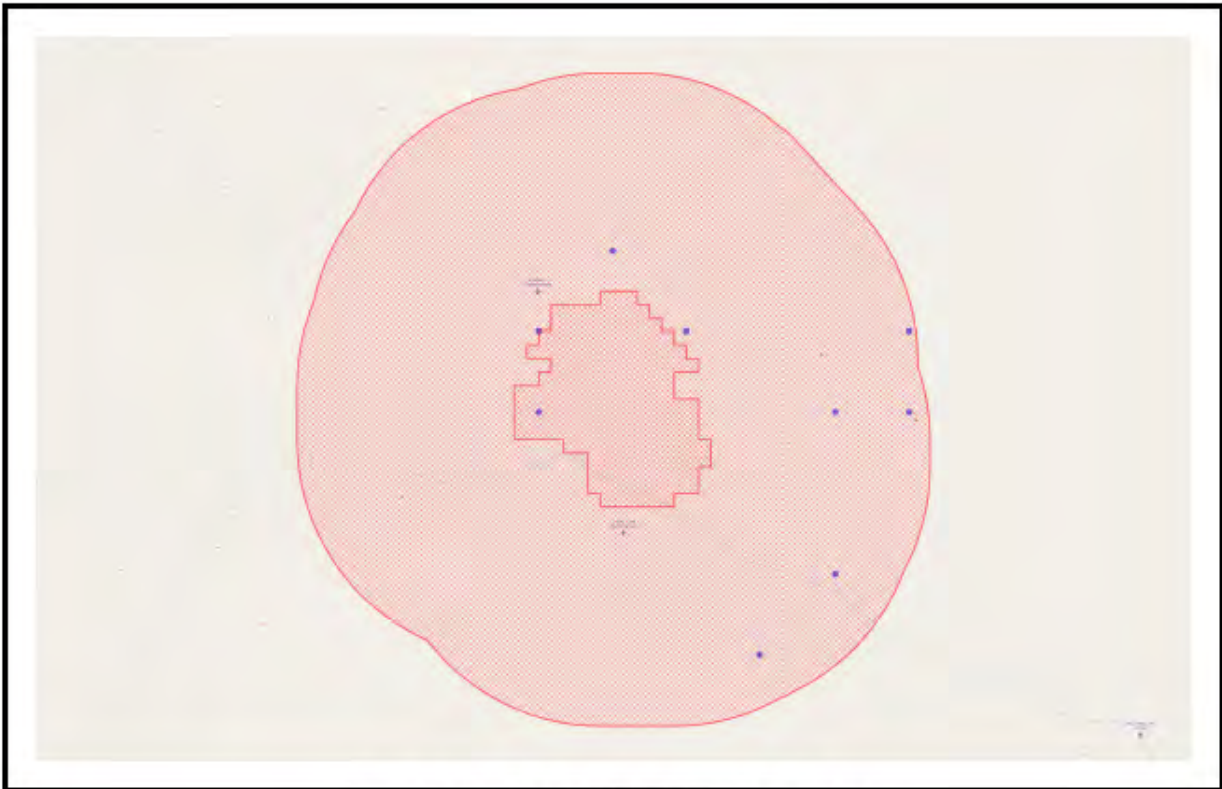


Figure 6: Map of All threatened species in My Area

Table 3: All threatened species

Family	Scientific Name	Common Name	No. Occurrences
MALURIDAE	<i>Malurus (Musciparus) leucopterus</i>	White-winged Fairy-wren	5
OTIDIDAE	<i>Ardeotis australis</i>	Australian Bustard	4
Asteraceae	<i>Rhodanthe frenchii</i>		4
BURHINIDAE	<i>Burhinus (Burhinus) grallarius</i>	Bush Stone-curlew	1
FALCONIDAE	<i>Falco (Hierofalco) hypoleucos</i>	Grey Falcon	1
Malvaceae	<i>Lawrencia</i> sp. Anna Plains (N.T.Burbidge 1433)		1

Figure 6: *Atlas of Living Australia Spatial Search (ALA 2015b)*; search area and threatened species results

Table 20: Conservation significant flora details

SPECIES NAME (REFERENCES)	DESCRIPTION	FL. PERIOD	SOIL	LANDFORM/HABITAT	ASSOCIATED VEGETATION
T					
<i>Pityrodia augustensis</i> (1, 2)	Bushy shrub c1 m high; purple/purple-red, lilac flowers	Aug-Oct	Sandstone, granite, alluvium	Gully, creekline, elevated drainage line, summit of rock, rocky hillslopes	<i>Acacia</i> shrubland; <i>Eucalyptus camaldulensis</i> , <i>Corymbia ferriticola</i>
P1					
<i>Acacia curryana</i> (1, 3) (formerly <i>Acacia</i> sp. Minnie Creek (B.R. Maslin 5217))	Obconic or rounded spreading shrub 1.5-2.5 m high; stems and main branches contorted, small phyllodes	Unknown	Granite clay loam	Diffuse drainage channels	Unknown
P2					
<i>Acacia petricola</i> (1, 3) (formerly <i>Acacia</i> sp. Mt Augustus (S.D. Hopper 3181), P3)	Erect multi-stemmed shrub 2-3 m (but up to 5 m) high, 3-6 m (but up to 8 m) wide, contorted main stems. Flower spikes 10-20 cm long, peduncles 2-4 mm long	July	Skeletal sandy soil, granite	Steep rocky slopes	Low trees, low shrubland, spinifex, <i>Acacia</i> woodland, <i>Mulga</i> , <i>Eremophila</i>
<i>Rhodanthe frenchii</i> (1)	Erect annual herb to 0.35 m high, yellow flowers	Aug-Oct	Granite, sandstone, banded ironstone	Stony hills, river beds, outcrops, rocky gully	<i>Eremophila</i> spp., <i>Acacia</i> shrubland, <i>Eucalyptus camaldulensis</i>
<i>Solanum octonum</i> (1, 4)	Erect shrub 0.8-1.5 m high, prickly stems, purple flowers	Jun-Sep	Sand, skeletal soil, alluvial sand	Gorge top, steep hillside, riparian	Mulga, <i>Acacia citrinoviridis</i> , <i>Triodia</i>
P3					
<i>Lawrenzia</i> sp. Anna Plains (N.T. Burbidge 1433) (1)	Erect perennial herb to 1.8 m high, white flowers	Aug	Gravel	Flats	Unknown (in Gascoyne)
<i>Maireana prosthocochaeta</i> (1)	Shrub 0.3-0.6 m high	Jul-Nov	Sand, alluvium, clay loam	Plains, slopes	Mulga, <i>Acacia</i> shrubland
P4					
<i>Lepidobolus densus</i> (1)	Rhizomatous perennial sedge to 0.4 m high	Aug-Nov	Sand	Slope	<i>Acacia</i> shrubland

References:

1. *FloraBase* (WAH 2015 accessed 3 March 2015)
2. DoE & Australian Government (2008)
3. Maslin (2014)
4. Bean (2013)

APPENDIX THREE: FLORISTIC QUADRAT DATA

HY14001

Staff RE **Date** 18/11/2014 **Season** A
Revisit SOK 19/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 415485 **mE** 7360627 **mN** **Lat.** -23.8636 **Long.** 116.1700
Habitat Creek
Aspect N/A **Slope** N/A
Soil Type River sand
Rock Type Mixed alluvial
Loose Rock 20-50% cover; 20-60 mm in size **Litter** 3% cover ; 2 cm in depth
Bare ground 75% cover **Weeds** 5% cover
Vegetation U+ ^^ *Acacia cyperophylla* var. *cyperophylla*, *Eucalyptus victrix*, *Acacia pruinocarpa* ^tree\6\c;G
^^ *Nicotiana occidentalis* subsp. *occidentalis*, *Malvastrum americanum*, *Cyperus iria* ^forb,shrub,
sedge\1\i
Veg. Condition Very Good
Disturbance Several weed species present, some evidence of grazing by cattle
Fire Age no evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia cyperophylla</i> var. <i>cyperophylla</i>		8	25	
<i>Acacia pruinocarpa</i>		8	5	
<i>Actinobole oldfieldianum</i>		0.1	<1	
<i>Aeschynomene indica</i>		1	<1	
<i>Alternanthera denticulata</i>		4	<1	

<i>Ammannia multiflora</i>	.3	<1
* <i>Asphodelus fistulosus</i>	0.3	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	.4	2
<i>Blumea tenella</i>	.1	<1
<i>Brachyscome iberidifolia</i>	0.3	<1
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	.1	<1
<i>Calandrinia ptychosperma</i>	0.1	<1
<i>Calocephalus beardii</i>	0.4	<1
<i>Calotis porphyroglossa</i>	0.3	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.2	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	.3	<1
<i>Cleome viscosa</i>	.4	<1
<i>Corchorus crozophorifolius</i>	S2 (1-2 M);	1
<i>Corchorus tridens</i>	.3	<1
<i>Crotalaria cunninghamii</i>	0.5	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	.4	<1
<i>Cymbopogon ambiguus</i>	G;	1
<i>Cyperus iria</i>	.3	2
<i>Cyperus pulchellus</i>	.2	<1
<i>Cyperus squarrosus</i>	.2	<1
* <i>Datura leichhardtii</i>	1	<1
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	.3	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.3	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	H;	1
* <i>Echinochloa colona</i>	.2	<1
<i>Eragrostis cumingii</i>	.3	<1
<i>Eragrostis tenellula</i>	.4	<1
<i>Eriachne aristidea</i>	.5	<1
<i>Eucalyptus victrix</i>	10	5
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	H;	1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Haloragis trigonocarpa</i>	0.3	<1
<i>Hybanthus aurantiacus</i>	.3	<1
<i>Lepidium oxytrichum</i>	H;	1
<i>Lipocarpa microcephala</i>	.2	<1
* <i>Malvastrum americanum</i>	.5	4
<i>Marsilea hirsuta</i>	.3	<1
<i>Myriocephalus gascoynensis</i>	0.2	<1
<i>Nicotiana occidentalis</i>	H;	1

<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>		.5	6
<i>Notoleptopus decaisnei</i>		.2	<1
<i>Paspalidium rarum</i>		.2	<1
<i>Peplidium muelleri</i>		.1	<1
<i>Perotis rara</i>		.4	<1
<i>Phyllanthus erwinii</i>		.1	<1
<i>Pluchea dentex</i>		.3	<1
<i>Polycarpaea corymbosa</i>		.2	<1
<i>Polycarpaea longiflora</i>		0.3	<1
<i>Pterocaulon sphacelatum</i>		.3	<1
<i>Ptilotus macrocephalus</i>		0.5	<1
<i>Rhodanthe propinqua</i>		0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>		S2 (1-2 M);	1
* <i>Setaria verticillata</i>		.3	<1
<i>Sporobolus blakei</i>	P 3	.4	<1
<i>Stemodia viscosa</i>		0.4	<1
<i>Trachymene pilbarensis</i>		.1	<1
<i>Trichodesma zeylanicum</i>		1.1	<1
<i>Tripogon loliiformis</i>		.2	<1
<i>Wahlenbergia tumidifructa</i>		.3	<1

Hastings Biological Surveys

<i>Calandrinia schistorhiza</i>	0.1	<1
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Calocephalus francisii</i>	H;	2
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	2
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.2	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	<1
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena cunninghamii</i>		<1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.3	2
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus macrocephalus</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1

HY14003

Staff RE **Date** 18/11/2014 **Season** A
Revisit SOK 18/05/2015 E
Type Q 20 m x 20 m
Location Rocky outcrop
MGA Zone 50 423906 **mE** 7358939 **mN** **Lat.** -23.8793 **Long.** 116.2526
Habitat Mid-Slope
Aspect N **Slope** Very Gentle
Soil Type Brown sandy loam
Rock Type Granite
Loose Rock 50-90% cover; 20-60 mm in size **Litter** 1% cover ; 1 cm in depth
Bare ground 60% cover **Weeds** <1% cover
Vegetation 6iM+ ^*Acacia tetragonophylla*,^*Acacia kempeana*\^shrub\4|i;G ^^*Aristida contorta*,*Paspalidium clementii*,*Dactyloctenium radulans*\^tussock grass,other grass\1\c
Veg. Condition Excellent
Disturbance Some evidence of grazing by cattle, few weeds
Fire Age no evidence
Notes To small to map , is a record of species growing around rockpiles



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Abutilon lepidum</i>		.3	<1	
<i>Abutilon oxycarpum</i>		0.3	<1	
<i>Acacia kempeana</i>		1.5	<1	
<i>Acacia tetragonophylla</i>		3.5	15	
<i>Amaranthus cuspidifolius</i>		.2	<1	
<i>Aristida contorta</i>		0.2	40	

<i>Brachyachne prostrata</i>	.2	<1
<i>Bulbostylis barbata</i>	.1	<1
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	.1	<1
<i>Calandrinia ptychosperma</i>	0.1	<1
<i>Calocephalus francisii</i>	H;	2
* <i>Cenchrus ciliaris</i>	.5	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	.8	<1
<i>Cymbopogon ambiguus</i>	.5	<1
<i>Cyperus squarrosus</i>	.2	<1
<i>Dactyloctenium radulans</i>	.2	2
<i>Digitaria brownii</i>	.4	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	H;	1
<i>Enneapogon caeruleus</i>	.3	<1
<i>Eragrostis cumingii</i>	.4	<1
<i>Eragrostis leptocarpa</i>	.4	<1
<i>Eremophila exillifolia</i>	S2 (1-2 M);	2
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	S2 (1-2 M);	2
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	S2 (1-2 M);	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	.5	<1
<i>Eriachne aristidea</i>	.4	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Glycine canescens</i>	Climber	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Indigofera colutea</i>	.2	<1
<i>Iseilema eremaeum</i>	0.2	<1
<i>Lepidium phlebopetalum</i>	.1	<1
<i>Panicum decompositum</i>	.6	<1
<i>Paspalidium clementii</i>	.4	2
<i>Portulaca oleracea</i>	.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	S2 (0-1 M);	2
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	.4	<1
<i>Solanum lasiophyllum</i>	S2 (1-2 M);	2
<i>Trachymene pilbarensis</i>	.4	<1
<i>Trichodesma zeylanicum</i>	.5	<1
<i>Tripogon loliiformis</i>	G;	2

<i>Brachyachne prostrata</i>	.2	2
<i>Calandrinia schistorhiza</i>	.1	<1
<i>Dysphania rhadinostachya</i>	.2	<1
<i>Enneapogon caerulescens</i>	.2	<1
<i>Eremophila cuneifolia</i>	1.2	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	.2	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.1	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	.2	<1
<i>Maireana</i> ? <i>pyramidata</i>	.4	<1
<i>Maireana planifolia</i>	0.4	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Ptilotus aevoides</i>	.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	.4	<1
<i>Salsola australis</i>	.4	<1
<i>Sclerolaena eriacantha</i>	.3	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.3	1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	.4	<1
<i>Solanum gabrielae</i>	.2	<1
<i>Streptoglossa decurrens</i>	0.3	<1
<i>Tribulus suberosus</i>	S2 (1-2 M);	1

HY14005

Staff RE **Date** 18/11/2014 **Season** A
Revisit JKN 15/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 424636 **mE** 7352552 **mN** **Lat.** -23.9370 **Long.** 116.2594
Habitat Plain
Aspect N/A **Slope** Negligible
Soil Type Red orange clay loam
Rock Type Calcrete, quartz
Loose Rock 50-90% cover; 2-6 mm in size **Litter** 1% cover ; < 1 cm in depth
Bare ground 95% cover **Weeds** 0% cover
Vegetation M+ *Senna artemisioides* subsp. *helmsii*, *Eremophila cuneifolia*, *Acacia synchronicia* \shrub\3\;
Veg. Condition Excellent
Disturbance Vehicle tracks, cattle
Fire Age >5 years
Notes Site moved approx 15 m to east to get more representative sample



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i>		1.5	<1	
<i>Acacia synchronicia</i>		0.5	2	
<i>Acacia tetragonophylla</i>		1.8	<1	
<i>Aristida contorta</i>		0.1	<1	
<i>Brachyachne prostrata</i>		0.05	<1	
<i>Enneapogon caerulescens</i>		0.1	<1	
<i>Eremophila cuneifolia</i>		1	2	

<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Goodenia tenuiloba</i>	0.05	<1
<i>Lawrenzia densiflora</i>	0.2	<1
<i>Lepidium phlebopetalum</i>	0.1	<1
<i>Maireana</i> ? <i>polypterygia</i> (sterile)	0.5	<1
<i>Maireana melanocoma</i>	0.3	<1
? <i>Maireana villosa</i> (indet.)	0.5	<1
<i>Marsdenia australis</i>	1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Salsola australis</i>	0.3	<1
<i>Santalum spicatum</i>	2	<1
<i>Sclerolaena eriacantha</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	S2 (1-2 M);	2
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	S2 (1-2 M);	2
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.5	4
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Trianthema triquetrum</i>	0.1	<1

HY14006

Staff RE **Date** 18/11/2014 **Season** A
Revisit JKN 15/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 429965 **mE** 7350911 **mN** **Lat.** -23.9521 **Long.** 116.3117
Habitat Hillslope - Footslope
Aspect **Slope** Gentle
Soil Type Orange sandy clay
Rock Type Ironstone, quartz, granite
Loose Rock 50-90% cover **Litter** 1% cover ; < 1 cm in depth
Bare ground 90% cover **Weeds** 0% cover
Vegetation M+ ^ ^ *Acacia kempeana*, *Acacia tetragonophylla*, *Eremophila exilifolia* \shrub\3\i; G ^ *Aristida contorta*, ^ *Eriachne pulchella* subsp. *dominii*, *Portulaca ? oleracea (sterile)* \tussock grass, forb\1\r
Veg. Condition Very Good
Disturbance Faeces
Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia curryana</i>	P 1	S2 (1-2 M);	1	
<i>Acacia kempeana</i>		S2 (1-2 M);	5	
<i>Acacia tetragonophylla</i>			4	
<i>Aristida contorta</i>		G;	25	
<i>Bulbostylis barbata</i>		0.10	<1	
<i>Calandrinia ptychosperma</i>		0.05	<1	

Hastings Biological Surveys

<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Calocephalus francisii</i>	H;	1
<i>Corchorus crozophorifolius</i>	S3 (0-1 M);	1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.15	<1
<i>Eremophila exilifolia</i>	S2 (1-2 M);	2
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	S2 (1-2 M);	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	G;	2
<i>Euphorbia porcata</i>	0.05	<1
<i>Fimbristylis depauperata</i>	0.05	<1
<i>Gomphrena cunninghamii</i>	0.30	<1
<i>Gomphrena kanisii</i>	H;	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium cunninghamii</i>	0.20	<1
<i>Heliotropium inexplicitum</i>	0.05	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.4	<1
<i>Indigofera decipiens</i>	0.30	<1
<i>Paspalidium clementii</i>	0.30	<1
<i>Phyllanthus maderaspatensis</i>	0.05	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca ? oleracea</i> (<i>sterile</i>)	0.05	2
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	0.50	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	S2 (1-2 M);	1
<i>Solanum gabrielae</i>	S2 (1-2 M);	<1
<i>Tripogon loliiformis</i>	G;	2

HY14007

Staff RE **Date** 19/11/2014 **Season** A
Revisit SOK 15/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 414857 **mE** 7357768 **mN** **Lat.** -23.8894 **Long.** 116.1636
Habitat Open Depression
Aspect N/A **Slope** N/A
Soil Type Brown clayey loam
Rock Type Mixed
Loose Rock 20-50% cover; 6-20 mm in size **Litter** <1% cover ; <1 cm in depth
Bare ground 75% cover **Weeds** <1% cover
Vegetation U+ ^ *Acacia aptaneura*, ^ *Acacia synchronicia* ^tree\6\r;M ^ *Eremophila cuneifolia*, ^ *Eremophila forrestii* subsp. *forrestii* ^shrub\3\r;G ^ ^ *Lawrencia densiflora*, *Angianthus milnei*, *Enneapogon caerulescens* ^forb,tussock grass\1\i
Veg. Condition Very Good
Disturbance Close to well, heavy grazing by cattle
Fire Age no evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Abutilon lepidum</i>		.4	<1	
<i>Acacia aptaneura</i>		6	8	
<i>Acacia macraneura</i>		S1 (>2 M);	2	
<i>Acacia synchronicia</i>		5	2	
<i>Amaranthus cuspidifolius</i>		.4	<1	

<i>Angianthus milnei</i>	.2	3
<i>Aristida contorta</i>	.3	<1
<i>Boerhavia coccinea</i>	.3	<1
<i>Brachyachne prostrata</i>	.1	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus tridens</i>	.3	<1
<i>Cucumis melo</i>	Prostrate	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.3	<1
<i>Dysphania rhadinostachya</i>	.4	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	S2 (1-2 M);	1
<i>Enneapogon caerulescens</i>	.1	1
<i>Enteropogon ramosus</i>	.3	<1
<i>Eremophila cuneifolia</i>	1.3	2
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1	1
<i>Erodium cygnorum</i>	.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	.3	<1
<i>Euphorbia boophthona</i>	.4	<1
<i>Euphorbia porcata</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.3	<1
<i>Gomphrena cunninghamii</i>	.3	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia forrestii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	.3	<1
<i>Ipomoea calobra</i>	Climber	<1
<i>Lawrencia densiflora</i>	.3	8
<i>Lepidium phlebopetalum</i>	.4	<1
<i>Maireana melanocoma</i>	.4	<1
* <i>Malvastrum americanum</i>	.3	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Melhania oblongifolia</i>	.2	<1
<i>Paspalidium clementii</i>	.4	<1
<i>Polygala glaucifolia</i>	.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.2	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	.4	<1
<i>Rhagodia eremaea</i>	S2 (1-2 M);	2
<i>Rhyncharrhena linearis</i>	Climber	<1
<i>Salsola australis</i>	.3	<1
<i>Scaevola spinescens</i>	S2 (1-2 M);	1

Hastings Biological Surveys

<i>Sclerolaena densiflora</i>	S3 (0-1 M);	1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	S2 (1-2 M);	3
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	S2 (1-2 M);	1
* <i>Setaria verticillata</i>	.5	<1
<i>Solanum lasiophyllum</i>	.2	<1
<i>Streptoglossa bubakii</i>	.4	<1
<i>Streptoglossa decurrens</i>	0.4	<1
<i>Trianthema triquetrum</i>	.2	<1
<i>Zygophyllum eichleri</i>	.3	<1
<i>Zygophyllum kochii</i>	0.3	<1

