



**Detailed Flora & Vegetation Survey
Medcalf Vanadium Mining Project
& Proposed Haul Road
Prepared For
Audalia Resources Limited**



**October 2017
Version 2**

Prepared by:
Botanica Consulting
PO Box 2027
Boulder WA 6432
90930024



Disclaimer

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

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

Quality Assurance

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

Document Job Number: 2017/18

Prepared by: Lauren Pick
Senior Environmental Consultant
Botanica Consulting

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

Contents	Page No.
1 Introduction	1
1.1 Project Description	1
1.2 Objectives	1
2 Regional Biophysical Environment	3
2.1 Regional Environment.....	3
2.2 Great Western Woodlands	5
2.3 Soils and Landscape Systems	7
2.4 Remnant Vegetation	10
2.5 Climate	14
2.6 Hydrology	15
2.7 Land Use	17
3 Survey Methodology	17
3.1 Desktop Assessment	17
3.1.1 Groundwater Dependent Ecosystems	21
3.2 Field Assessment	23
3.2.1 Sampling Quadrats	23
3.2.2 Personnel involved	25
3.2.3 Scientific licences	25
3.3 Data Analysis Tools	25
3.3.1 PATN Analysis	25
3.3.2 EstimateS	26
3.4 Flora survey limitations and constraints	26
4 Results	27
4.1 Desktop Assessment	27
4.1.1 Literature Review	27
4.1.2 Flora of Conservation Significance	30
4.1.3 Groundwater Dependence Assessment	37
4.1.4 Field Assessment.....	39
4.2 Flora of conservation significance.....	39
4.2.1 <i>Marianthus aquilonaris</i> (T)	39
4.2.2 <i>Acacia hystrix</i> subsp. <i>continua</i> (P1)	41
4.2.3 <i>Acacia mutabilis</i> subsp. <i>stipulifera</i> (P3)	42
4.2.4 <i>Bossiaea flexuosa</i> (P3)	43
4.2.5 <i>Brachyloma stenolobum</i> (P1).....	44
4.2.6 <i>Eucalyptus pterocarpa</i> (P4).....	44
4.2.7 <i>Eucalyptus rhomboidea</i> (P4).....	46
4.2.8 <i>Hakea pendens</i> (P3)	47
4.2.9 <i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583) (P3).....	48
4.2.10 <i>Stenanthemum bremerense</i> (P4).....	49
4.2.11 <i>Teucrium</i> sp. dwarf (R. Davis 8813) (P1).....	50
4.3 Floristic Communities	52
4.3.1 Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa (CD-CSSSF1).....	54
4.3.2 Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1).....	55
4.3.3 Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1).....	57
4.3.4 Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain (CLP-MWS2)	58
4.3.5 Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop (G-H1)	59
4.3.6 Regrowth of dense low forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope (HS-EW1).....	60
4.3.7 Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope (HS-MWS1)	61

4.3.8	Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope (HS-MWS2).....	62
4.3.9	Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope (HS-MWS3).....	63
4.3.10	Regrowth mixed low shrubland on hillslope (HS-OS1).....	64
4.3.11	Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain (SLP-EW1).....	65
4.3.12	Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain (SLP-MWS1).....	66
4.3.13	Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia / Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain (SLP-MWS2).....	67
4.3.14	Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/ Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain (SLP-OS1).....	68
4.4	Vegetation Condition.....	69
4.5	Introduced Plant Species.....	73
4.5.1	<i>Asphodelus fistulosus</i> (Onion Weed).....	73
4.5.2	<i>Bromus rubens</i> (Red brome).....	74
4.5.3	<i>Carrichtera annua</i> (Ward's Weed).....	75
4.5.4	<i>Centaurea melitensis</i> (Maltese Cockspur).....	76
4.5.5	<i>Lysimachia arvensis</i> (Pimpernel).....	77
4.5.6	<i>Pentameris airoides</i>	78
4.5.7	<i>Rostraria pumila</i> (Roughtail).....	79
4.5.8	<i>Sonchus oleraceus</i> (Common Sowthistle).....	80
4.5.9	<i>Vulpia ?muralis</i>	81
4.6	Floristic Composition of the Medcalf Vanadium Mining Project Quadrats.....	82
4.6.1	Species Richness and accumulation estimates.....	84
4.7	Vegetation of Conservation Significance.....	84
4.7.1	Matters of National Environmental Significance.....	84
4.7.2	Matters of State Environmental Significance.....	85
5	Summary	86
6	Bibliography	87

Tables

Table 1:	Soil Landscape Systems within the survey area.....	8
Table 2:	Pre-European Vegetation Associations within the survey area.....	11
Table 3:	Definitions of Conservation Significant Flora.....	18
Table 4:	Definition of conservation significant communities.....	19
Table 5:	Scientific Licences of Botanica Staff coordinating the survey.....	25
Table 6:	Limitations and constraints associated with the flora and vegetation survey.....	26
Table 7:	Previous Flora and Vegetation Surveys within the surrounding area.....	28
Table 8:	Likelihood of occurrence for Flora of Conservation Significance within the survey area.....	30
Table 9:	Groundwater Dependent Ecosystems within the survey area.....	37
Table 10:	Summary of floristic communities within the survey area.....	52
Table 11:	Vegetation assemblage for Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa.....	54
Table 12:	Vegetation assemblage for Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain.....	55
Table 13:	Vegetation assemblage for Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain.....	57
Table 14:	Vegetation assemblage for Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain.....	58
Table 15:	Vegetation assemblage for Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop.....	59
Table 16:	Vegetation assemblage for Regrowth of dense low forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope.....	60
Table 17:	Vegetation assemblage for Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope.....	61
Table 18:	Vegetation assemblage for Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope.....	62

Table 19: Vegetation assemblage for Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina</i> / <i>Hakea</i> / <i>Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	63
Table 20: Vegetation assemblage for Regrowth mixed low shrubland on hillslope	64
Table 21: Vegetation assemblage for Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium</i> <i>filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	65
Table 22: Vegetation assemblage for Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain	66
Table 23: Vegetation assemblage for Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia</i> / <i>Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain.....	67
Table 24: Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia</i> / <i>Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	68
Table 25: Vegetation Condition Rating of the survey area	69
Table 26: Vegetation communities with corresponding quadrats	82

Figures

Figure 1: Regional map of the survey area.....	2
Figure 2: Map of Interim Biogeographic Regionalisation of Australia (IBRA)	4
Figure 3: Location of the survey area within the Great Western Woodlands	6
Figure 4: Map of Soil Landscape Systems within the survey area	9
Figure 5: Pre-European Vegetation Associations within the survey area.....	13
Figure 6: Mean monthly rainfall and maximum temperature (1999 to 2017) for the Norseman Aero weather station (#12009) (BoM, 2017a).....	14
Figure 7: Monthly rainfall and mean monthly rainfall (January 2014 to September 2017) for the Norseman Aero weather station (#12009) (BoM, 2017a)	15
Figure 8: Hydrology of the survey area (data obtained from Geoscience Australia, 2001)	16
Figure 9: Survey area boundary and GPS tracks traversed throughout the survey area.....	24
Figure 10: Potential for Groundwater Dependent Ecosystems within the survey area	38
Figure 11: Flora of Conservation Significance identified within the survey area	51
Figure 12: Vegetation Condition Rating of the survey area	71
Figure 13: Map of fire history along the extent of the survey area obtained from Landgate fire watch database (Landgate, 2017).....	72
Figure 14: Species accumulation curve	84

Plates

Plate 1: <i>Marianthus aquilonaris</i> (T)	40
Plate 2: <i>Acacia hystrix</i> subsp. <i>continua</i> (P1)	41
Plate 3: <i>Acacia mutabilis</i> subsp. <i>stipulifera</i> (P3)	42
Plate 4: <i>Bossiaea flexuosa</i> (P3).....	43
Plate 5: <i>Brachyloma stenolobum</i> (P1)	44
Plate 6: <i>Eucalyptus pterocarpa</i> (P4)	45
Plate 7: <i>Eucalyptus rhomboidea</i> (P4) (Image provided by Paul Armstrong, 2012)	46
Plate 8: <i>Hakea pendens</i> (P3).....	47
Plate 9: <i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583) (P3)	48
Plate 10: <i>Stenanthemum bremerense</i> (P4)	49
Plate 11: <i>Teucrium</i> sp. dwarf (R. Davis 8813) (P1)	50
Plate 12: Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma</i> <i>crassifolium</i> on playa	54
Plate 13: Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain.....	55
Plate 14: Regrowth <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain.....	56
Plate 15: Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	57
Plate 16: Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	58
Plate 17: Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop	59
Plate 18: Regrowth of dense low forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope.....	60
Plate 19: Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	61
Plate 20: Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	62

Plate 21: Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	63
Plate 22: Regrowth mixed low shrubland on hillslope	64
Plate 23: Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	65
Plate 24: Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain.....	66
Plate 25: Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia / Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain.....	67
Plate 26: Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/ Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	68
Plate 27: <i>Asphodelus fistulosus</i> (Onion Weed)	73
Plate 28: <i>Bromus rubens</i> (Red Brome) (DPIRD, 2017)	74
Plate 29: <i>Carrichtera annua</i> (Ward's Weed).....	75
Plate 30: <i>Centaurea melitensis</i> (Maltese Cockspur).....	76
Plate 31: <i>Lysimachia arvensis</i> (Pimpernel).....	77
Plate 32: <i>Pentameris airoides</i> (False Hairgrass) (DPIRD, 2017)	78
Plate 33: <i>Rostraria pumila</i> (Roughtail)	79
Plate 34: <i>Sonchus oleraceus</i> (Common Sowthistle).....	80
Plate 35: <i>Vulpia muralis</i> (Silver Grass-Wall Fescue) (DPIRD, 2017)	81

Appendices

Appendix 1: Regional map of the survey area including DBCA Flora of Conservation Significance and areas of Conservation Significance	90
Appendix 2: Vegetation maps of the survey area.....	91
Appendix 3: List of species identified within each floristic community.....	96
Appendix 4: GPS coordinates of Flora of Conservation Significance locations within the survey area (GDA94).....	109
Appendix 5: GPS Coordinates of Quadrat Locations (GDA 94)	128
Appendix 6: Vegetation Condition Rating	131
Appendix 7: PATN Analysis Results	132
Appendix 8: Quadrat Datasheets.....	135
Appendix 9: Quadrat Photographs.....	136

Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
Audalia	Audalia Resources Limited.
BA	Birdlife Australia (Formerly RAOU, Birds Australia).
BAM Act	Biosecurity and Agriculture Management Act 2007, WA Government.
BC	Botanica Consulting.
BoM	Bureau of Meteorology.
CAMBA	China Australia Migratory Bird Agreement 1998.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DER	Department of Environment Regulation (now DWER), WA Government.
DMIRS	Department of Mines, Industry Regulation and Safety (formerly DMP), WA Government
DMP	Department of Mines and Petroleum (now DMIRS), WA Government.
DotEE	Department of the Environment and Energy (formerly DSEWPaC), Australian Government.
DoW	Department of Water (now DWER), WA Government.
DPaW	Department of Parks and Wildlife (now DBCA), WA Government.
DPIRD	Department of Primary Industries and Regional Development, WA Government

Acronym	Description
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotEE), Australian Government.
DWER	Department of Water and Environmental Regulation (formerly EPA, DER and DoW), WA Government
EP Act	Environmental Protection Act 1986, WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority (now DWER), WA Government.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999, Australian Government.
ESA	Environmentally Sensitive Area.
Ha	Hectare (10,000 square metres).
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
JAMBA	Japan Australia Migratory Bird Agreement 1981.
Km	Kilometre (1,000 metres).
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority, WA Government.
PEC	Priority Ecological Community.
RAOU	Royal Australia Ornithologist Union.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement 2007.
SRE	Short Range Endemic.
SSC	Species Survival Commission, International.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WAM	Western Australian Museum, WA Government.
WC Act	Wildlife Conservation Act 1950, WA Government.

Executive Summary

Botanica Consulting (BC) was commissioned by Audalia Resources Limited (Audalia) to undertake a Detailed (quadrat based) flora and vegetation survey of the Medcalf Vanadium Mining (MVM) Project and associated haul road (referred to collectively as the 'survey area'). The MVM Project is located approximately 97km south-west of Norseman, Western Australia with the proposed haul road extending approximately 73km east from the project to the Coolgardie-Esperance Highway. The inaugural detailed flora and vegetation survey of the MVM Project was conducted in spring 2013; 62 quadrats were established and re-surveyed in autumn 2013. In spring 2014, the MVM Project area was expanded with a further 30 quadrats established. These quadrats were re-surveyed in autumn 2015. A detailed flora and vegetation survey of the proposed haul road was conducted on the 19th to the 23rd March 2017, with 35 quadrats established. These quadrats were re-surveyed from the 8th to 10th September 2017. A total of 127 quadrats were established within the 18,770 ha survey area (MVM Project and haul road inclusive).

Fourteen floristic communities were identified within the survey area. These communities were located within five different landform types and comprised of five major vegetation groups, which were represented by a total of 58 Families, 162 Genera and 411 Taxa.

One Threatened Flora taxon as listed under the *Wildlife Conservation (WC) Act 1950*¹ was recorded within the survey area; *Marianthus aquilonaris* (T). This taxon is not currently listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Ten Priority Flora taxa as listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were identified within the survey area:

1. *Acacia hystrix* subsp. *continua* (P1);
2. *Acacia mutabilis* subsp. *stipulifera* (P3);
3. *Bossiaea flexuosa* (P3);
4. *Brachyloma stenolobum* (P1);
5. *Eucalyptus pterocarpa* (P4);
6. *Eucalyptus rhomboidea* (P4);
7. *Hakea pendens* (P3);
8. *Microcybe* sp. Windy Hill (G.F. Craig 6583) (P3);
9. *Stenanthemum bremerense* (P4); and
10. *Teucrium* sp. dwarf (R. Davis 8813) (P1).

No Threatened Ecological Communities (TEC) pursuant to Commonwealth or State legislation were identified within the survey area. The survey area does not contain any world or national heritage places and does not occur within a Bush Forever site. There are no wetlands of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetlands within the survey area. Approximately 2236 ha of the western extremity of the survey area is located within the *Bremer Range Vegetation Complexes* Priority 1 Ecological Community (PEC) as listed by DBCA.

The survey area contains Environmentally Sensitive Areas (ESA) which occur within a 50m radius of each Threatened Flora plant (covering an area of 19.7 ha), listed under the *Environmental Protection (EP) Act 1986*. One un-named Class A Nature Reserve (Identifier R 42943) managed by DBCA is located within the eastern extremity of the survey area (approximately 301 ha of the survey area). This Nature Reserve is also listed as a Schedule 1 Area under the EP Act.

¹ *Biodiversity Conservation Act 2016* received assent on 21 September 2016 with Parts of the Act coming into effect on 3 December 2016. Once fully enacted with enabling subsidiary regulations, it will replace the *Wildlife Conservation Act 1950*.

Desktop assessments indicate the survey area has potential to include two Groundwater Dependent Ecosystems (reliant on subsurface presence of groundwater); The first potential ecosystem is described as *Medium Woodland; Salmon Gum*. The database results indicate a moderate potential for interaction of this ecosystem with groundwater. The second ecosystem is described as *Shrublands; scrub heath in the Coolgardie Region*. The database results indicate a low potential for interaction of this ecosystem with groundwater.

Based on the vegetation condition rating scale adapted from Keighery, 1994 and Trudgen, 1988 (ranging from 'pristine' to 'completely degraded'), eight communities were rated as 'good' and the remaining seven communities had a vegetation condition rating of 'very good'. Nine introduced species were identified in the survey area:

1. *Asphodelus fistulosus* (Onion Weed);
2. *Bromus rubens* (Red brome);
3. *Carrichtera annua* (Ward's weed);
4. *Centaurea melitensis* (Maltese cockspur);
5. *Lysimachia arvensis* (Pimpernel);
6. *Pentameris airoides*;
7. *Rostraria pumila* (Roughtail);
8. *Sonchus oleraceus* (Common sowthistle); and
9. *Vulpia ?muralis*.

1 **Introduction**

1.1 **Project Description**

Botanica Consulting (BC) was commissioned by Audalia Resources Limited (Audalia) to undertake a Detailed (quadrat based) flora and vegetation survey of the Medcalf Vanadium Mining (MVM) Project and associated haul road (referred to collectively as the 'survey area'). The MVM Project is located approximately 97km south-west of Norseman, Western Australia with the proposed haul road extending approximately 73km east from the project to the Coolgardie-Esperance Highway (Figure 1). The inaugural detailed flora and vegetation survey of the MVM Project was conducted in spring 2013; 62 quadrats were established and re-surveyed in autumn 2013. In spring 2014, the MVM Project area was expanded with a further 30 quadrats established. These quadrats were re-surveyed in autumn 2015. A detailed flora and vegetation survey of the proposed haul road was conducted on the 19th to the 23rd March 2017, with 35 quadrats established. These quadrats were re-surveyed from the 8th to 10th September 2017. A total of 127 quadrats were established within the 18,770 ha survey area (MVM Project and haul road inclusive). This report presents the findings of flora surveys conducted within the MVM Project area (conducted from spring 2013 to autumn 2015) and flora surveys of the associated haul road (conducted from autumn 2017 to spring 2017).

1.2 **Objectives**

The survey was conducted in accordance with *Guidance for the Assessment of Environmental Factors (No. 51) Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004) and *Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016* (DPaW & EPA, 2016). The objectives of the assessment were to:

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



Figure 1: Regional map of the survey area

2 Regional Biophysical Environment

2.1 Regional Environment

The survey area lies within the Coolgardie Botanical District of the South-West Province of WA. The Coolgardie Botanical District consists of predominantly mulga low woodland on plains and reduces to scrub on hills (Beard, 1990).

Based on the Interim Biogeographic Regionalisation of Australia (IBRA), Version 7 (DotEE, 2012), the survey area is located within the Coolgardie Bioregion of WA (Figure 2). The Coolgardie Bioregion is further divided into three subregions; Mardabilla, Southern Cross and Eastern Goldfields subregion with the survey area located within the Southern Cross (COO2) and Eastern Goldfields (COO3) subregion (Figure 2). The survey area is located approximately 5km north of the Mallee Bioregion, which is divided into two subregions; Eastern Mallee (MAL1) and Western Mallee (MAL2) as shown in Figure 2.

The Coolgardie Bioregion is within the Yilgarn Craton. The climate is arid to semi-arid warm Mediterranean with 250-300mm of mainly winter rainfall. It comprises diverse woodlands, rich in endemic eucalypts, which occur on low greenstone hills, alluvial soils on the valley floors, around the saline playas of the region's occluded drainage system and on broad plains of calcareous earths. Granite basement outcrops occur at mid-level in the landscape, supporting swards of 'granite grass', Acacia shrublands and York Gum. The playa lakes support dwarf shrublands of samphire. Sand lunettes are associated with playas along the broad valley floors, and sand sheets surround the granite outcrops. Upper levels in the landscape are the eroded remnants of a Tertiary lateritic duricrust, with yellow (in the Southern Cross subregion) or red (in the Eastern Goldfields subregion) sandplains, gravel plains and laterite breakaways. These support scrubs and mallees. In the west, these scrubs are rich in endemic Proteaceae; in the east, they are rich in endemic Acacias (McKenzie, May and McKenna, 2002).

The Mallee Bioregion occurs within the south-eastern part of Yilgarn Craton and is gently undulating, with partially occluded drainage. The climate is Mediterranean to semi-arid, with winter rainfall of between 250 and 500mm. This region includes mallee communities, samphires around small salt lakes and *Eucalyptus* woodlands occur mainly on fine-textured soils, with scrub-heath on sands and laterite (McKenzie *et. al.*, 2002).

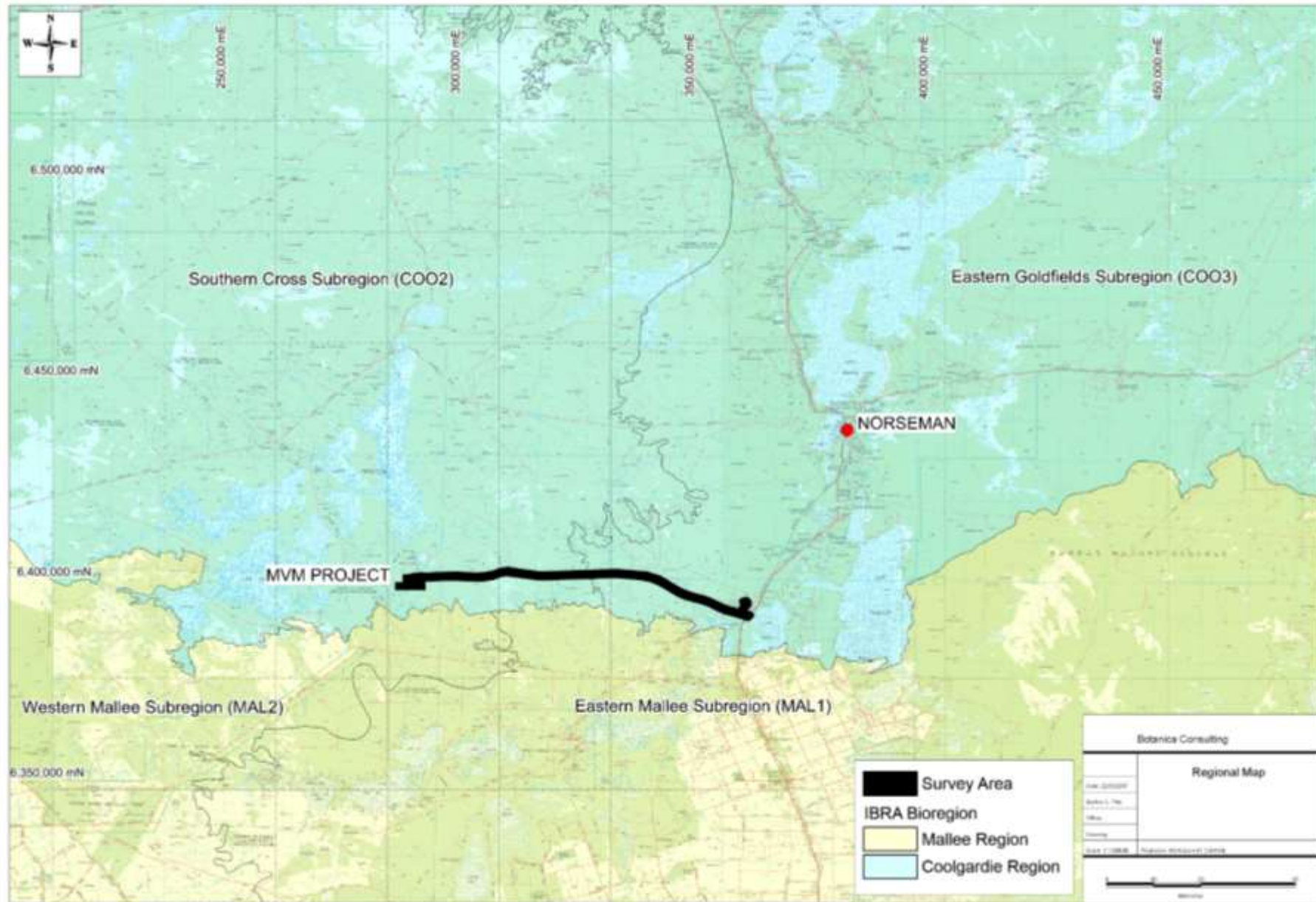


Figure 2: Map of Interim Biogeographic Regionalisation of Australia (IBRA)

2.2 Great Western Woodlands

The survey area lies within the Great Western Woodlands (Figure 3). The Great Western Woodlands is considered by The Wilderness Society to be of global biological and conservation importance as one of the largest and healthiest temperate woodlands on Earth, containing many endemic species. The region covers almost 16 million hectares, 160,000 square kilometers, from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east.

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

No specific management strategy applies to the Great Western Woodlands, rather an approach to conservation which occurs across all land tenures and when different stakeholders work together with biodiversity in mind. The central component of this approach is to identify and conserve key large-scale, long term ecological processes that drive connectivity between ecosystems and species. The Great Western Woodlands currently includes towns, highways, roads, railways, private property, Crown Reserves, agricultural activities and mining tenements.

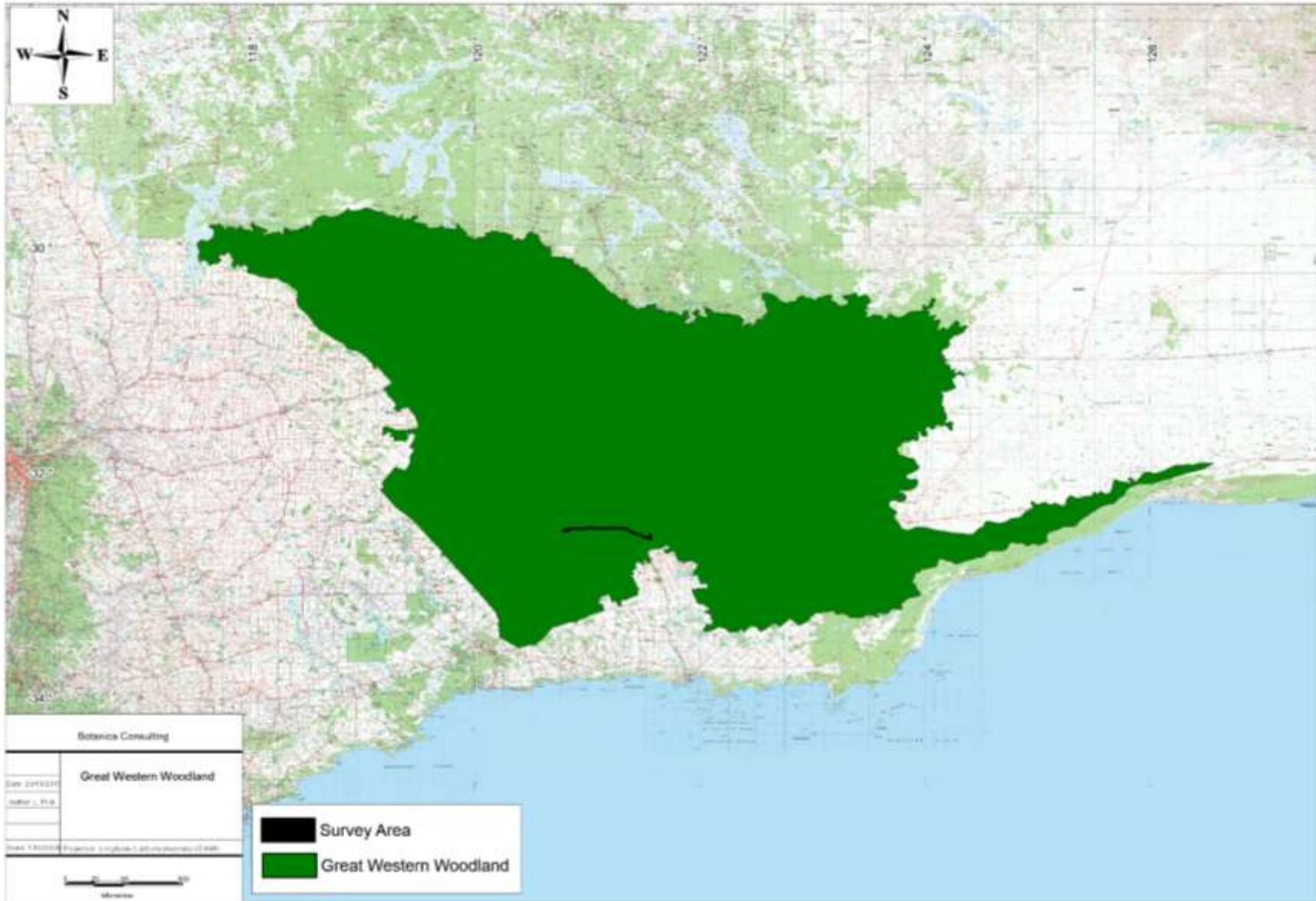


Figure 3: Location of the survey area within the Great Western Woodlands

2.3 Soils and Landscape Systems

The Southern Cross subregion (COO2) lies on the Yilgarn Craton's 'Southern Cross Terrains'. The relief is subdued and comprises of gently undulating uplands dissected by broad valleys with bands of low greenstone hills. The underlying geology is of granite strata interrupted by parallel intrusions of Archaean Greenstone. Calcareous earths are the dominant soil community and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan, 2001). Beard (1990) describes the topography of the region as gently undulating with occasional range of low hills and sandplains in the western area and some large playa lakes. The dominant soil type is calcareous earth.

The Eastern Goldfields subregion (COO3) lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan, 2001).

Based on geographic information provided by the Department of Primary Industries and Regional Development (DPIRD), the survey area is located within the Salmon Gums Mallee Zone (246) of the Stirling Province (24) and the Norseman Zone (266) of the Kalgoorlie Province (26).

The Salmon Gums Mallee Zone is characterized by flat to undulating plains (with some salt lakes) on deeply weathered mantle and alluvium over Bremer Basin sediments on granite and gneiss of the Yilgarn Craton and Albany-Fraser Orogen. Soils include calcareous loamy earths and alkaline grey shallow sandy duplexes with salt lake soils and some alkaline grey shallow loamy duplexes and pale deep sands. Vegetation includes merri-coral gum-Salmon gum-red mallee woodlands with mallee scrub and some mallee heath. This zone is located in the South Coast district between Pyramid Lake, Scaddan, Norseman and Mt Ragged (Tille, 2006).

The Norseman Zone is characterized by undulating plains and uplands (with some sandplains and salt lakes) on granitic rocks of the Yilgarn Craton. Soils include calcareous loamy earths, yellow sandy and loamy earths, red loamy earths, red deep sands and salt lake soils. Vegetation includes Salmon gum-redwood-merri-red mallee-gimlet woodland with Acacia-Casuarina thickets (and some mulga shrublands and spinifex grasslands). This zone is located in the southern Goldfields between Koolyanobbing, Menzies, Zanthus (Trans-Australian Railway), Norseman and Lake Hope (Tille, 2006).

These zones are further divided into soil landscape systems, with the soil landscape systems of the survey area shown in Table 1 and Figure 4 (ASRIS, 2014).

Table 1: Soil Landscape Systems within the survey area

Zone	Landscape System/ Mapping Unit	Description
Salmon Gums Mallee Zone (246)	Halbert System	Level to gently undulating plain with numerous salt lakes within a paleo valley on Tertiary marine sediments (Plantagenet and Werrilup formations). Soils are alkaline grey shallow sandy duplex soils and salt lake soils.
	Johnston System	Gently undulating inland plain with occasional rises on Archaean granite deeply weathered
	JY1	Undulating land with small valleys and flats
	Salmon Gums System	Level to very gently undulating, slightly elevated, inland plain with few surface drainage features and occasional swamps. Soils are alkaline grey shallow sandy duplex soils with associated calcareous loamy earths and red non-cracking clays
Norseman Zone (266)	DD13	Gently undulating plains with some gilgai areas, occasionally broken by stony ridges and hills
	Nc2	Gently undulating plains with some gilgai areas, and irregularly broken by small remnants of sand plain, unit AC1, and granitic bosses and tors
	SV2	Saline valleys with some dunes including barchan forms-salt lake channels, mostly devoid of true soils, and their fringing areas
	Ya28	Sandy plains with some clay pans and small salt lakes, dunes, and lunettes

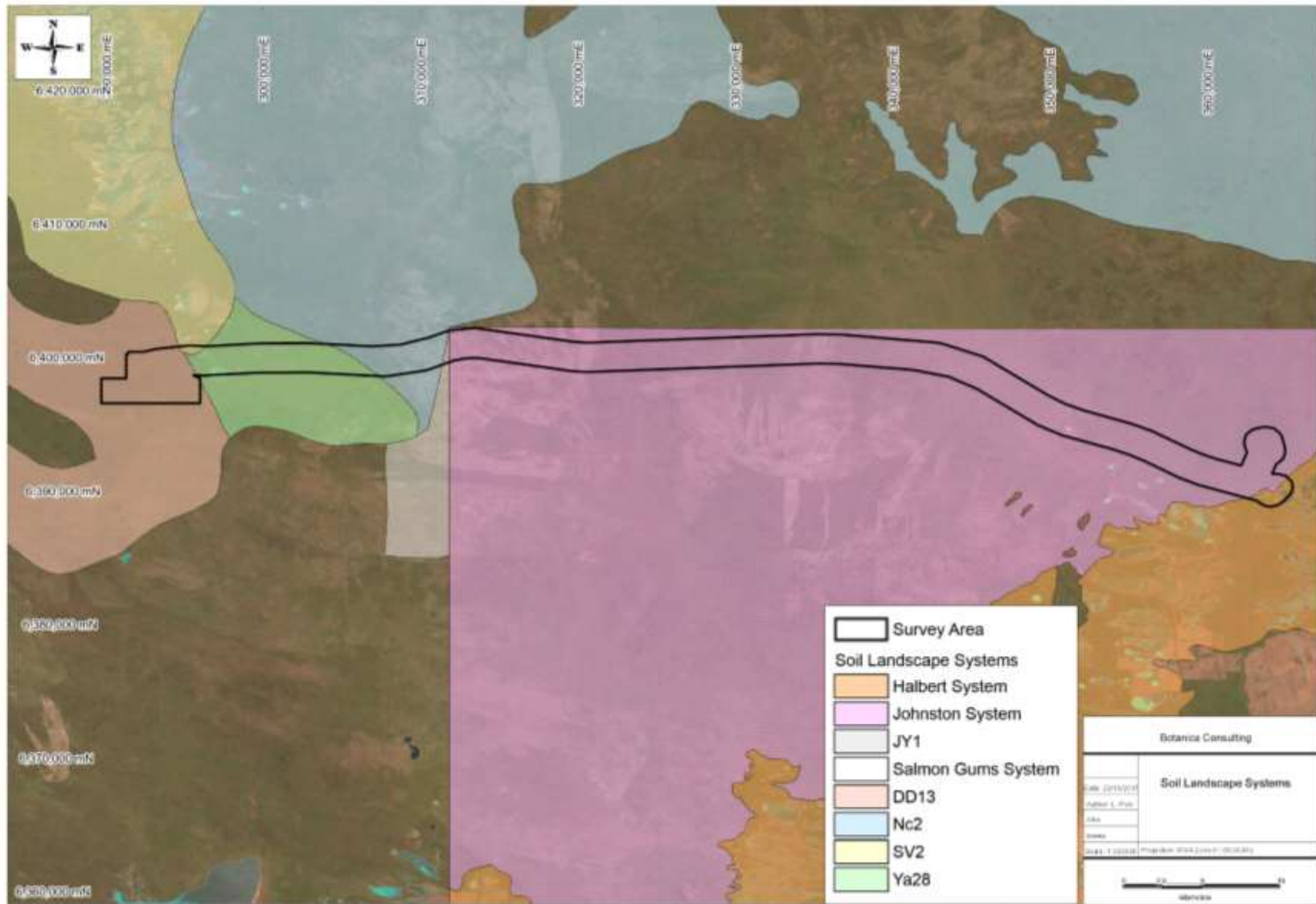


Figure 4: Map of Soil Landscape Systems within the survey area

2.4 Remnant Vegetation

The DPIRD GIS file (DAFWA, 2011) indicates that the survey area is located within Pre-European Beard vegetation associations of the Binneringe, Bremer Range, Cave Hill and Dundas system (Figure 5). The extent of these vegetation associations as specified in the *2015 Statewide Vegetation Statistics* (DPaW, 2015) is provided in Table 2.

Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered” (EPA, 2000). All of the vegetation types present in the areas intersected by the survey area are estimated to remain at >97% their estimated pre-European extent.

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

IBRA Subregion	Vegetation association	Pre-European Extent (Ha)	Current Extent (Ha)	Pre-European extent remaining (%)	% of Current extent within DPaW managed lands	Vegetation Description (Beard, 1990)
Southern Cross Subregion (COO2)	Bremer Range 491***	67,120.09	67,021.01	99.85	0	Medium woodland; morrell & Dundas blackbutt (<i>E. dundasii</i>)
	Cave Hill 125*	46,346.61	46,345.88	100.00	0.00	Bare areas; salt lakes
	Cave Hill 128*	35,277.85	35,265.94	99.97	0.50	Bare areas; rock outcrops
	Cave Hill 522***	160,658.84	160,643.58	99.99	0.18	Medium woodland; redwood (<i>Eucalyptus transcontinentalis</i>) & merrit (<i>E. flocktoniae</i>)
	Cave Hill 936**	157,638.63	157,638.63	100.00	0	Medium woodland; salmon gum
	Cave Hill 1148*	21,463.89	21,463.89	100.00	0.00	Shrublands; scrub-heath in the Coolgardie Region
	Cave Hill 1413*	81,471.54	81,471.54	100.00	0.10	Shrublands; Acacia, Casuarina & Melaleuca thicket
Eastern Goldfields (COO3)	Binneringe 522***	166,611.55	166,394.75	99.87	0.34	Medium woodland; redwood (<i>Eucalyptus transcontinentalis</i>) & merrit (<i>E. flocktoniae</i>)
	Cave Hill 522***	14,855.84	14,855.84	100.00	0	Medium woodland; redwood (<i>Eucalyptus transcontinentalis</i>) & merrit (<i>E. flocktoniae</i>)
	Cave Hill 1413*	6,463.46	6,463.46	100.00	0	Shrublands; Acacia, Casuarina & Melaleuca thicket
	Dundas 125*	56,750.21	56,750.21	100.00	16.19	Bare areas; salt lakes
	Dundas 128*	3,516.23	3,515.92	99.99	0	Bare areas; rock outcrops
	Dundas 486	22,349.06	22,349.06	100.00	0	Mosaic: Medium woodland; salmon gum & red mallee /

IBRA Subregion	Vegetation association	Pre-European Extent (Ha)	Current Extent (Ha)	Pre-European extent remaining (%)	% of Current extent within DPaW managed lands	Vegetation Description (Beard, 1990)
						Shrublands; mallee scrub <i>Eucalyptus eremophila</i>
	Dundas 551*	844.42	844.42	100.00	0	Shrublands; <i>Allocasuarina campestris</i> thicket
	Dundas 3106	52,659.62	51,601.68	97.99	7.81	Medium woodland; salmon gum & Dundas blackbutt

*Low Reservation Priority according to the International Union for Conservation of Nature (IUCN)

**Medium Reservation Priority according the IUCN

***High Reservation Priority according the IUCN

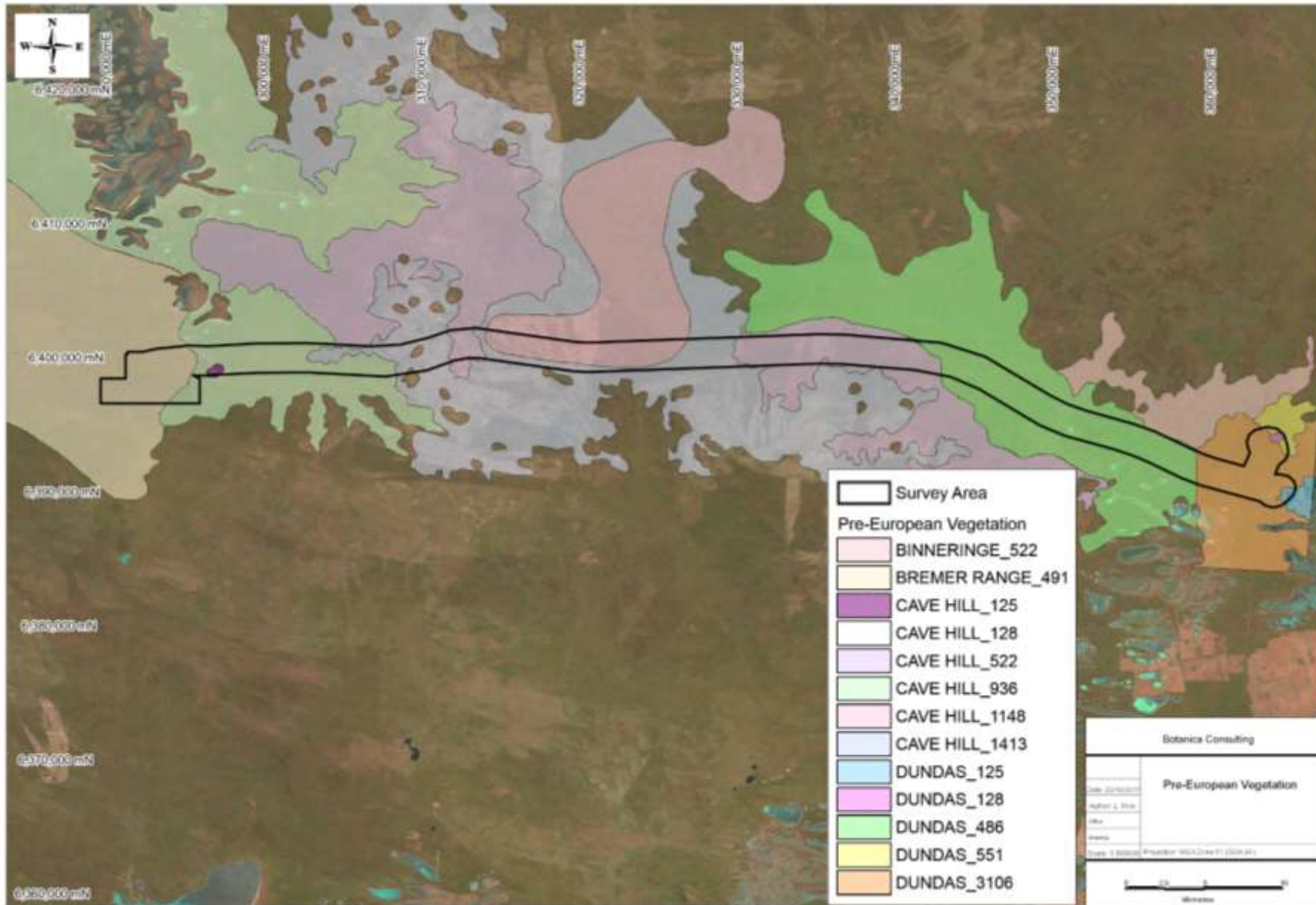


Figure 5: Pre-European Vegetation Associations within the survey area

2.5 Climate

The climate of the Coolgardie Bioregion is characterised as arid to semi-arid warm Mediterranean with 250-300mm of mainly winter rainfall (McKenzie *et. al.*, 2002). Mean climate data for the Norseman aero weather station (#12009) obtained from the Bureau of Meteorology (BoM) is provided in Figure 6 (BoM, 2017a). Monthly rainfall of across the entire survey period (2014 to 2017) is shown in Figure 7.