<i>Acacia tetragonophylla</i>		2	<1
<i>Amaranthus cuspidifolius</i>		.5	<1
<i>Aristida contorta</i>		.2	30
<i>Boerhavia coccinea</i>		.4	<1
<i>Bulbostylis barbata</i>		.1	<1
<i>Calandrinia ptychosperma</i>		0.1	<1
<i>Calocephalus francisii</i>		H;	1
<i>Cheilanthes brownii</i>		.3	<1
<i>Cleome viscosa</i>		.4	1
<i>Corchorus crozophorifolius</i>	S3 (0-1 M);		1
<i>Cymbopogon ambiguus</i>		.5	2
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>		0.2	<1
<i>Dysphania rhadinostachya</i>		.3	<1
<i>Enneapogon caerulescens</i>		.4	<1
<i>Eragrostis cumingii</i>		0.3	<1
<i>Eriachne aristidea</i>		.2	<1
<i>Eriachne mucronata</i>		0.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>		.2	<1
<i>Glycine canescens</i>	Climber		<1
<i>Gomphrena cunninghamii</i>		.2	<1
<i>Gomphrena kanisii</i>		.2	<1
<i>Goodenia tenuiloba</i>		0.2	<1
<i>Indigofera colutea</i>		.3	<1
<i>Indigofera decipiens</i>		.3	<1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	H;		0
<i>Marsdenia australis</i>	Climber		<1
<i>Nicotiana ? benthamiana</i>	H;		1
<i>Paspalidium clementii</i>		.4	<1
<i>Phyllanthus erwinii</i>		.2	<1
<i>Polycarpaea corymbosa</i>		.3	<1
<i>Polycarpaea longiflora</i>		.3	<1
<i>Portulaca oleracea</i>		.2	<1
<i>Pterocaulon sphacelatum</i>		.5	<1
<i>Rhodanthe frenchii</i>	P 2	0.5	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>		1.2	<1
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>		.4	<1
<i>Solanum gabrielae</i>		1	<1
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)		.5	<1
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606)		.4	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

Trachymene pilbarensis

.4 <1

Trichodesma zeylanicum

.5 <1

Tripogon loliformis

G; 2

HY14009

Staff RE **Date** 19/11/2014 **Season** A
Revisit SOK 17/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 423879 **mE** 7364506 **mN** **Lat.** -23.8290 **Long.** 116.2526
Habitat Gently undulating landscape
Aspect N **Slope** Very Gentle
Soil Type Red brown sandy loam
Rock Type Granite
Loose Rock 50-90% cover; 20-60 mm in size **Litter** 2% cover ; 0 cm in depth
Bare ground 50% cover **Weeds** 0% cover
Vegetation M+ ^^ *Eremophila phyllopoda* subsp. *obliqua*, *Acacia tetragonophylla*, *Eremophila exilifolia* \^shrub\3\r;G ^^ *Aristida contorta*, *Portulaca oleracea*, *Fimbristylis depauperata* \^other grass, forb, sedge\1\c
Veg. Condition Excellent
Disturbance Minor grazing
Fire Age no evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia macraneura</i>			<1	
<i>Acacia tetragonophylla</i>		1.5	2	
<i>Aristida contorta</i>		0.3	50	
<i>Bulbostylis barbata</i>		0.1	<1	
<i>Calocephalus francisii</i>		H;	2	

Hastings Biological Surveys

<i>Eremophila exilifolia</i>	1	1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	S2 (1-2 M);	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.2	4
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1
<i>Fimbristylis depauperata</i>	0.3	1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Heliotropium inexplicitum</i>	0.2	<1
<i>Indigofera colutea</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	5
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1
<i>Solanum lasiophyllum</i>	0.3	<1
<i>Tripogon loliiformis</i>	0.3	<1

* <i>Argemone ochroleuca</i>	.2	<1
* <i>Asphodelus fistulosus</i>	0.2	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	.2	<1
* <i>Cenchrus ciliaris</i>	.5	5
* <i>Cenchrus setiger</i>	.4	3
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.3	<1
<i>Cleome viscosa</i>	.4	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus crozophorifolius</i>	S2 (1-2 M);	1
<i>Crotalaria cunninghamii</i>	0.5	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	.3	<1
<i>Cymbopogon ambiguus</i>	G;	5
<i>Cyperus bifax</i>	Se;	2
<i>Cyperus vaginatus</i>	1	<1
* <i>Datura leichhardtii</i>	0.2	<1
<i>Duperreya commixta</i>	.3	<1
* <i>Echinochloa colona</i>	.2	<1
<i>Eucalyptus camaldulensis</i>	12	20
<i>Euphorbia biconvexa</i>	0.4	<1
<i>Goodenia forrestii</i>	.3	<1
<i>Hybanthus aurantiacus</i>	.4	<1
<i>Indigofera monophylla</i>	S2 (1-2 M);	1
* <i>Malvastrum americanum</i>	.5	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Melaleuca glomerata</i>	4	15
<i>Nicotiana occidentalis</i>	0.4	<1
<i>Petalostylis labicheoides</i>	.3	<1
<i>Pterocaulon sphacelatum</i>	H;	1
<i>Scaevola spinescens</i>	.5	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	S3 (0-1 M);	1
<i>Sesbania cannabina</i>	.5	<1
<i>Stemodia viscosa</i>	0.3	<1
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	S3 (0-1 M);	1
<i>Trachymene pilbarensis</i>	0.3	<1

<i>Amaranthus cuspidifolius</i>	0.3	<1
<i>Aristida contorta</i>	0.3	35
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	0.1	3
<i>Calandrinia schistorhiza</i>	0.1	<1
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Dysphania rhadinostachya</i>	0.3	5
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	H;	1
<i>Eremophila cuneifolia</i>	S2 (1-2 M);	2
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.2	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	3
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Grevillea berryana</i>	4	<1
<i>Haloragis trigonocarpa</i>	0.4	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Iseilema dolichotrichum</i>	0.1	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Psyrax suaveolens</i>	2	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	S2 (0-1 M);	2
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	2
<i>Senna stricta</i>	1.2	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	0.4	<1

HY14012

Staff RE **Date** 19/11/2014 **Season** A
Revisit JKN 16/05/2015 E
Type Q 20 m x 20 m
Location
MGA Zone 50 418678 mE 7369104 mN **Lat.** -23.7872 **Long.** 116.2018
Habitat Plain
Aspect **Slope** Negligible
Soil Type Orange sandy clay
Rock Type Ironstone, quartz
Loose Rock **Litter**
Bare ground **Weeds**
Vegetation M+ ^ ^ *Acacia kempeana*, *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *helmsii* ^ shrub\3\r;G ^ *Aristida contorta*, ^ *Calocephalus francisii* ^ tussock grass, forb\1\i
Veg. Condition Excellent
Disturbance Animal tracks
Fire Age
Notes Original waypoint on sw corner



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia kempeana</i>		S2 (1-2 M);	3	
<i>Aristida contorta</i>		G;	10	
<i>Bulbostylis barbata</i>		0.1	<1	
<i>Calandrinia ptychosperma</i>		0.05	<1	
<i>Calandrinia schistorhiza</i>		0.05	<1	
<i>Calocephalus francisii</i>		H;	3	

<i>Cleome viscosa</i>	0.2	<1
<i>Dysphania glomulifera</i> subsp. <i>eremaea</i>	0.1	<1
<i>Dysphania rhadinostachya</i>	H;	1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Eremophila exilifolia</i>	S2 (1-2 M);	2
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	S2 (1-2 M);	3
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	S2 (1-2 M);	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Erodium cygnorum</i>	H;	1
<i>Euphorbia boophthona</i>	0.15	<1
<i>Euphorbia porcata</i>	H;	1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Indigofera decipiens</i>	0.1	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus helipteroides</i>	0.2	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.4	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	S2 (1-2 M);	3
<i>Solanum gabrielae</i>	S2 (1-2 M);	1
<i>Streptoglossa decurrens</i>	0.4	<1
<i>Swainsona longipilosa</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tripogon loliiformis</i>	G;	2
<i>Zygophyllum eichleri</i>	0.1	<1

<i>Dysphania rhadinostachya</i>	.2	<1
<i>Eremophila phyllopora</i> subsp. <i>obliqua</i>	2.3	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.3	2
<i>Euphorbia porcata</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	.4	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Phyllanthus erwinii</i>	.3	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Polygala glaucifolia</i>	.3	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Ptilotus helipteroides</i>	.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.1	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Salsola australis</i>	.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.4	<1
<i>Senna glaucifolia</i>	1.5	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	.2	<1
<i>Tripogon loliiformis</i>	.1	<1
<i>Wurmbea inflata</i>	.3	<1

<i>Calandrinia creethiae</i>	.3	<1
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	.3	<1
<i>Cleome viscosa</i>	.1	<1
<i>Cyperus iria</i>	.4	<1
<i>Cyperus pulchellus</i>	.2	2
<i>Cyperus squarrosus</i>	.1	<1
<i>Drosera indica</i>	.3	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.4	<1
<i>Dysphania rhadinostachya</i>	.2	<1
<i>Eragrostis cumingii</i>	.3	2
<i>Eragrostis tenellula</i>	.2	<1
<i>Eriachne aristidea</i>	.3	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Fimbristylis depauperata</i>	.2	<1
<i>Fimbristylis microcarya</i>	.2	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Gonocarpus ephemerus</i>	.3	15
<i>Goodenia tenuiloba</i>	.2	<1
<i>Hybanthus aurantiacus</i>	.2	2
<i>Ipomoea coptica</i>	Climber	<1
<i>Lipocarpa microcephala</i>	.2	1
<i>Marsilea hirsuta</i>	Prostrate	<1
<i>Myriocephalus rudallii</i>	0.2	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	.4	<1
<i>Paspalidium rarum</i>	.1	<1
<i>Phyllanthus erwinii</i>	.3	<1
<i>Pluchea dentex</i>	.3	1
<i>Polycarpaea corymbosa</i>	.3	<1
<i>Polycarpaea longiflora</i>	.3	<1
<i>Portulaca oleracea</i>	.1	<1
<i>Stemodia viscosa</i>	0.4	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	.2	<1
<i>Trachymene pilbarensis</i>	.4	<1
<i>Tripogon loliiformis</i>	.2	2
<i>Wahlenbergia tumidifructa</i>	.3	<1
<i>Wurmbea inflata</i>	.2	<1
<i>Yakirra australiensis</i>	.2	<1

Hastings Biological Surveys

<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	2
<i>Gomphrena cunninghamii</i>	.3	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Ptilotus helipteroides</i>	.3	<1
<i>Ptilotus roei</i>	.2	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1
<i>Wurmbea inflata</i>	.2	<1

<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	0.3	<1
<i>Corchorus crozophorifolius</i>	0.3	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	3
<i>Enneapogon caerulescens</i>	0.3	<1
<i>Eremophila cuneifolia</i>	0.8	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	10
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena cunninghamii</i>	0.3	<1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Iseilema dolichotrichum</i>	0.2	<1
<i>Ixiochlamys cuneifolia</i>	0.1	<1
<i>Paspalidium clementii</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca</i> ?intraterranea	0.1	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	0.4	<1
<i>Salsola australis</i>	0.3	<1
<i>Sclerolaena eriacantha</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.1	1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	0.4	<1
<i>Solanum horridum</i>	0.2	<1
<i>Trachymene pilbarensis</i>	0.2	<1
<i>Tribulus astrocarpus</i>	0.1	<1

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	10
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Enneapogon polyphyllus</i>	0.1	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.8	6
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena cunninghamii</i>	0.05	2
<i>Goodenia tenuiloba</i>	0.15	<1
<i>Paspalidium clementii</i>	0.1	<1
<i>Polycarpaea longiflora</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	0.3	1
<i>Rhagodia eremaea</i>	0.2	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	<1
<i>Senna stricta</i>	1.8	4
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.4	<1
<i>Solanum</i> ? <i>cleistogamum</i>	0.1	<1
<i>Trachymene pilbarensis</i>	0.15	<1
<i>Tribulus suberosus</i>	0.3	<1
<i>Wurmbea inflata</i>	0.1	<1

* <i>Cenchrus ciliaris</i>	0.3	<1
<i>Cheilanthes brownii</i>	0.1	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Cucumis variabilis</i>	0.1	<1
<i>Dactyloctenium radulans</i>	0.15	<1
<i>Digitaria ctenantha</i>	0.25	<1
<i>Dodonaea petiolaris</i>	1.8	2
<i>Dysphania rhadinostachya</i>	0.1	6
<i>Enneapogon caeruleus</i>	0.15	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.9	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Hibiscus burtonii</i>	0.2	<1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	0.05	<1
<i>Paspalidium clementii</i>	0.1	2
<i>Polycarpha corymbosa</i>	0.15	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	<1
<i>Salsola australis</i>	0.3	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.4	<1
<i>Solanum ?cleistogamum</i>	0.15	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Trachymene pilbarensis</i>	0.2	<1
<i>Tribulus suberosus</i>	0.4	<1
<i>Wurmbea inflata</i>	0.05	<1

<i>Bulbostylis barbata</i>	0.1	<1
<i>Calandrinia Ptychosperma</i>	0.1	<1
<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Cullen cinereum</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	2
<i>Enneapogon caeruleus</i>	0.15	<1
<i>Eremophila phyllophora</i> subsp. <i>obliqua</i>	1.8	20
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.15	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia muelleriana</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Iseilema dolichotrichum</i>	0.2	<1
<i>Paspalidium clementii</i>	0.1	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Psydrax latifolia</i>	0.5	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.2	1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	<1
<i>Salsola australis</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	2	5
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.15	<1
<i>Solanum ?cleistogamum</i>	0.05	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.1	<1

<i>Bulbostylis barbata</i>	.2	<1
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	.2	<1
<i>Chrysopogon fallax</i>	1	2
<i>Dysphania rhadinostachya</i>	.4	5
<i>Eremophila canaliculata</i>	.4	5
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.1	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	5
<i>Eriachne helmsii</i>	.6	<1
<i>Euphorbia boophthona</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.3	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia muelleriana</i>	.3	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)	0.2	<1
<i>Hybanthus aurantiacus</i>	.3	<1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	0.4	<1
<i>Paspalidium clementii</i>	.2	1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Polycarpaea longiflora</i>	.3	<1
<i>Polygala glaucifolia</i>	.3	<1
<i>Portulaca oleracea</i>	.3	<1
<i>Pterocaulon sphacelatum</i>	0.2	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	.1	<1
<i>Senna glaucifolia</i>	1.5	1
<i>Solanum cleistogamum</i>	.2	<1
<i>Tribulus suberosus</i>	.3	<1
<i>Wurmbea inflata</i>	.2	<1

HY15021

Staff SOK **Date** 17/05/2015 **Season** E

Revisit

Type Q 20 m x 20 m

Location

MGA Zone 50 430297 **mE** 7363452 **mN** **Lat.** -23.8388 **Long.** 116.3156

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Brown sandy loam

Rock Type Granite

Loose Rock 20-50% cover; 20-60 mm in size **Litter** <1% cover ; <1 cm in depth

Bare ground 50% cover **Weeds** 0% cover

Vegetation M+ ^ ^ *Eremophila phyllopada* subsp. *obliqua*, *Acacia kempeana*, *Senna artemisioides* subsp. *helmsii* ^ ^ shrub\3\r;G ^ ^ *Aristida contorta*, *Bulbostylis barbata*, *Eriachne pulchella* subsp. *domini* ^ ^ tussock grass, sedge, other grass\1\c

Veg. Condition Excellent

Disturbance Evidence of grazing by cattle

Fire Age no evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Abutilon ? oxycarpum</i>		.2	<1	
<i>Acacia kempeana</i>		2	2	
<i>Aristida contorta</i>		.3	30	
<i>Bulbostylis barbata</i>		.2	5	
<i>Calandrinia creethiae</i>		.2	2	

<i>Corchorus crozophorifolius</i>	.5	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Dysphania rhadinostachya</i>	.3	<1
<i>Enneapogon caerulescens</i>	.2	<1
<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	1	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	5
<i>Euphorbia boophthona</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Gomphrena cunninghamii</i>	.1	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	.3	<1
<i>Heliotropium heteranthum</i>	Prostrate	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Polygala glaucifolia</i>	.1	<1
<i>Portulaca oleracea</i>	.2	2
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.3	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	.3	<1
<i>Trianthema glossostigmum</i>	Prostrate	<1
<i>Tribulus astrocarpus</i>	Prostrate	<1
<i>Tribulus suberosus</i>	.2	<1
<i>Tripogon loliiformis</i>	.2	<1

* <i>Asphodelus fistulosus</i>	0.2	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	0.3	<1
<i>Calotis hispidula</i>	0.1	<1
* <i>Cenchrus ciliaris</i>	0.5	10
* <i>Cenchrus setiger</i>	0.5	10
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.15	<1
<i>Cleome viscosa</i>	0.2	<1
<i>Clerodendrum floribundum</i>	0.4	<1
<i>Commicarpus australis</i>	0.1	<1
<i>Convolvulus clementii</i>	0.05	<1
<i>Cucumis melo</i>	Climber	<1
* <i>Datura leichhardtii</i>	0.3	<1
<i>Dicladanthera forrestii</i>	0.2	<1
<i>Duperreya commixta</i>	0.2	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	0.2	<1
* <i>Echinochloa colona</i>	0.4	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.1	<1
<i>Eucalyptus victrix</i>	14	30
<i>Euphorbia biconvexa</i>	0.2	<1
<i>Euphorbia boophthona</i>	0.5	<1
* <i>Flaveria trinervia</i>	0.3	<1
<i>Haloragis ? trigonocarpa</i>	0.1	<1
<i>Haloragis trigonocarpa</i>	0.1	<1
<i>Heliotropium ammophilum</i>	0.2	<1
<i>Indigofera monophylla</i>	0.4	<1
<i>Lepidium muelleri-ferdinandii</i>	0.3	<1
? <i>Lepidium</i> sp.	0.1	<1
* <i>Malvastrum americanum</i>	0.3	<1
<i>Nicotiana occidentalis</i>	0.4	<1
<i>Operculina aequisepala</i>	Climber	<1
<i>Petalostylis labicheoides</i>	1.4	<1
<i>Phyllanthus maderaspatensis</i>	0.3	<1
<i>Pterocaulon sphacelatum</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Sesbania cannabina</i>	0.3	<1
* <i>Setaria verticillata</i>	0.5	20
* <i>Sisymbrium orientale</i>	0.3	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	0.2	<1

Trichodesma zeylanicum

0.5

<1

<i>*Bidens subalternans</i> var. <i>simulans</i>	0.3	<1
<i>Boerhavia burbridgeana</i>	Prostrate	<1
<i>Calandrinia Ptychosperma</i>	0.05	<1
<i>Calotis porphyroglossa</i>	0.1	<1
<i>*Cenchrus ciliaris</i>	0.3	1
<i>*Cenchrus setiger</i>	0.4	20
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.15	<1
<i>Cleome viscosa</i>	0.3	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus crozophorifolius</i>	0.5	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.2	<1
<i>Cucumis melo</i>	Trailing	<1
<i>Cullen ? cinereum</i>	0.4	<1
<i>Cullen cinereum</i>	0.5	<1
<i>Cyperus squarrosus</i>	0.1	<1
<i>*Datura leichhardtii</i>		<1
<i>Dicladantha forrestii</i>	0.15	<1
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>	0.3	<1
<i>Dysphania cristata</i>	0.2	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>?Enchylaena tomentosa</i>	0.3	<1
<i>Eragrostis leptocarpa</i>		<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eucalyptus victrix</i>	8	1
<i>Euphorbia ? biconvexa</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia boophthona</i>	0.3	<1
<i>*Flaveria trinervia</i>	0.1	<1
<i>Goodenia wilunensis</i>	0.1	<1
<i>Haloragis ? trigonocarpa</i>		<1
<i>Heliotropium ammophilum</i>	0.15	<1
<i>Indigofera monophylla</i>	0.4	<1
<i>Lotus cruentus</i>	0.2	<1
<i>*Malvastrum americanum</i>	0.3	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Pterocaulon sphacelatum</i>		<1
<i>Ptilotus aevoides</i>	0.1	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Ptilotus gomphrenoides</i>	0.15	<1
<i>Ptilotus macrocephalus</i>	0.3	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	2
<i>Rhynchosia minima</i>		<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.1	<1
* <i>Setaria verticillata</i>	0.5	10
<i>Triraphis mollis</i>	0.4	<1
<i>Wahlenbergia tumidifructa</i>	0.4	<1
<i>Zaleya galericulata</i>	0.05	<1

<i>Cullen cinereum</i>	0.15	<1
<i>Cyperus squarrosus</i>	0.1	<1
* <i>Datura leichhardtii</i>	0.2	<1
<i>Duma florulenta</i>	0.3	<1
<i>Dysphania cristata</i>	0.1	<1
<i>Dysphania kalpari</i>	0.05	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Erodium cygnorum</i>	0.05	<1
<i>Eucalyptus camaldulensis</i>	3	<1
* <i>Flaveria trinervia</i>	0.2	<1
<i>Haloragis ? trigonocarpa</i>	0.1	<1
<i>Helichrysum luteoalbum</i>	0.4	<1
<i>Heliotropium ammophilum</i>	0.4	<1
<i>Heliotropium curassavicum</i>	0.1	<1
<i>Lepidium muelleri-ferdinandii</i>	0.4	<1
<i>Leptochloa digitata</i>	0.2	<1
<i>Marsilea hirsuta</i>	0.1	<1
<i>Melaleuca glomerata</i>	4.5	40
[Missing specimen]	0.1	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Sesbania cannabina</i>	0.2	<1
* <i>Sonchus oleraceus</i>		<1
<i>Stemodia ? viscosa</i>	0.1	<1
<i>Stemodia viscosa</i>	0.4	<1
<i>Wahlenbergia tumidifructa</i>	0.4	<1
<i>Zygophyllum ? simile</i>	0.1	<1
<i>Zygophyllum simile</i>	0.5	<1

* <i>Asphodelus fistulosus</i>	0.1	<1
<i>Boerhavia coccinea</i>	0.1	<1
<i>Calotis porphyroglossa</i>	0.4	<1
* <i>Cenchrus ciliaris</i>		<1
<i>Cleome viscosa</i>	0.5	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus tridens</i>	0.05	<1
<i>Cucumis melo</i>	Climber	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cullen cinereum</i>	0.4	25
* <i>Datura leichhardtii</i>	0.5	5
<i>Duperreya commixta</i>	Climber	<1
<i>Dysphania cristata</i>	0.1	<1
<i>Dysphania kalpari</i>	0.1	<1
<i>Eragrostis leptocarpa</i>	0.5	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.3	<1
* <i>Flaveria trinervia</i>	0.5	10
<i>Haloragis trigonocarpa</i>	0.3	<1
<i>Heliotropium ammophilum</i>	0.3	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Lotus cruentus</i>	0.1	<1
* <i>Malvastrum americanum</i>	0.4	<1
[Missing specimen]		<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.05	<1
<i>Notoleptopus decaisnei</i>	0.2	<1
<i>Phyllanthus maderaspatensis</i>	0.3	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Pterocaulon sphacelatum</i>	0.05	<1
<i>Ptilotus macrocephalus</i>	1	<1
<i>Salsola australis</i>	1	<1
<i>Setaria dielsii</i>	0.3	<1
* <i>Setaria verticillata</i>	0.5	<1
<i>Stemodia viscosa</i>	0.2	<1
<i>Trianthema triquetrum</i>	0.1	<1
* <i>Tribulus terrestris</i>	0.1	<1

Zygophyllum kochii

0.2

<1

<i>Corchorus sidooides</i>	.5	<1
<i>Enneapogon caeruleus</i>	.2	<1
<i>Eremophila exilifolia</i>	2.5	12
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	.5	<1
<i>Eriachne aristidea</i>	.4	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.3	<1
<i>Euphorbia boophthona</i>	.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.3	<1
<i>Gomphrena cunninghamii</i>	.3	<1
<i>Gomphrena kanisii</i>	.2	2
<i>Goodenia tenuiloba</i>	.3	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	.5	<1
<i>Indigofera colutea</i>	.3	10
<i>Indigofera decipiens</i>	.3	1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	.3	<1
<i>Paspalidium clementii</i>	.4	<1
<i>Phyllanthus erwinii</i>	.3	<1
<i>Polycarpaea corymbosa</i>	.3	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.5	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	.3	<1
<i>Trachymene pilbarensis</i>	.4	<1

<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	3
<i>Euphorbia boophthona</i>	0.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca ?intraterranea</i>	0.1	5
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1	<1
<i>Solanum lasiophyllum</i>	0.4	<1
<i>Tribulus astrocarpus</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.2	<1
<i>Wurmbea inflata</i>	0.1	<1

<i>Boerhavia coccinea</i>	0.2	<1
<i>Bulbostylis barbata</i>	0.1	<1
<i>Calandrinia ptychosperma</i>	0.1	<1
<i>Corchorus crozophorifolius</i>	0.5	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	6
<i>Enneapogon caerulescens</i>	0.3	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>		<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	4
<i>Euphorbia boophthona</i>	0.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium cunninghamii</i>	0.2	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.5	<1
<i>Indigofera colutea</i>	0.3	5
<i>Paspalidium clementii</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca</i> ? <i>intraterranea</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	<1
<i>Roebuckiella cuneata</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1	<1
<i>Sida brownii</i>	0.4	<1
<i>Solanum cleistogamum</i>	0.2	<1
<i>Solanum lasiophyllum</i>	0.4	<1
<i>Tripogon loliiformis</i>	0.2	<1

Hastings Biological Surveys

<i>Corchorus crozophorifolius</i>	.5	<1
<i>Cymbopogon ambiguus</i>	.5	<1
<i>Dysphania rhadinostachya</i>	.3	<1
<i>Eremophila exilifolia</i>	1.5	5
<i>Eriachne aristidea</i>	.3	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Erodium cygnorum</i>	.1	<1
<i>Euphorbia porcata</i>	.2	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	2
<i>Goodenia tenuiloba</i>	.3	1
<i>Paspalidium clementii</i>	.3	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Polygala glaucifolia</i>	.2	<1
<i>Portulaca oleracea</i>	.2	1
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	.5	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.5	<1
<i>Senna glaucifolia</i>	1	<1
<i>Tripogon loliiformis</i>	.3	<1
<i>Wurmbea inflata</i>	.2	<1

<i>Cleome viscosa</i>	0.4	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.4	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Eremophila exilifolia</i>	1.2	2
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.5	<1
<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	0.8	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Fimbristylis depauperata</i>	0.4	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.4	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Indigofera colutea</i>	0.2	3
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	5
<i>Ptilotus gomphrenoides</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	<1
<i>Sida brownii</i>	0.3	<1
<i>Stackhousia muricata</i>	0.3	<1
<i>Swainsona rotunda</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.2	<1

<i>Calandrinia Ptychosperma</i>	0.1	<1
<i>Cheilanthes brownii</i>	0.2	<1
<i>Dactyloctenium radulans</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Enneapogon polyphyllus</i>	0.3	<1
<i>Eremophila exilifolia</i>	1.3	15
<i>Eriachne aristidea</i>	0.4	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	4
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Fimbristylis depauperata</i>	0.4	5
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.1	<1
<i>Hybanthus aurantiacus</i>	0.1	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1	<1
<i>Trachymene pilbarensis</i>	0.4	<1
<i>Tripogon loliiformis</i>	0.3	<1

<i>Enneapogon caerulescens</i>	0.1	<1
<i>Eremophea spinosa</i>	0.2	<1
<i>Eremophila cuneifolia</i>	1.2	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Ixiochlamys cuneifolia</i>	0.2	<1
<i>Lawrenzia densiflora</i>	0.2	<1
<i>Lepidium platypetalum</i>	0.3	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus aevoides</i>	0.05	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Rhagodia eremaea</i>	0.5	<1
<i>Salsola australis</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.2	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Swainsona elegantoides</i>	0.4	<1
<i>Trianthema triquetrum</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Zygophyllum kochii</i>	0.1	1

* <i>Cenchrus ciliaris</i>	0.4	20
* <i>Cenchrus setiger</i>	0.6	5
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.1	<1
<i>Cleome viscosa</i>	0.4	<1
<i>Convolvulus clementii</i>	0.15	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.4	<1
<i>Cucumis melo</i>	0.05	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cyperus iria</i>	0.1	<1
<i>Cyperus squarrosus</i>	0.1	<1
<i>Dactyloctenium radulans</i>	0.15	<1
* <i>Datura leichhardtii</i>	0.4	<1
<i>Duperreya commixta</i>	Climber	<1
<i>Dysphania kalpari</i>	0.1	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Euphorbia biconvexa</i>	0.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
* <i>Flaveria trinervia</i>	0.4	<1
<i>Glycine canescens</i>	Climber	<1
<i>Goodenia wilunensis</i>	0.4	<1
<i>Haloragis ? trigonocarpa</i>	0.1	<1
<i>Hybanthus aurantiacus</i>	0.3	<1
<i>Ipomoea coptica</i>	Climber	<1
<i>Ipomoea plebeia</i>	Climber	<1
<i>Isotropis forrestii</i>	0.5	<1
<i>Lepidium oxytrichum</i>	0.3	<1
<i>Lotus cruentus</i>	0.1	<1
* <i>Malvastrum americanum</i>	0.5	<1
<i>Marsilea hirsuta</i>	0.1	<1
<i>Melaleuca glomerata</i>	11	15
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.1	<1
<i>Notoleptopus decaisnei</i>	0.3	<1
<i>Operculina aequisejala</i>	Climber	<1
<i>Phyllanthus maderaspatensis</i>	0.4	<1
<i>Pluchea rubelliflora</i>	0.4	<1
<i>Rhynchosia minima</i>	0.4	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	<1
* <i>Sonchus oleraceus</i>	0.1	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Stemodia ? viscosa</i>	0.1	<1
<i>Stemodia viscosa</i>	0.4	<1
<i>Streptoglossa bubakii</i>	0.1	<1
<i>Trachymene pilbarensis</i>	0.3	<1
<i>Trichodesma zeylanicum</i>	0.6	<1
<i>Urochloa occidentalis</i> var. <i>ciliata</i>	0.15	<1
<i>Vigna lanceolata</i>	Climber	<1
<i>Wahlenbergia tumidifructa</i>	0.1	<1

HY15035

Staff JKN **Date** 16/05/2015 **Season** E

Revisit

Type Q 20 m x 20 m

Location

MGA Zone 50 421159 **mE** 7370176 **mN** **Lat.** -23.7777 **Long.** 116.2262

Habitat Crest

Aspect NW **Slope** Very Gentle

Soil Type Red brown clay loam

Rock Type Granite

Loose Rock 20-50% cover; 60-200 mm in size **Litter** 2% cover ; 1 cm in depth

Bare ground 30% cover **Weeds** <1% cover

Vegetation M+ ^ *Acacia tetragonophylla*, ^ *Eremophila exilifolia*, *Senna artemisioides* subsp. *helmsii* ^ shrub\3\; G ^ *Aristida contorta*, ^ *Indigofera* sp. *Decipiens* (Peter G. Wilson & J. Palmer PGW 1777) ^ tussock grass, shrub\

Veg. Condition Excellent

Disturbance Nil

Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Abutilon lepidum</i>		Trailing	<1	
<i>Acacia kempeana</i>		1.5	<1	
<i>Acacia tetragonophylla</i>		1.8	10	
<i>Amaranthus cuspidifolius</i>		0.1	<1	
<i>Aristida contorta</i>		0.1	15	

<i>Boerhavia coccinea</i>	0.1	<1
<i>Brachyscome iberidifolia</i>		<1
<i>Bulbostylis barbata</i>	0.1	<1
<i>Calandrinia ptychosperma</i>	0.1	<1
* <i>Cenchrus ciliaris</i>	0.3	<1
<i>Cheilanthes brownii</i>		<1
<i>Cleome viscosa</i>	0.3	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cyperus squarrosus</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Eremophila exilifolia</i>	1.2	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Glycine canescens</i>	Climber	<1
<i>Gomphrena cunninghamii</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.3	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Indigofera decipiens</i>	0.2	
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>		<1
<i>Marsdenia australis</i>	Climber	<1
<i>Paspalidium clementii</i>	0.2	<1
<i>Phyllanthus erwinii</i>	0.2	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polycarpaea longiflora</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	5
<i>Sida brownii</i>	0.3	<1
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)		<1
<i>Solanum</i> ? <i>cleistogamum</i>	0.1	<1
<i>Solanum gabrielae</i>	0.1	<1
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	0.3	<1
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606)	0.5	<1
<i>Trachymene pilbarensis</i>	0.2	<1
<i>Tripogon loliiformis</i>	0.1	<1

<i>Brachyachne prostrata</i>	0.05	<1
<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Dactyloctenium radulans</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1
<i>Enneapogon caerulescens</i>	0.1	<1
<i>Enneapogon polyphyllus</i>	0.2	<1
<i>Eremophea spinosa</i>	0.2	15
<i>Eremophila cuneifolia</i>	0.7	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.1	<1
<i>Goodenia muelleriana</i>	0.05	<1
<i>Hakea preissii</i>	1	<1
<i>Heliotropium inexplicitum</i>	0.1	<1
<i>Ixiochlamys cuneifolia</i>	0.1	<1
<i>Lawrenzia densiflora</i>	0.15	2
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Pterocaulon sphacelatum</i>	0.4	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.1	<1
<i>Ptilotus macrocephalus</i>	0.4	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.15	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	<1
<i>Salsola australis</i>	0.15	1
<i>Schoenia ayersii</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.2	4
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1
<i>Sida fibulifera</i>	0.1	<1
<i>Solanum cleistogamum</i>	0.1	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Swainsona elegantoides</i>	0.3	<1
<i>Triraphis mollis</i>	0.4	<1
<i>Zygophyllum kochii</i>	0.15	<1

<i>*Bidens subalternans</i> var. <i>simulans</i>		.3	<1
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)		.2	<1
<i>Calandrinia ptychosperma</i>		0.1	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>		.2	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		.2	<1
<i>Cleome viscosa</i>		.4	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>		.2	<1
<i>Cyperus iria</i>		.3	<1
<i>Cyperus pulchellus</i>		.2	<1
<i>Cyperus squarrosus</i>		.2	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>		.3	<1
<i>*Eragrostis amabilis</i>		0.4	<1
<i>Eragrostis cumingii</i>		.4	<1
<i>Eragrostis leptocarpa</i>		.4	5
<i>Eragrostis tenellula</i>		.3	<1
<i>Eremophila exillifolia</i>		.7	<1
<i>Eriachne aristidea</i>		.4	5
<i>Euphorbia boophthona</i>		.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>		.2	<1
<i>Fimbristylis depauperata</i>		.5	<1
<i>Gonocarpus ephemerus</i>		.2	<1
<i>Goodenia berringbinensis</i>	P 4	.3	<1
<i>Goodenia tenuiloba</i>		0.4	<1
<i>Hybanthus aurantiacus</i>		.3	<1
<i>Indigofera colutea</i>		.2	<1
<i>Ipomoea coptica</i>		Climber	<1
<i>Lipocarpa microcephala</i>		.1	<1
<i>Myriocephalus gascoynensis</i>		0.2	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>		.4	3
<i>Panicum decompositum</i>		.4	<1
<i>Paspalidium rarum</i>		.2	<1
<i>Phyllanthus erwinii</i>		.2	<1
<i>Pluchea dentex</i>		.2	<1
<i>Portulaca oleracea</i>		.2	<1
<i>Pterocaulon sphacelatum</i>		.5	<1
<i>Setaria surgens</i>		.4	<1
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)		.5	<1
<i>Sporobolus blakei</i>	P 3	.5	<1
<i>Streptoglossa decurrens</i>		0.3	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Trachymene pilbarensis</i>	.3	<1
<i>Tripogon loliiformis</i>	0.2	<1
<i>Urochloa subquadripara</i>	.3	<1
<i>Wahlenbergia tumidifruca</i>	.3	<1

<i>Boerhavia coccinea</i>	.4	<1
<i>Bulbostylis barbata</i>	.1	<1
* <i>Cenchrus ciliaris</i>	.3	<1
<i>Cleome viscosa</i>	.5	<1
<i>Corchorus crozophorifolius</i>	.5	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	.5	<1
<i>Cucumis melo</i>	Prostrate	<1
<i>Digitaria ctenantha</i>	.5	<1
<i>Dysphania rhadinostachya</i>	.2	<1
<i>Enneapogon caerulescens</i>	.3	<1
<i>Eremophila exilifolia</i>	2	6
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	10
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.1	<1
<i>Fimbristylis depauperata</i>	.1	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia forrestii</i>	.3	<1
<i>Heliotropium cunninghamii</i>	.2	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	.5	<1
<i>Hybanthus aurantiacus</i>	.4	<1
<i>Indigofera colutea</i>	.4	2
<i>Indigofera decipiens</i>	.3	<1
<i>Iseilema dolichotrichum</i>	.4	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Portulaca oleracea</i>	.2	2
<i>Rhynchosia minima</i>	.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	2.2	2
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	<1
<i>Solanum cleistogamum</i>	.4	<1
<i>Streptoglossa decurrens</i>	0.3	<1
<i>Tephrosia</i> sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)	.4	<1
<i>Trachymene pilbarensis</i>	0.3	<1
<i>Tribulus suberosus</i>	.4	<1
<i>Tripogon loliiformis</i>	.2	<1

<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.05	5
<i>Calocephalus francisii</i>	0.1	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Eremophila cuneifolia</i>	0.1	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	0.5	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	15
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Grevillea berryana</i>	0.3	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)	0.5	<1
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	0.2	<1
<i>Ipomoea calobra</i>		<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>		<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.15	<1
<i>Ptilotus roei</i>	0.05	<1
<i>Salsola australis</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.8	2
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	0.1	<1
<i>Trianthema glossostigmum</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1

<i>Boerhavia coccinea</i>	.3	<1
<i>Brachyachne prostrata</i>	.2	1
<i>Bulbostylis barbata</i>	.1	<1
<i>Bulbostylis turbinata</i>	.2	<1
<i>Calotis porphyroglossa</i>	.3	<1
* <i>Cenchrus ciliaris</i>	.3	1
<i>Corchorus tridens</i>	.2	<1
<i>Dactyloctenium radulans</i>	.1	<1
<i>Dysphania rhadinostachya</i>	.3	<1
<i>Enneapogon caerulescens</i>	.1	<1
<i>Eragrostis leptocarpa</i>	.2	<1
<i>Eragrostis setifolia</i>	0.4	<1
<i>Eragrostis xerophila</i>	.4	5
<i>Eremophila cuneifolia</i>	1.2	4
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	Prostrate	<1
<i>Euphorbia boophthona</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Heliotropium crispatum</i>	0.3	<1
<i>Lotus cruentus</i>	.4	<1
* <i>Malvastrum americanum</i>	.3	<1
<i>Paspalidium clementii</i>	.7	<1
<i>Polycarpaea corymbosa</i>	.3	<1
<i>Polycarpaea longiflora</i>	0.4	<1
<i>Polygala glaucifolia</i>	.1	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Ptilotus aevoides</i>	.3	<1
<i>Ptilotus carinatus</i>	.3	<1
<i>Ptilotus gomphrenoides</i>	.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.3	<1
<i>Rhagodia eremaea</i>	.4	<1
<i>Salsola australis</i>	.3	<1
<i>Scaevola spinescens</i>	.5	<1
<i>Sclerolaena eriacantha</i>	.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.5	5
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1
<i>Sida fibulifera</i>	.4	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

Solanum cleistogamum

.2 <1

Sporobolus australasicus

.2 <1

Streptoglossa bubakii

.3 <1

<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.05	15
<i>Calocephalus francisii</i>	0.1	<1
<i>Digitaria brownii</i>	0.15	<1
<i>Dysphania kalpari</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	2
<i>Eremophila exilifolia</i>	1	1
<i>Eremophila flaccida</i>	0.5	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Psyrax latifolia</i>	3	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus macrocephalus</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Roebuckiella ? cuneata</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	<1
<i>Stenopetalum anfractum</i>	0.1	<1
<i>Trianthera glossostigma</i>	0.1	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tripogon loliiformis</i>	0.1	<1

Hastings Biological Surveys

<i>Enneapogon caeruleus</i>	0.2	<1
<i>Eremophila phyllopora</i> subsp. <i>obliqua</i>	1	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	25
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Heliotropium inexplicitum</i>	0.1	<1
<i>Marsdenia australis</i>	1	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	<1
<i>Salsola australis</i>	0.2	<1

* <i>Cenchrus ciliaris</i>	.7	40
* <i>Cenchrus setiger</i>	.7	30
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.1	<1
<i>Cucumis melo</i>	Creepers	<1
<i>Cyperus bifax</i>	.5	2
* <i>Datura leichhardtii</i>	.8	<1
* <i>Echinochloa colona</i>	.3	<1
<i>Eragrostis tenellula</i>	.3	<1
<i>Eucalyptus victrix</i>	12	25
* <i>Flaveria trinervia</i>	.5	<1
* <i>Lysimachia arvensis</i>	0.1	<1
* <i>Malvastrum americanum</i>	.4	<1
<i>Marsilea hirsuta</i>	.2	<1
<i>Myriocephalus gascoynensis</i>	0.2	<1
<i>Nicotiana occidentalis</i>	0.5	<1
<i>Notoleptopus decaisnei</i>	.5	<1
<i>Ptilotus gomphrenoides</i>	0.2	<1
* <i>Setaria verticillata</i>	.4	<1
<i>Stemodia viscosa</i>	0.5	<1
<i>Trichodesma zeylanicum</i>	.5	<1

Hastings Biological Surveys

<i>Calandrinia Ptychosperma</i>	0.1	<1
<i>Calandrinia schistorhiza</i>	.2	<1
<i>Cleome oxalidea</i>	.1	<1
<i>Corchorus crozophorifolius</i>	.5	<1
<i>Cucumis variabilis</i>	.1	<1
<i>Dysphania rhadinostachya</i>	.4	<1
<i>Eremophila exilifolia</i>	1.4	12
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	1
<i>Erodium cygnorum</i>	.1	<1
<i>Euphorbia porcata</i>	Prostrate	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia tenuiloba</i>	.4	<1
<i>Heliotropium heteranthum</i>	.1	<1
<i>Heliotropium inexplicitum</i>	.2	<1
<i>Iseilema dolichotrichum</i>	.1	<1
<i>Paspalidium clementii</i>	.5	<1
<i>Phyllanthus erwinii</i>	.2	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Polygala glaucifolia</i>	.2	<1
<i>Portulaca oleracea</i>	.2	1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	2
<i>Sida brownii</i>	.5	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	.5	<1
<i>Solanum cleistogamum</i>	.4	<1
<i>Trianthema glossostigmum</i>	Prostrate	<1
<i>Tribulus astrocarpus</i>	Prostrate	<1
<i>Tripogon loliiformis</i>	.3	<1

<i>Amaranthus cuspidifolius</i>	0.3	<1
<i>Aristida contorta</i>	0.3	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	0.2	<1
<i>Boerhavia coccinea</i>	0.05	<1
<i>Calandrinia ptychosperma</i>	0.05	<1
<i>Calotis porphyroglossa</i>	0.4	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.2	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	0.1	<1
<i>Cleome viscosa</i>	0.4	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus crozophorifolius</i>	0.4	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.3	<1
<i>Cucumis melo</i>	Climber	<1
<i>Cucumis variabilis</i>		<1
<i>Digitaria brownii</i>	0.2	<1
<i>Dysphania cristata</i>	0.15	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	15
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>		<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.8	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Glycine canescens</i>	0.7	<1
<i>Gomphrena cunninghamii</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Ipomoea calobra</i>	Climber	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.3	<1
<i>Notoleptopus decaisnei</i>	0.1	<1
<i>Paspalidium clementii</i>	0.2	30
<i>Phyllanthus maderaspatensis</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Psydrax suaveolens</i>	1	<1
<i>Pterocaulon sphacelatum</i>	0.2	<1
<i>Ptilotus aervoides</i>	0.1	<1
<i>Ptilotus macrocephalus</i>	0.6	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	<1
<i>Rhodanthe propinqua</i>	0.1	<1

<i>Solanum octonum</i>	P 2	0.7	<1
<i>Stemodia viscosa</i>		0.3	<1
<i>Streptoglossa decurrens</i>			<1
<i>Trachymene pilbarensis</i>		0.2	<1
<i>Tribulus astrocarpus</i>		0.05	<1
<i>Trichodesma zeylanicum</i>		0.4	<1
<i>Wahlenbergia tumidifructa</i>			<1

<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Enneapogon caerulescens</i>	0.1	<1
<i>Eremophila cuneifolia</i>	0.8	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	0.1	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1
<i>Frankenia hispidula</i>		<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Maireana georgei</i>		<1
<i>Maireana melanocoma</i>	0.15	<1
<i>Paspalidium clementii</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus aevoides</i>	0.05	<1
<i>Ptilotus helipteroides</i>	0.2	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.15	<1
<i>Rhagodia eremaea</i>		<1
<i>Salsola australis</i>	0.1	<1
<i>Scaevola spinescens</i>	0.6	1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	2	1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1	2
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa bubakii</i>		<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Trichodesma zeylanicum</i>		<1
<i>Tripogon loliiformis</i>	0.1	<1

Hastings Biological Surveys

<i>Eremophila cuneifolia</i>	1	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	2
<i>Gomphrena kanisii</i>	0.15	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Iseilema dolichotrichum</i>	0.1	<1
<i>Maireana melanocoma</i>	0.2	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Ptilotus aevoides</i>	0.05	<1
<i>Ptilotus helipteroides</i>	0.2	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Scaevola spinescens</i>	0.15	<1
<i>Sclerolaena densiflora</i>	0.2	<1
<i>Sclerolaena eriacantha</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	2	2
<i>Senna stricta</i>	1.5	1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tripogon loliiformis</i>	0.1	<1

* <i>Asphodelus fistulosus</i>	0.1	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	0.2	<1
<i>Boerhavia coccinea</i>	0.1	<1
<i>Bothriochloa ewartiana</i>	0.6	<1
* <i>Cenchrus ciliaris</i>	0.3	65
* <i>Cenchrus setiger</i>	0.3	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.1	<1
<i>Codonocarpus cotinifolius</i>	0.5	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Cucumis melo</i>	Climber	<1
* <i>Datura leichhardtii</i>	0.3	<1
<i>Dysphania cristata</i>	0.2	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
* <i>Echinochloa colona</i>	0.3	<1
<i>Enneapogon caeruleus</i>		<1
<i>Eragrostis cumingii</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eucalyptus camaldulensis</i>	15	20
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia biconvexa</i>	0.15	<1
* <i>Flaveria trinervia</i>	0.2	<1
<i>Glycine canescens</i>	Climber	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Haloragis ? trigonocarpa</i>	0.1	<1
<i>Helichrysum luteoalbum</i>	0.4	<1
<i>Indigofera colutea</i>	0.1	<1
* <i>Malvastrum americanum</i>	0.2	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Melhania oblongifolia</i>	0.1	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.3	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Phyllanthus maderaspatensis</i>	0.2	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Rhagodia eremaea</i>	0.2	<1
<i>Rhynchosia minima</i>	Climber	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.3	<1
* <i>Setaria verticillata</i>	0.3	<1
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	0.1	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