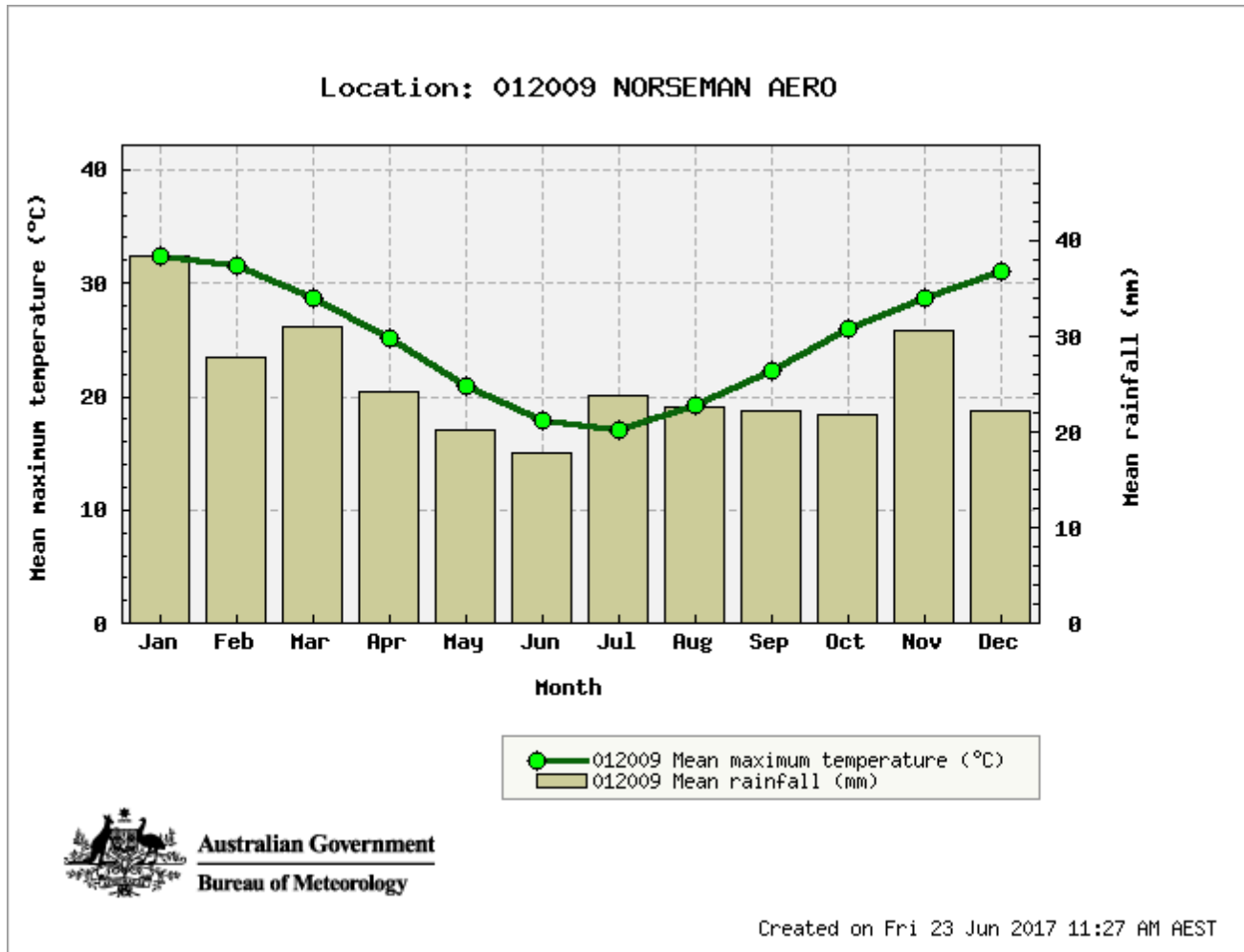


Figure 6: Mean monthly rainfall and maximum temperature (1999 to 2017) for the Norseman Aero weather station (#12009) (BoM, 2017a)

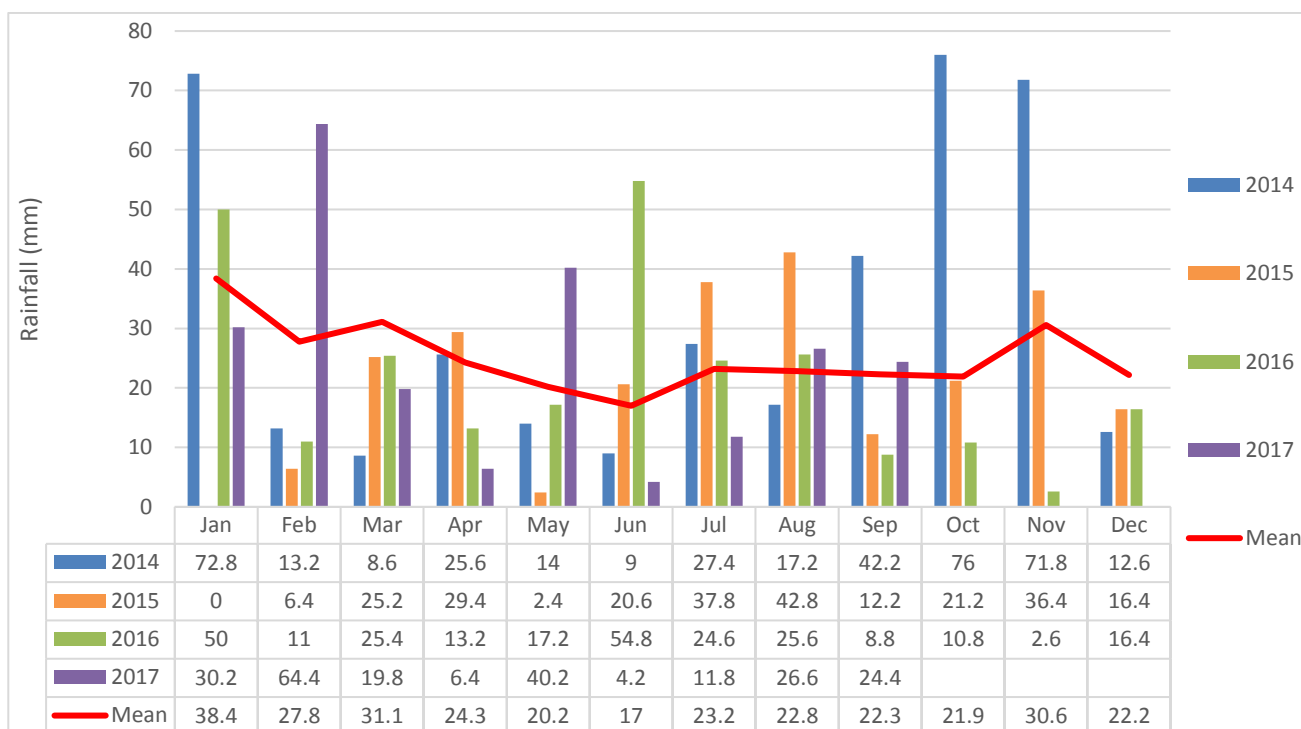


Figure 7: Monthly rainfall and mean monthly rainfall (January 2014 to September 2017) for the Norseman Aero weather station (#12009) (BoM, 2017a)

2.6 Hydrology

According to the Geoscience Australia database (2001) there are multiple non-perennial/ intermittent drainage lines within the survey area. No inland waters are recorded on the database within the survey area (Figure 8).

The survey area intercepts two paleochannels; Lake Lefroy and Lake Cowan. The Lefroy Palaeochannel covers an area of approximately 881,400 ha and is located in the western end of the survey area. The Cowan Paleochannel covers an area of approximately 765,300 ha and is located within the eastern end of the survey area.

The Lefroy and Cowan Paleochannels were excavated into the Archaean Yilgarn Craton during the Jurassic period and historically drained from the southwest to the northeast (Clarke 1994). Groundwater flows eastwards in the direction of the original drainage. The groundwater outflow is ultimately towards the Eucla Basin, which is approximately 150 km to the east of the area. The Lefroy and Cowan Paleochannels contain marine sediments derived from multiple Eocene eustatic transgressions, in addition to fluvio-lacustrine sediments (Magee, 2009).

According to the Department of Water (DoW) groundwater salinity database (DoW, 2017), groundwater salinities in the Project area ranges from 14,000 mg/L to 35,000 mg/L with the Lake Lefroy and Lake Cowan Paleochannels recording a groundwater salinity >35,000 mg/L. Groundwater in the region is a local flow system in Precambrian Rocks. The survey area is located within the Yilgarn-Goldfields Groundwater Province.

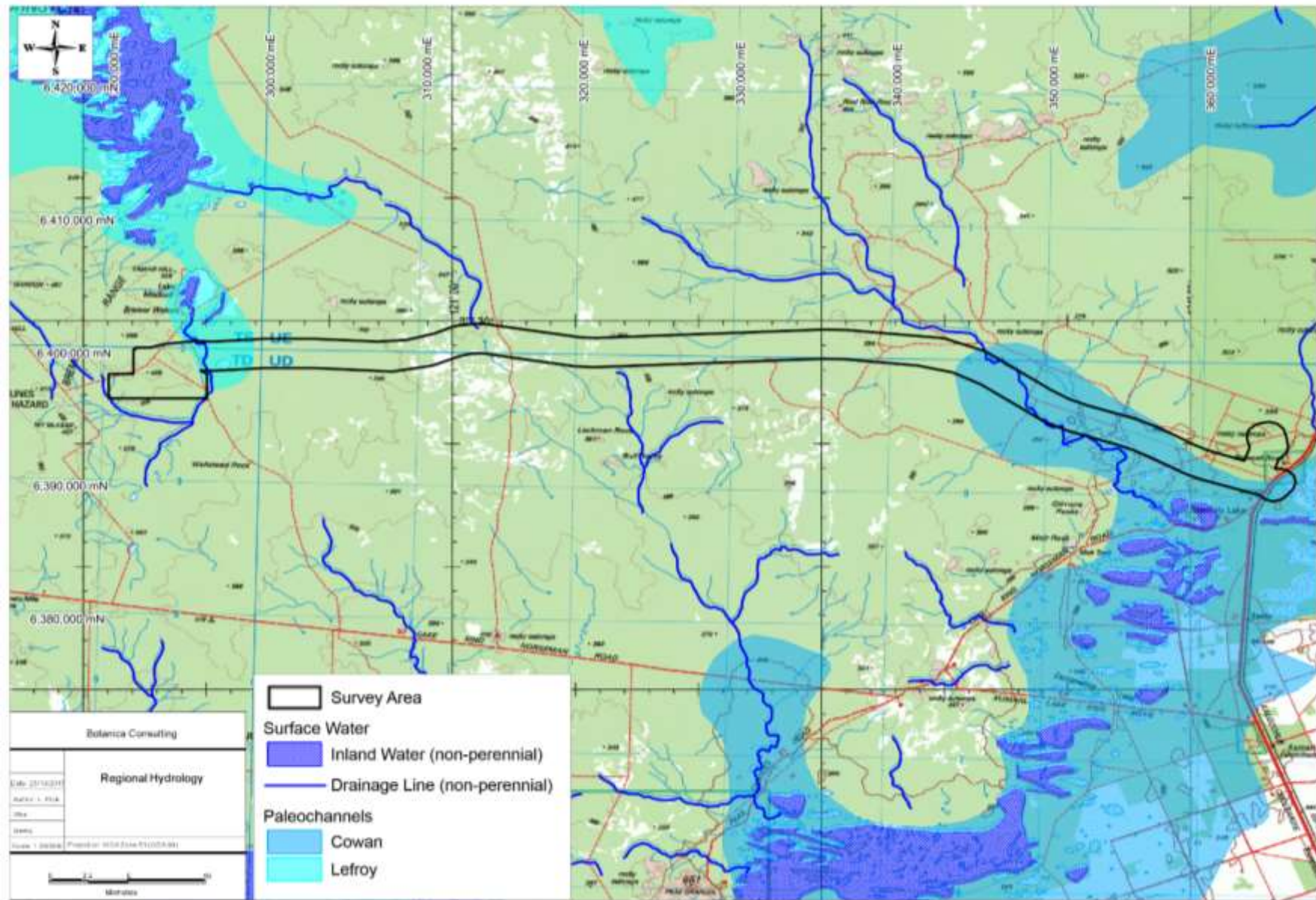


Figure 8: Hydrology of the survey area (data obtained from Geoscience Australia, 2001)

2.7 Land Use

The dominant land uses of the Southern Cross subregion are; native pastures (17%), Conservation Reserves (11.53%), UCL & Crown Reserves (66.74%) and Cultivation – Dry Land agriculture (2.27%) (Cowan, 2001). The dominant land uses of the Eastern Goldfields subregion are UCL and Crown reserves, Grazing-Native pastures-leasehold (37.8%) freehold (7.15%), conservation, and Mining leases (Cowan, 2001).

3 Survey Methodology

3.1 Desktop Assessment

Searches of the following databases were undertaken to aid in the compilation of a list of plant taxa within the survey area:

- DBCA Priority/ Threatened Flora Database Search (DEC, 2013a; DPaW, 2017a)
- DPaW Priority/ Threatened Ecological Communities Database Search (DEC, 2013b; DPaW, 2017b)
- DBCA NatureMap Database (DPaW, 2017c);
- DotEE Protected Matters search tool (DotEE, 2017a).

The Naturemap and Protected Matters searches were conducted for an area encompassing a 40km radius of the centre coordinates; 32° 31' 1.2" S 121° 11' 38.4" E.

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

Prior to the field survey, a combined search of the DPaW Flora of Conservation Significance databases (DEC, 2013a; DPaW, 2017a) was undertaken within a 60km radius of the survey area. Significant flora species identified through the database search were examined on the Western Australian Herbarium's (WAHERB) web page prior to the survey, to familiarise staff with their appearance. Locations of Threatened Flora and Priority Flora were overlaid on aerial photography of the area. Vegetation descriptions and available images of the Threatened/ Priority Flora were also obtained from Florabase.

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

- EPBC Act. Administered by the Australian Government (DotEE);
- WC Act. Administered by the WA Government (DBCA)²;
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List – the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List

² *Biodiversity Conservation Act 2016* received assent on 21 September 2016 with Parts of the Act coming into effect on 3 December 2016. Once fully enacted with enabling subsidiary regulations, it will replace the *Wildlife Conservation Act 1950*.

has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and

- DBCA Priority Flora list. A non-legislative list maintained by DBCA for management purposes.

Table 3 represents the definitions of Flora of Conservation Significance ratings under the WC Act and EPBC Act.

Table 3: Definitions of Conservation Significant Flora

Code	Category
State categories of threatened and priority species	
T	Threatened Flora "flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F (2) of the Wildlife Conservation Act."
P1	Priority One – Poorly Known Taxa "Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey."
P2	Priority Two – Poorly Known Taxa "Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey."
P3	Priority Three – Poorly Known Taxa "Taxa which are known from several populations and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but needs further survey."
P4	Priority Four – Rare Taxa "Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5 – 10 years."
P5	Priority Five-Conservation Dependent Taxa Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.
Commonwealth categories of threatened species	
Extinct	Taxa where there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically endangered	Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

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

Conservation significant flora identified during the database searches were assessed and ranked for their likelihood of occurrence within the survey area. The rankings and criteria used were:

- Unlikely: Area is outside of the currently documented distribution for the species and /or no suitable habitat (type, quality and extent) was identified as being present during the field/desktop assessment.
- Possible: Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field/desktop assessment, supported in some cases by recent records being documented from within or near the area.
- Known to Occur: The species in question was positively identified as being present during the field survey.

A search of the DBCA PEC and TEC database was also conducted within a 60km radius of the survey area (DEC, 2013b; DPaW, 2017b). Table 4 represents the definitions of Threatened and Priority Ecological Communities.

Table 4: Definition of conservation significant communities

Category Code	Category
State categories of Threatened Ecological Communities (TEC)	
	Presumed Totally Destroyed
PTD	An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies: records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or; all occurrences recorded within the last 50 years have since been destroyed.
	Critically Endangered
CE	An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:

Category Code	Category
	<p>The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification;</p> <p>The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;</p> <p>The ecological community is highly modified with potential of being rehabilitated in the immediate future.</p>
E	<p>Endangered</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria:</p> <p>The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short-term future, or is unlikely to be substantially rehabilitated in the short-term future due to modification;</p> <p>The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;</p> <p>The ecological community is highly modified with potential of being rehabilitated in the short-term future.</p>
V	<p>Vulnerable</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 high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria:</p> <p>The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated;</p> <p>The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution;</p> <p>The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.</p>
Commonwealth categories of Threatened Ecological Communities (TEC)	
CE	<p>Critically Endangered</p> <p>If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).</p>
E	<p>Endangered</p> <p>If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).</p>
V	<p>Vulnerable</p> <p>If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).</p>

Category Code	Category
Priority Ecological Communities (PEC)	
P1	<p>Poorly-known ecological communities</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.</p>
P2	<p>Poorly-known ecological communities</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, un-allocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.</p>
P3	<p>Poorly known ecological communities</p> <p>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:</p> <p>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;</p> <p>Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.</p>
P4	<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>
P5	<p>Conservation Dependent ecological communities</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>

3.1.1 Groundwater Dependent Ecosystems

A search of the BoM *Atlas of Groundwater Dependent Ecosystems* database (BoM, 2017b) was conducted to assess the potential for Groundwater Dependent Ecosystems (GDE) to occur within the survey area. A GDE refers to ecosystems that rely on groundwater for some or all of their water requirements (Geoscience Australia, 2017). According to the database, there are two potential GDE classes:

1. **Aquatic** ecosystems that rely on the surface expression of groundwater—this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs.
2. **Terrestrial** ecosystems that rely on the subsurface presence of groundwater—this includes all vegetation ecosystems

A low potential for groundwater interaction means that *ecosystems 'are relatively unlikely to be interacting with groundwater. This includes ecosystems that are not interacting with groundwater'* (Australian Government, 2012). High potential for groundwater interaction means that *'there is a strong possibility that ecosystems are interacting with groundwater'* (Australian Government, 2012).

GDE Potential categories specified in the database are based on the physical landscape and ecosystem characteristics as specified by the following rules (Australian Government, 2012):

Rule 1: Vegetation that demonstrates an evapotranspiration that is higher than rainfall is more likely to be using groundwater.

Rule 2: Vegetation that intersects with a spring is likely to be using groundwater.

Rule 3: Vegetation is more likely to be using groundwater in areas where the watertable is shallow.

Rule 4: Vegetation growing in areas where water stored in the unsaturated zone is limited, is more likely to be using groundwater.

Rule 5: Certain vegetation communities are more likely to access groundwater than others.

The GDE potential assessment does not convey the confidence of the prediction, or the reliability of the GDE potential result. This is conveyed using the 'Lines of Evidence' attribute which indicates the amount of evidence (i.e. number of rules listed above that could be applied) used in determining the GDE potential for each ecosystem. Details on the 'Lines of Evidence' are not available on the database.

Results of the GDE assessment are provided in Section 4.1.3.

3.2 Field Assessment

The inaugural detailed flora and vegetation survey of the MVM Project was conducted in spring 2013; 62 quadrats were established and re-surveyed in autumn 2013. In spring 2014, the MVM Project area was expanded with a further 30 quadrats established. These quadrats were re-surveyed in autumn 2015. A detailed flora and vegetation survey of the proposed haul road was conducted on the 19th to the 23rd March 2017, with 35 quadrats established. These quadrats were re-surveyed from the 8th to 10th September 2017. A total of 127 quadrats were established within the 18,770 ha survey area (MVM Project and haul road inclusive).

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

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

Unknown specimens collected during the survey were identified with the aid of samples housed at the BC Herbarium and WAHERB. Floristic communities were classified in accordance with the NVIS Floristic Community Type classification. The survey area was traversed by three people via 4WD, all-terrain vehicle and on foot (Figure 9).

3.2.1 Sampling Quadrats

One hundred and twenty-seven 20m x 20m quadrats were established within the survey area (Figure 9). The objective was to have at least three quadrats per vegetation type to capture the floristic variations within the survey area. Where a community was insufficiently large to accommodate three quadrats, the maximum number of quadrats that would fit within that specific community was established. The quadrats were established by inserting metal pickets in each corner, and measuring the length of the resultant boundaries to verify the quadrats were 20m x 20m (square quadrats).

Following their establishment and boundary verification, the location of each quadrat was recorded by GPS (Appendix 5) photographed (Appendix 9) and all vascular plants within the quadrat were recorded (Appendix 8). This included recording of dominant taxa from the upper, middle and lower stratum, and sampling of all unknown taxa. Unknown taxa were identified using BC's own reference herbarium and relevant taxonomical keys or by a taxonomic consultant. Data on level of disturbance, presence of coarse fragments on surface, topographical position, elevation, aspect, percentage litter, percentage bare ground, percentage surface rock (bedrock and surface deposits), soil types (colour, profile, field texture and surface type), and vegetation structure were collected from each quadrat (Appendix 8). Methods of recording data from these quadrats largely follow those outlined in CSIRO's *Australian Soil and Land Survey Field Handbook* (McDonald *et al.* 1998) and in accordance with current DPaW/EPA Guidelines (2016).



Figure 9: Survey area boundary and GPS tracks traversed throughout the survey area

3.2.2 Personnel involved

Jim Williams	- Environmental Consultant/ Director (Diploma of Horticulture)
Andrea Williams	- Environmental Consultant (BSc Hons Mineral Resources Management)
Lauren Pick	- Environmental Consultant (Bachelor of Science-Conservation Biology)
Patrick Harton	- Environmental Consultant (Bachelor of Environmental Science)
Matthew Newlands	- Environmental Technician
Emma Williams	- Environmental Technician
Alana Butler	- Environmental Technician
Frank Obbens	- Taxonomical Consultant
Mike Hislop	- WA Herbarium Taxonomic Consultant

3.2.3 Scientific licences

Table 5: Scientific Licences of Botanica Staff coordinating the survey

Licensed staff	Permit Number	Valid Until
Jim Williams	SL011001	21-05-15
	SL011451	21-05-16
	SL011826	21-05-17
	SL012116	21-05-18
Andrea Williams	SL011002	21-05-15
	SL011450	21-05-16
	SL011824	21-05-17
	SL012115	21-05-18
Lauren Pick	SL011000	21-05-15
	SL011449	21-05-16
	SL011825	21-05-17
	SL012117	21-05-18
Pat Harton	SL011003	21-05-15
	SL011452	21-05-16

3.3 Data Analysis Tools

Once the survey was completed the data obtained was analysed to generate a vegetation map (Appendix 2). The statistical program PATN was used to assess species composition of the quadrats (Appendix 7).

3.3.1 PATN Analysis

The PATN software package was used to assess the similarities/ dissimilarities between quadrats based on presence/ absence of species. Annual taxa were removed from the data prior to analysis (total of six annual taxa). Species reconciliation eliminated those sterile taxa that could not be fully identified from the analysis (five taxa), and reconciled subsp. and/or variant taxa. Singleton taxa were excluded from the analysis (79 taxa).

The analysis produced a quantitative estimate of the relationship between species composition of each quadrat. The classifications were based upon a Bray-Curtis association matrix using a flexible Unweighted Pair Group Arithmetic Mean (UPGMA) method (with a beta value of -0.1) which standardises the data enabling the analysis to be completed. Semi-strong hybrid (SSH) ordination of

the quadrat is then undertaken to show spatial relationships between groups and to elucidate possible environmental correlates with the classification.

The analysis also produced a stress value which is a measure of the 'strength' of the analysis (i.e. how well the quadrats are grouped together into the appropriate floristic groups). The lower the stress value the greater the strength of the analysis with a value of less than 0.3 showing that the analysis appropriately grouped quadrats. A stress value greater than 0.3 suggests that the analysis was unable to group quadrats appropriately due to extraneous variables (i.e. other factors influencing differences in floristic groups other than species composition e.g. fire, clearing disturbance etc.).

3.3.2 EstimateS

EstimateS software was used to estimate species richness present using the Chao2 richness estimator. For any number of samples, the estimator uses the existing pattern of species accumulation to estimate the true number of species at a site. The estimators tend to under-estimate species number when sample size is small, hence the estimated number of true species can be seen to increase with sample size. This software was also used to compute Coleman rarefaction curves estimates which were used to calculate species accumulation curves.

3.4 Flora survey limitations and constraints

It is important to note that flora surveys will entail limitations notwithstanding careful planning and design. Potential limitations are listed in Table 6.

Table 6: Limitations and constraints associated with the flora and vegetation survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	Access tracks within the survey area was limited, however the area was sufficiently covered through the use of 4WD, all-terrain vehicle and on foot.
Competency/ Experience	Not a constraint	The BC personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Botanist: Jim Williams Field Staff: Jim Williams, Andrea Williams, Lauren Pick, Pat Harton, Matthew Newlands, Alana Butler, Emma Williams Data Interpretation: Jim Williams, Andrea Williams & Lauren Pick
Timing of survey, weather & season	Not a constraint	Survey work has been conducted over multiple years and different seasons in accordance with Technical guidelines for flora and vegetation surveys. Surveys were conducted during optimum time when a large number of annual species were present and many species were in flower. Supplementary surveys were also conducted in dry periods as recommended by EPA and additional wet periods.
Area disturbance	Minor constraint	The survey area has been subject to disturbance from fire over multiple years.
Survey Effort/ Extent	Not a constraint	Survey intensity was high with a quadrat based detailed survey conducted. Prior to the quadrats being established a reconnaissance of the survey area was conducted in order to identify vegetation communities and any Flora of Conservation Significance.

Variable	Potential Impact on Survey	Details
Availability of contextual information at a regional and local scale	Not a constraint	Threatened flora database searches provided by the DBCA were used to identify any potential locations of Threatened/Priority Flora species. BoM, DWER, DPIRD, DBCA and DotEE databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region. Environmental assessments within the local region have been limited however BC was able to obtain information about the area from previous flora assessments conducted within the Coolgardie region and reconnaissance surveys conducted by BC which provided context on the local environment.
Data Analysis	Minor constraint	BC staff conducting the PATN analyses are not statistical analysts and have basic statistics training. These analyses are able to provide basic information on the relationships between vegetation communities.
Completeness	Minor constraint	<p>In the opinion of BC, the survey area was covered sufficiently in order to identify vegetation assemblages. Few of the plants during the survey were in flower and there were very few annual species present. It is estimated that approximately 85% of the flora within the survey area were able to be fully identified.</p> <p>The vegetation types for this study were based on visual descriptions of locations in the field. The distribution of these vegetation communities outside the study area is not known, however vegetation types identified were categorised via comparison to vegetation distributions throughout WA specified in the NVIS Major Vegetation Groups (DotEE, 2017b).</p>

4 Results

4.1 Desktop Assessment

4.1.1 Literature Review

Flora and vegetation surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available have been used as the primary reference material for the current vegetation assessment (Table 7).

Table 7: Previous Flora and Vegetation Surveys within the surrounding area

Survey/ Author/ Year	Vegetation/Landforms	Flora of Conservation Significance
How R.A. <i>et al</i> (1998)	Seven broad landforms: 1. Breakaway; 2. Granite Exposure; 3. Hill: Granite & Banded Ironstone Formation (BIF); 4. Salt Lake Features: Saline flats, well-drained flats; 5. Sandplains; 6. Undulating Plain; and 7. Broad Valley.	Two Threatened Flora: 1. <i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> ; and 2. <i>Drummondita hassellii</i> . <i>Drummondita hassellii</i> is no longer listed as Threatened Flora.
Brearley, Dunlop and Osborne (1998)	Nine vegetation communities comprised of Tree Mallee (<i>Eucalyptus eremophila</i>), Eucalypt Woodlands (<i>E. tenuis</i> , <i>E. flocktoniae</i> , <i>E. longicornis</i> and <i>E. dundasii</i>) and <i>Cratystylis conocephala</i> Scrub.	Two Threatened Flora: 1. <i>Leucopogon breviflorus</i> ; and 2. <i>Eucalyptus georgei</i> subsp. <i>georgei</i> . Neither of these species are currently listed as Threatened Flora.
Gibson and Lyons (1998)	Six broad communities which included Eucalypt Woodlands on laterite rises (<i>E. rhomboidea</i> / <i>E. eremophila</i> and <i>E. livida</i>), Eucalypt Woodlands on undulating plains/saline depressions (<i>E. tenuis</i> , <i>E. flocktoniae</i> , <i>E. salmonophloia</i> , <i>E. longicornis</i> and <i>E. dundasii</i>), <i>Acacia duriuscula</i> , <i>Allocasuarina globosa</i> , <i>Eucalyptus georgei</i> subsp. <i>georgei</i> and <i>Eucalyptus oleosa</i> on greenstone ridges.	One Threatened Flora: <i>Allocasuarina globosa</i> . Four Priority Flora: 1. <i>Acacia triculenta</i> (P3) 2. <i>Eucalyptus cerasiformis</i> (P4) 3. <i>Eucalyptus georgei</i> subsp. <i>georgei</i> (P4); and 4. <i>Eucalyptus rhomboidea</i> (P4)
Paul Armstrong and Associates (2012)	Nine vegetation communities in various stages of regrowth including recovering <i>Eucalyptus salmonophloia</i> Woodland, Recovering <i>E. eremophila</i> Woodland, Recovering <i>Eucalyptus</i> Woodland 1 and 2 (juveniles), Recovering <i>Eucalyptus</i> Woodland 2 (<i>Eucalyptus</i> spp. sterile), Recovering Mallee 1 (<i>E. rhomboidea</i> / <i>E. eremophila</i>) Recovering Mallee 2 (<i>Eucalyptus</i> spp. sterile), Recovering Dwarf Scrub (<i>Melaleuca uncinata</i> and/or <i>Allocasuarina campestris</i>), Recovering Low Heath (<i>Lepidosperma sanguinolentum</i>) and Recovering Lateritic Ridge (<i>Eucalyptus eremophila</i> , <i>Eucalyptus calycogona</i> and patches of <i>Eucalyptus rhomboidea</i>).	One Threatened Flora: <i>Marianthus aquilonaris</i> . Four Priority Flora: 1. <i>Eucalyptus rhomboidea</i> (P4); 2. <i>Hakea pendens</i> (P3); 3. <i>Stenanthemum bremerense</i> (P3); and 4. <i>Teucrium</i> sp. dwarf (R. Davis 8813) (P1).
BC (2013)	N/A	One Threatened Flora: <i>Marianthus aquilonaris</i> .

Survey/ Author/ Year	Vegetation/Landforms	Flora of Conservation Significance
		Four Priority Flora: 1. <i>Eucalyptus rhomboidea</i> (P4); 2. <i>Hakea pendens</i> (P3); 3. <i>Stenanthemum bremerense</i> (P3); and 4. <i>Teucrium</i> sp. dwarf (R. Davis 8813) (P1).
BC (2015)	Ten vegetation communities were identified within the survey area: 1. Burnt open tree mallee of <i>Eucalyptus livida</i> over open low scrub of <i>Hakea pendens</i> (P3) and open dwarf scrub of <i>Goodia medicaginea</i> ; 2. Burnt open low woodland of <i>Eucalyptus salmonophloia</i> over dwarf scrub of <i>Melaleuca</i> sp. (Sterile) and open low grass of <i>Austrostipa variabilis</i> ; 3. Burnt forest of <i>Eucalyptus urna</i> over low scrub <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> ; 4. Regrowth dwarf scrub of <i>Anthocercis anisantha</i> subsp. <i>anisantha</i> / <i>Acacia poliochroa</i> / <i>Alyogyne hakeifolia</i> / <i>Dodonaea stenozyga</i> ; 5. Regrowth of dense low forest of <i>Eucalyptus</i> sp. (Sterile). 6. Regrowth open low woodland of <i>Codonocarpus cotinifolius</i> over low scrub of <i>Acacia</i> sp. (Sterile)/ <i>Melaleuca hamata</i> and open low grass of <i>Schoenus brevisetis</i> ; 7. Regrowth open shrub mallee of <i>Eucalyptus</i> sp. (Sterile) over open low scrub of <i>Acacia acanthoclada</i> / <i>Grevillea huegelii</i> and hummock grass of <i>Triodia scariosa</i> ; 8. Very open shrub mallee of <i>Eucalyptus</i> sp. (Sterile) over low scrub of <i>Acacia assimilis</i> subsp. <i>assimilis</i> / <i>A. yorkrakinensis</i> / <i>Duboisia hopwoodii</i> and open low grass of <i>Schoenus breviculmis</i> ; 9. Open shrub mallee of <i>Eucalyptus livida</i> over low scrub of <i>Allocasuarina campestris</i> / <i>Hakea francisiana</i> / <i>Melaleuca hamata</i> and open low sedges of <i>Lepidosperma sanguinolentum</i> ; and 10. Low woodland of <i>Eucalyptus urna</i> over low heath of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia erinacea</i> / <i>Acacia poliochroa</i> .	One Threatened Flora: <i>Marianthus aquilonaris</i> . Six Priority Flora: 1. <i>Acacia mutabilis</i> subsp. <i>stipulifera</i> (P3); 2. <i>Eucalyptus rhomboidea</i> (P4); 3. <i>Hakea pendens</i> (P3); 4. <i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583) (P3) 5. <i>Stenanthemum bremerense</i> (P4); and 6. <i>Teucrium</i> sp. dwarf (R. Davis 8813) (P1).

4.1.2 Flora of Conservation Significance

The results of the combined search of the DBCA Flora of Conservation Significance databases, Naturemap search and DotEE protected matters search recorded a total of 124 Priority Flora and 11 Threatened Flora taxa within the local region. These taxa were assessed and ranked for their likelihood of occurrence within the survey area (Table 8). Eight taxa were recorded on the database as occurring within the survey area (listed as 'known to occur' in Table 8). The rankings and criteria used were:

- Unlikely: Area is outside of the currently documented distribution for the species/no suitable habitat (type, quality and extent) was identified as being present during field/desktop assessments.
- Possible: Area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during field/desktop assessments, supported in some cases by recent records being documented from within or near the area.
- Known to Occur: The species in question was positively identified as being present during field assessments/ DBCA database record.

Table 8: Likelihood of occurrence for Flora of Conservation Significance within the survey area

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i>	T	Lignotuberous shrub, 1-3 m high. Fl. yellow-orange, Mar to May. Lateritic gravel, grey sand.	Possible
<i>Boronia revoluta</i>	T	Shrub, 0.4-0.8 m high. Fl. pink, Jul to Aug. Stony sandy loam or sand. Plains, hillsides & summits.	Unlikely
<i>Conostylis lepidospermoides</i>	T	Rhizomatous, tufted perennial, grass-like or herb, 0.17-0.36 m high. Fl. yellow, Sep to Oct. Grey or yellow-brown sand over laterite.	Unlikely
<i>Daviesia microcarpa</i>	T	Sprawling, tangled shrub, to 0.4 m high, ca 1 m wide. Fl. orange & red, Sep. Weathered gravel.	Unlikely
<i>Drummondita longifolia</i>	T	Shrub, 0.3-1 m high, well-spaced slender leaves, resinous sepals and branchlets. Fl. red/white/pink, Apr to May or Aug or Oct. Granitic loam, skeletal sandy loam.	Unlikely
<i>Eremophila denticulata</i> subsp. <i>trisulcata</i>	T	Compact shrub, to 2 m high. Fl. pink-orange-red, May or Sep. Sand or loam over limestone.	Unlikely
<i>Eremophila virens</i>	T	Erect, slender shrub, 1.5-5 m high. Fl. green, Aug to Oct. Red/brown sand. Granite hillsides.	Unlikely
<i>Eucalyptus platydisca</i>	T	Mallee, 2-4 m high, bark smooth. Granitic soils, clay. Stony hills.	Unlikely
<i>Marianthus aquilonaris</i>	T	No description available	Known to occur
<i>Ricinocarpus trichophorus</i>	T	Erect, openly branching shrub, 0.3-1 m high. Fl. white, May or Aug to Sep. Sandy clay, loam. Breakaways, among sandstone rocks.	Unlikely
<i>Roycea pycnophylloides</i>	T	Perennial, herb, forming densely branched, silvery mats to 1 m wide. Fl. Sep. Sandy soils, clay. Saline flats.	Possible

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Acacia diaphana</i>	P1	Bushy shrub, 1.5-3 m high. Fl. yellow. Clay, sandy loam. Wet or waterlogged depressions.	Unlikely
<i>Acacia dorsenna</i>	P1	Dense, domed shrub, 1-1.6 m high, to 3 m wide. Fl. yellow, Aug to Sep. Rocky sandy loam or clay loam. Low rocky hills.	Possible
<i>Acacia hystrix</i> subsp. <i>continua</i>	P1	Rounded or obconic shrub, 0.3-1 m high. Fl. yellow. Clay loam.	Known to occur
<i>Aotus prosacris</i>	P1	Prostrate shrub, to 0.3 m high. Fl. yellow/orange, Sep. White sand, cream sand over laterite. Flats.	Unlikely
<i>Baeckea</i> sp. Exclamation Lake (M.E. Trudgen 1524)	P1	Shrub, to 0.6 m high, bark grey with parallel longitudinal fissures. Red-brown loam, quartz, granite. Small depressions.	Unlikely
<i>Bossiaea arcuata</i>	P1	Erect, divaricately branched superficially leafless shrub, to 1.5 m high. Fl. yellow & red, Mar to Apr or Sep to Oct. Deep white sand. Perimeter of salt lakes.	Possible
<i>Bossiaea aurantiaca</i>	P1	Compact, rounded or spreading, spinescent shrub, to 1.5 m high. Fl. red/yellow, Sep to Oct. Red sand, red clay loam. Low-lying, winter-damp sites.	Unlikely
<i>Bossiaea saxosa</i>	P1	Erect, intricately-branched shrub, to 1.5 m high. Fl. yellow-cream, Sep to Oct. Stony, red soil. Woodlands.	Possible
<i>Cryptandra exserta</i>	P1	Shrub, to c. 0.5 m high. Sandy soil with laterite gravel, red sand over clay. Gentle mid-slopes, plains.	Possible
<i>Cyathostemon</i> sp. Esperance (A. Fairall 2431)	P1	No description available	Possible
<i>Cyathostemon</i> sp. Red Roo Rock (G.F. Craig 6896)	P1	No description available	Possible
<i>Eremophila hamulata</i>	P1	No description available	Possible
<i>Eremophila lucida</i>	P1	Shrub, to 1.8 m high. Fl. cream-yellow, Oct. Clay loam, sandy loam. Adjacent to sapphire flats & granite outcrops.	Possible
<i>Eucalyptus jimberlanica</i>	P1	Mallee or tree, 4-10 m high, bark smooth. Loam. Valley edges.	Unlikely
<i>Eucalyptus misella</i>	P1	(Mallee), 1-3 m high, bark smooth. Fl. cream, Nov. White, yellow or grey sand. Low-lying sandplains.	Possible
<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>	P1	Spreading mallee, to 3 m high, bark 'minni-ritchi'. Fl. yellow, Sep to Nov. Rocky rises.	Unlikely
<i>Eutaxia andocada</i>	P1	Erect shrub (with sparse ascending branches), 0.2-0.4 m high. White sand or brown sandy-clay over granite.	Possible
<i>Gastrolobium hians</i>	P1	Erect shrub (more or less glaucous), to 1.7 m high. Fl. Orange & yellow & purple, Sep. Sandy loam or clay soils. Sandplains.	Possible
<i>Gastrolobium involutum</i>	P1	Erect, spreading shrub, to 3 m high. Fl. orange, Jun to Nov. Sandy soils over granite. Base of rock outcrops, drainage channels.	Possible
<i>Grevillea phillipsiana</i>	P1	Prickly shrub, 0.8-1.5 m high. Fl. red/red & orange, Jul to Sep. Red sand, stony loam. Granite hills.	Possible