Sporobolus australasicus

0.1

<1

Trachymene pilbarensis

0.2

<1

Trichodesma zeylanicum

0.3

<1

Wahlenbergia tumidifruca

0.3

<1

<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1
<i>Enneapogon caerulescens</i>	0.3	<1
<i>Eremophila flaccida</i>	0.5	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	30
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium heteranthum</i>	0.5	<1
<i>Iseilema dolichotrichum</i>	0.1	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.3	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca</i> ? <i>intraterranea</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.6	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Salsola australis</i>	0.4	<1
<i>Sclerolaena eriacantha</i>	0.2	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	2
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.4	<1
<i>Tribulus astrocarpus</i>	0.1	<1
<i>Tribulus suberosus</i>	0.3	<1

<i>Boerhavia coccinea</i>	0.2	<1
<i>Bulbostylis turbinata</i>	0.2	4
<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	0.2	10
<i>Calandrinia ptychosperma</i>	0.1	<1
<i>Calandrinia schistorhiza</i>	0.2	<1
<i>Calocephalus francisii</i>	0.2	<1
<i>Calocephalus knappii</i>	0.2	<1
* <i>Cenchrus ciliaris</i>	0.2	<1
* <i>Cuscuta planiflora</i>	0.1	<1
<i>Cyperus iria</i>	0.3	<1
<i>Duperreya commixta</i>	0.2	<1
<i>Dysphania glomulifera</i> subsp. <i>eremaea</i>	0.2	2
<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>	0.4	10
? <i>Enchylaena tomentosa</i>	0.3	<1
<i>Enneapogon caeruleus</i>	0.3	<1
<i>Enneapogon polyphyllus</i>	0.4	<1
<i>Eragrostis leptocarpa</i>	0.4	<1
<i>Eragrostis pergracilis</i>	0.3	30
<i>Eragrostis tenellula</i>	0.4	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Goodenia berardiana</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Grevillea berryana</i>	3	<1
<i>Hibiscus burtonii</i>	0.5	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.4	<1
<i>Paspalidium clementii</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca</i> ? <i>intraterranea</i>	0.1	2
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.3	<1
<i>Ptilotus helipteroides</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.5	2
<i>Rhodanthe propinqua</i>	0.3	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.7	<1
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	0.3	<1
<i>Solanum lasiophyllum</i>	0.4	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.1	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

Tragus australianus

0.2 <1

Trianthera glossostigmum

0.1 <1

Tribulus astrocarpus

0.1 <1

Tripogon loliiformis

0.2 <1

Zygophyllum eichleri

0.3 <1

<i>Calandrinia Ptychosperma</i>	0.05	4
<i>Calocephalus knappii</i>	0.3	<1
<i>Calotis porphyroglossa</i>	0.3	<1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		<1
<i>Cleome viscosa</i>	0.3	<1
<i>Corchorus crozophorifolius</i>	0.2	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.2	<1
<i>Cucumis melo</i>	0.1	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cyperus iria</i>		<1
<i>Digitaria brownii</i>	0.15	<1
<i>Dysphania glomulifera</i> subsp. <i>eremaea</i>		<1
<i>Dysphania kalpari</i>	0.1	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.15	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia ? biconvexa</i>	0.15	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia berardiana</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Ipomoea calobra</i>		<1
<i>Isotropis forrestii</i>	0.5	<1
* <i>Malvastrum americanum</i>	0.3	<1
<i>Melhania oblongifolia</i>		<1
<i>Notoleptopus decaisnei</i>	0.2	<1
<i>Paspalidium clementii</i>	0.2	2
<i>Phyllanthus maderaspatensis</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polygala glaucifolia</i>		<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Psydrax suaveolens</i>	3	<1
<i>Pterocaulon sphacelatum</i>	0.1	<1
<i>Ptilotus aevoides</i>	0.05	<1

<i>Ptilotus gaudichaudii</i> subsp. <i>gaudichaudii</i>	0.2	<1
<i>Ptilotus macrocephalus</i>	0.5	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Ptilotus polystachyus</i>	0.3	<1
<i>Rhodanthe propinqua</i>	0.15	35
<i>Senna glaucifolia</i>	2.5	<1
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	0.1	<1
<i>Solanum</i> ? <i>cleistogamum</i>		<1
<i>Solanum lasiophyllum</i>	0.15	<1
<i>Trianthera glossostigmum</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Trichodesma zeylanicum</i>	0.4	<1
<i>Zygophyllum</i> ? <i>simile</i>		<1

Hastings Biological Surveys

<i>Calandrinia schistorhiza</i>	0.1	<1
<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	0.1	30
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	5
<i>Eremophila flaccida</i>	0.8	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	3
<i>Gomphrena kanisii</i>	0.3	<1
<i>Grevillea berryana</i>	4	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)	0.5	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.2	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Senna glaucifolia</i>	1	1
<i>Solanum lasiophyllum</i>	0.4	<1
<i>Tribulus astrocarpus</i>	0.1	<1

<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Euphorbia boophthona</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	2
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	<1
<i>Salsola australis</i>	0.4	<1
<i>Sclerolaena densiflora</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	0.8	<1
<i>Solanum gabrielae</i>	0.8	1
<i>Tribulus suberosus</i>	0.5	<1
<i>Tripogon loliiformis</i>	0.1	<1

Hastings Biological Surveys

* <i>Cenchrus ciliaris</i>	0.1	<1
<i>Convolvulus clementii</i>	0.1	<1
<i>Dactyloctenium radulans</i>	0.1	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.4	<1
<i>Enneapogon caerulescens</i>	0.15	<1
<i>Eremophea spinosa</i>	0.2	2
<i>Eremophila cuneifolia</i>	1	2
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia boophthona</i>	0.15	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.15	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Lawrenzia densiflora</i>	0.15	1
<i>Lepidium phlebopetalum</i>	0.1	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.05	<1
<i>Paspalidium clementii</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	1
<i>Salsola australis</i>	0.15	<1
<i>Sclerolaena diacantha</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.3	2
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.3	4
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.2	<1
<i>Solanum gabrielae</i>	0.4	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Tribulus astrocarpus</i>	0.05	<1
* <i>Tribulus terrestris</i>		<1
<i>Zygophyllum kochii</i>	0.2	<1

<i>Austrobryonia pilbarensis</i>	0.1	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	0.3	<1
<i>Bulbostylis turbinata</i>	0.05	<1
<i>Calandrinia pumila</i>	0.05	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.1	<1
<i>Chloris pumilio</i>	0.2	<1
<i>Cleome viscosa</i>	0.5	<1
<i>Convolvulus clementii</i>	Climber	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Cullen cinereum</i>	0.1	<1
<i>Cullen graveolens</i>	0.3	<1
<i>Cyperus iria</i>	0.1	<1
<i>Cyperus squarrosus</i>	0.1	<1
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	0.4	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	0.15	<1
<i>Dysphania rhadinostachya</i>	0.4	<1
* <i>Echinochloa colona</i>	0.3	<1
<i>Elacholoma hornii</i>	0.02	<1
<i>Eragrostis setifolia</i>	0.3	10
<i>Eragrostis tenellula</i>	0.2	5
<i>Eragrostis xerophila</i>	0.3	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	2	<1
<i>Eriachne flaccida</i>		<1
<i>Euphorbia coghlanii</i>	0.15	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.15	<1
<i>Haloragis trigonocarpa</i>	0.1	<1
<i>Lotus cruentus</i>	0.1	15
* <i>Malvastrum americanum</i>	0.3	<1
<i>Marsilea hirsuta</i>		<1
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	0.4	<1
<i>Operculina aequisejala</i>	0.1	<1
<i>Panicum decompositum</i>	0.3	<1
<i>Ptilotus carinatus</i>	0.3	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Schenkia clementii</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.6	1
* <i>Setaria verticillata</i>	0.3	<1
<i>Sida fibulifera</i>	0.1	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

Solanum cleistogamum

0.1

<1

Solanum gabrielae

0.2

<1

Streptoglossa adscendens

0.3

2

Streptoglossa bubakii

<1

<i>Brachyachne prostrata</i>	0.05	<1
<i>Calandrinia Ptychosperma</i>	0.1	<1
<i>Calotis porphyroglossa</i>	0.4	<1
* <i>Cenchrus ciliaris</i>	0.6	20
* <i>Cenchrus setiger</i>	0.5	<1
<i>Cleome viscosa</i>	0.4	<1
<i>Convolvulus clementii</i>	0.1	<1
<i>Corchorus crozophorifolius</i>	0.6	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	0.4	<1
<i>Cucumis melo</i>	0.1	<1
<i>Cullen cinereum</i>	0.15	<1
<i>Cyperus iria</i>	0.1	<1
<i>Dactyloctenium radulans</i>	0.2	<1
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	0.3	<1
<i>Dysphania ?glomulifera</i>	0.05	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Eragrostis cumingii</i>	0.1	<1
<i>Eragrostis leptocarpa</i>		<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.15	<1
* <i>Flaveria trinervia</i>	0.5	<1
<i>Glycine canescens</i>	Climber	<1
<i>Goodenia forrestii</i>		<1
<i>Goodenia wilunensis</i>	0.1	<1
<i>Hybanthus aurantiacus</i>	0.4	<1
<i>Hybanthus aurantiacus</i> (erect red flower form)	0.3	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Lotus cruentus</i>	0.3	<1
* <i>Malvastrum americanum</i>	0.5	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.3	<1
<i>Notoleptopus decaisnei</i>	0.1	<1
<i>Phyllanthus maderaspatensis</i>	0.5	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Pterocaulon sphacelatum</i>	0.2	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus macrocephalus</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	<1

Hastings Biological Surveys

<i>Rhynchosia minima</i>	Climber	<1
<i>Salsola australis</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	<1
* <i>Setaria verticillata</i>	0.5	<1
<i>Sida fibulifera</i>	0.3	<1
<i>Solanum austropiceum</i>	0.5	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Stemodia viscosa</i>	0.1	<1
<i>Streptoglossa bubakii</i>	0.3	<1
<i>Tragus australianus</i>	0.1	<1
<i>Trichodesma zeylanicum</i>	0.5	<1
<i>Triraphis mollis</i>	0.5	<1
<i>Wahlenbergia tumidifructa</i>	0.3	<1

Hastings Biological Surveys

<i>Enneapogon caeruleus</i>	0.2	<1
<i>Eremophila exilifolia</i>	0.7	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.2	2
<i>Eriachne aristidea</i>	0.4	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	<1
<i>Euphorbia boophthona</i>	0.3	<1
<i>Euphorbia porcata</i>	0.1	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Iseilema dolichotrichum</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	3
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	0.8	<1
<i>Solanum gabriellae</i>	0.7	<1

<i>Calotis porphyroglossa</i>	.2	<1
* <i>Cenchrus ciliaris</i>	.4	25
* <i>Cenchrus setiger</i>	.4	5
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.1	<1
<i>Cleome viscosa</i>	.4	<1
<i>Cucumis variabilis</i>	.5	<1
<i>Cullen cinereum</i>	.4	<1
* <i>Datura leichhardtii</i>	.5	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.8	<1
* <i>Echinochloa colona</i>	.2	<1
<i>Eragrostis tenellula</i>	.4	<1
<i>Eucalyptus victrix</i>	15	5
* <i>Flaveria trinervia</i>	0.5	<1
<i>Gnephosis brevifolia</i>	0.2	<1
<i>Haloragis trigonocarpa</i>	0.3	<1
<i>Heliotropium ammophilum</i>	.2	<1
<i>Indigofera monophylla</i>	.5	<1
<i>Lepidium oxytrichum</i>	.2	<1
<i>Lotus cruentus</i>	.2	<1
* <i>Malvastrum americanum</i>	.3	2
<i>Nicotiana occidentalis</i>	0.5	<1
<i>Phyllanthus maderaspatensis</i>	.5	<1
<i>Pterocaulon sphacelatum</i>	.4	<1
<i>Ptilotus gomphrenoides</i>	.3	<1
<i>Rhynchosia minima</i>	.3	<1
* <i>Setaria verticillata</i>	.3	<1
* <i>Sisymbrium orientale</i>	.1	<1
<i>Stemodia viscosa</i>	0.4	<1
<i>Wahlenbergia tumidifruca</i>	0.3	<1

<i>Boerhavia coccinea</i>	0.05	<1
* <i>Cenchrus ciliaris</i>	0.15	<1
<i>Cleome viscosa</i>	0.3	<1
<i>Corchorus crozophorifolius</i>	0.4	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Cullen cinereum</i>	0.1	<1
<i>Dactyloctenium radulans</i>	0.05	<1
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	0.15	<1
<i>Dysphania cristata</i>	0.15	<1
<i>Dysphania rhadinostachya</i>		<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.15	<1
<i>Enneapogon caerulescens</i>	0.1	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eremophea spinosa</i>	0.1	<1
<i>Erodium cygnorum</i>	0.05	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Euphorbia boophthona</i>	0.2	<1
<i>Gomphrena cunninghamii</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia forrestii</i>	0.15	<1
<i>Heliotropium ammophilum</i>	0.1	1
<i>Heliotropium inexplicitum</i>	0.05	<1
<i>Indigofera colutea</i>	0.05	<1
<i>Lawrenzia densiflora</i>	0.1	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Pterocaulon sphacelatum</i>	0.05	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Rhagodia eremaea</i>	0.2	<1
<i>Salsola australis</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.4	<1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.5	1
* <i>Setaria verticillata</i>	0.2	<1
<i>Sporobolus australasicus</i>	0.05	1
<i>Streptoglossa liatroides</i>	0.4	<1
<i>Stylobasium spathulatum</i>	1	1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Tephrosia clementii</i>	0.05	<1
<i>Trianthema triquetrum</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1
* <i>Tribulus terrestris</i>	0.1	<1
<i>Triraphis mollis</i>	0.2	<1
<i>Zygophyllum kochii</i>	0.1	<1

<i>Calandrinia Ptychosperma</i>	0.05	<1
<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	2	1
<i>Eremophila tietkensis</i>	0.5	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Fimbristylis depauperata</i>	0.15	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Indigofera decipiens</i>	0.2	<1
<i>Paspalidium clementii</i>	0.15	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polygala glaucifolia</i>		<1
<i>Portulaca oleracea</i>	0.05	2
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	1
<i>Solanum gabrielae</i>	0.3	<1
<i>Stenopetalum anfractum</i>	0.2	<1
<i>Swainsona longipilosa</i>	0.1	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tripogon loliiformis</i>	0.1	<1

Hastings Biological Surveys

<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.15	<1
<i>Eremophila flaccida</i>	1	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	10
<i>Gomphrena kanisii</i>	0.15	<1
<i>Goodenia tenuiloba</i>	0.15	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polycarpaea longiflora</i>	0.1	<1
<i>Psydrax latifolia</i>	0.4	<1
<i>Ptilotus macrocephalus</i>	0.2	<1
<i>Ptilotus roei</i>	0.05	<1
<i>Salsola australis</i>	0.1	<1
<i>Sclerolaena eriacantha</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	<1
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.2	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.05	<1
<i>Trianthema glossostigmum</i>		<1
<i>Tribulus astrocarpus</i>	0.05	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Eremophila flaccida</i>	0.6	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Grevillea berryana</i>	2.2	<1
<i>Paspalidium clementii</i>	0.15	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Ptilotus gomphrenoides</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.2	<1
<i>Ptilotus roei</i>	0.05	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.6	<1

<i>Boerhavia coccinea</i>	.1	<1
<i>Corchorus crozophorifolius</i>	.5	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.2	<1
<i>Enneapogon caerulescens</i>	.3	3
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	.4	4
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.5	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	.1	<1
<i>Euphorbia boophthona</i>	.4	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.1	<1
<i>Gomphrena cunninghamii</i>	.1	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	.3	<1
<i>Indigofera colutea</i>	.2	<1
<i>Melhania oblongifolia</i>	.4	<1
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	.4	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Polygala glaucifolia</i>	.1	<1
<i>Portulaca oleracea</i>		<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	.5	6
<i>Roebuckiella cuneata</i>	.2	<1
<i>Salsola australis</i>	.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.3	<1
<i>Sida brownii</i>	.4	<1
<i>Sida fibulifera</i>	.2	<1
<i>Streptoglossa decurrens</i>	.3	<1
<i>Swainsona</i> aff. <i>villosa</i>	.1	<1
<i>Trachymene pilbarensis</i>	0.3	<1
<i>Zygophyllum kochii</i>	.3	<1

Hastings Biological Surveys

<i>Eremophila exilifolia</i>	1	1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.5	1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	1
<i>Euphorbia porcata</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Portulaca oleracea</i>	0.05	5
<i>Ptilotus helipteroides</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	1
<i>Solanum gabrielae</i>	0.5	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.2	<1

<i>Euphorbia porcata</i>	0.05	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus aevroides</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.05	<1
<i>Salsola australis</i>	0.2	<1
<i>Sclerolaena eriacantha</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.3	<1
<i>Senna stricta</i>	1.6	<1
<i>Solanum gabrielae</i>		<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tripogon loliiformis</i>	0.1	<1

<i>Calandrinia schistorhiza</i>	0.05	<1
<i>Calandrinia</i> sp. 1 (indet.)	0.05	<1
<i>Corchorus crozophorifolius</i>	0.3	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Enneapogon caeruleus</i>	0.1	<1
<i>Eremophea spinosa</i>	0.1	<1
<i>Eremophila cuneifolia</i>	1.5	4
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia muelleriana</i>	0.1	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium ammophilum</i>	0.1	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Iseilema dolichotrichum</i>	0.05	<1
<i>Lawrencia densiflora</i>	0.1	<1
<i>Lawrencia glomerata</i>	0.1	<1
? <i>Maireana villosa</i> (indet.)	0.2	<1
<i>Marsdenia australis</i>		<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus aevoides</i>	0.05	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.3	1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	0.4	<1
<i>Salsola australis</i>	0.3	<1
<i>Scaevola spinescens</i>	1	1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.2	<1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.5	<1
<i>Solanum lasiophyllum</i>	0.4	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.05	<1
<i>Trianthema triquetrum</i>	0.05	<1
<i>Tribulus astrocarpus</i>	0.1	<1
<i>Triraphis mollis</i>	0.15	<1

Hastings Biological Surveys

* <i>Cenchrus ciliaris</i>	0.4	35
* <i>Cenchrus setiger</i>	0.3	<1
* <i>Citrullus lanatus</i>	0.05	<1
<i>Cleome viscosa</i>	0.3	<1
<i>Convolvulus clementii</i>	0.1	<1
<i>Corchorus tridens</i>	0.1	<1
<i>Cucumis melo</i>	0.1	<1
* <i>Cucumis myriocarpus</i>	0.05	<1
<i>Cullen cinereum</i>	0.15	<1
<i>Dactyloctenium radulans</i>	0.1	<1
* <i>Datura leichhardtii</i>	0.5	5
<i>Dysphania cristata</i>	0.3	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eucalyptus camaldulensis</i>	16	15
<i>Euphorbia biconvexa</i>	0.2	<1
<i>Euphorbia boophthona</i>	0.3	<1
* <i>Flaveria trinervia</i>	0.4	40
<i>Heliotropium ammophilum</i>	0.15	<1
<i>Heliotropium curassavicum</i>	0.1	<1
* <i>Malvastrum americanum</i>	0.3	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.05	<1
<i>Notoleptopus decaisnei</i>	0.2	<1
<i>Phyllanthus maderaspatensis</i>	0.15	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Salsola australis</i>	0.3	<1
<i>Sesbania cannabina</i>	1	<1
<i>Setaria dielsii</i>		<1
* <i>Setaria verticillata</i>	0.3	<1
<i>Trianthema triquetrum</i>	0.05	<1
* <i>Tribulus terrestris</i>	0.1	<1
<i>Zygophyllum ? simile</i>	0.1	<1
<i>Zygophyllum kochii</i>	0.2	<1

<i>Calandrinia schistorhiza</i>	.1	2
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	.2	<1
<i>Dysphania rhadinostachya</i>	.3	<1
<i>Eremophila exilifolia</i>	1.5	5
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.5	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Fimbristylis depauperata</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Indigofera decipiens</i>	.2	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Portulaca oleracea</i>	.3	2
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1	<1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	.4	<1
<i>Trianthema triquetrum</i>	0.1	<1
<i>Tripogon loliiformis</i>	.4	5
<i>Wurmbea inflata</i>	.2	<1

<i>Dysphania rhadinostachya</i>	0.20	1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	1	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1.6	4
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.30	<1
<i>Euphorbia boophthona</i>	.10	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.20	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca ? oleracea</i> (sterile)	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.10	<1
<i>Ptilotus roei</i>	0.10	<1
<i>Sclerolaena eriacantha</i>	0.05	<1
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.6	1
<i>Solanum gabrielae</i>	0.5	<1
<i>Trachymene pilbarensis</i>	0.05	<1
<i>Tribulus suberosus</i>	.20	<1
<i>Wurmbea inflata</i>	0.05	<1

Hastings Biological Surveys

<i>Cullen cinereum</i>	0.3	<1
<i>Cyperus iria</i>	0.1	<1
<i>Cyperus vaginatus</i>		<1
* <i>Datura leichhardtii</i>	0.3	<1
<i>Dysphania cristata</i>	0.2	<1
<i>Dysphania kalpari</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.15	<1
<i>Eucalyptus camaldulensis</i>	16	15
<i>Euphorbia biconvexa</i>	0.15	<1
* <i>Flaveria trinervia</i>	0.3	<1
<i>Haloragis ? trigonocarpa</i>	0.1	<1
<i>Heliotropium ammophilum</i>	0.2	<1
* <i>Lysimachia arvensis</i>	0.1	<1
<i>Melaleuca glomerata</i>	3	40
[Missing specimen]	0.1	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.05	2
<i>Petalostylis labicheoides</i>	2.5	<1
<i>Phyllanthus maderaspatensis</i>	0.4	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Scaevola spinescens</i>	1.7	<1
<i>Sesbania cannabina</i>	1.2	<1
* <i>Setaria verticillata</i>	0.4	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Urochloa occidentalis</i> var. <i>ciliata</i>	0.3	<1
<i>Zygophyllum ? simile</i>	0.1	<1

<i>Cleome viscosa</i>	0.1	<1
<i>Corchorus sidoides</i>	0.15	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Eragrostis leptocarpa</i>	0.25	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.15	<1
<i>Heliotropium inexplicitum</i>	0.05	<1
<i>Lawrencia densiflora</i>	0.1	<1
<i>Paspalidium clementii</i>	0.15	<1
<i>Polycarpaea corymbosa</i>	0.05	<1
<i>Polycarpaea longiflora</i>	0.3	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	2
<i>Ptilotus roei</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Senna glaucifolia</i>	1.5	2
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	<1
<i>Solanum gabrielae</i>	0.2	<1
<i>Tribulus suberosus</i>	1.2	<1
<i>Tripogon loliiformis</i>	0.1	<1