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Hibbertia carinata</i>	P1	Shrub, to 0.4 m high. Fl. yellow, Aug to Sep. Well-drained gravelly sand, yellow sand with gravel.	Unlikely
<i>Leucopogon rugulosus</i>	P1	No description available	Possible
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)	P1	Erect shrub, 0.2-0.5 m high. Fl. white, May. White/grey sand. Undulating sandplains.	Possible
<i>Leucopogon</i> sp. Lake Tay (W.R. Archer 2104138)	P1	No description available	Possible
<i>Leucopogon</i> sp. Yellowdine (M. Hislop & F. Hort MH 3194)	P1	No description available	Possible
<i>Melaleuca agathosmoides</i>	P1	Spreading shrub, 0.5-2 m high. Fl. white-cream, Sep to Oct. Gravelly red clay loam. Hills.	Possible
<i>Microcybe pauciflora</i> subsp. <i>grandis</i>	P1	Shrub, to 0.6 m high, leaves 14-16 mm long, petals sparsely stellate-hairy. Fl. yellow. Clay-loam or loam.	Possible
<i>Micromyrtus papillosa</i>	P1	Erect or low, spreading shrub, 0.4-1.2 m high. Fl. white, Apr or Aug to Oct. Sandy or clay soils, ironstone, granite. Rocky sites, outcrops, on hills from base to summit.	Possible
<i>Olearia newbeyi</i>	P1	No description available	Unlikely
<i>Persoonia baeckeoides</i>	P1	Erect, spreading shrub, 0.5-1.5 m high. Fl. green-yellow, Nov to Dec. Gravelly sand, laterite, sandy clay over sandstone. Undulating plains.	Unlikely
<i>Philothea apiculata</i>	P1	Erect shrub, 0.5-1.5 m high. Fl. white-pink, Aug to Nov. Stony clay loam. Rocky outcrops, hillsides.	Possible
<i>Scaevola tortuosa</i>	P1	Ascending perennial, herb, 0.1-0.2 m high. Fl. blue-purple/pink, Oct. Sandy clay. Margins of salt lakes.	Possible
<i>Stackhousia stratfordiae</i>	P1	No description available	Unlikely
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	Compact, dwarf shrub, 0.1 m high, to 0.1 m wide. Fl. white, Apr. Hills, road verges.	Known to occur
<i>Verticordia sieberi</i> var. <i>pachyphylla</i>	P1	Shrub, 0.25-0.6 m high. Fl. pink-cream-white, Oct or Jan. Sand. Edges of salt lakes.	Possible
<i>Verticordia</i> sp. Dundas (C.A. Gardner 2848)	P1	No description available	Possible
<i>Acacia amyctica</i>	P2	Erect, bushy, pungent shrub, 0.7-1.5 m high. Fl. yellow, Aug to Sep. Sandy loam or clay. Flats.	Possible
<i>Acacia asepala</i>	P2	Diffuse, much-branched shrub, 0.5-1.5 m high. Fl. yellow, Aug. Red-brown sandy loam. Undulating plains, along drainage lines.	Unlikely
<i>Acacia kerryana</i>	P2	Low, spreading, domed shrub, 0.3-1 m high. Fl. yellow, Oct to Dec or Jan to Feb. Granitic loamy sand, stony clayey loam or clayey sand. Low stony ridges, undulating plains.	Unlikely
<i>Angianthus newbeyi</i>	P2	Erect or ascending annual, herb, 0.03-0.05 m high. Fl. yellow, Sep. Sub-saline sand. On slopes into salt lakes.	Possible
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	No description available	Known to occur
<i>Baeckea</i> sp. Fitzgerald Peaks (P.J. Poli 53)	P2	No description available	Possible

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Baeckea</i> sp. Mt Gibbs (G.F. Craig 7031)	P2	No description available	Possible
<i>Boronia acanthoclada</i>	P2	Spreading shrub, ca 0.3 m high, leaves alternate, branchlets spinescent. Fl. white, Sep. Sand over gravel.	Possible
<i>Boronia corynophylla</i>	P2	Spreading, densely branched shrub, ca 0.3 m high, leaves terete to clavate, cuticle exfoliating to form a grey scurfy covering. Fl. red. Well drained clayey sand. Eucalyptus salmonophloia open woodland.	Possible
<i>Bossiaea simulata</i>	P2	Compact shrub, to 1 m high. Fl. yellow, Oct to Dec. Sandy loam. Well-drained sites, raised sites in salt lakes, sand dunes above samphire zone.	Unlikely
<i>Conospermum sigmoideum</i>	P2	Erect shrub, 0.2-0.5 m high. Fl. blue, Aug to Sep. Yellow sand.	Unlikely
<i>Cyathostemon</i> sp. Jyndabinbin Rocks (K.R. Newbey 7689)	P2	No description available	Possible
<i>Cyathostemon</i> sp. Lake King (M.E. & M.E. Trudgen 1462)	P2	Erect shrub, to 0.8 m high. Fl. pink/white, Oct. Yellow-brown sand or sandy clay, gravel, laterite. Plains.	Possible
<i>Darwinia</i> sp. Peak Charles (A.S. George 10627)	P2	Shrub, ca 1.7 m high. Fl. white-red, Apr. Granitic loam.	Unlikely
<i>Eucalyptus fraseri</i> subsp. <i>melanobasis</i>	P2	Tree, 8-15 m high, bark rough, dark grey-black at the base for 1-2 m. Fl. white, Jan to Mar. Red calcareous loam.	Possible
<i>Gastrolobium acrocaroli</i>	P2	Erect, open shrub, to 2.7 m high. Fl. orange/yellow, Apr or Sep to Nov. Skeletal soils over granite. Rock outcrops, open shrubland or dense heath.	Unlikely
<i>Goodenia scapigera</i> subsp. <i>graniticola</i>	P2	Herb, 0.7-1.5 m high, leaves fasciculate, linear, entire. Fl. white, Sep to Oct. Skeletal loamy sand over granite. Hillsides & rocky outcrops.	Possible
<i>Hibbertia charlesii</i>	P2	Shrub, to 1 m high. Fl. yellow, Oct to Nov. Skeletal loamy sand, granite. Exposed mountain slopes.	Unlikely
<i>Lepidobolus spiralis</i>	P2	Rhizomatous, clumped or spreading perennial, herb (sedge-like), ca 0.5 m high, to 2 m wide. Fl. May to Sep. Yellow sand. Dry kwongan.	Unlikely
<i>Leucopogon</i> sp. Varley (M. Hislop 3659)	P2	No description available	Possible
<i>Logania nanophylla</i>	P2	Low spreading shrub, 0.1-0.25 m high, to 0.5 m wide. Fl. white, Aug. White sand, pebbly calcareous sandy clay. Sand dunes.	Unlikely
<i>Newcastelia insignis</i>	P2	Much-branched shrub, 0.3-0.9(-1.5) m high. Fl. yellow-white, Sep to Nov. Red or yellow sandy soils.	Unlikely
<i>Olearia laciniifolia</i>	P2	Erect, few-stemmed shrub, 0.6-1.2 m high. Fl. blue/purple & white/yellow, May to Sep. White sand. Around playa lakes.	Possible
<i>Opercularia hirsuta</i>	P2	Perennial, herb or shrub, 0.2-0.7 m high. Sandy soils over granite or quartzite.	Unlikely
<i>Orianthera exilis</i>	P2	No description available	Possible

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Rinzia rubra</i>	P2	Spreading shrub, 0.25-0.7 m high, to 1 m wide. Fl. white, Aug or Nov. Sandy soils. Undulating plains.	Possible
<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>	P3	Rounded or obconic shrub, 0.6-1.6 m high, to 6 m wide. Fl. yellow, Aug to Sep. Red sand, clay loam, loam. Undulating plains.	Possible
<i>Acacia dissona</i> var. <i>indoloria</i>	P3	Domed or rounded, dense, pungent shrub, 0.5-2 m high. Fl. yellow, Aug to Sep. Sand, sandy loam. Undulating plains.	Possible
<i>Acacia eremophila</i> var. Numerous-nerved variant (A.S.George 11924)	P3	Dense, spreading shrub, 1-2 m high. Fl. yellow, Sep. Sandy soils. Flats.	Possible
<i>Acacia improcera</i>	P3	Spreading, spiny shrub, 0.15-0.4 m high. Fl. yellow, Aug. Sand, loamy clay, clay. Undulating plains, flats.	Possible
<i>Acacia singula</i>	P3	Shrub, 0.35-2 m high. Fl. yellow, Aug to Oct. Gravelly sand over laterite, white or yellow sand. Rises, hilltops.	Unlikely
<i>Acacia truculenta</i>	P3	Spreading, straggly, prickly shrub, 0.7-2.2 m high. Fl. yellow, Aug to Sep. Sand or loam.	Possible
<i>Adenanthos gracilipes</i>	P3	Erect, lignotuberous shrub, 0.4-1.5 m high. Fl. cream & red & pink, Mar or Aug to Dec. White sand.	Unlikely
<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>	P3	Dioecious or monoecious shrub, 1-3 m high, bracteoles prominently exceeding cone. Stony loam, laterite clay. Granite outcrops.	Possible
<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>	P3	Monoecious, short-lived annual or perennial, herb, ca 0.2 m high. Crab hole plains.	Unlikely
<i>Baeckea</i> sp. Hatter Hill (K.R. Newbey 3284)	P3	Narrow, open, upright shrub, to 1.3 m high. Fl. pink, Jun to Oct. Yellow-orange coarse sandy loam with laterite gravel, red-brown sandy loam with quartz pebbles. Undulating plains.	Possible
<i>Banksia lullfitzii</i>	P3	Lignotuberous shrub, 0.8-2 m high. Fl. yellow-orange/orange-brown, Mar to May. Yellow sand. Sandplains.	Possible
<i>Banksia rufa</i> subsp. <i>flavescens</i>	P3	Prostrate, lignotuberous shrub, to 0.45 m high. Fl. cream-yellow, Jul to Aug. Sandy loam or sand with gravel.	Possible
<i>Banksia viscida</i>	P3	Densely branched, non-lignotuberous shrub, 0.4-1 m high. Fl. yellow-orange, Jul to Oct. Gravelly soils. Lateritic rises.	Possible
<i>Beyeria sulcata</i> var. <i>truncata</i>	P3	No description available	Possible
<i>Bossiaea flexuosa</i>	P3	Compact shrub, to 0.6 m high. Fl. yellow-orange-red-brown, Sep to Nov. Deep sandy soil.	Possible
<i>Chrysocephalum apiculatum</i> subsp. <i>norsemanense</i>	P3	No description available	Possible
<i>Comesperma calcicola</i>	P3	Soft perennial, herb, to 0.3 m high. Fl. pink, Oct to Dec or Jan. Calcareous or semi-saline clay loams, limestone. Areas around saline water.	Possible
<i>Cryptandra crispula</i>	P3	Non-spinescent shrub, 0.25-0.9 m high. Brown sandy clay, yellow loamy sand, red soil, pebbles. Dune ridges, hills, near salt lakes.	Unlikely

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	Erect, compact shrub, to 3 m high. Fl. white, May or Oct to Nov. Orange sand, white sand or sandy clay over granite, light brown clay with gypsum, saline soils. Flats, dry river beds, near claypans.	Unlikely
<i>Dampiera sericantha</i>	P3	Erect, slender perennial, herb, 0.05-0.3(-0.6) m high, stems with blunt angles. Fl. blue, May or Aug to Dec. Sand, sometimes with gravel. Plains.	Possible
<i>Daviesia newbeyi</i>	P3	Bushy, multi-stemmed, broom-like shrub, 0.25-1.5 m high. Fl. orange/yellow & red, Aug to Oct. Sand or sandy clay over granite. Rocky slopes.	Possible
<i>Dielsiodoxa leucantha</i> subsp. <i>leucantha</i>	P3	No description available	Possible
<i>Eremophila purpurascens</i>	P3	Erect, bushy shrub, 0.3-1.5 m high. Fl. pink & purple/red, Aug to Oct. Sandy clay, stony loam over greenstone. Granite hills & rocks.	Possible
<i>Eremophila succinea</i>	P3	Erect shrub, 1.2-3 m high. Fl. blue-purple, Sep. Clay, sand over clay.	Possible
<i>Eucalyptus brockwayi</i>	P3	Tree, 5-20 m high, bark smooth. Fl. white-cream, Mar to Jun. Gravelly sandy loam. Low rocky hills & slopes.	Possible
<i>Eucalyptus histophylla</i>	P3	(Mallee), 2-6 m high, bark smooth. Fl. yellow, Dec. Sandy loam on granite or laterite. Granite outcrops.	Possible
<i>Eutaxia acanthoclada</i>	P3	Compact, mat-forming, prostrate shrub, to 0.3 m high. Fl. yellow/orange/red, Oct to Nov. Light brown sandy clay, shallow sandy loam, red clay over banded ironstone, gravel. Gently undulating plains.	Possible
<i>Eutaxia actinophylla</i>	P3	Shrub, to 0.5 m high. Fl. yellow/red, Sep to Oct. Red-brown clay loam, red clay loam over granite, gravel. Small depressions.	Unlikely
<i>Gastrolobium cruciatum</i>	P3	Spreading shrub, to 0.5 m high. Fl. Yellow & red, Sep. Sand & clayey sand with gravel, rocky loams, laterite. Flats, gently undulating areas.	Possible
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	Erect, woody shrub (subshrub), 0.1-0.25 m high, largest leaves 15-25 x 1-3 mm, entire. Fl. yellow, Aug to Dec. Sandy loam or laterite.	Possible
<i>Hibbertia pachyphylla</i>	P3	Shrub, to 0.5 m high. Fl. yellow, Sep to Nov. White to yellow sand, brown sandy gravel, gravelly loam, laterite, granite, quartz. Undulating plains, low rises, valley floors.	Unlikely
<i>Leucopogon</i> sp. Ironcaps (N. Gibson & K. Brown 3070)	P3	Slender, open shrub, to 1 m high, to 0.6 m wide. Fl. white, Aug. Skeletal sand, yellow sandy loam, rocky loam, gravel, laterite, ironstone. Gentle lower slopes, flat uplands, hill tops.	Possible
<i>Melaleuca coccinea</i>	P3	Much branched shrub, 1.5-2.6 m high, leaf blade elliptic to ovate, 1.5-2.2 times as long as wide. Fl. red, Sep to Nov or Jan. Sandy loam over granite. Granite outcrops, sandplain, river valleys.	Unlikely
<i>Melaleuca ochroma</i>	P3	No description available	Possible

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)	P3	No description available	Known to occur
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	Erect shrub, 0.1-0.4(-1) m high. Deep aeolian sand, grey or white sand, white sandy clay. Undulating plains, dunes, hill crests.	Unlikely
<i>Microseris walteri</i>	P3	No description available	Possible
<i>Mirbelia densiflora</i>	P3	Erect or straggling shrub, 0.2-1 m high. Fl. yellow-orange, Oct or Jan. Stony loam, loamy sand. Small ridges, breakaways, undulating plains.	Unlikely
<i>Notisia intonsa</i>	P3	No description available	Possible
<i>Oxymyrrhine plicata</i>	P3	No description available	Possible
<i>Persoonia cymbifolia</i>	P3	Erect, spreading shrub, 0.2-0.6(-1) m high. Fl. yellow, Dec or Jan. Sandy soils. On flats or in rock crevices.	Unlikely
<i>Persoonia scabra</i>	P3	Erect, spreading, lignotuberous shrub, 0.3-0.9 m high. Fl. yellow, Nov to Dec or Jan. White sand or sandy loam.	Unlikely
<i>Phlegmatospermum eremaeum</i>	P3	Prostrate to spreading annual, herb, 0.02-0.1(-0.2) m high. Fl. white-cream, Jun or Aug to Oct. Stony loam.	Possible
<i>Pityrodia chrysocalyx</i>	P3	Erect, branched shrub, 0.3-0.75(-1) m high. Fl. white, Aug to Oct. Sandy soils.	Possible
<i>Pityrodia scabra</i> subsp. <i>dendrotricha</i>	P3	No description available	Possible
<i>Pultenaea daena</i>	P3	Dense, prostrate, domed shrub, to 0.07 m high. Fl. yellow, Mar. White to yellow sand or sandy loam, sandy or loamy clay, gravel, limestone, dolomite, laterite. Gently undulating plains, adjacent to salt lakes, in disturbed areas.	Possible
<i>Rinzia torquata</i>	P3	No description available	Possible
<i>Seringia adenogyna</i>	P3	No description available	Possible
<i>Stylidium pulviniforme</i>	P3	Caespitose perennial, herb, 0.01-0.05 m high, forming dense flat-topped cushions. Fl. white, Sep to Nov. White sand. Winter-wet areas.	Known to occur
<i>Stylidium sejunctum</i>	P3	Caespitose perennial, herb, 0.25-0.45 m high, Leaves tufted, linear to narrowly oblanceolate, 10-30 cm long, 0.8-4 mm wide, apex acute to mucronate, margin involute, glabrous to scabrous. Membraneous scale leaves present at base of mature leaves. Scape glandular throughout. Inflorescence paniculate. Fl. white/pink-purple, Sep to Nov. Clayey sand or loam, laterite. Outcrops, upper slopes, breakaways. Mallee and Allocasuarina shrubland.	Possible
<i>Darwinia polycephala</i>	P4	Diffuse shrub, 0.1-0.5 m high. Fl. red-purple, Mar or May to Jul or Sep. Sand, clay. Flats, near salt lakes.	Possible
<i>Eremophila parvifolia</i> subsp. <i>parvifolia</i>	P4	Low, divaricate shrub, 0.15-0.7 m high. Fl. blue-purple, Jun or Sep to Oct or Jan to Feb. Loam, yellow sand, clay, limestone. Plains, claypans.	Unlikely

Taxon	Conservation Code	Description (WAHERB, 2017)	Likelihood of Occurrence
<i>Eucalyptus deflexa</i>	P4	(Mallee), 1-3 m high, bark smooth. Fl. pink/cream-white, Mar or May to Oct. Clay loam, sandy loam, white or yellow sand, often with gravel. Flat areas & slight rises.	Possible
<i>Eucalyptus pterocarpa</i>	P4	Tree, to 15 m high, bark smooth throughout, becoming ribbony, light grey over salmon cream. Red-brown sandy loam, yellow-brown silty loam. Creek edges, rocky slopes.	Possible
<i>Eucalyptus rhomboidea</i>	P4	Tree, 8-10 m high. Gravelly sand. Slight rises.	Known to occur
<i>Eucalyptus rugulata</i>	P4	Tree or (mallet), to 12 m high, bark smooth, decorticating in strips, grey-olive oversilvery grey to pale tan-cream. Fl. yellow-cream, Nov. Orange laterite gravel. Summits, gentle upland slopes.	Possible
<i>Frankenia glomerata</i>	P4	Prostrate shrub. Fl. pink-white, Nov. White sand.	Unlikely
<i>Grevillea aneura</i>	P4	Dense, prickly shrub, 0.5-2.8 m high. Fl. red, Jun or Aug to Dec or Jan. Sand, sandy clay, gravel.	Possible
<i>Haegiela tatei</i>	P4	Ascending to erect annual, herb, 0.02-0.08(-0.2) m high. Fl. white-yellow, Aug to Nov. Clay, sandy loam, gypsum. Saline habitats.	Unlikely
<i>Myriophyllum petraeum</i>	P4	Aquatic annual, herb, stems 0.15-0.3 m long. Fl. white, Aug to Dec. Strictly confined to ephemeral rock pools on granite outcrops.	Unlikely
<i>Stenanthemum bremerense</i>	P4	Erect or low and spreading shrub, (0.2-)0.3-0.6(-1.4) m high. Orange-brown sandy loam, orange-red gravelly loam, skeletal red loam, laterite, ironstone. Top or sides of outcrops and breakaways.	Known to occur
<i>Tecticornia entrichoma</i>	P4	Decumbent shrub, 0.05-0.3 m high. Clay, clayey sand. Margins of slightly brackish lakes.	Possible

4.1.3 Groundwater Dependence Assessment

Results of the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2017b) database, indicate the survey area has potential to include five terrestrial groundwater dependent ecosystems. No aquatic groundwater dependent ecosystems were identified on the database as potentially occurring within the survey area. A description of these potential GDEs listed on the database within the survey area is provided in Table 9 and shown in Figure 10.