<i>Amaranthus cuspidifolius</i>	.1	<1
<i>Ammannia multiflora</i>	.2	<1
<i>Aristida contorta</i>	.2	<1
* <i>Asphodelus fistulosus</i>	.3	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	.5	<1
<i>Boerhavia coccinea</i>	.1	<1
<i>Bulbostylis barbata</i>	.2	<1
<i>Calandrinia ptychosperma</i>	.2	<1
* <i>Cenchrus ciliaris</i>	.5	1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.4	<1
<i>Cleome viscosa</i>	.3	<1
<i>Convolvulus clementii</i>	.2	<1
<i>Corchorus crozophorifolius</i>	.5	<1
<i>Corchorus tridens</i>	.2	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	.3	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cullen ?lachnostachys</i>	.2	<1
<i>Cyperus iria</i>	.5	7
<i>Cyperus squarrosus</i>	.4	<1
<i>Dactyloctenium radulans</i>	.2	<1
* <i>Datura leichhardtii</i>	1	2
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	.6	<1
<i>Digitaria ctenantha</i>	.5	<1
<i>Drosera indica</i>	.1	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	.3	<1
* <i>Echinochloa colona</i>	.2	5
<i>Eragrostis cumingii</i>	.3	10
<i>Eragrostis dielsii</i>	.1	<1
<i>Eragrostis leptocarpa</i>	.5	<1
<i>Eragrostis tenellula</i>	.4	<1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.6	4
<i>Eriachne aristidea</i>	.5	<1
<i>Erodium cygnorum</i>	.1	<1
<i>Euphorbia biconvexa</i>	.3	<1
<i>Euphorbia boophthona</i>	.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.2	<1
<i>Gomphrena kanisii</i>	.3	<1
<i>Goodenia tenuiloba</i>	.2	<1
<i>Heliotropium ammophilum</i>	.4	<1

<i>Indigofera linnaei</i>	.1	<1
<i>Ipomoea polymorpha</i>	.1	<1
<i>Lipocarpa microcephala</i>	.2	<1
* <i>Malvastrum americanum</i>	.3	<1
<i>Marsilea hirsuta</i>	.1	<1
<i>Myriocephalus gascoynensis</i>	0.2	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	.4	<1
<i>Panicum decompositum</i>	0.5	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Paspalidium rarum</i>	.2	<1
<i>Phyllanthus erwinii</i>	.1	<1
<i>Pluchea dentex</i>	.1	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Polycarpaea longiflora</i>	.2	<1
<i>Portulaca oleracea</i>		<1
<i>Pterocaulon sphacelatum</i>	.3	<1
<i>Ptilotus gomphrenoides</i>	.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	.6	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	1.2	<1
<i>Stemodia grossa</i>	0.5	<1
<i>Stemodia viscosa</i>	0.4	<1
<i>Streptoglossa decurrens</i>	.2	<1
<i>Tephrosia supina</i>	.3	<1
<i>Trachymene pilbarensis</i>	.4	<1
<i>Trianthema triquetrum</i>	.1	<1
<i>Trichodesma zeylanicum</i>	.5	<1
<i>Triraphis mollis</i>		<1
<i>Wahlenbergia tumidifructa</i>	.3	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Euphorbia porcata</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	5
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	<1
<i>Solanum gabrielae</i>	0.2	<1
<i>Tribulus astrocarpus</i>	0.1	<1

Hastings Biological Surveys

<i>Cyperus squarrosus</i>	.1	<1
<i>Dactyloctenium radulans</i>	.2	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eremophila cuneifolia</i>	.8	<1
<i>Eriachne aristidea</i>	.3	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.4	<1
<i>Frankenia hispidula</i>	.3	<1
<i>Frankenia setosa</i>	.4	10
<i>Gnephosis brevifolia</i>	0.1	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia forrestii</i>	.1	<1
<i>Lepidium phlebopetalum</i>	.1	<1
<i>Maireana georgei</i>	.3	2
<i>Oldenlandia galioides</i>	.1	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Portulaca oleracea</i>	.1	<1
<i>Sclerolaena eriacantha</i>	.2	<1
<i>Sclerolaena medicaginooides</i>	.4	5
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	.7	<1
<i>Senna hamersleyensis</i>	.2	<1
<i>Swainsona kingii</i>	.1	<1
<i>Trianthema triquetrum</i>	.1	<1

<i>Aristida contorta</i>	.2	<1
* <i>Bidens subalternans</i> var. <i>simulans</i>	.4	<1
<i>Boerhavia coccinea</i>	.2	<1
<i>Bulbostylis turbinata</i>	.2	2
<i>Calandrinia creethiae</i>	.1	<1
<i>Calandrinia ptychosperma</i>	0.1	<1
<i>Calotis porphyroglossa</i>	0.2	<1
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.3	<1
<i>Cleome viscosa</i>	.4	<1
<i>Cucumis melo</i>	.4	<1
<i>Cyperus iria</i>	.3	3
<i>Cyperus squarrosus</i>	.1	<1
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	.4	<1
<i>Dysphania rhadinostachya</i>	.5	<1
<i>Eragrostis leptocarpa</i>	.6	<1
<i>Eragrostis pergracilis</i>	.2	<1
<i>Eragrostis tenellula</i>	.2	<1
<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	.8	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.3	5
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.3	<1
<i>Gomphrena kanisii</i>	.2	<1
<i>Goodenia berardiana</i>	.3	<1
<i>Goodenia tenuiloba</i>	.3	<1
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	.2	<1
<i>Indigofera decipiens</i>	.3	<1
<i>Iseilema membranaceum</i>	.2	<1
* <i>Malvastrum americanum</i>	.3	<1
<i>Marsilea hirsuta</i>	.1	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Paspalidium rarum</i>	.2	<1
<i>Podolepis kendallii</i>	0.5	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Portulaca oleracea</i>	.2	<1
<i>Pterocaulon sphacelatum</i>	.1	<1
<i>Ptilotus aevoides</i>	.1	<1
<i>Ptilotus gomphrenoides</i>	.3	<1
<i>Ptilotus helipteroides</i>	.3	<1
<i>Ptilotus macrocephalus</i>	.3	2

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Rhodanthe floribunda</i>	0.2	<1
<i>Rhodanthe propinqua</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.2	<1
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	.4	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	.1	<1
<i>Trichodesma zeylanicum</i>	.4	<1
<i>Tripogon loliiformis</i>	.3	<1

Hastings Biological Surveys

<i>Dodonaea petiolaris</i>		1.2	1
<i>Enneapogon polyphyllus</i>		.4	5
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>		1.5	2
<i>Eremophila reticulata</i>		1.3	5
<i>Eriachne mucronata</i>		.4	5
<i>Euphorbia boophthona</i>		.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>		.2	<1
<i>Ficus brachypoda</i>		4	3
<i>Gomphrena cunninghamii</i>		.3	2
<i>Gomphrena kanisii</i>		.3	<1
<i>Hybanthus aurantiacus</i>		.3	<1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>		0.4	<1
<i>Nicotiana benthamiana</i>		.5	<1
<i>Polycarpaea longiflora</i>		.3	<1
<i>Portulaca oleracea</i>		.2	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>		.5	<1
<i>Rhodanthe frenchii</i>	P 2	0.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>		1.2	<1
<i>Zaleya galericulata</i>		.6	<1

Hastings Biological Surveys

<i>Eremophea spinosa</i>	.4	2
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	.2	<1
<i>Euphorbia boophthona</i>	.4	<1
<i>Gomphrena kanisii</i>	.4	<1
<i>Heliotropium ammophilum</i>	.4	<1
<i>Ixiochlamys cuneifolia</i>	0.1	<1
<i>Lawrencia densiflora</i>	.3	4
<i>Maireana ? polypterygia</i> (sterile)	.5	5
<i>Marsdenia australis</i>	Climber	<1
<i>Paspalidium clementii</i>	.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.3	<1
<i>Roebuckiella cuneata</i>	0.2	<1
<i>Salsola australis</i>	.4	<1
<i>Schoenia ayersii</i>	.3	<1
<i>Streptoglossa bubakii</i>	0.2	<1
<i>Trianthema triquetrum</i>	.1	<1
<i>Triraphis mollis</i>	.3	<1
<i>Zygophyllum kochii</i>	.2	<1

<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	0.1	<1
* <i>Cenchrus ciliaris</i>	0.2	<1
<i>Dactyloctenium radulans</i>	0.1	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1
<i>Enneapogon caerulescens</i>	0.2	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eremophea spinosa</i>	0.2	<1
<i>Eremophila cuneifolia</i>	1	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia forrestii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Ixiochlamys cuneifolia</i>	0.1	<1
<i>Lawrenzia densiflora</i>	0.2	<1
<i>Lepidium phlebopetalum</i>	0.1	<1
<i>Maireana georgei</i>	0.3	<1
<i>Maireana tomentosa</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.2	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	<1
<i>Roebuckiella cuneata</i>	0.2	<1
<i>Salsola australis</i>	0.2	<1
<i>Sclerolaena densiflora</i>	0.1	<1
<i>Sclerolaena eriacantha</i>	0.2	5
<i>Sclerolaena medicaginooides</i>	0.2	<1
<i>Sporobolus australasicus</i>	0.2	<1
<i>Streptoglossa decurrens</i>	0.2	<1
<i>Trianthema triquetrum</i>	0.1	2
<i>Tribulus astrocarpus</i>	0.1	<1

<i>Cullen cinereum</i>	0.15	<1
<i>Cyperus iria</i>	0.15	3
<i>Cyperus squarrosus</i>	0.1	<1
* <i>Echinochloa colona</i>	0.05	<1
<i>Elacholoma</i> sp. Showy Flower (informal phrase name)		<1
<i>Elytrophorus spicatus</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eucalyptus victrix</i>	8	2
<i>Goodenia maideniana</i>	0.05	<1
<i>Hibiscus verdcourtii</i>	0.1	<1
<i>Marsilea hirsuta</i>	0.1	<1
<i>Mimulus gracilis</i>	0.1	2
<i>Neptunia dimorphantha</i>	0.1	<1
<i>Panicum laevinode</i>	0.5	4
<i>Phyllanthus maderaspatensis</i>	0.2	<1
<i>Ptilotus gomphrenoides</i>	0.1	<1
<i>Rhagodia eremaea</i>	1	5
<i>Schoenoplectus dissachanthus</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.4	<1
<i>Streptoglossa bubakii</i>	0.1	<1
* <i>Vachellia farnesiana</i>	1.6	<1

Hastings Biological Surveys

<i>Centipeda minima</i> subsp. <i>macrocephala</i>	.05	1
<i>Cullen cinereum</i>	.4	2
<i>Eragrostis setifolia</i>	.3	<1
<i>Eragrostis tenellula</i>	.2	<1
<i>Eucalyptus victrix</i>	8	5
<i>Goodenia maideniana</i>	.2	2
<i>Marsilea hirsuta</i>	.05	1
<i>Mimulus gracilis</i>	.1	3
<i>Myriocephalus oldfieldii</i>	.3	1
<i>Nicotiana occidentalis</i>	.4	<1
<i>Panicum decompositum</i>	.5	<1
<i>Ptilotus gomphrenoides</i>	.1	<1
<i>Schoenoplectus dissachanthus</i>	.05	<1
<i>Sida spinosa</i>	.3	<1
<i>Trigonella suavissima</i>	.1	<1
* <i>Vachellia farnesiana</i>	1.5	1

Hastings Biological Surveys

<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	60
<i>Gomphrena kanisii</i>	0.3	<1
<i>Grevillea berryana</i>	1	<1
<i>Heliotropium heteranthum</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus roei</i>	0.1	2
<i>Sclerolaena diacantha</i>	0.3	<1
<i>Senna glaucifolia</i>	1.2	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	1

Hastings Biological Surveys

<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Euphorbia porcata</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.4	4
<i>Hybanthus aurantiacus</i>	0.1	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	<1
<i>Trachymene pilbarensis</i>	0.3	<1

<i>Cymbopogon ambiguus</i>	0.5	2
<i>Dodonaea petiolaris</i>	1	10
<i>Dysphania rhadinostachya</i>	0.3	<1
<i>Eragrostis cumingii</i>	0.3	<1
<i>Eremophila exilifolia</i>	6	<1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	2	3
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	0.6	<1
<i>Erodium cygnorum</i>	0.2	<1
<i>Euphorbia boophthona</i>	0.3	<1
<i>Gomphrena cunninghamii</i>	0.2	4
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	0.3	<1
<i>Paspalidium clementii</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Polycarpaea longiflora</i>	0.3	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	2
<i>Trachymene pilbarensis</i>	0.4	<1

Hastings Biological Surveys

<i>Goodenia tenuiloba</i>	0.3	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Indigofera colutea</i>	0.2	10
<i>Paspalidium clementii</i>	0.3	<1
<i>Phyllanthus erwinii</i>	0.2	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Roebuckiella cuneata</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	<1
<i>Trichodesma zeylanicum</i>	0.5	<1
<i>Tripogon loliiformis</i>	0.2	<1

Hastings Biological Surveys

<i>Corchorus crozophorifolius</i>	0.6	<1
<i>Dysphania rhadinostachya</i>	0.3	5
<i>Eremophila flaccida</i>	1	8
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.8	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.3	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia muelleriana</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.5	<1
<i>Hibiscus sturtii</i>	0.3	<1
<i>Paspalidium clementii</i>	0.3	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	0.4	<1
<i>Rhagodia eremaea</i>	0.9	<1
<i>Santalum lanceolatum</i>	2	1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.7	<1
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.5	<1
<i>Solanum gabrielae</i>	0.5	<1
<i>Trachymene pilbarensis</i>	0.3	<1

Hastings Biological Surveys

<i>Enneapogon caerulescens</i>	0.3	<1
<i>Enteropogon ramosus</i>	0.5	<1
<i>Eremophila cuneifolia</i>	1	15
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium inexplicitum</i>	0.1	<1
<i>Maireana planifolia</i>	0.5	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca intraterranea</i>	0.1	2
<i>Pterocaulon sphacelatum</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.5	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	1	<1
<i>Ptilotus polystachyus</i>	0.3	<1
<i>Rhagodia eremaea</i>	0.6	<1
<i>Salsola australis</i>	0.4	<1
<i>Scaevola spinescens</i>	0.6	<1
<i>Sclerolaena densiflora</i>	0.3	<1
<i>Sclerolaena diacantha</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.2	5
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	5
<i>Sida fibulifera</i>	0.3	<1
<i>Solanum lasiophyllum</i>	0.3	<1
<i>Streptoglossa bubakii</i>	0.2	<1
<i>Streptoglossa cylindriceps</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.2	<1

Hastings Biological Surveys

<i>Enneapogon caeruleus</i>	0.2	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eremophila cuneifolia</i>	0.6	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Hakea preissii</i>	0.6	<1
<i>Lawrenzia densiflora</i>	0.4	<1
<i>Lepidium phlebopetalum</i>	0.2	<1
<i>Maireana melanocoma</i>	0.5	<1
<i>Polycarpaea corymbosa</i>	0.2	<1
<i>Portulaca intraterranea</i>	0.1	<1
<i>Pterocaulon sphacelatum</i>	0.1	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus auriculifolius</i>	0.2	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.4	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	<1
<i>Salsola australis</i>	0.4	<1
<i>Scaevola spinescens</i>	0.6	<1
<i>Sclerolaena cuneata</i>	0.3	2
<i>Sclerolaena densiflora</i>	0.2	8
<i>Sclerolaena diacantha</i>	0.3	<1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.5	<1
<i>Sporobolus actinocladius</i>	0.3	<1
<i>Trianthema triquetrum</i>	0.1	<1
<i>Tribulus suberosus</i>	0.2	<1
<i>Zygophyllum kochii</i>	0.2	<1

Hastings Biological Surveys

<i>Dysphania rhadinostachya</i>	0.3	<1
<i>Enneapogon caeruleus</i>	0.2	<1
<i>Eragrostis cumingii</i>	0.1	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus aevoides</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Salsola australis</i>	0.3	<1
<i>Sclerolaena densiflora</i>	0.2	1
<i>Sclerolaena eriacantha</i>	0.2	1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.8	<1
<i>Solanum cleistogamum</i>	0.1	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.2	1

Hastings Biological Surveys

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	1
<i>Eremophila exilifolia</i>	0.5	1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.8	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Euphorbia porcata</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Indigofera decipiens</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.05	2
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	<1
<i>Solanum gabrielae</i>	0.3	<1
<i>Trachymene pilbarensis</i>	0.2	<1
<i>Tripogon loliiformis</i>	0.1	5

Hastings Biological Surveys

<i>Dysphania rhadinostachya</i>	0.3	<1
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	1	2
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.2	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Gomphrena cunninghamii</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.4	<1
<i>Heliotropium cunninghamii</i>	0.1	<1
<i>Indigofera colutea</i>	0.2	5
<i>Iseilema eremaeum</i>	0.1	<1
<i>Paspalidium clementii</i>	0.2	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.1	5
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	2
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.1	<1
<i>Sida brownii</i>	0.3	<1
<i>Solanum gabrielae</i>	0.5	<1
<i>Wahlenbergia tumidifructa</i>	0.2	<1

<i>Cymbopogon ambiguus</i>		0.5	1
<i>Dodonaea petiolaris</i>		0.8	2
<i>Dysphania rhadinostachya</i>		0.2	2
<i>Enneapogon polyphyllus</i>		0.1	3
<i>Eremophila exilifolia</i>		1	2
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>		1.2	5
<i>Eriachne mucronata</i>		0.4	5
<i>Erodium cygnorum</i>		0.1	<1
<i>Euphorbia boophthona</i>		0.1	<1
<i>Gomphrena cunninghamii</i>		0.2	5
<i>Marsdenia australis</i>		2	<1
<i>Paraneurachne muelleri</i>		0.2	<1
<i>Paspalidium clementii</i>		0.3	<1
<i>Polycarpaea longiflora</i>		0.1	<1
<i>Rhodanthe frenchii</i>	P 2	0.4	<1
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>		0.6	<1
<i>Solanum gabrielae</i>		0.4	<1
<i>Trachymene pilbarensis</i>		0.4	1
<i>Tribulus suberosus</i>		0.6	<1

HY15103

Staff AIC **Date** 13/08/2015 **Season** E

Revisit

Type Q 20 m x 20 m

Location

MGA Zone 50 427799 **mE** 7352261 **mN** **Lat.** -23.9398 **Long.** 116.2905

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Orange brown sandy loam

Rock Type Quartz

Loose Rock <2 % cover; 60-200 mm in size **Litter** <1 % cover ; <1 cm in depth

Bare ground 50 % cover **Weeds** 0 % cover

Vegetation M+ ^*Acacia synchronicia*,^*Eremophila cuneifolia*\^shrub\3\r;G ^*Frankenia hispidula*,^*Aristida contorta*\^shrub,tussock grass\1\i

Veg. Condition Excellent

Disturbance Cattle

Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia synchronicia</i>		1.5	2	
<i>Aristida contorta</i>		0.1	2	
<i>Calandrinia Ptychosperma</i>		0.05	<1	
<i>Calandrinia schistorhiza</i>		0.05	<1	
<i>Calocephalus francisii</i>		0.1	<1	
<i>Eragrostis dielsii</i>		0.05	<1	

<i>Eremophila cuneifolia</i>	0.6	5
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Frankenia hispidula</i>	0.3	10
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Maireana tomentosa</i>	0.3	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Portulaca intraterranea</i>	0.05	<1
<i>Pterocaulon sphacelatum</i>	0.1	<1
<i>Salsola australis</i>	0.3	<1
<i>Scaevola spinescens</i>	0.5	<1
<i>Sclerolaena densiflora</i>	0.3	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.5	<1
<i>Senna hamersleyensis</i>	0.2	<1
<i>Sporobolus australasicus</i>	0.2	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Trianthema triquetrum</i>	0.05	2
<i>Tripogon loliiformis</i>	0.1	<1

* <i>Cenchrus ciliaris</i>	0.6	35
* <i>Cenchrus setiger</i>	0.6	20
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.1	<1
<i>Crotalaria cunninghamii</i>	0.15	<1
<i>Cucumis melo</i>	Climber	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cyperus iria</i>	0.1	<1
<i>Cyperus vaginatus</i>	0.5	<1
<i>Dactyloctenium radulans</i>	0.05	<1
<i>Duperreya commixta</i>	Climber	<1
<i>Dysphania cristata</i>	0.05	<1
* <i>Echinochloa colona</i>	0.1	<1
<i>Eragrostis cumingii</i>	0.1	<1
<i>Eragrostis tenellula</i>	0.1	<1
<i>Eucalyptus camaldulensis</i>	18	40
<i>Euphorbia ? biconvexa</i>	0.1	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1
<i>Haloragis trigonocarpa</i>	0.15	<1
<i>Lipocarpa microcephala</i>	0.05	<1
* <i>Malvastrum americanum</i>	0.3	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.05	<1
<i>Oldenlandia galioides</i>	0.05	<1
<i>Peplidium muelleri</i>		<1
<i>Petalostylis labicheoides</i>	3	<1
<i>Phyllanthus maderaspatensis</i>	0.4	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Pterocaulon sphacelatum</i>	0.1	<1
* <i>Setaria verticillata</i>	0.15	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Stemodia viscosa</i>	0.2	<1
<i>Streptoglossa decurrens</i>	0.15	<1
<i>Trachymene pilbarensis</i>	0.3	<1

<i>Cucumis melo</i>	0.3	<1
<i>Cucumis variabilis</i>	0.5	<1
<i>Dysphania melanocarpa</i> forma <i>leucocarpa</i>	0.4	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1
<i>Enneapogon caerulescens</i>	0.3	<1
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.3	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.3	<1
<i>Gomphrena cunninghamii</i>	0.2	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Heliotropium inexplicitum</i>	0.1	<1
<i>Lepidium platypetalum</i>	0.4	<1
* <i>Malvastrum americanum</i>	0.3	<1
<i>Marsdenia australis</i>	0.5	<1
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	0.3	<1
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.4	<1
<i>Paspalidium clementii</i>	0.4	<1
<i>Portulaca oleracea</i>	0.1	<1
<i>Ptilotus aevroides</i>	0.1	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Ptilotus polystachyus</i>	0.3	<1
<i>Salsola australis</i>	0.4	<1
<i>Scaevola spinescens</i>	0.5	<1
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.3	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.4	<1
<i>Senna stricta</i>	1	1
* <i>Setaria verticillata</i>	0.4	<1
<i>Sporobolus australasicus</i>	0.3	<1
<i>Streptoglossa decurrens</i>	0.2	<1
<i>Swainsona longipilosa</i>	0.1	<1
* <i>Tribulus terrestris</i>	0.1	<1
<i>Zygophyllum kochii</i>	0.2	3

<i>*Cenchrus ciliaris</i>	.1	<1
<i>Dysphania rhadinostachya</i>	.3	2
<i>Enneapogon caerulescens</i>	.3	<1
<i>Eremophila cuneifolia</i>	1.2	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Heliotropium heteranthum</i>	.1	<1
<i>Marsdenia australis</i>	Climber	<1
<i>Polycarpaea corymbosa</i>	.1	<1
<i>Polygala glaucifolia</i>	.1	<1
<i>Portulaca oleracea</i>	.1	<1
<i>Ptilotus aevoides</i>	.1	<1
<i>Ptilotus carinatus</i>	.2	<1
<i>Ptilotus gaudichaudii</i> subsp. <i>gaudichaudii</i>	.3	<1
<i>Ptilotus helipteroides</i>	.4	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.4	<1
<i>Salsola australis</i>	.3	<1
<i>Sclerolaena eriacantha</i>	.3	<1
<i>Solanum lasiophyllum</i>	.2	<1
<i>Trianthema glossostigium</i>	Prostrate	<1
<i>Tribulus astrocarpus</i>	Prostrate	<1

RHY15059

Staff JKN **Date** 18/05/2015 **Season** E

Revisit

Type Q 20 m x 20 m

Location

MGA Zone 50 413800 **mE** 7348352 **mN** **Lat.** -23.9744 **Long.** 116.1527

Habitat Mid-Slope

Aspect W **Slope**

Soil Type Red brown clay loam

Rock Type Ironstone

Loose Rock >90% cover; 60-200 mm in size **Litter** <1% cover ; <1 cm in depth

Bare ground 95% cover **Weeds** nil % cover

Vegetation M+ ^ *Eremophila phyllopoda* subsp. *obliqua*, ^ *Eremophila cuneifolia* ^shrub\3\r;G ^ *Dysphania rhadinostachya* subsp. *rhadinostachya*, ^ *Aristida contorta*, *Ptilotus nobilis* subsp. *nobilis* ^forb, tussock grass\1\j

Veg. Condition Excellent

Disturbance Nil

Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Abutilon lepidum</i>		0.2	<1	
<i>Acacia synchronicia</i>		0.5	<1	
<i>Aristida contorta</i>		0.15	2	
<i>Boerhavia coccinea</i>		0.1	<1	
<i>Calandrinia ptychosperma</i>		0.1	<1	

<i>Cucumis melo</i>	0.05	<1
<i>Cymbopogon ambiguus</i>	0.4	<1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	5
<i>Enneapogon caerulescens</i>	0.1	<1
<i>Eremophila canaliculata</i>	0.3	<1
<i>Eremophila cuneifolia</i>	1.5	2
<i>Eremophila phyllopoda</i> subsp. <i>obliqua</i>	2	4
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia boophthona</i>	0.15	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1
<i>Gomphrena cunninghamii</i>	0.05	<1
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Paspalidium clementii</i>	0.15	<1
<i>Polycarpaea longiflora</i>	0.2	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.3	1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Salsola australis</i>	0.15	<1
<i>Senna</i> ? <i>ferraria</i>	0.5	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	<1
<i>Solanum cleistogamum</i>	0.1	<1
<i>Solanum gabrielae</i>	0.6	<1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.1	<1
<i>Tribulus suberosus</i>	0.2	<1

RHY15061

Staff SOK **Date** 20/05/2015 **Season** E

Revisit

Type Q 20 m x 20 m

Location

MGA Zone 50 410254 **mE** 7371935 **mN** **Lat.** -23.7612 **Long.** 116.1193

Habitat River

Aspect N/A **Slope** N/A

Soil Type River sand

Rock Type Mixed alluvial

Loose Rock 50-90% cover; 20-60 mm in size **Litter** 4% cover ; 2 cm in depth

Bare ground 60% cover **Weeds** 30% cover

Vegetation U+ ^ *Eucalyptus victrix*, ^ *Acacia citrinoviridis* ^tree\7i;M ^ *Melaleuca glomerata*, ^ *Acacia pyrifolia* var. *pyrifolia* ^shrub\4r;G ^ *Cenchrus ciliaris* ^*temp*\1c

Veg. Condition Good

Disturbance Large amount of Buffel Grass in understory, evidence of grazing by cattle

Fire Age

Notes



Species	WA Cons.	Height (m)	Cover (%)	Count
<i>Acacia citrinoviridis</i>		8	5	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>		2	1	
<i>Acacia tetragonophylla</i>		1	<1	
<i>Aeschynomene indica</i>		.2	<1	
<i>Amaranthus cuspidifolius</i>		.5	<1	
* <i>Argemone ochroleuca</i>		.1	<1	

Hastings Biological Surveys

<i>*Cenchrus ciliaris</i>	.4	35
<i>Cleome viscosa</i>	.3	<1
<i>Corchorus crozophorifolius</i>	1	<1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	.3	<1
<i>Cucumis melo</i>	.2	<1
<i>Cullen cinereum</i>	.4	<1
<i>Duperreya commixta</i>	.3	<1
<i>Dysphania rhadinostachya</i>	.4	<1
<i>Eucalyptus victrix</i>	15	20
<i>Goodenia forrestii</i>	.2	<1
<i>Hybanthus aurantiacus</i>	.3	<1
<i>Indigofera colutea</i>	.2	<1
<i>*Malvastrum americanum</i>	.3	<1
<i>Melaleuca glomerata</i>	2.5	2
<i>Phyllanthus maderaspatensis</i>	.3	<1
<i>Polycarpaea longiflora</i>	.4	<1

<i>Enneapogon caeruleus</i>	.2	<1
<i>Eremophila exilifolia</i>	1.5	6
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	.2	<1
<i>Eriachne aristidea</i>	.3	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	.3	<1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	.3	<1
<i>Fimbristylis depauperata</i>	.3	<1
<i>Gomphrena cunninghamii</i>	.2	<1
<i>Gomphrena kanisii</i>	.4	<1
<i>Indigofera colutea</i>	.2	<1
<i>Indigofera decipiens</i>	.3	<1
<i>Phyllanthus erwinii</i>	.3	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Portulaca oleracea</i>	.2	2
<i>Ptilotus aervoides</i>	.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.5	1
<i>Tephrosia supina</i>	.4	<1
<i>Tripogon loliiformis</i>	.3	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Eremophila exilifolia</i>	1	3
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.1	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1
<i>Erodium cygnorum</i>	0.1	<1
<i>Euphorbia porcata</i>	0.1	<1
<i>Gomphrena kanisii</i>	0.3	<1
<i>Goodenia tenuiloba</i>	0.3	<1
<i>Indigofera colutea</i>	0.1	<1
<i>Phyllanthus erwinii</i>	0.1	<1
<i>Polygala glaucifolia</i>	0.1	<1
<i>Portulaca oleracea</i>	0.1	5
<i>Ptilotus aervoides</i>	0.1	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1	2
<i>Tripogon loliiformis</i>	0.2	<1

<i>Calandrinia</i> ?sp. The Pink Hills (F. Obbens FO 19/06)	.2	<1
<i>Calandrinia schistorhiza</i>	.1	<1
<i>Dysphania rhadinostachya</i>	.3	<1
<i>Enneapogon caerulescens</i>	.2	<1
<i>Enteropogon ramosus</i>	.5	<1
<i>Eremophila cuneifolia</i>	.3	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.2	<1
<i>Gomphrena cunninghamii</i>		<1
<i>Hakea preissii</i>	1.8	<1
<i>Heliotropium heteranthum</i>	Prostrate	<1
<i>Iseilema dolichotrichum</i>	.1	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Ptilotus aevoides</i>	Prostrate	<1
<i>Ptilotus helipteroides</i>	.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	.1	1
<i>Salsola australis</i>	.5	<1
<i>Scaevola spinescens</i>	1.5	2
<i>Sclerolaena eriacantha</i>	.3	2
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	.5	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.2	1
<i>Tribulus astrocarpus</i>	Prostrate	<1
<i>Triraphis mollis</i>	.2	<1

QUADRAT SUMMARIES

Hastings Biological Surveys

<i>Dysphania rhadinostachya</i>	.3	<1
<i>Eragrostis pergracilis</i>	.2	<1
<i>Eremophila flaccida</i>	1.2	2
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	.3	15
<i>Gomphrena kanisii</i>	.3	<1
<i>Heliotropium heteranthum</i>	.1	<1
<i>Panicum decompositum</i>	.4	<1
<i>Polycarpaea corymbosa</i>	.2	<1
<i>Portulaca oleracea</i>	.2	2
<i>Ptilotus helipteroides</i>	.4	<1
<i>Ptilotus roei</i>	.2	<1
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	1.3	<1
<i>Trianthema glossostigmum</i>	Prostrate	2
<i>Tribulus astrocarpus</i>	Prostrate	<1

<i>Aristida contorta</i>	0.15	<1
<i>Boerhavia coccinea</i>	0.05	<1
<i>Brachyachne prostrata</i>	0.05	<1
* <i>Cenchrus ciliaris</i>	0.1	<1
<i>Cleome viscosa</i>	0.2	<1
<i>Cucumis variabilis</i>	Climber	<1
<i>Cullen cinereum</i>		<1
<i>Dactyloctenium radulans</i>	0.05	<1
<i>Dysphania rhadinostachya</i>	0.1	<1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.4	<1
<i>Enneapogon caerulescens</i>	0.1	<1
<i>Enneapogon polyphyllus</i>	0.2	<1
<i>Eremophea spinosa</i>	0.25	<1
<i>Eremophila cuneifolia</i>	0.25	<1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.05	<1
<i>Gomphrena cunninghamii</i>	0.05	<1
<i>Goodenia tenuiloba</i>	0.1	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Ixiochlamys cuneifolia</i>	0.1	<1
* <i>Malvastrum americanum</i>	0.3	<1
[Missing specimen]	0.05	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus aevoides</i>	0.05	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus macrocephalus</i>	0.1	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.4	2
<i>Rhagodia eremaea</i>	0.4	<1
<i>Salsola australis</i>	0.2	<1
<i>Schoenia ayersii</i>	0.3	<1
<i>Sclerolaena densiflora</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.1	<1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.2	<1
<i>Setaria dielsii</i>	0.2	<1
<i>Solanum</i> ? <i>cleistogamum</i>	0.1	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Tribulus astrocarpus</i>	0.05	<1

Zygophyllum kochii

0.15

<1

<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.2	<1
<i>Enneapogon caerulescens</i>	0.1	1
<i>Eremophea spinosa</i>	0.1	<1
<i>Eremophila</i> ? <i>cryptothrix</i>	0.15	<1
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>	1.4	<1
<i>Eriochiton sclerolaenoides</i>	0.1	<1
<i>Euphorbia porcata</i>	0.05	<1
<i>Exocarpos</i> ? <i>aphyllus</i>	0.6	<1
<i>Goodenia muelleriana</i>	0.15	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium inexplicitum</i>	0.1	<1
<i>Lawrencia densiflora</i>	0.1	1
<i>Marsdenia australis</i>	Climber	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Salsola australis</i>	0.1	<1
<i>Scaevola spinescens</i>	1	2
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.5	1
<i>Tribulus astrocarpus</i>	0.1	<1
<i>Tripogon loliiformis</i>	0.05	<1
<i>Zygophyllum</i> ? <i>simile</i>	0.1	<1

<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	1	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	5
<i>Gomphrena kanisii</i>	0.2	<1
<i>Goodenia tenuiloba</i>	0.2	<1
<i>Heliotropium heteranthum</i>	0.05	<1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	0.1	<1
<i>Paspalidium clementii</i>	0.15	<1
<i>Polycarpaea corymbosa</i>	0.1	<1
<i>Polygala glaucifolia</i>	0.05	<1
<i>Portulaca oleracea</i>	0.05	<1
<i>Ptilotus helipteroides</i>	0.3	<1
<i>Ptilotus nobilis</i> subsp. <i>nobilis</i>	0.1	<1
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.3	<1
<i>Ptilotus roei</i>	0.1	<1
<i>Salsola australis</i>	0.2	<1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.4	<1
<i>Senna glaucifolia</i>	1.4	<1
<i>Solanum gabrielae</i>	0.4	<1
<i>Sporobolus australasicus</i>	0.1	<1
<i>Streptoglossa decurrens</i>	0.1	<1
<i>Tribulus astrocarpus</i>	0.05	<1
<i>Tribulus suberosus</i>	0.3	<1
<i>Tripogon loliiformis</i>	0.1	<1
<i>Wurmbea inflata</i>	0.1	<1

APPENDIX FOUR: FLORA INVENTORY

Acanthaceae

Dicladantha forrestii
Dipteracanthus australasicus subsp.
 australasicus
Harnieria kempeana subsp. *muelleri*

Aizoaceae

Trianthesa glossostigmum
Trianthesa triquetrum
Zaleya galericulata

Amaranthaceae

Alternanthera denticulata
Alternanthera nodiflora
Amaranthus cuspidifolius
Gomphrena cunninghamii
Gomphrena kanisii
Ptilotus aevroides
Ptilotus auriculifolius
Ptilotus carinatus
Ptilotus divaricatus
Ptilotus gaudichaudii subsp. *gaudichaudii*
Ptilotus gomphrenoides
Ptilotus helipteroides
Ptilotus macrocephalus
Ptilotus nobilis subsp. *nobilis*
Ptilotus obovatus var. *obovatus*
Ptilotus polystachyus
Ptilotus roei
Ptilotus schwartzii var. *schwartzii*

Apiaceae

Daucus glochidiatus

Apocynaceae

Gymnanthera cunninghamii (P3)
Marsdenia australis
Rhyncharrhena linearis
Sarcostemma viminale subsp. *australe*

Araliaceae

Trachymene pilbarensis

Asphodelaceae

**Asphodelus fistulosus*
Bulbine pendula

Asteraceae

Actinobole oldfieldianum
Angianthus milnei
**Bidens subalternans* var. *simulans*
Blumea tenella
Brachyscome iberidifolia
Calocephalus beardii

Calocephalus francisii
Calocephalus knappii
Calotis hispidula
Calotis multicaulis
Calotis porphyroglossa
Centipeda minima subsp. *macrocephala*
Erymophyllum compactum
**Flaveria trinervia*
Gnephosis arachnoidea
Gnephosis brevifolia
Haptotrichion conicum
Helichrysum luteoalbum
Helipterum craspedioides
Ixiochlamys cuneifolia
Myriocephalus gascoynensis
Myriocephalus oldfieldii
Myriocephalus rudallii
Pluchea dentex
Pluchea rubelliflora
Podolepis kendallii
Pterocaulon sphacelatum
Rhodanthe chlorocephala
Rhodanthe floribunda
Rhodanthe frenchii (P2)
Rhodanthe propinqua
Rhodanthe stricta
Roebuckiella ?cuneata
Roebuckiella cuneata
Schoenia ayersii
**Sonchus oleraceus*
Streptoglossa adscendens
Streptoglossa bubakii
Streptoglossa cylindriceps
Streptoglossa decurrens
Streptoglossa liatroides
Vittadinia eremaea

Boraginaceae

Heliotropium ammophilum
Heliotropium crispatum
Heliotropium cunninghamii
Heliotropium curassavicum
Heliotropium heteranthum
Heliotropium inexplicitum
Trichodesma zeylanicum

Brassicaceae

?*Lepidium* sp.
Lepidium muelleri-ferdinandii

- Lepidium oxytrichum*
Lepidium pedicellosum
Lepidium phlebopetalum
Lepidium platypetalum
Menkea sphaerocarpa
 **Sisymbrium erysimoides*
 **Sisymbrium orientale*
Stenopetalum anfractum
Stenopetalum pedicellare
Campanulaceae
Lobelia heterophylla subsp. *pilbarensis*
Wahlenbergia tumidifruca
Capparaceae
Capparis lasiantha
Caryophyllaceae
Polycarphaea corymbosa
Polycarphaea longiflora
Celastraceae
Stackhousia muricata
Chenopodiaceae
 ?*Enchylaena tomentosa*
 ?*Maireana villosa*
Atriplex codonocarpa
 **Chenopodium murale*
Dysphania ?glomulifera
Dysphania cristata
Dysphania glomulifera subsp. *eremaea*
Dysphania kalpari
Dysphania melanocarpa forma *leucocarpa*
Dysphania rhadinostachya
Dysphania rhadinostachya subsp. *inflata*
Dysphania rhadinostachya subsp.
 rhadinostachya
Enchylaena tomentosa var. *tomentosa*
Eremophea spinosa
Eriochiton sclerolaenoides
Maireana ?polypterygia
Maireana ?pyramidata
Maireana carnosa
Maireana georgei
Maireana melanocoma
Maireana planifolia
Maireana pyramidata
Maireana thesioides
Maireana tomentosa
Maireana triptera
Rhagodia eremaea
Salsola australis
Sclerolaena costata
Sclerolaena cuneata
Sclerolaena densiflora
Sclerolaena diacantha
Sclerolaena eriacantha
Sclerolaena lanicuspis
Sclerolaena medicaginooides
Cleomaceae
Cleome oxalidea
Cleome viscosa
Colchicaceae
Wurmbea fluviatilis (P2)
Wurmbea inflata
Convolvulaceae
Bonamia pilbarensis
Convolvulus clementii
 **Cuscuta planiflora*
Duperreya commixta
Evolvulus alsinoides var. *villosicalyx*
Ipomoea calobra
Ipomoea coptica
Ipomoea plebeia
Ipomoea polymorpha
Operculina aequisejala
Cucurbitaceae
Austrobryonia pilbarensis
 **Citrullus lanatus*
Cucumis melo
 **Cucumis myriocarpus*
Cucumis variabilis
Cyperaceae
Bulbostylis barbata
Bulbostylis turbinata
Cyperus bifax
Cyperus iria
Cyperus pulchellus
Cyperus squarrosus
Cyperus vaginatus
Fimbristylis depauperata
Fimbristylis microcarya
Lipocarpha microcephala
Schoenoplectus dissachanthus
Schoenoplectus laevis
Schoenoplectus subulatus
Droseraceae
Drosera indica
Elatinaceae
Bergia pedicellaris
Bergia trimera
Euphorbiaceae
Adriana tomentosa var. *tomentosa*
Euphorbia ?biconvexa

Euphorbia australis var. *subtomentosa*
Euphorbia biconvexa
Euphorbia boophthona
Euphorbia coghlanii
Euphorbia porcata
Fabaceae
Acacia ampliceps
Acacia aptaneura
Acacia citrinoviridis
Acacia coriacea subsp. *pendens*
Acacia craspedocarpa
Acacia curryana (P1)
Acacia cuthbertsonii subsp. *cuthbertsonii*
Acacia cyperophylla var. *cyperophylla*
Acacia fuscaneura
Acacia kempeana
Acacia macraneura
Acacia pruinocarpa
Acacia pyrifolia var. *pyrifolia*
Acacia ramulosa var. *linophylla*
Acacia sclerosperma subsp. *sclerosperma*
Acacia sibirica
Acacia synchronicia
Acacia tetragonophylla
Acacia xiphophylla
Aeschynomene indica
Crotalaria cunninghamii
Crotalaria medicaginea var. *neglecta*
Cullen ?*cinereum*
Cullen ?*lachnostachys*
Cullen cinereum
Cullen graveolens
Cullen leucanthum
Erythrina vespertilio
Glycine canescens
Indigofera colutea
Indigofera decipiens
Indigofera hirsuta
Indigofera linifolia
Indigofera linnaei
Indigofera monophylla
Isotropis forrestii
Lotus cruentus
Muelleranthus obovatus
Neptunia dimorphantha
Petalostylis labicheoides
Rhynchosia minima
Senna ?*ferraria*
Senna artemisioides subsp. *helmsii*
Senna artemisioides subsp. *oligophylla*

Senna artemisioides subsp. *oligophylla* x *helmsii*
Senna artemisioides subsp. x *sturtii*
Senna glaucifolia
Senna glutinosa subsp. *pruinosa*
Senna glutinosa subsp. x *luerssenii*
Senna hamersleyensis
Senna sp. Meekatharra (E. Bailey 1-26)
Senna stricta
Sesbania cannabina
Swainsona aff. *villosa*
Swainsona elegantoides
Swainsona formosa
Swainsona forrestii
Swainsona kingii
Swainsona longipilosa
Swainsona oroboides
Swainsona pterostylis
Swainsona rotunda
Tephrosia clementii
Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)
Tephrosia sp. Fortescue (A.A. Mitchell 606)
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)
Tephrosia supina
Trigonella suavissima
 **Vachellia farnesiana*
Vigna lanceolata
Vigna sp. Hamersley Clay (A.A. Mitchell PRP 113)
Frankeniaceae
Frankenia hispidula
Frankenia setosa
Gentianaceae
Schenkia clementii
Geraniaceae
Erodium cygnorum
Goodeniaceae
Goodenia berardiana
Goodenia berringbinensis (P4)
Goodenia forrestii
Goodenia maideniana
Goodenia muelleriana
Goodenia nuda (P4)
Goodenia tenuiloba
Goodenia wilunensis
Scaevola spinescens
Scaevola tomentosa
Velleia glabrata

Gyrostemonaceae*Codonocarpus cotinifolius***Haloragaceae***Gonocarpus ephemerus**Haloragis ?trigonocarpa**Haloragis trigonocarpa***Hydrocharitaceae***Najas marina**Najas tenuifolia***Hypericaceae***Hypericum gramineum***Juncaginaceae***Triglochin hexagona***Lamiaceae***Clerodendrum floribundum**Spartothamnella teucriflora**Teucrium racemosum***Lauraceae***Cassytha aurea***Loranthaceae***?Diplatia grandibractea**Amyema fitzgeraldii**Lysiana casuarinae**Lysiana exocarp***Lythraceae***Ammannia multiflora***Malvaceae***Abutilon ?lepidum**Abutilon ?oxycarpum**Abutilon amplum**Abutilon cryptopetalum**Abutilon fraseri**Abutilon lepidum**Abutilon malvifolium**Abutilon oxycarpum**Abutilon oxycarpum* subsp. *Prostrate* (A.A. Mitchell PRP 1266)*Corchorus crozophorifolius**Corchorus sidoides**Corchorus tridens**Gossypium robinsonii**Hibiscus burtonii**Hibiscus* sp. *Gardneri* (A.L. Payne PRP 1435)*Hibiscus sturtii**Hibiscus sturtii* (pale form)*Hibiscus sturtii* var. *grandiflorus**Hibiscus verdcourtii**Lawrenzia densiflora**Lawrenzia glomerata***Malvastrum americanum**Melhania oblongifolia**Sida brownii**Sida fibulifera**Sida kingii**Sida rohlenae* subsp. *rohlenae**Sida* sp. dark green fruits (S. van Leeuwen 2260)*Sida* sp. spiciform panicles (E. Leyland s.n. 14/8/90)*Sida* sp. verrucose glands (F.H. Mollemans 2423)*Sida spinosa**Waltheria indica***Marsileaceae***Marsilea hirsuta***Moraceae***Ficus brachypoda***Myrtaceae***Eucalyptus camaldulensis**Eucalyptus victrix**Melaleuca glomerata***Nyctaginaceae***Boerhavia burbidgeana**Boerhavia coccinea**Commicarpus australis***Papaveraceae****Argemone ochroleuca***Phrymaceae***Elacholoma hornii**Elacholoma* sp. 'Showy Flower' (proposed phrase name)*Glossostigma diandrum**Mimulus gracilis**Peplidium aithocheilum**Peplidium muelleri**Peplidium* sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)**Phyllanthaceae***Notoleptopus decaisnei**Phyllanthus erwinii**Phyllanthus maderaspatensis**Sauropus crassifolius***Plantaginaceae***Stemodia ?viscosa**Stemodia grossa**Stemodia viscosa***Poaceae***Acrachne racemosa**Aristida contorta**Bothriochloa ewartiana**Brachyachne prostrata***Cenchrus ciliaris*