Table 9: Groundwater Dependent Ecosystems within the survey area

Ecosystem Description	Groundwater Interaction Potential
Medium woodland; redwood (<i>Eucalyptus transcontinentalis</i>) & merrit (<i>E. flocktoniae</i>)	Low potential
Medium woodland; morrel & Dundas blackbutt (<i>E. dundasii</i>)	Low potential
Medium woodland; salmon gum	Moderate potential
Shrublands; Acacia, Casuarina & Melaleuca thicket	Moderate potential
Bare areas; salt lakes	High potential

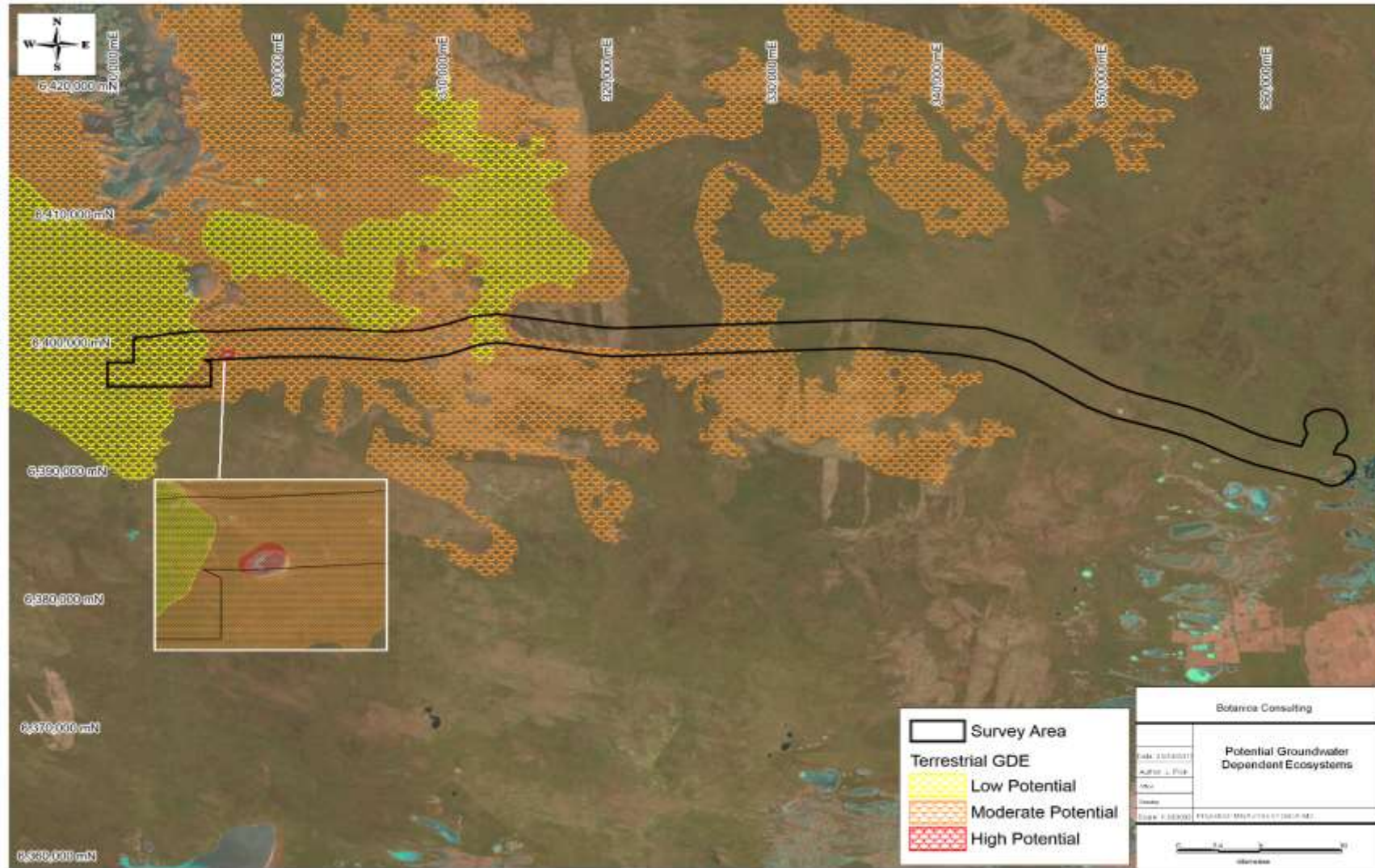


Figure 10: Potential for Groundwater Dependent Ecosystems within the survey area³

³ Ecosystem extents shown in the maps do not necessarily show the spatial extent of groundwater use. Rather, the ecosystem polygons should be interpreted as showing the area within which groundwater interaction may be occurring (Australian Government, 2012).

4.1.4 Field Assessment

4.2 Flora of conservation significance

Flora of conservation significance identified in the desktop assessment as potentially occurring within the survey area were targeted during the field assessment. One Threatened Flora taxon pursuant to subsection (2) of section 23F of the WC Act was identified within the survey area; *Marianthus aquilonaris*. This taxon is not listed as Threatened under the EPBC Act.

Ten Priority Flora taxa as listed by DBCA were identified within the survey area:

1. *Acacia hystrix* subsp. *continua* (P1);
2. *Acacia mutabilis* subsp. *stipulifera* (P3);
3. *Bossiaea flexuosa* (P3);
4. *Brachyloma stenolobum* (P1);
5. *Eucalyptus pterocarpa* (P4);
6. *Eucalyptus rhomboidea* (P4);
7. *Hakea pendens* (P3);
8. *Microcybe* sp. Windy Hill (G.F. Craig 6583) (P3);
9. *Stenanthemum bremerense* (P4); and
10. *Teucrium* sp. dwarf (R. Davis 8813) (P1).

A map showing the locations of these flora taxa identified within the survey area is provided in Figure 11. GPS coordinates for flora of conservation significance recorded within the survey area are provided in Appendix 4⁴.

Locations of all flora of conservation significance listed on the DBCA database within the survey area were searched during the survey, however the following taxa were not identified during the survey:

1. *Aotus* sp. Dundas (M.A. Burgman 2835)
2. *Stylidium pulviniforme*

4.2.1 *Marianthus aquilonaris* (T)

Marianthus aquilonaris is described as an erect, straggly shrub growing up to 1.6 m high with hairy stems, alternate, elliptic to oblong leaves, a glabrous calyx and a pale blue and white corolla (Plate 1). Flowers appear between September and October. It is found in the Bremer Range, growing on orange to grey-brown sandy loam, rocky red-orange clay loam, laterite and quartzite, on rock outcrops and slopes. Habitat critical to the survival of this species includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species (DPaW, 2010).

Marianthus aquilonaris was declared as Threatened under the *WC Act 1950* in 2002 and is currently listed as 'critically endangered' under the World Conservation Union (IUCN) criteria due to its extent of occurrence being less than 100 km² and its area of occupancy being less than 10 km² (DPaW,

⁴ Location of Threatened Flora not provided in this report due to the sensitive nature of this information

2010). This species is however not currently listed as Threatened under the Commonwealth EPBC Act.

Marianthus aquilonaris is currently known from two populations, including five subpopulations which occur within the Bremer Range. 1662 locations of this taxon were recorded within the survey area. All locations have been previously reported to DBCA for their records.



Plate 1: *Marianthus aquilonaris* (T)

4.2.2 *Acacia hystrix* subsp. *continua* (P1)

This taxon is described as a rounded or obconic shrub, which grows between 0.3-1 m high (Plate 2). It produces yellow flowers and occurs on clay loam soil (WAHERB, 2017). A total of four locations of this taxon have been recorded within the survey area, located approximately 500m east from a DBCA known location.



Plate 2: *Acacia hystrix* subsp. *continua* (P1)

4.2.3 *Acacia mutabilis* subsp. *stipulifera* (P3)

This taxon was formerly identified as *Acacia glaucissima* (P3) however has been re-identified as *Acacia mutabilis* subsp. *stipulifera* (P3). This taxon is described as a spreading shrub that grows between 0.3 to 1m high (Plate 3). It produces yellow flowers and grows in loam or clay, usually in slightly saline soils (WAHERB, 2017). A total of thirty-seven locations of this taxon have been recorded by BC within the survey area. Location details for this taxon will be provided to DBCA to update their records.



Plate 3: *Acacia mutabilis* subsp. *stipulifera* (P3)

4.2.4 *Bossiaea flexuosa* (P3)

This taxon is described as a compact shrub, which grows to 0.6m high (Plate 4). It produces yellow-orange-red-brown flowers from September to November. It occurs on deep sandy soil (WAHERB, 2017). One location of this taxon was recorded by BC within the survey area, which is not a DBCA known location. Location details for this taxon will be provided to DBCA to update their records.



Plate 4: *Bossiaea flexuosa* (P3)

4.2.5 *Brachyloma stenolobum* (P1)

This taxon is described as an erect shrub which grows to 1.5 m high and 1.2 m wide (Plate 5). It is single-stemmed at ground level from a fire-sensitive rootstock. It produces white flowers and narrowly triangular, adaxially keeled corolla lobes. This taxon grows on yellow sandplain as a component of heath. Associated species include *Allocasuarina spinosissima*, *Acacia heteroneura*, *Melaleuca cordata* and *M. calyptroides* (Hislop & Cranfield, 2014). One location of this taxon was recorded within the survey area which represents a range extension for this taxon, having previously only been recorded within the Forrestania region, approximately 100km west of the survey area. Location details for this taxon will be provided to DBCA to update their records.



Plate 5: *Brachyloma stenolobum* (P1)

4.2.6 *Eucalyptus pterocarpa* (P4)

This taxon is described as a tree, to 15 m high, with smooth bark throughout, becoming ribbony, light grey over salmon cream (Plate 6). It occurs on red-brown sandy loam, yellow-brown silty loam soils of creek edges and rocky slopes (WAHERB, 2017). One location of this taxon was recorded by BC within the survey area, which is not a DBCA known location. Location details for this taxon will be provided to DBCA to update their records.



Plate 6: *Eucalyptus pterocarpa* (P4)

4.2.7 *Eucalyptus rhomboidea* (P4)

This taxon is described as a tree that grows between 8 to 10m high (Plate 7). It grows in gravelly sand, and is found on slight rises (WAHERB, 2017). This taxon is listed by the DBCA as occurring within the survey area. A total of 88 locations of this taxon have been recorded within the survey area, one of which was a DBCA known location. Location details for this taxon have been previously provided to DBCA for their records.



Plate 7: *Eucalyptus rhomboidea* (P4) (Image provided by Paul Armstrong, 2012)

4.2.8 *Hakea pendens* (P3)

This taxon is described as a shrub that grows between 2 to 3m high, and 2.5 to 3.1m wide. It produces pink-white flowers in September (Plate 8). It grows in stony loam and is found on ironstone ridges (WAHERB, 2017). A total of 545 locations of this taxon were recorded within the survey area none of which are DBCA locations. Location details for this taxon have been previously provided to DBCA for their records.



Plate 8: *Hakea pendens* (P3)

4.2.9 *Microcybe* sp. Windy Hill (G.F. Craig 6583) (P3)

There is no description from WAHERB available for this taxon (Plate 9). A total of three locations of this taxon were recorded within the survey area, one of which is a DBCA known location. Location details for this taxon have been previously provided to DBCA for their records.



Plate 9: *Microcybe* sp. Windy Hill (G.F. Craig 6583) (P3)

4.2.10 *Stenanthemum bremerense* (P4)

This taxon is described as an erect or a low and spreading shrub that can grow between 0.3 to 0.6m high (Plate 10). It grows in orange-brown sandy loam, orange-red gravelly loam, skeletal red loam, laterite and ironstone. It is found on the top or sides of outcrops and breakaways (WAHERB, 2017). A total of 353 locations of this taxon were recorded within the survey area, four of which are DBCA known locations. Location details for this taxon have been previously provided to DBCA for their records.



Plate 10: *Stenanthemum bremerense* (P4)

4.2.11 *Teucrium* sp. dwarf (R. Davis 8813) (P1)

This species is described as a compact, dwarf shrub that grows up to 0.1m high and to 0.1m wide (Plate 11). It has white flowers in April and is found on hills and road verges (WAHERB, 2017). A total of 27 locations of this taxon were recorded within the survey area, four of which are DBCA known locations. Location details for this taxon have been previously provided to DBCA for their records.



Plate 11: *Teucrium* sp. dwarf (R. Davis 8813) (P1)

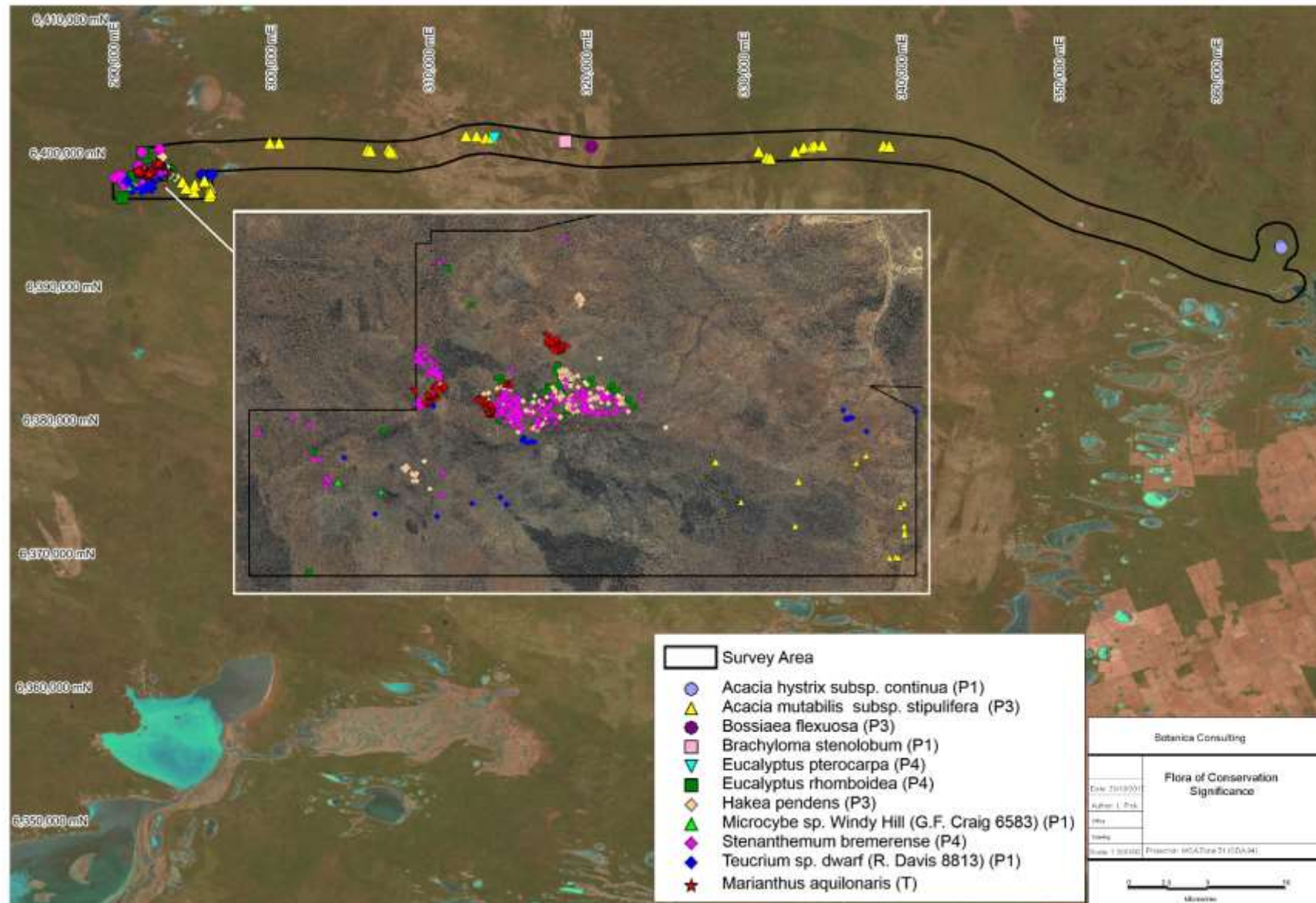


Figure 11: Flora of Conservation Significance identified within the survey area

4.3 Floristic Communities

Fourteen floristic communities were identified within the survey area. These communities were located within five different landform types and comprised of five major vegetation groups, which were represented by a total of 58 Families, 162 Genera and 411 Taxa (Appendix 3). A map showing the floristic communities present in the survey area is located in Appendix 2 and a summary of communities is presented in Table 10.

Table 10: Summary of floristic communities within the survey area

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Area (ha)	Area (%)
Closed Depression	Chenopod Shrublands, Samphire Shrublands and Forblands (MVG 22)	Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa	CD-CSSSF1	67	0.4
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain	CLP-EW1	10022 ⁵	53.4
	Mallee Woodlands and Shrublands (MVG 14)	Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	CLP-MWS1	1975	10.5
		Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	CLP-MWS2	2561	13.6
Granite Outcrop	Heathlands (MVG 18)	Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop	G-H1	265	1.4
Hillslope	Eucalypt Woodlands (MVG 5)	Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope	HS-EW1	15	0.1
	Mallee Woodlands and Shrublands (MVG 14)	Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	HS-MWS1	150	0.8
		Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	HS-MWS2	16	0.1
		Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	HS-MWS3	96	0.5
	Other Shrublands (MVG 17)	Regrowth mixed low shrubland on hillslope	HS-OS1	412	2.2

⁵ 5381 ha comprised of mature woodland. Remaining area comprised of regrowth.

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Area (ha)	Area (%)
Sand-Loam Plain	Eucalypt Woodlands (MVG 5)	Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	SLP-EW1	1519	8.1
	Mallee Woodlands and Shrublands (MVG 14)	Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain	SLP-MWS1	1436	7.7
		Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia / Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain	SLP-MWS2	67	0.4
	Other Shrublands (MVG 17)	Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/ Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	SLP-OS1	27	0.1
TOTAL				18770	100

Closed Depression: Chenopod Shrublands, Samphire Shrublands and Forblands

4.3.1 Low samphire shrubland of *Tecticornia indica* subsp. *bidens* over low open forbland of *Disphyma crassifolium* on playa (CD-CSSSF1)

The total flora recorded within this community was represented by a total of 9 Families, 20 Genera and 28 Taxa (Plate 12). No Threatened Flora taxa or Priority Flora taxa were identified within this community. Dominant taxa from the vegetation assemblage are shown in Table 11. According to the NVIS, this community is best represented by the MVG22- Chenopod Shrublands, Samphire Shrublands and Forblands (DotEE, 2017b).