- *Cenchrus setiger*
Chloris pumilio
Chrysopogon fallax
Cymbopogon ambiguus
**Cynodon dactylon*
Dactyloctenium radulans
Dichanthium sericeum subsp. *humilius*
Digitaria brownii
Digitaria ctenantha
**Echinochloa colona*
Elytrophorus spicatus
Enneapogon caeruleus
Enneapogon polyphyllus
Enteropogon ramosus
**Eragrostis amabilis*
Eragrostis cumingii
Eragrostis dielsii
Eragrostis leptocarpa
Eragrostis pergracilis
Eragrostis setifolia
Eragrostis tenellula
Eragrostis xerophila
Eriachne aristidea
Eriachne benthamii
Eriachne flaccida
Eriachne helmsii
Eriachne mucronata
Eriachne pulchella subsp. *dominii*
Eriochloa pseudoacrotricha
Eulalia aurea
Iseilema dolichotrichum
Iseilema eremaeum
Iseilema membranaceum
Leptochloa digitata
**Lolium multiflorum*
Panicum decompositum
Panicum laevinode
Paraneurachne muelleri
Paspalidium clementii
Paspalidium jubiflorum
Paspalidium rarum
Perotis rara
Setaria dielsii
Setaria surgens
**Setaria verticillata*
Sporobolus actinocladus
Sporobolus australasicus
Sporobolus blakei (P3)
Themeda triandra
Tragus australianus
- Tripogon loliiformis*
Triraphis mollis
Urochloa occidentalis var. *ciliata*
Urochloa subquadripara
Yakirra australiensis
- Polygalaceae**
- Polygala glaucifolia*
- Polygonaceae**
- *Acetosa vesicaria*
Duma florulenta
- Portulacaceae**
- Calandrinia* ?sp. The Pink Hills (F. Obbens FO 19/06)
Calandrinia creethiae
Calandrinia eremaea
Calandrinia ptychosperma
Calandrinia pumila
Calandrinia schistorhiza
Calandrinia sp.
Calandrinia sp. Black angular seeds (A.A. Mitchell PRP 1661)
Calandrinia sp. The Pink Hills (F. Obbens FO 19/06)
Calandrinia stagnensis
Portulaca ?oleracea
Portulaca ?intraterranea
Portulaca intraterranea
Portulaca oleracea
Portulaca pilosa
- Primulaceae**
- *Lysimachia arvensis*
- Proteaceae**
- Grevillea berryana*
Hakea lorea subsp. *lorea*
Hakea preissii
- Pteridaceae**
- Cheilanthes brownii*
Cheilanthes sieberi subsp. *sieberi*
- Rubiaceae**
- Oldenlandia galioides*
Psydrax latifolia
Psydrax suaveolens
Synaptantha tillaeacea var. *tillaeacea*
- Ruppiaceae**
- Ruppia polycarpa*
- Santalaceae**
- Exocarpos ?aphyllus*
Santalum lanceolatum
Santalum spicatum
- Sapindaceae**

*Dodonaea pachyneura**Dodonaea petiolaris**Dodonaea pinifolia***Scrophulariaceae***Eremophila ?cryptothrix**Eremophila canaliculata**Eremophila cuneifolia**Eremophila exilifolia**Eremophila flaccida**Eremophila forrestii* subsp. *forrestii**Eremophila forrestii* subsp. *hastieana**Eremophila fraseri* subsp. *fraseri**Eremophila jucunda* subsp. *jucunda**Eremophila jucunda* subsp. *pulcherrima**Eremophila latrobei* subsp. *filiformis**Eremophila latrobei* subsp. *latrobei**Eremophila longifolia**Eremophila oppositifolia* subsp. *angustifolia**Eremophila phyllopoda* subsp. *obliqua**Eremophila platycalyx* subsp. *pardalota**Eremophila platycalyx* subsp. *platycalyx**Eremophila reticulata**Eremophila tietkensis**Myoporum montanum***Solanaceae****Datura leichhardtii**Nicotiana ?benthamiana**Nicotiana benthamiana**Nicotiana occidentalis**Nicotiana occidentalis* subsp. *obliqua**Nicotiana occidentalis* subsp. *occidentalis**Solanum ?cleistogamum**Solanum austropiceum**Solanum cleistogamum**Solanum gabrielae**Solanum horridum**Solanum lasiophyllum**Solanum octonum* (P2)**Surianaceae***Stylobasium spathulatum***Typhaceae***Typha domingensis***Violaceae***Hybanthus aurantiacus**Hybanthus aurantiacus* (erect red flower form)**Zygophyllaceae***Tribulus astrocarpus**Tribulus suberosus***Tribulus terrestris**Zygophyllum ?simile**Zygophyllum aurantiacum* subsp. *aurantiacum**Zygophyllum eichleri**Zygophyllum kochii**Zygophyllum simile*

APPENDIX FIVE: SITE X SPECIES TABLE

APPENDIX SIX: CONSERVATION SIGNIFICANT FLORA

Table 22: Conservation significant flora locations (GDA 94, Zone 50K)

Shading indicates records outside of the study area

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Acacia atopa</i> (P3)	421988	7341358	10/08/2015	2000
<i>Acacia curryana</i> (P1)	414338	7353567	13/05/2015	100
<i>Acacia curryana</i> (P1)	414502	7353491	13/05/2015	100
<i>Acacia curryana</i> (P1)	414502	7353491	13/05/2015	100
<i>Acacia curryana</i> (P1)	414671	7353537	13/05/2015	100
<i>Acacia curryana</i> (P1)	414522	7353788	13/05/2015	100
<i>Acacia curryana</i> (P1)	426523	7351664	15/05/2015	20
<i>Acacia curryana</i> (P1)	423655	7349961	15/05/2015	50
<i>Acacia curryana</i> (P1)	423755	7349943	15/05/2015	50
<i>Acacia curryana</i> (P1)	423827	7349891	15/05/2015	50
<i>Acacia curryana</i> (P1)	423889	7349825	15/05/2015	50
<i>Acacia curryana</i> (P1)	423943	7349785	15/05/2015	50
<i>Acacia curryana</i> (P1)	424180	7349733	15/05/2015	50
<i>Acacia curryana</i> (P1)	424333	7349680	15/05/2015	50
<i>Acacia curryana</i> (P1)	424431	7349579	15/05/2015	50
<i>Acacia curryana</i> (P1)	424286	7354697	15/05/2015	100
<i>Acacia curryana</i> (P1)	424286	7354697	15/05/2015	100
<i>Acacia curryana</i> (P1)	423696	7354895	15/05/2015	100
<i>Acacia curryana</i> (P1)	425048	7353768	21/05/2015	100
<i>Acacia curryana</i> (P1)	425261	7353777	21/05/2015	10
<i>Acacia curryana</i> (P1)	425395	7353649	21/05/2015	10
<i>Acacia curryana</i> (P1)	425436	7353607	21/05/2015	100
<i>Acacia curryana</i> (P1)	425436	7353607	21/05/2015	100
<i>Acacia curryana</i> (P1)	425546	7353536	21/05/2015	10
<i>Acacia curryana</i> (P1)	425199	7353659	21/05/2015	100
<i>Acacia curryana</i> (P1)	425413	7354464	21/05/2015	100
<i>Acacia curryana</i> (P1)	424962	7354454	21/05/2015	100
<i>Acacia curryana</i> (P1)	424552	7354539	21/05/2015	100
<i>Acacia curryana</i> (P1)	424343	7354674	21/05/2015	100
<i>Acacia curryana</i> (P1)	424343	7354674	21/05/2015	10
<i>Acacia curryana</i> (P1)	423697	7354897	21/05/2015	100
<i>Acacia curryana</i> (P1)	423313	7354960	21/05/2015	100
<i>Acacia curryana</i> (P1)	419948	7355706	21/05/2015	10
<i>Acacia curryana</i> (P1)	419208	7355582	22/05/2015	10
<i>Acacia curryana</i> (P1)	418625	7355279	21/05/2015	10
<i>Acacia curryana</i> (P1)	417777	7356000	21/05/2015	10
<i>Acacia curryana</i> (P1)	417119	7356523	21/05/2015	50
<i>Acacia curryana</i> (P1)	417119	7356523	21/05/2015	50

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Acacia curryana</i> (P1)	423367	7354809	22/05/2015	10
<i>Acacia curryana</i> (P1)	423287	7354760	22/05/2015	5
<i>Acacia curryana</i> (P1)	423190	7354749	22/05/2015	25
<i>Acacia curryana</i> (P1)	423173	7354642	22/05/2015	20
<i>Acacia curryana</i> (P1)	423138	7354531	22/05/2015	5
<i>Acacia curryana</i> (P1)	423080	7354472	22/05/2015	5
<i>Acacia curryana</i> (P1)	423000	7354387	22/05/2015	10
<i>Acacia curryana</i> (P1)	423040	7354286	22/05/2015	20
<i>Acacia curryana</i> (P1)	423063	7354122	22/05/2015	20
<i>Acacia curryana</i> (P1)	423215	7353945	22/05/2015	40
<i>Acacia curryana</i> (P1)	423676	7353601	22/05/2015	15
<i>Acacia curryana</i> (P1)	423839	7353450	22/05/2015	10
<i>Acacia curryana</i> (P1)	423938	7353260	22/05/2015	20
<i>Acacia curryana</i> (P1)	424044	7353497	22/05/2015	15
<i>Acacia curryana</i> (P1)	424037	7353633	22/05/2015	30
<i>Acacia curryana</i> (P1)	423975	7353773	22/05/2015	30
<i>Acacia curryana</i> (P1)	423912	7353943	22/05/2015	15
<i>Acacia curryana</i> (P1)	423809	7354157	22/05/2015	25
<i>Acacia curryana</i> (P1)	423750	7354323	22/05/2015	5
<i>Acacia curryana</i> (P1)	423701	7354479	22/05/2015	30
<i>Acacia curryana</i> (P1)	423673	7354664	22/05/2015	30
<i>Acacia curryana</i> (P1)	423665	7354850	22/05/2015	30
<i>Acacia curryana</i> (P1)	423627	7354997	22/05/2015	10
<i>Acacia curryana</i> (P1)	423552	7355146	22/05/2015	10
<i>Acacia curryana</i> (P1)	423524	7355231	22/05/2015	10
<i>Acacia curryana</i> (P1)	423414	7355171	22/05/2015	10
<i>Acacia curryana</i> (P1)	422382	7356134	15/05/2015	50
<i>Acacia curryana</i> (P1)	422685	7355682	15/05/2015	50
<i>Acacia curryana</i> (P1)	419937	7355713	15/05/2015	50
<i>Acacia curryana</i> (P1)	416964	7356822	15/05/2015	50
<i>Acacia curryana</i> (P1)	426877	7363980	17/05/2015	100
<i>Acacia curryana</i> (P1)	429164	7363324	17/05/2015	100
<i>Acacia curryana</i> (P1)	429545	7363454	17/05/2015	100
<i>Acacia curryana</i> (P1)	430089	7362885	17/05/2015	100
<i>Acacia curryana</i> (P1)	429758	7362655	17/05/2015	100
<i>Acacia curryana</i> (P1)	429424	7362570	17/05/2015	100
<i>Acacia curryana</i> (P1)	429281	7362578	17/05/2015	100
<i>Acacia curryana</i> (P1)	428294	7362743	17/05/2015	100
<i>Acacia curryana</i> (P1)	427876	7363301	17/05/2015	100
<i>Acacia curryana</i> (P1)	429103	7356480	18/05/2015	10
<i>Acacia curryana</i> (P1)	414720	7364384	19/05/2015	200
<i>Acacia curryana</i> (P1)	421937	7360349	19/05/2015	200
<i>Acacia curryana</i> (P1)	422453	7359916	19/05/2015	10
<i>Acacia curryana</i> (P1)	426685	7361571	19/05/2015	10

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Acacia curryana</i> (P1)	423660	7350112	12/05/2015	30
<i>Acacia curryana</i> (P1)	425508	7354522	12/05/2015	30
<i>Acacia curryana</i> (P1)	428699	7351904	15/05/2015	5
<i>Acacia curryana</i> (P1)	429031	7351591	15/05/2015	5
<i>Acacia curryana</i> (P1)	430537	7351310	15/05/2015	1
<i>Acacia curryana</i> (P1)	430580	7351316	15/05/2015	1
<i>Acacia curryana</i> (P1)	430594	7351302	15/05/2015	1
<i>Acacia curryana</i> (P1)	430594	7351302	15/05/2015	20
<i>Acacia curryana</i> (P1)	430704	7351303	15/05/2015	5
<i>Acacia curryana</i> (P1)	430777	7351379	15/05/2015	5
<i>Acacia curryana</i> (P1)	430968	7351685	15/05/2015	1
<i>Acacia curryana</i> (P1)	431006	7351759	15/05/2015	1
<i>Acacia curryana</i> (P1)	430548	7351415	15/05/2015	10
<i>Acacia curryana</i> (P1)	422363	7351119	17/05/2015	10
<i>Acacia curryana</i> (P1)	422227	7351203	17/05/2015	10
<i>Acacia curryana</i> (P1)	421886	7351143	17/05/2015	10
<i>Acacia curryana</i> (P1)	421815	7351046	17/05/2015	10
<i>Acacia curryana</i> (P1)	424395	7348111	17/05/2015	50
<i>Acacia curryana</i> (P1)	424771	7348177	17/05/2015	10
<i>Acacia curryana</i> (P1)	424839	7348196	17/05/2015	50
<i>Acacia curryana</i> (P1)	424946	7353680	21/05/2015	50
<i>Acacia curryana</i> (P1)	424946	7353680	21/05/2015	50
<i>Acacia curryana</i> (P1)	425128	7354210	21/05/2015	50
<i>Acacia curryana</i> (P1)	425968	7355558	21/05/2015	50
<i>Acacia curryana</i> (P1)	425447	7358552	21/05/2015	50
<i>Acacia curryana</i> (P1)	425229	7358716	21/05/2015	50
<i>Acacia curryana</i> (P1)	424794	7359112	21/05/2015	20
<i>Acacia curryana</i> (P1)	424794	7359112	21/05/2015	20
<i>Acacia curryana</i> (P1)	424173	7359397	21/05/2015	20
<i>Acacia curryana</i> (P1)	424173	7359397	21/05/2015	20
<i>Acacia curryana</i> (P1)	422377	7359943	21/05/2015	20
<i>Acacia curryana</i> (P1)	422377	7359943	21/05/2015	20
<i>Acacia curryana</i> (P1)	421989	7360347	21/05/2015	20
<i>Acacia curryana</i> (P1)	421989	7360347	21/05/2015	20
<i>Acacia curryana</i> (P1)	421989	7360347	21/05/2015	20
<i>Acacia curryana</i> (P1)	421989	7360347	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421679	7360402	21/05/2015	20
<i>Acacia curryana</i> (P1)	421183	7360354	21/05/2015	20
<i>Acacia curryana</i> (P1)	421183	7360354	21/05/2015	20

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Acacia curryana</i> (P1)	421183	7360354	21/05/2015	20
<i>Acacia curryana</i> (P1)	421183	7360354	21/05/2015	20
<i>Acacia curryana</i> (P1)	419846	7361862	10/08/2015	100
<i>Acacia curryana</i> (P1)	419991	7361957	10/08/2015	100
<i>Acacia curryana</i> (P1)	420282	7362004	10/08/2015	100
<i>Acacia curryana</i> (P1)	420367	7362101	10/08/2015	100
<i>Acacia curryana</i> (P1)	420199	7362211	10/08/2015	100
<i>Acacia curryana</i> (P1)	420041	7362299	10/08/2015	100
<i>Acacia curryana</i> (P1)	419938	7362420	10/08/2015	100
<i>Acacia curryana</i> (P1)	419904	7362623	10/08/2015	100
<i>Acacia curryana</i> (P1)	419907	7362630	10/08/2015	100
<i>Acacia curryana</i> (P1)	421948	7361197	10/08/2015	30
<i>Acacia curryana</i> (P1)	421947	7361368	10/08/2015	100
<i>Acacia curryana</i> (P1)	421969	7361538	10/08/2015	100
<i>Acacia curryana</i> (P1)	422215	7361568	10/08/2015	100
<i>Acacia curryana</i> (P1)	422344	7361636	10/08/2015	100
<i>Acacia curryana</i> (P1)	422686	7361648	10/08/2015	100
<i>Acacia curryana</i> (P1)	423437	7364329	11/08/2015	100
<i>Acacia curryana</i> (P1)	423521	7364197	11/08/2015	100
<i>Acacia curryana</i> (P1)	423720	7364271	11/08/2015	100
<i>Acacia curryana</i> (P1)	417248	7357232	12/08/2015	50
<i>Acacia curryana</i> (P1)	417161	7357116	12/08/2015	50
<i>Acacia curryana</i> (P1)	419291	7354163	12/08/2015	50
<i>Acacia curryana</i> (P1)	418847	7353899	12/08/2015	100
<i>Acacia curryana</i> (P1)	418606	7353814	12/08/2015	100
<i>Acacia curryana</i> (P1)	418779	7353350	12/08/2015	100
<i>Acacia curryana</i> (P1)	419249	7353669	12/08/2015	10
<i>Acacia curryana</i> (P1)	419195	7355231	7/08/2015	50
<i>Acacia curryana</i> (P1)	419062	7355407	7/08/2015	5
<i>Acacia curryana</i> (P1)	429965	7350911	5/05/2015	1
<i>Acacia curryana</i> (P1)	419154	7355270	7/08/2015	1
<i>Acacia curryana</i> (P1)	413957	7353838	13/05/2015	50
<i>Acacia curryana</i> (P1)	424428	7349577	15/05/2015	1
<i>Acacia curryana</i> (P1)	421820	7351002	17/05/2015	1
<i>Acacia curryana</i> (P1)	412599	7353790	15/05/2015	1
<i>Acacia curryana</i> (P1)	424933	7348102	17/05/2015	1
<i>Acacia curryana</i> (P1)	420085	7361985	10/08/2015	1
<i>Acacia curryana</i> (P1)	422826	7361620	10/08/2015	1
<i>Acacia curryana</i> (P1)	420496	7354375	12/08/2015	1
<i>Acacia curryana</i> (P1)	413708	7354083	13/05/2015	100
<i>Acacia curryana</i> (P1)	423558	7288456	5/08/2015	1
<i>Acacia curryana</i> (P1)	423558	7288456	5/08/2015	1
<i>Acacia curryana</i> (P1)	428257	7308577	5/08/2015	500
<i>Acacia curryana</i> (P1)	422325	7287039	15/08/2015	200

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Acacia curryana</i> (P1)	411937	7266198	15/08/2015	200
<i>Acacia curryana</i> (P1)	405476	7263394	15/08/2015	200
<i>Acacia curryana</i> (P1)	401058	7260143	15/08/2015	200
<i>Acacia curryana</i> (P1)	431072	7342404	20/05/2015	1
<i>Elacholoma</i> 'sp. Showy Flower'	423704	7350999	6/08/2015	50
<i>Elacholoma</i> 'sp. Showy Flower'	415844	7371263	9/08/2015	100
<i>Elacholoma</i> 'sp. Showy Flower'	417278	7344888	8/08/2015	1000
<i>Elacholoma</i> 'sp. Showy Flower'	417294	7344427	8/08/2015	100
<i>Elacholoma</i> 'sp. Showy Flower'	417272	7344828	18/05/2015	1
<i>Goodenia berringbinensis</i> (P4)	423710	7351004	6/08/2015	4
<i>Goodenia berringbinensis</i> (P4)	415348	7346024	8/08/2015	100
<i>Goodenia berringbinensis</i> (P4)	415868	7345860	8/08/2015	30
<i>Goodenia berringbinensis</i> (P4)	415869	7345779	8/08/2015	30
<i>Goodenia berringbinensis</i> (P4)	415869	7345712	8/08/2015	30
<i>Goodenia berringbinensis</i> (P4)	415869	7345712	8/08/2015	30
<i>Goodenia berringbinensis</i> (P4)	415870	7371240	9/08/2015	50
<i>Goodenia berringbinensis</i> (P4)	426577	7367521	9/08/2015	50
<i>Goodenia berringbinensis</i> (P4)	422644	7365721	17/05/2015	1
<i>Goodenia berringbinensis</i> (P4)	406520	7365762	8/08/2015	30
<i>Goodenia berringbinensis</i> (P4)	426088	7368044	9/08/2015	50
<i>Goodenia berringbinensis</i> (P4)	426350	7368230	9/08/2015	10
<i>Goodenia nuda</i> (P4)	422022	7345211	19/05/2015	1
<i>Gymnanthera cunninghamii</i> (P3)	420325	7346346	13/08/2015	5
<i>Rhodanthe frenchii</i> (P2)	416106	7358511	21/05/2015	50
<i>Rhodanthe frenchii</i> (P2)	429908	7350904	6/08/2015	6
<i>Rhodanthe frenchii</i> (P2)	429886	7350896	6/08/2015	6
<i>Rhodanthe frenchii</i> (P2)	429057	7357049	6/08/2015	50
<i>Rhodanthe frenchii</i> (P2)	419133	7356286	7/08/2015	10
<i>Rhodanthe frenchii</i> (P2)	419050	7356391	7/08/2015	10
<i>Rhodanthe frenchii</i> (P2)	419003	7356457	7/08/2015	30
<i>Rhodanthe frenchii</i> (P2)	419000	7356422	7/08/2015	30
<i>Rhodanthe frenchii</i> (P2)	419119	7356285	7/08/2015	30
<i>Rhodanthe frenchii</i> (P2)	415549	7346999	8/08/2015	30
<i>Rhodanthe frenchii</i> (P2)	416178	7346498	8/08/2015	30
<i>Rhodanthe frenchii</i> (P2)	421258	7369272	9/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	421237	7369297	9/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	420329	7362064	10/08/2015	1
<i>Rhodanthe frenchii</i> (P2)	420367	7362101	10/08/2015	1
<i>Rhodanthe frenchii</i> (P2)	419840	7363217	10/08/2015	10
<i>Rhodanthe frenchii</i> (P2)	419689	7363151	10/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	421946	7361478	10/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	421955	7361509	10/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	422738	7361683	10/08/2015	50
<i>Rhodanthe frenchii</i> (P2)	422846	7361705	10/08/2015	50

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Rhodanthe frenchii</i> (P2)	422842	7361646	10/08/2015	50
<i>Rhodanthe frenchii</i> (P2)	421889	7360553	10/08/2015	15
<i>Rhodanthe frenchii</i> (P2)	421646	7360509	10/08/2015	25
<i>Rhodanthe frenchii</i> (P2)	421636	7360499	10/08/2015	15
<i>Rhodanthe frenchii</i> (P2)	423974	7359253	10/08/2015	15
<i>Rhodanthe frenchii</i> (P2)	423876	7358910	10/08/2015	15
<i>Rhodanthe frenchii</i> (P2)	424085	7359245	10/08/2015	10
<i>Rhodanthe frenchii</i> (P2)	423563	7364152	11/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	423685	7364233	11/08/2015	40
<i>Rhodanthe frenchii</i> (P2)	425210	7367085	11/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	424993	7367287	11/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	424752	7367715	11/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	424695	7367628	11/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	424610	7367146	11/08/2015	40
<i>Rhodanthe frenchii</i> (P2)	424620	7367072	11/08/2015	40
<i>Rhodanthe frenchii</i> (P2)	424626	7367067	11/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	426803	7363888	11/08/2015	1
<i>Rhodanthe frenchii</i> (P2)	426802	7363888	11/08/2015	10
<i>Rhodanthe frenchii</i> (P2)	426869	7363831	11/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	426820	7363877	11/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	416711	7358703	12/08/2015	100
<i>Rhodanthe frenchii</i> (P2)	420945	7355157	12/08/2015	5
<i>Rhodanthe frenchii</i> (P2)	420771	7354991	12/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	418213	7353212	12/08/2015	20
<i>Rhodanthe frenchii</i> (P2)	418385	7353155	12/08/2015	50
<i>Rhodanthe frenchii</i> (P2)	419161	7355205	7/08/2015	2
<i>Rhodanthe frenchii</i> (P2)	419154	7355270	7/08/2015	1
<i>Rhodanthe frenchii</i> (P2)	429056	7357066	6/08/2015	1
<i>Rhodanthe frenchii</i> (P2)	425062	7359049	13/08/2015	1
<i>Solanum octonum</i> (P2)	407231	7365559	20/05/2015	2
<i>Solanum octonum</i> (P2)	423696	7345835	17/05/2015	1
<i>Solanum octonum</i> (P2)	419768	7346485	13/08/2015	4
<i>Solanum octonum</i> (P2)	405350	7358262	14/08/2015	2
<i>Solanum octonum</i> (P2)	405547	7357631	14/08/2015	2
<i>Solanum octonum</i> (P2)	405427	7356905	14/08/2015	2
<i>Solanum octonum</i> (P2)	408367	7354051	14/05/2015	1
<i>Sporobolus blakei</i> (P3)	422068	7350512	6/08/2015	1
<i>Sporobolus blakei</i> (P3)	422044	7350562	6/08/2015	1
<i>Sporobolus blakei</i> (P3)	421993	7351017	6/08/2015	20
<i>Sporobolus blakei</i> (P3)	422063	7351012	6/08/2015	20
<i>Sporobolus blakei</i> (P3)	413633	7354214	7/08/2015	10
<i>Sporobolus blakei</i> (P3)	425604	7359706	11/08/2015	30
<i>Sporobolus blakei</i> (P3)	425720	7359439	11/08/2015	10
<i>Sporobolus blakei</i> (P3)	426020	7356393	11/08/2015	100

SPECIES	EASTING	NORTHING	DATE	NO. OF PLANTS
<i>Sporobolus blakei</i> (P3)	425985	7356127	11/08/2015	20
<i>Sporobolus blakei</i> (P3)	417113	7357929	12/08/2015	50
<i>Sporobolus blakei</i> (P3)	417170	7357945	12/08/2015	200
<i>Sporobolus blakei</i> (P3)	418132	7358542	12/08/2015	200
<i>Sporobolus blakei</i> (P3)	425768	7358438	13/08/2015	2
<i>Sporobolus blakei</i> (P3)	415485	7360627	19/05/2015	1
<i>Sporobolus blakei</i> (P3)	422644	7365721	17/05/2015	1
<i>Wurmbea fluviatilis</i> (P2)	422955	7355571	15/05/2015	3
<i>Wurmbea fluviatilis</i> (P2)	419084	7355432	15/05/2015	10
<i>Wurmbea fluviatilis</i> (P2)	428037	7363064	17/05/2015	50
<i>Wurmbea fluviatilis</i> (P2)	426950	7361553	19/05/2015	3
<i>Wurmbea fluviatilis</i> (P2)	419577	7362983	10/08/2015	10
<i>Wurmbea fluviatilis</i> (P2)	420786	7355017	12/08/2015	20
<i>Wurmbea fluviatilis</i> (P2)	419547	7354178	12/08/2015	5
<i>Wurmbea fluviatilis</i> (P2)	418714	7353839	12/08/2015	5
<i>Wurmbea fluviatilis</i> (P2)	418607	7353248	12/08/2015	20

APPENDIX SEVEN: THREATENED AND PRIORITY FLORA REPORT FORMS



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Acacia curryana Maslin</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>11-24/05/2015 and 03-14/08/2015</u>		CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>See attached</u>		PHONE: <u>9430 8955</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270 km east-northeast of Carnarvon on Wanna Station

DISTRICT: <u>Geraldton</u>		LGA: <u>Upper Gascoyne</u>		Reserve No.: _____	
Land manager present: <input type="checkbox"/>					

DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: <u>See attached</u>		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: <u>See attached</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		Zone: _____			

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): 5,500,000,000m² (55,000 ha)

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive					
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

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REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower

Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____



Threatened and Priority Flora Report Form

•			
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HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input checked="" type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input checked="" type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input checked="" type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia curryana, Senna artemisioides subsp. helmsii and Eremophila spp. sparse shrubland
2. Aristida contorta and Eriachne pulchella subsp. dominii tussock grassland
- 3.
- 4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

- Eremophila exilifolia
- Eremophila phyllopoda subsp. obliqua
- Dysphania rhadinostachya subsp. rhadinostachya
- Acacia kempeana

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ **Fire Intensity:** High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN:	Collectors No: See attached	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other:	
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other:
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other:			

Submitter of record:	<u>Udani Sirisena</u>	Role:	<u>Botanist</u>
Signature:	<u>U Sirisena</u>	Date submitted:	<u>04/12/2015</u>

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Goodenia berringbinensis Carolin</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>17/05/2015</u>	CONSERVATION STATUS: <u>P4</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern</u>		PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7365721</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0422644</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	2			2	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

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REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower

Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____
• Grazing	L	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input checked="" type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input checked="" type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

Creek

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION*:

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);

2. Open shrubland (Hibbertia sp., Acacia spp.)

3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia cyperophylla var. cyperophylla woodland

2. Acacia cuthbertsonii subsp. cuthbertsonii shrubland

3. Eragrostis leptocarpa and Eriachne aristidea tussock grassland

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

Nicotiana occidentalis subsp. occidentalis

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-SOK-FI-15037-3 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Goodenia nuda E.Pritz.</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>19/05/2015</u>		CONSERVATION STATUS: <u>P4</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Stephen Kern; Andrew Fry</u>		PHONE: <u>9430 8955</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7345211</u>	No. satellites:	Map used:
WGS84 <input type="checkbox"/>	Long / Easting: <u>0422022</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale:
Unknown <input type="checkbox"/>	Zone: _____		

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	1			1	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

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REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>N</u>	<u>L</u>	_____
• Grazing	<u>L</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input checked="" type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);

2. Open shrubland (Hibbertia sp., Acacia spp.)

3. Isolated clumps of sedges (Mesomelaena tetragona)

1.

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-
SOK-FI-54 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Gymnanthera cunninghamii (Benth.) P.I.Forst.</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>13/08/2015</u>		CONSERVATION STATUS: <u>P3</u> New population <input checked="" type="checkbox"/>	
OBSERVER/S: <u>Stephen Kern</u>		PHONE: <u>9430 8955</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

DISTRICT: Geraldton **LGA:** Upper Gascoyne **Reserve No.:** _____ Land manager present:

DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7346346</u>		No. satellites: _____		Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0420325</u>		Boundary polygon captured: <input type="checkbox"/>		Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____				

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	5			5	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				
------------------------------------	--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower

Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____
• Grazing	L	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)					
LANDFORM: Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	ROCK TYPE: Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other: _____	LOOSE ROCK: (on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	SOIL TYPE: Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other: _____	SOIL COLOUR: Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other: _____	DRAINAGE: Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other: _____
Specific Landform Element: (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other: _____					
VEGETATION CLASSIFICATION:* E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Not recorded 2. 3. 4.				
ASSOCIATED SPECIES: Other (non-dominant) spp	Not recorded				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
CONDITION OF HABITAT: Pristine <input type="checkbox"/> Excellent <input type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
COMMENT: Not recorded					
FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input type="checkbox"/>					
FENCING: Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
ROADSIDE MARKERS: Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-SOK-FI-276 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena **Role:** Botanist

Signature: U Sirisena **Date submitted:** 16/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: Rhodanthe frenchii (F.Muell.) Paul G.Wilson		TPFL Pop. No.: _____
OBSERVATION DATE: 21/05/2015	CONSERVATION STATUS: P2	New population <input type="checkbox"/>
OBSERVER/S: Stephen Kern; Andrew Fry		PHONE: 9430 8955
ROLE: Botanist	ORGANISATION: ecoscape	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: Geraldton	LGA: Upper Gascoyne	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 7358511	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: 0416106	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____
	50+			50+	
Alive					Note: Pls record count as numbers (not percentages) for database.
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive			
------------------------------------	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____
• Grazing	L	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other: Not recorded	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Not recorded

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

Not recorded

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT: Not recorded

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-
SOK-FI-94 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Solanum octonum A.R.Bean</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>14/05/2015</u>		CONSERVATION STATUS: <u>P2</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Jared Nelson</u>		PHONE: <u>9430 8955</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7354051</u>	No. satellites:	Map used:
WGS84 <input type="checkbox"/>	Long / Easting: <u>0408367</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale:
Unknown <input type="checkbox"/>	Zone: _____		

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	1			1	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>L</u>	<u>L</u>	_____
• Grazing	<u>M</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input checked="" type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input checked="" type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION*:

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);

2. Open shrubland (Hibbertia sp., Acacia spp.)

3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia ramulosa var. linophylla sparse woodland

2. Paspalidium clementii grassland and Dysphania rhadinostachya subsp. rhadinostachya herbs

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Solanum octonum A.R.Bean</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>17/05/2015</u>		CONSERVATION STATUS: <u>P2</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Jared Nelson</u>		PHONE: <u>9430 8955</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7345835</u>	No. satellites:	Map used:
WGS84 <input type="checkbox"/>	Long / Easting: <u>0423696</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale:
Unknown <input type="checkbox"/>	Zone: _____		

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	1			1	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive			
------------------------------------	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>L</u>	<u>L</u>	_____
• Grazing	<u>L</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input checked="" type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Not recorded

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

Not recorded

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT: Not recorded

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-
JKN-FI-48 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: Solanum octonum A.R.Bean		TPFL Pop. No.: _____	
OBSERVATION DATE: 20/05/2015		CONSERVATION STATUS: P2 New population <input type="checkbox"/>	
OBSERVER/S: Stephen Kern		PHONE: 9430 8955	
ROLE: Botanist		ORGANISATION: ecoscape	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: Geraldton	LGA: Upper Gascoyne	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 7365559	No. satellites:	Map used:
WGS84 <input type="checkbox"/>	Long / Easting: 0407231	Boundary polygon captured: <input type="checkbox"/>	Map scale:
Unknown <input type="checkbox"/>	Zone: _____		

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	2			2	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	L	L	_____
• Grazing	L	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input checked="" type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1.
2.
3.
4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

Not recorded

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Sporobolus blakei B.K.Simon</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>17/05/2015</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern</u>		PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7365721</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0422644</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	2			2	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive

--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>L</u>	<u>L</u>	_____
• Grazing	<u>L</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input checked="" type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

Creek

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION*:

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);

2. Open shrubland (Hibbertia sp., Acacia spp.)

3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia cyperophylla var. cyperophylla woodland

2. Acacia cuthbertsonii subsp. cuthbertsonii shrubland

3. Eragrostis leptocarpa and Eriachne aristidea tussock grassland

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

Nicotiana occidentalis subsp. occidentalis

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-SOK-FI-15037-2 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Wurmbea fluviatilis T.Macfarlane & A.L.Case</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>15/05/2015</u>	CONSERVATION STATUS: <u>P2</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern; Andrew Fry</u>		PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7355571</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0422955</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	3			3	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive			
------------------------------------	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____
• Grazing	L	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);

2. Open shrubland (Hibbertia sp., Acacia spp.)

3. Isolated clumps of sedges (Mesomelaena tetragona)

1.

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-
SOK-FI-42 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena **Role:** Botanist

Signature: U Sirisena **Date submitted:** 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Wurmbea fluviatilis T.Macfarlane & A.L.Case</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>17/05/2015</u>	CONSERVATION STATUS: <u>P2</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern; Andrew Fry</u>		PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7363064</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0428037</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	50			50	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive			
------------------------------------	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>L</u>	<u>L</u>	_____
• Grazing	<u>M</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	Red <input type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other:

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1.
2.
3.
4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-
SOK-FI-50 WA Herb. Regional Herb. District Herb. Other:

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena **Role:** Botanist

Signature: U Sirisena **Date submitted:** 04/12/2015

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Wurmbea fluviatilis T.Macfarlane & A.L.Case</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>19/05/2015</u>	CONSERVATION STATUS: <u>P2</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern; Andrew Fry</u>		PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7361552</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0426949</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	3			3	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				
------------------------------------	--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	N	_____	_____
• Presence of invasive species nearby	N	L	_____
• Grazing	M	M	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)					
LANDFORM: Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	ROCK TYPE: Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other: _____	LOOSE ROCK: (on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	SOIL TYPE: Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other: _____	SOIL COLOUR: Red <input type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other: _____	DRAINAGE: Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other: _____
Specific Landform Element: (Refer to field manual for additional values)					
CONDITION OF SOIL:					
Dry <input type="checkbox"/> Moist <input checked="" type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other: _____					
VEGETATION CLASSIFICATION:* E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. _____ 2. _____ 3. _____ 4. _____				
ASSOCIATED SPECIES: Other (non-dominant) spp	_____ _____ _____ _____				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
CONDITION OF HABITAT: Pristine <input type="checkbox"/> Excellent <input type="checkbox"/> Very good <input checked="" type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
COMMENT:					
FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input type="checkbox"/>					
FENCING: Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
ROADSIDE MARKERS: Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch DPaW**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.



Threatened and Priority Flora Report Form

Please complete as much of the form as possible.

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

TAXON: <u>Wurmbea fluviatilis T.Macfarlane & A.L.Case</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>15/05/2015</u>	CONSERVATION STATUS: <u>P2</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Stephen Kern; Andrew Fry</u>	PHONE: <u>9430 8955</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ecoscape</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Yangibana project area is located approximately 270km east-northeast of Carnarvon on Wanna Station

Reserve No.: _____

DISTRICT: <u>Geraldton</u>	LGA: <u>Upper Gascoyne</u>	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7355432</u>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>0419084</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	Zone: _____	

LAND TENURE:

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input checked="" type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT: Edge survey Partial survey Full survey Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

POP'N COUNT ACCURACY: Actual Extrapolation Estimate

Count method: (Refer to field manual for list) _____

WHAT COUNTED: Plants Clumps Clonal stems

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	10			10	
Dead					

QUADRATS PRESENT: No. _____ Size _____ Data attached Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				
------------------------------------	--	--	--	--

REPRODUCTIVE STATE: Clonal Vegetative Flowerbud Flower
 Immature fruit Fruit Dehisced fruit Percentage in flower: _____%

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT:

THREATS - type, agent and supporting information: <small>E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.</small>	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Clearing by mining company	<u>N</u>	_____	_____
• Presence of invasive species nearby	<u>N</u>	<u>L</u>	_____
• Grazing	<u>M</u>	<u>M</u>	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other: _____	(on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input type="checkbox"/>	Sand <input checked="" type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other: _____	Red <input type="checkbox"/> Brown <input type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other: _____	Well drained <input type="checkbox"/> Seasonally inundated <input checked="" type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other: _____

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry Moist Waterlogged Inundated Cracked Saline Other: _____

VEGETATION CLASSIFICATION:*

E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia);
 2. Open shrubland (Hibbertia sp., Acacia spp.)
 3. Isolated clumps of sedges (Mesomelaena tetragona)

1.
2.
3.
4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Please return completed form to **Species And Communities Branch DPaW**,
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database



Threatened and Priority Flora Report Form

DRF PERMIT/ LICENCE No: Andrew Fry - SL011322; Andrew Craigie - SL011507; Jared Nelson - SL011329; Stephen Kern - SL011316

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: 3397-SOK-FI-43 WA Herb. Regional Herb. District Herb. Other: GPS point only

ATTACHED: Map Mudmap Photo GIS data Field notes Other:

COPY SENT TO: Regional Office District Office Other:

Submitter of record: Udani Sirisena

Role: Botanist

Signature: U Sirisena

Date submitted: 04/12/2015

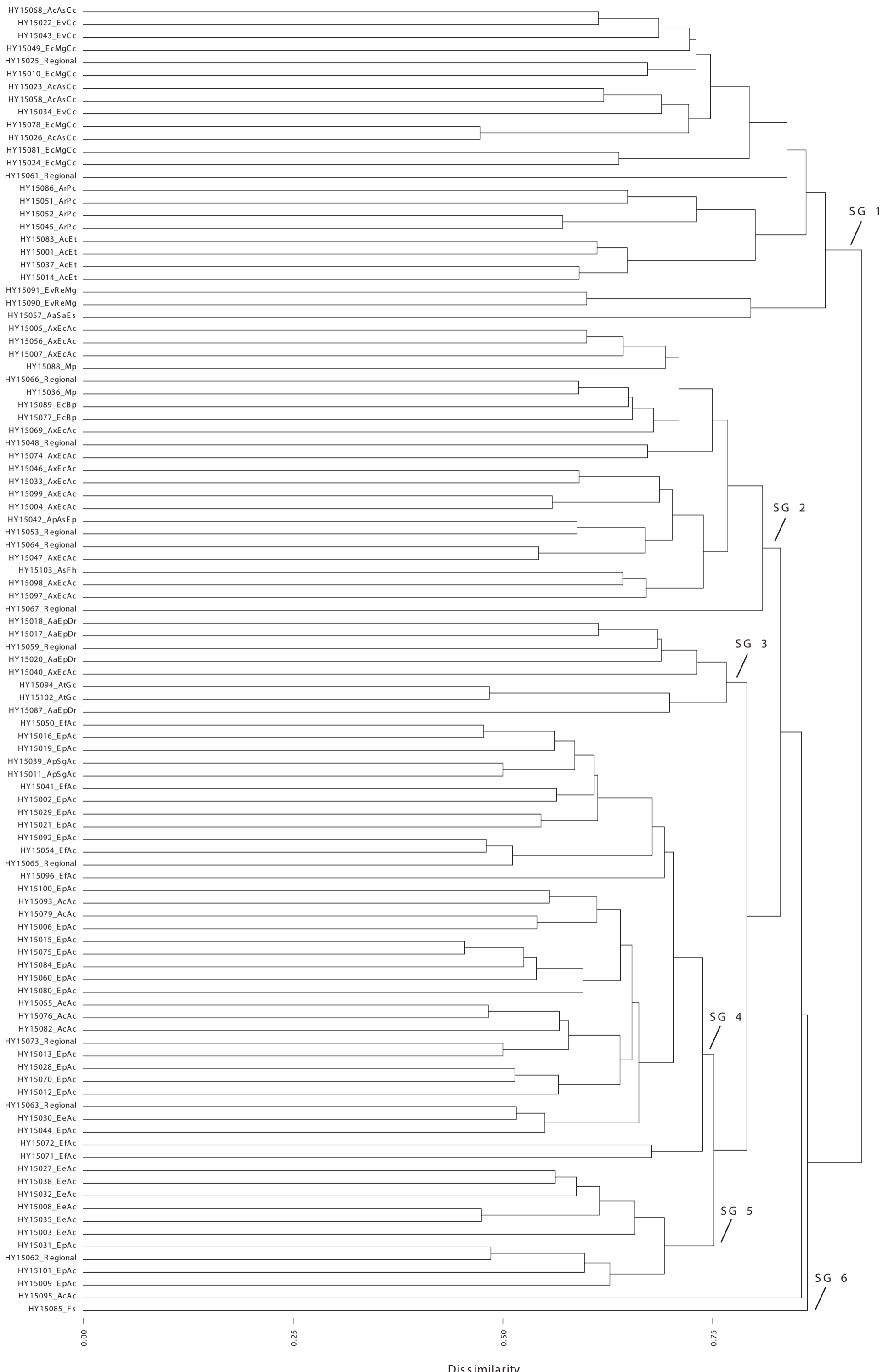
Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Accepted in Database

APPENDIX EIGHT: FLORISTIC ANALYSIS DENDROGRAM



APPENDIX NINE: CONSERVATION SIGNIFICANT FLORA LIKELIHOOD ASSESSMENT

Table 23: Conservation Significant Flora likelihood assessment

SPECIES	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	DISTANCE TO NEAREST RECORD*	LIKELIHOOD OF OCCURRENCE
T								
<i>Pityrodia angustissimus</i>	Sandstone, granite, alluvium	Gully, creekline, elevated drainage line, summit of rock, rocky hillslopes	<i>Acacia</i> shrubland; <i>Eucalyptus camaldulensis</i> , <i>Corymbia ferritcola</i>	Y	N	N	50-60 km E	Highly unlikely
P1								
<i>Acacia curryana</i>	Granite clay loam	Diffuse drainage channels	Unknown	Y	Y	Y	Previously ~30 km SW	Known (recorded)
P2								
<i>Acacia petricola</i>	Skeletal sandy soil, granite	Steep rocky slopes	Low trees, low shrubland, spinifex, <i>Acacia</i> woodland, Mulga, <i>Eremophila</i>	Y	N	Possibly	Record mapped on western boundary of study area considered unreliable. Reliable records 70 km to SE	Unlikely
<i>Rhodanthe frenchii</i>	Granite, sandstone, banded ironstone	Stony hills, river beds, outcrops, rocky gully	<i>Eremophila</i> spp., <i>Acacia</i> shrubland, <i>Eucalyptus camaldulensis</i>	Y	Y	Y	~10 km N	Known (recorded)
<i>Solanum octonum</i>	Sand, skeletal soil, alluvial sand	Gorge top, steep hillside, riparian	Mulga, <i>Acacia citrinoviridis</i> , <i>Triodia</i>	Y	Y	Y	~10 km N	Known (recorded)
P3								
<i>Lawrencia</i> sp. Anna Plains (N.T. Burbidge 1433)	Gravel	Flats	Unknown (in Gascoyne)	Y	Y	Unknown	~30 km E	Possible
<i>Maireana prosthochaeta</i>	Sand, alluvium, clay loam	Plains, slopes, hilltops	Mulga, <i>Acacia</i> shrubland	Y	Y	Y	60 km S	Possible
P4								
<i>Lepidobolus densus</i>	Sand	Slope	<i>Acacia</i> shrubland	Y	Y	Y	60 km SW, location considered inaccurate. N	Highly unlikely