Table 11: Vegetation assemblage for Low samphire shrubland of *Tecticornia indica* subsp. *bidens* over low open forbland of *Disphyma crassifolium* on playa

Life Form/Height Class	Canopy Cover	Dominant Taxa
Samphire Shrub <0.5m	30-70%	<i>Tecticornia indica</i> subsp. <i>bidens</i>
Forbs <0.5m	10-30%	<i>Disphyma crassifolium</i>



Plate 12: Low samphire shrubland of *Tecticornia indica* subsp. *bidens* over low open forbland of *Disphyma crassifolium* on playa

Clay-Loam Plain: Eucalypt Woodlands

4.3.2 Low open woodland of *Eucalyptus salmonophloia* over mixed shrubs on clay-loam plain (CLP-EW1)

The total flora recorded within this vegetation type was represented by a total of 38 Families, 98 Genera and 198 Taxa (Plate 13). No Threatened Flora taxa were identified within this community. Seven Priority Flora taxa were recorded within this community; *Stenanthemum bremerense* (P4), *Hakea pendens* (P3), *Eucalyptus rhomboidea* (P4), *Eucalyptus pterocarpa* (P4), *Acacia hystrix* subsp. *continua* (P1), *Acacia mutabilis* subsp. *stipulifera* (P3) and *Teucrium* sp. Dwarf (R. Davis 8813) (P1). Dominant taxa from the vegetation assemblage are shown in Table 12. According to the NVIS, this community is best represented by the MVG5- Eucalypt Woodlands (DotEE, 2017b).

Table 12: Vegetation assemblage for Low open woodland of *Eucalyptus salmonophloia* over mixed shrubs on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant Taxa
Tree <10m	5-10%	<i>Eucalyptus salmonophloia</i>
Shrub 1-2m	10-30%	<i>Dodonaea stenozyga</i> <i>Exocarpos aphyllus</i> <i>Santalum acuminatum</i> <i>Scaevola spinescens</i>
Shrub <1m	10-30%	<i>Acacia merrallii</i> <i>Acacia poliochroa</i> <i>Eremophila caerulea</i> subsp. <i>caerulea</i> <i>Melaleuca calyptroides</i> <i>Westringia cephalantha</i>



Plate 13: Low open woodland of *Eucalyptus salmonophloia* over mixed shrubs on clay-loam plain

Approximately 4641 ha of this community (~46% of the total extent within the survey area) has been disturbed by fire and comprised of regrowth vegetation (Plate 14; Appendix 2).



Plate 14: Regrowth *Eucalyptus salmonophloia* over mixed shrubs on clay-loam plain

Clay-Loam Plain: Mallee Woodlands and Shrublands

4.3.3 Mid mallee shrubland of *Eucalyptus* spp. over mid shrubland of *Melaleuca pauperiflora* and mixed low shrubland on clay-loam plain (CLP-MWS1)

The total flora recorded within this vegetation type was represented by a total of 27 Families, 62 Genera and 116 Taxa (Plate 15). No Threatened Flora taxa were identified within this community. Six Priority Flora taxa were identified within this vegetation community; *Stenanthemum bremerense* (P4), *Hakea pendens* (P3), *Eucalyptus rhomboidea* (P4), *Acacia mutabilis* subsp. *stipulifera* (P3), *Microcybe* sp. Windy Hill (G.F Craig 6583) (P3) and *Teucrium* sp. Dwarf (R. Davis 8813) (P1). Dominant taxa from the vegetation assemblage are shown in Table 13. According to the NVIS, this community is best represented by the MVG14- Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 13: Vegetation assemblage for Mid mallee shrubland of *Eucalyptus* spp. over mid shrubland of *Melaleuca pauperiflora* and mixed low shrubland on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub Mallee 3-10m	30-70%	<i>Eucalyptus eremophila</i> <i>Eucalyptus diptera</i> <i>Eucalyptus urna</i>
Shrub 1-2m	30-70%	<i>Melaleuca pauperiflora</i>
Shrub <1m	10-30%	<i>Trymalium myrtillus</i> <i>Westringia rigida</i>



Plate 15: Mid mallee shrubland of *Eucalyptus* spp. over mid shrubland of *Melaleuca pauperiflora* and mixed low shrubland on clay-loam plain

4.3.4 Mid mallee woodland of *Eucalyptus* spp. over mixed low shrubland/ heathland on clay-loam plain (CLP-MWS2)

The total flora recorded within this vegetation type was represented by a total of 29 Families, 59 Genera and 120 Taxa (Plate 16). No Threatened Flora taxa were identified within this community. Two Priority Flora taxa were identified within this vegetation community; *Acacia mutabilis* subsp. *stipulifera* (P3) and *Brachyloma stenolobum* (P1). Dominant taxa from the vegetation assemblage are shown in Table 14. According to the NVIS, this community is best represented by the MVG14-Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 14: Vegetation assemblage for Mid mallee woodland of *Eucalyptus* spp. over mixed low shrubland/ heathland on clay-loam plain

Life Form/Height Class	Canopy Cover	Dominant species present
Tree Mallee 3-10m	30-70%	<i>Eucalyptus cylindrocarpa</i> <i>Eucalyptus eremophila</i> <i>Eucalyptus urna</i>
Shrub 1-2m	30-70%	<i>Dodonaea bursariifolia</i> <i>Exocarpos sparteus</i> <i>Melaleuca lateriflora</i>
Heath Shrub 1-2m	30-70%	<i>Melaleuca hamata</i>
Shrub <1m	10-30%	<i>Cryptandra minutifolia</i> <i>Melaleuca calyptroides</i> <i>Westringia cephalantha</i>



Plate 16: Mid mallee woodland of *Eucalyptus* spp. over mixed low shrubland/ heathland on clay-loam plain

Granite Outcrop: Heathlands

4.3.5 Heathland of *Thryptomene* spp. over sparse tussock grassland of *Neurachne alopecuroidea* on granite outcrop (G-H1)

The total flora recorded within this vegetation type was represented by a total of 13 Families, 22 Genera and 24 Taxa (Plate 17). No Threatened Flora or Priority Flora taxon were identified within this community. Dominant taxa from the vegetation assemblage are shown in Table 15. According to the NVIS, this community is best represented by the MVG18- Heathlands (DotEE, 2017b).

Table 15: Vegetation assemblage for Heathland of *Thryptomene* spp. over sparse tussock grassland of *Neurachne alopecuroidea* on granite outcrop

Life Form/Height Class	Canopy Cover	Dominant Taxa
Heath Shrub >2m	30-70%	<i>Thryptomene australis</i>
Heath Shrub 1-2m	10-30%	<i>Thryptomene kochii</i>
Tussock grass <1m	5-10%	<i>Neurachne alopecuroidea</i>



Plate 17: Heathland of *Thryptomene* spp. over sparse tussock grassland of *Neurachne alopecuroidea* on granite outcrop

Hillslope: Eucalypt Woodlands

4.3.6 Regrowth of dense low forest of *Eucalyptus* sp. (Sterile) on hillslope (HS-EW1)

The total flora recorded within this vegetation type was represented by a total of 11 Families, 17 Genera and 22 Taxa (Plate 18). No Threatened Flora or Priority Flora taxa were identified within this vegetation community. Dominant taxa from the vegetation assemblage are shown in Table 16. According to the NVIS, this vegetation community is best represented by the MVG5-Eucalypt Woodlands (DotEE, 2017b).

Table 16: Vegetation assemblage for Regrowth of dense low forest of *Eucalyptus* sp. (Sterile) on hillslope

Life Form/Height Class	Canopy Cover	Dominant Taxa
Tree <3m	30-70%	<i>Eucalyptus</i> sp. (sterile)



Plate 18: Regrowth of dense low forest of *Eucalyptus* sp. (Sterile) on hillslope

Hillslope: Mallee Woodlands and Shrublands

4.3.7 Regrowth mid open mallee woodland *Eucalyptus livida* over mid open shrubland of *Hakea pendens* and open low shrubland of *Goodia medicaginea* on hillslope (HS-MWS1)

The total flora recorded within this vegetation type was represented by a total of 35 Families, 69 Genera and 89 Taxa (Plate 19). One Threatened Flora taxon was identified within this vegetation community; *Marianthus aquilonaris*. Three Priority Flora taxa were identified within this vegetation community; *Stenanthemum bremerense* (P4), *Hakea pendens* (P3) and *Eucalyptus rhomboidea* (P4). Dominant taxa from the vegetation assemblage are shown in Table 17. According to the NVIS, this vegetation community is best represented by the MVG14-Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 17: Vegetation assemblage for Regrowth mid open mallee woodland *Eucalyptus livida* over mid open shrubland of *Hakea pendens* and open low shrubland of *Goodia medicaginea* on hillslope

Life Form/Height Class	Canopy Cover	Dominant Taxa
Tree Mallee 3-10m	10-30%	<i>Eucalyptus livida</i>
Shrub 1-2m	5-10%	<i>Hakea pendens</i> (P3)
Shrub <1m	5-10%	<i>Goodenia medicaginea</i>



Plate 19: Regrowth mid open mallee woodland *Eucalyptus livida* over mid open shrubland of *Hakea pendens* and open low shrubland of *Goodia medicaginea* on hillslope

4.3.8 Regrowth low open mallee shrubland of *Eucalyptus* spp. over low shrubland of *Acacia* spp. and open tussock grassland of *Schoenus breviculmis* on hillslope (HS-MWS2)

The total flora recorded within this vegetation type was represented by a total of 11 Families, 13 Genera and 15 Taxa (Plate 20). No Threatened Flora or Priority Flora taxa were identified within this vegetation community. Dominant taxa from the vegetation assemblage are shown in Table 18. According to the NVIS, this vegetation community is best represented by the MVG14-Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 18: Vegetation assemblage for Regrowth low open mallee shrubland of *Eucalyptus* spp. over low shrubland of *Acacia* spp. and open tussock grassland of *Schoenus breviculmis* on hillslope

Life Form/Height Class	Canopy Cover	Dominant Taxa
Shrub Mallee <3m	10-30%	<i>Eucalyptus</i> sp. (sterile)
Shrub <1m	10-30%	<i>Acacia assimilis</i> subsp. <i>assimilis</i> <i>Acacia yorkrakinensis</i> <i>Duboisia hopwoodii</i>
Tussock Grass <1m	10-30%	<i>Schoenus brevisetis</i>



Plate 20: Regrowth low open mallee shrubland of *Eucalyptus* spp. over low shrubland of *Acacia* spp. and open tussock grassland of *Schoenus breviculmis* on hillslope

4.3.9 Mid open mallee woodland *Eucalyptus livida* over heathland of *Allocasuarina/ Hakea/ Melaleuca* and open low sedge of *Lepidosperma sanguinolentum* on hillslope (HS-MWS3)

The total flora recorded within this vegetation type was represented by a total of 15 Families, 25 Genera and 35 Taxa (Plate 21). No Threatened Flora were identified within this vegetation community. Three Priority Flora taxa were identified within this community; *Stenanthemum bremerense* (P4), *Eucalyptus rhomboidea* (P4) and *Teucrium* sp. dwarf (R. Davis 8813) (P1). Dominant taxa from the vegetation assemblage are shown in Table 19. According to the NVIS, this vegetation community is best represented by the MVG14-Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 19: Vegetation assemblage for Mid open mallee woodland *Eucalyptus livida* over heathland of *Allocasuarina/ Hakea/ Melaleuca* and open low sedge of *Lepidosperma sanguinolentum* on hillslope

Life Form/Height Class	Canopy Cover	Dominant Taxa
Shrub Mallee <3m	10-30%	<i>Eucalyptus livida</i>
Shrub 1-2m	10-30%	<i>Allocasuarina campestris</i> <i>Hakea francisiana</i> <i>Melaleuca hamata</i>
Sedge <0.5m	10-30%	<i>Lepidosperma sanguinolentum</i>



Plate 21: Mid open mallee woodland *Eucalyptus livida* over heathland of *Allocasuarina/ Hakea/ Melaleuca* and open low sedge of *Lepidosperma sanguinolentum* on hillslope

Hillslope: Other Shrublands

4.3.10 Regrowth mixed low shrubland on hillslope (HS-OS1)

The total flora recorded within this vegetation type was represented by a total of 24 Families, 42 Genera and 55 Taxa (Plate 22). No Threatened Flora taxa were identified within this community. Four Priority Flora taxon was identified within this community; *Hakea pendens* (P3), *Stenanthemum bremerense* (P4), *Microcybe* sp. Windy Hill (G.F Craig 6583) (P3) and *Teucrium* sp. Dwarf (R. Davis 8813) (P1). Dominant taxa from the vegetation assemblage are shown in Table 20. According to the NVIS, this community is best represented by the MVG17- Other Shrublands (DotEE, 2017b).

Table 20: Vegetation assemblage for Regrowth mixed low shrubland on hillslope

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub 1-2m	30-70%	<i>Anthocercis anisantha</i> subsp. <i>anisantha</i> <i>Acacia poliochroa</i> <i>Alyogyne hakeifolia</i> <i>Dodonaea stenozyga</i>



Plate 22: Regrowth mixed low shrubland on hillslope

Sand-Loam Plain: Eucalypt Woodlands

4.3.11 Low woodland of *Eucalyptus salicola* over low open shrubland of *Phebalium filifolium* and low open sedgeland of *Gahnia ancistrocarpa* on sand-loam plain (SLP-EW1)

The total flora recorded within this vegetation type was represented by a total of 26 Families, 53 Genera and 79 Taxa (Plate 23). No Threatened Flora or Priority Flora taxa were identified within this community. Dominant taxa from the vegetation assemblage are shown in Table 21. According to the NVIS, this community is best represented by the MVG5- Eucalypt Woodland (DotEE, 2017b).

Table 21: Vegetation assemblage for Low woodland of *Eucalyptus salicola* over low open shrubland of *Phebalium filifolium* and low open sedgeland of *Gahnia ancistrocarpa* on sand-loam plain

Life Form/Height Class	Canopy Cover	Dominant species present
Tree <10m	10-30%	<i>Eucalyptus salicola</i>
Shrub <1m	10-30%	<i>Phebalium filifolium</i>
Sedge <0.5m	10-30%	<i>Gahnia ancistrocarpa</i>



Plate 23: Low woodland of *Eucalyptus salicola* over low open shrubland of *Phebalium filifolium* and low open sedgeland of *Gahnia ancistrocarpa* on sand-loam plain

Sand-Loam Plain: Mallee Woodlands and Shrublands

4.3.12 Mid sparse mallee shrubland of *Eucalyptus eremophila* over heathland of *Melaleuca* spp. on sand-loam plain (SLP-MWS1)

The total flora recorded within this vegetation type was represented by a total of 21 Families, 48 Genera and 98 Taxa (Plate 24). No Threatened Flora taxa were identified within this community. Two Priority Flora taxa were identified within this community; *Acacia mutabilis* subsp. *stipulifera* (P3) and *Bossiaea flexuosa* (P3). Dominant taxa from the vegetation assemblage are shown in Table 22. According to the NVIS, this community is best represented by the MVG14- Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 22: Vegetation assemblage for Mid sparse mallee shrubland of *Eucalyptus eremophila* over heathland of *Melaleuca* spp. on sand-loam plain

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub Mallee <3m	5-10%	<i>Eucalyptus eremophila</i> <i>Eucalyptus grossa</i>
Heath Shrub 1-2m	30-70%	<i>Acacia fragilis</i> <i>Melaleuca hamata</i>
Heath Shrub <1m	10-30%	<i>Melaleuca cordata</i>
Sedge <0.5m	10-30%	<i>Lepidosperma sanguinolentum</i>



Plate 24: Mid sparse mallee shrubland of *Eucalyptus eremophila* over heathland of *Melaleuca* spp. on sand-loam plain

4.3.13 Regrowth mid sparse mallee shrubland of *Eucalyptus* spp. over low open shrubland of *Acacia* / *Grevillea* spp. and open hummock grassland of *Triodia scariosa* on sand-loam plain (SLP-MWS2)

The total flora recorded within this vegetation type was represented by a total of 13 Families, 18 Genera and 24 Taxa (Plate 25). No Threatened Flora taxa were identified within this community. One Priority Flora taxon was identified within this community; *Acacia mutabilis* subsp. *stipulifera* (P3). Dominant taxa from the vegetation assemblage are shown in Table 23. According to the NVIS, this community is best represented by the MVG14- Mallee Woodlands and Shrublands (DotEE, 2017b).

Table 23: Vegetation assemblage for Regrowth mid sparse mallee shrubland of *Eucalyptus* spp. over low open shrubland of *Acacia* / *Grevillea* spp. and open hummock grassland of *Triodia scariosa* on sand-loam plain

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub Mallee <3m	5-10%	<i>Eucalyptus</i> sp. (sterile)
Shrub <1m	10-30%	<i>Acacia acanthoclada</i> <i>Grevillea huegelii</i>
Hummock Grass <0.5m	10-30%	<i>Triodia scariosa</i>



Plate 25: Regrowth mid sparse mallee shrubland of *Eucalyptus* spp. over low open shrubland of *Acacia* / *Grevillea* spp. and open hummock grassland of *Triodia scariosa* on sand-loam plain

Sand-Loam Plain: Other Shrublands

4.3.14 Regrowth low open woodland of *Codonocarpus cotinifolius* over mid shrubland of *Acacia/ Melaleuca* spp. and open tussock grassland of *Schoenus breviculmis* on sand-loam plain (SLP-OS1)

The total flora recorded within this vegetation type was represented by a total of 10 Families, 15 Genera and 18 Taxa (Plate 26). No Threatened Flora taxa were identified within this community. One Priority Flora taxon was identified within this community; *Teucrium* sp. Dwarf (R. Davis 8813) (P1). Dominant taxa from the vegetation assemblage are shown in Table 24. According to the NVIS, this community is best represented by the MVG17- Other Shrublands (DotEE, 2017b).

Table 24: Regrowth low open woodland of *Codonocarpus cotinifolius* over mid shrubland of *Acacia/ Melaleuca* spp. and open tussock grassland of *Schoenus breviculmis* on sand-loam plain

Life Form/Height Class	Canopy Cover	Dominant Taxa
Tree <3m	5-10%	<i>Codonocarpus cotinifolius</i>
Shrub <1m	10-30%	<i>Acacia</i> sp. (sterile) <i>Melaleuca hamata</i>
Tussock Grass <0.5m	10-30%	<i>Schoenus brevisetis</i>



Plate 26: Regrowth low open woodland of *Codonocarpus cotinifolius* over mid shrubland of *Acacia/ Melaleuca* spp. and open tussock grassland of *Schoenus breviculmis* on sand-loam plain

4.4 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery, 1994 and Trudgen, 1988 (Appendix 6), eight communities were rated as 'good' and the remaining seven communities had a vegetation condition rating of 'very good' (Table 25). A map of the vegetation condition within the survey area is provided in Figure 12.

'Good' condition depicts that vegetation structure has been significantly altered by very obvious signs of multiple disturbances, however it retains its basic vegetation structure or has ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

'Very Good' condition depicts that vegetation structure has been altered by obvious signs of disturbance, caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

The entire survey area has been subjected to a major fire in 2010 (Figure 13), with some areas subjected to multiple successional fires in 2010. In February 2015, the area was again subjected to fire (observed by Audalia staff in the area) however this fire has not been recorded on the Landgate database. Vegetation within the area is in various stages of regrowth.

Table 25: Vegetation Condition Rating of the survey area

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Vegetation Condition
Closed Depression	Chenopod Shrublands, Samphire Shrublands and Forblands (MVG 22)	Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa	CD-CSSSF1	Very Good
	N/A	Playa (no vegetation)	PLAYA	N/A
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain	CLP-EW1	Good
	Mallee Woodlands and Shrublands (MVG 14)	Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	CLP-MWS1	Very Good
		Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	CLP-MWS2	Very Good
Granite Outcrop	Heathlands (MVG 18)	Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop	G-H1	Very Good
Hillslope	Eucalypt Woodlands (MVG 5)	Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope	HS-EW1	Good
	Mallee Woodlands and Shrublands (MVG 14)	Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	HS-MWS1	Good

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Vegetation Condition
		Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	HS-MWS2	Good
		Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	HS-MWS3	Good
	Other Shrublands (MVG 17)	Regrowth mixed low shrubland on hillslope	HS-OS1	Good
Sand-Loam Plain	Eucalypt Woodlands (MVG 5)	Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	SLP-EW1	Very Good
	Mallee Woodlands and Shrublands (MVG 14)	Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain	SLP-MWS1	Very Good
		Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia / Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain	SLP-MWS2	Good
	Other Shrublands (MVG 17)	Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/ Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	SLP-OS1	Good



Figure 12: Vegetation Condition Rating of the survey area

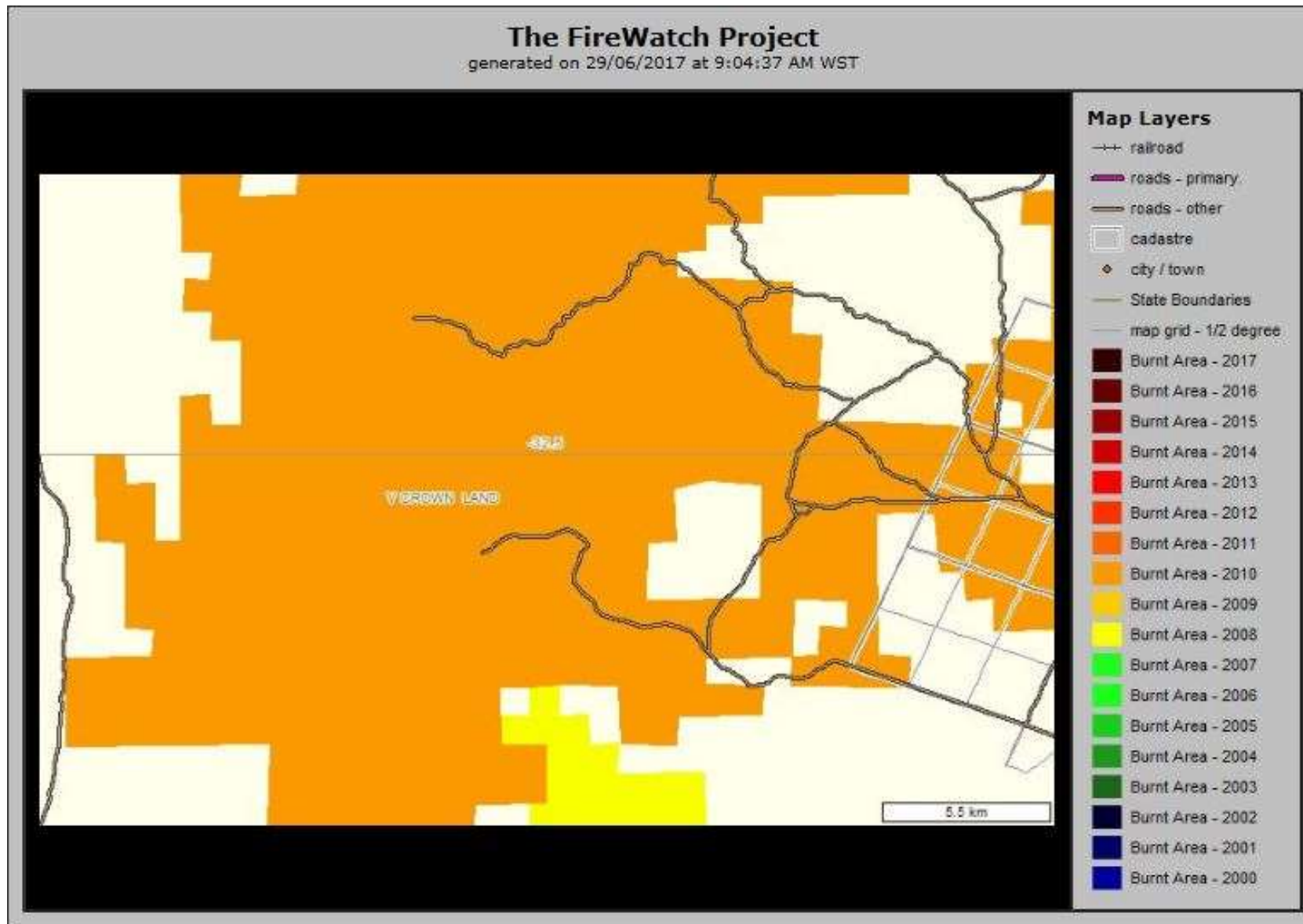


Figure 13: Map of fire history along the extent of the survey area obtained from Landgate fire watch database (Landgate, 2017)

4.5 Introduced Plant Species

Nine introduced species were identified in the survey area:

1. *Asphodelus fistulosus* (Onion Weed);
2. *Bromus rubens* (Red brome);
3. *Carrichtera annua* (Ward's weed);
4. *Centaurea melitensis* (Maltese cockspur);
5. *Lysimachia arvensis* (Pimpernel);
6. *Pentameris airoides*;
7. *Rostraria pumila* (Roughtail);
8. *Sonchus oleraceus* (Common sowthistle); and
9. *Vulpia ?muralis*.

According to the DPRID, none of these taxa are listed as a Declared Plant under Section 22 of the BAM Act 2007 (DPIRD, 2017).

4.5.1 *Asphodelus fistulosus* (Onion Weed)

This taxon is described as an annual or biennial, herb, which grows between 0.2-0.4 m high. It produces white flowers from June to October (Plate 27). This taxon occurs on sand, clay and calcareous soils (WAHERB, 2017). This taxon was identified within one vegetation community; CLP-EW1.

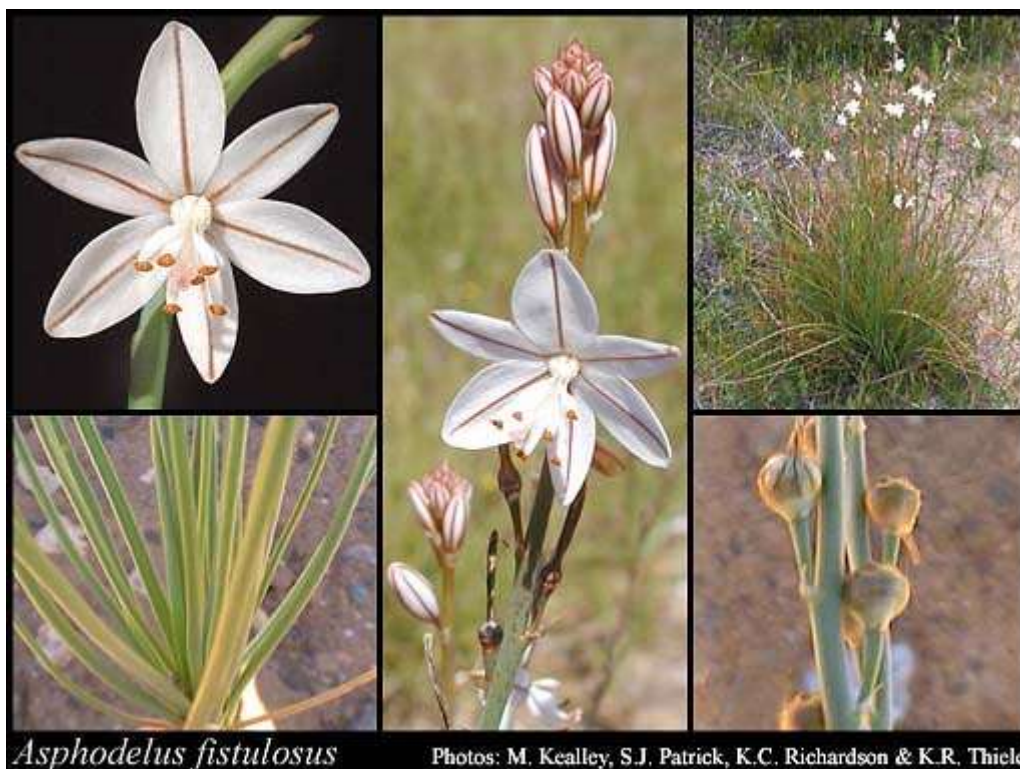


Plate 27: *Asphodelus fistulosus* (Onion Weed)

4.5.2 *Bromus rubens* (Red brome)

This taxon is described as a tufted annual, grass-like or herb, that grows between 0.1-0.4m high (Plate 28). It produces green/red-purple flowers from August to October. It grows in sand, red-brown clay and calcareous loam (WAHERB, 2017). *Bromus rubens* was identified in one community; HS-OS1.



Plate 28: *Bromus rubens* (Red Brome) (DPIRD, 2017)

4.5.3 *Carrichtera annua* (Ward's Weed)

This taxon is described as an erect, annual herb that can grow between 0.05-0.4m high (Plate 29). It produces yellow flowers from September to November. It can be found in semi-arid regions (WAHERB, 2017). *Carrichtera annua* was identified within two communities: CLP-EW1 and HS-OS1.



Plate 29: *Carrichtera annua* (Ward's Weed)

4.5.4 *Centaurea melitensis* (Maltese Cockspur)

This taxon is described as an erect annual or biennial herb that grows anywhere between 0.2 to 1m high (Plate 30). It produces yellow flowers from September to December or from January to March. It can be found along roadsides, cultivated areas or any other disturbed areas (WAHERB, 2017). *Centaurea melitensis* was recorded within two communities; CLP-EW1 and HS-OS1.



Plate 30: *Centaurea melitensis* (Maltese Cockspur)

4.5.5 *Lysimachia arvensis* (Pimpernel)

No description is available for this taxon (Plate 31). *Lysimachia arvensis* was recorded within one community; CLP-EW1.



Plate 31: *Lysimachia arvensis* (Pimpernel)

4.5.6 *Pentameris airoides*

No description is available for this taxon (Plate 32). *Pentameris airoides* was identified in one community; CLP-EW1.



Plate 32: *Pentameris airoides* (False Hairgrass) (DPIRD, 2017)

4.5.7 *Rostraria pumila* (Roughtail)

This taxon is described as a tufted annual, grass-like or herb, that grows between 0.05-0.2m high (Plate 33). It produces green flowers from July to October. It grows in grey, black or red sand, sandy clay, clay and limestone. It is a weed of roadsides, sand dunes and cliff slopes (WAHERB, 2017). *Rostraria pumila* was identified in one community; CLP-EW1.



Plate 33: *Rostraria pumila* (Roughtail)

4.5.8 *Sonchus oleraceus* (Common Sowthistle)

This taxon is described as an erect, annual herb that can grow to 1.5m high (Plate 34). It produces yellow flowers from January to December. It grows in variety of soils, and is a weed of waste places and disturbed ground (WAHERB, 2017). *Sonchus oleraceus* was identified in four communities: CLP-EW1, CLP-MWS1, RH-OS1 and HS-EW1.



Plate 34: *Sonchus oleraceus* (Common Sowthistle)

4.5.9 *Vulpia ?muralis*

This taxon is described as a slender annual, grass-like or herb, that grows to 0.6m high (Plate 35). It produces flowers from August to December (WAHERB, 2017). *Vulpia ?muralis* was identified in one vegetation community; CLP-MWS1.



Plate 35: *Vulpia muralis* (Silver Grass-Wall Fescue) (DPIRD, 2017)

4.6 Floristic Composition of the Medcalf Vanadium Mining Project Quadrats

This analysis was used to determine the similarities or differences between vegetation types. Appendix 7 provides the dendrogram and ordination graph for all generated from the PATN statistical analysis. A list of the 127 quadrats and their respective vegetation communities are provided in Table 26 below. The PATN analysis produced a stress value of 0.2856.

Table 26: Vegetation communities with corresponding quadrats

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Quadrat
Closed Depression	Chenopod Shrublands, Samphire Shrublands and Forblands (MVG 22)	Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa	CD-CSSSF1	Q103, Q104, Q124
Clay-Loam Plain	Eucalypt Woodlands (MVG 5)	Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain	CLP-EW1	Q2, Q3, Q4, Q6, Q8, Q9, Q11, Q15, Q24, Q27, Q28, Q32, Q35, Q39, Q66, Q78, Q83, Q84, Q85, Q88, Q89, Q92, Q95, Q96, Q99, Q100, Q102, Q110, Q113, Q113, Q144, Q115, Q116, Q118, Q119, Q121, Q122
	Mallee Woodlands and Shrublands (MVG 14)	Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	CLP-MWS1	Q7, Q10, Q12, Q18, Q19, Q20, Q29, Q30, Q31, Q34, Q37, Q38, Q40, Q41, Q69, Q74, Q75, Q77, Q79, Q80, Q81, Q86, Q87, Q90, Q91, Q106, Q109
		Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	CLP-MWS2	Q94, Q97, Q101, Q105, Q111, Q112
Granite Outcrop	Heathlands (MVG 18)	Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop	G-H1	Q123, Q125, Q127
Hillslope	Eucalypt Woodlands (MVG 5)	Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope	HS-EW1	Q54, Q59, Q61
	Mallee Woodlands and Shrublands (MVG 14)	Regrowth mid open mallee woodland <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	HS-MWS1	Q1, Q5, Q13, Q14, Q16, Q17, Q21, Q22, Q23, Q25, Q26, Q33, Q36, Q55, Q56, Q58, Q60, Q62
		Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	HS-MWS2	Q71, Q72
		Mid open mallee woodland <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	HS-MWS3	Q63, Q64, Q65, Q67, Q68, Q70

Landform	NVIS Vegetation Group	Floristic Community	Vegetation Code	Quadrat
	Other Shrublands (MVG 17)	Regrowth mixed low shrubland on hillslope	HS-OS1	Q42, Q43, Q44, Q45, Q46, Q47, Q48, Q49, Q50, Q51, Q52, Q53, Q57
Sand-Loam Plain	Eucalypt Woodlands (MVG 5)	Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	SLP-EW1	Q117, Q120, Q126
	Mallee Woodlands and Shrublands (MVG 14)	Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain	SLP-MWS1	Q93, Q98, Q107, Q108
		Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia</i> / <i>Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain	SLP-MWS2	Q76, Q82
	Other Shrublands (MVG 17)	Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia</i> / <i>Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	SLP-OS1	Q73

Two 'supergroups' were identified in the PATN analysis:

1. Hillslopes (mallee woodland and shrubland), sand-loam plain (other shrubland/ eucalypt woodland/ mallee woodland and shrubland), granite outcrop (other shrubland) and closed depression (chenopod/ samphire shrubland), clay-loam plain (mallee woodland and shrubland).
2. Hillslopes (eucalypt woodland/ other shrubland), clay-loam plain (eucalypt woodland/ mallee woodland and shrubland), sand-loam plain (mallee woodland and shrubland).

The first supergroup was divided into eight floristic groups, comprising of quadrats from each of the five different landform types and major vegetation groups. The hillslopes communities (mallee woodland and shrubland), were divided into three groups, intermixed with quadrats from the clay-loam plain communities. The clay-loam plain communities were divided into four groups. The sand-loam plain (other shrubland/ eucalypt woodland/ mallee woodland and shrubland) communities were divided into four groups, also intermixed with quadrats from the clay-loam plain communities. The granite outcrop and closed depression community quadrats were grouped separately from all other quadrats.

The second group was divided into six floristic groups, comprising of quadrats from three different landform types (hillslopes, clay-loam plain and sand-loam plain) and three major vegetation groups (eucalypt woodland, other shrubland and mallee woodland and shrubland).

Based on the results of the PATN analysis, there was minimal heterogeneity in species composition across the survey area, with majority of vegetation types intermixed into floristic groups despite differences in both dominant stratum taxa and landform. The two super groups were highly mixed including quadrats from all the different landforms and major vegetation groups.

4.6.1 Species Richness and accumulation estimates

The Chaos 2 richness estimator provided an estimated species richness of 205 species in 127 sample sites (quadrats). Species richness recorded for the 117 quadrats surveyed was 221 species (including annuals) which indicates survey intensity was adequate.

A species accumulation curve was created to display the rate of species accumulation. The R^2 value (0.95) suggests that the data “fits” the species accumulation curve shown in Figure 14. The rate of species accumulation for the first 20 quadrats ranged from seven to three species per quadrat. The rate of species accumulation between 20-45 quadrats was two species per quadrat. Species accumulation reduced to ≤ 1 species per quadrat as quadrat number increased above 100. BC has determined that according to this data a sufficient number of quadrats were established in the survey area to adequately assess the floristic composition of the area.

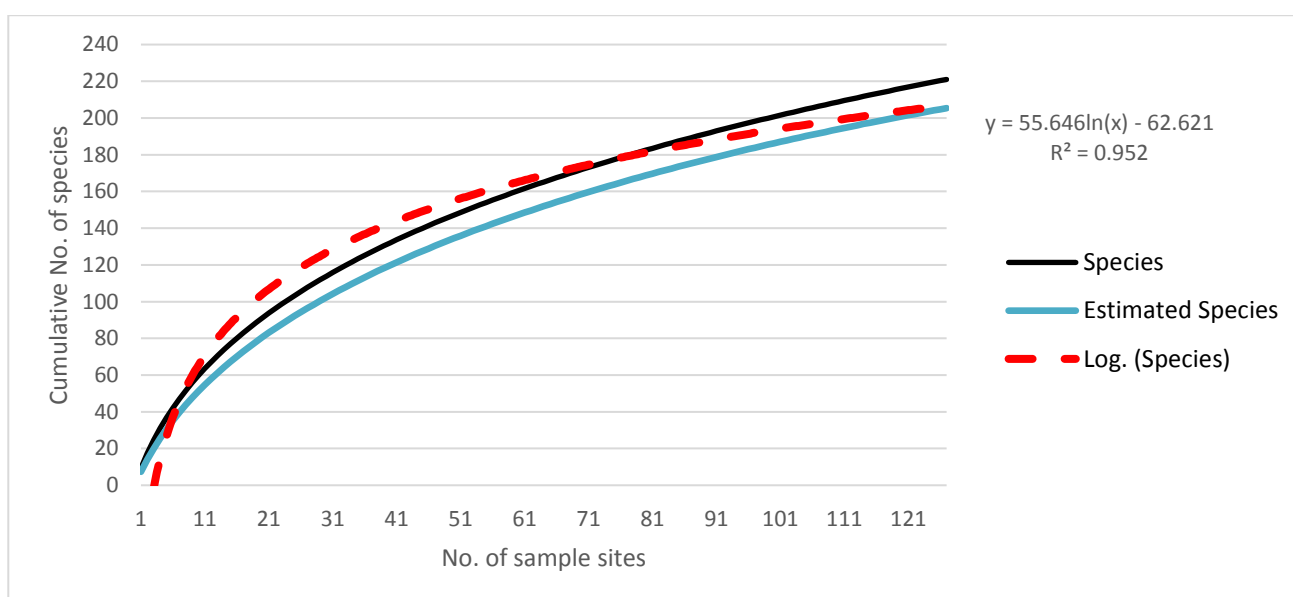


Figure 14: Species accumulation curve

4.7 Vegetation of Conservation Significance

4.7.1 Matters of National Environmental Significance

None of the following matters of national environmental significance as defined by the Commonwealth EPBC Act were identified within the survey area:

- world heritage properties
- national heritage places
- wetlands of international importance (often called ‘Ramsar’ wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining) a water resource, in relation to coal seam gas development and large coal mining development.

4.7.2 Matters of State Environmental Significance

There are no wetlands of national importance (ANCA Wetlands) or conservation category wetlands within the survey area. The survey area does not contain any TEC as listed under the WC Act or EP Act. One Threatened Flora taxon listed under the WC Act was recorded within the survey area. The survey area contains ESA which occur within a 50m radius of each Threatened Flora plant (covering an area of 19.7 ha), listed under the EP Act. One un-named Class A Nature Reserve (Identifier R 42943) managed by DBCA is located within the eastern extremity of the survey area (approximately 301 ha of the survey area). This Nature Reserve is also listed as a Schedule 1 Area under the EP Act.

Approximately 2236 ha of the western extremity of the survey area is located within the *Bremer Range Vegetation Complexes* PEC1 as listed by DBCA. Ten Priority Flora taxa were recorded within the survey area.

A map showing areas of conservation significance in relation to the survey area is provided in Appendix 1.

5 Summary

Fourteen floristic communities were identified within the survey area. These communities were located within five different landform types and comprised of five major vegetation groups, which were represented by a total of 58 Families, 162 Genera and 411 Taxa.

One Threatened Flora taxon; *Marianthus aquilonaris*, listed under State legislation were recorded within the survey area. This taxon is not listed as Threatened under or Commonwealth legislation. Ten Priority Flora taxa as listed by DBCA were identified within the survey area.

No TEC pursuant to State or Commonwealth legislation were identified within the survey area. The survey area does not contain any world or national heritage places, wetlands of international or national importance. Approximately 2236 ha of the western extremity of the survey area is located within the *Bremer Range Vegetation Complexes* PEC1 as listed by DBCA. The survey area contains ESA which occur within a 50m radius of each Threatened Flora plant (covering an area of 19.7 ha), listed under the EP Act. One un-named Class A Nature Reserve (Identifier R 42943) managed by DBCA is located within the eastern extremity of the survey area (approximately 301 ha of the survey area). This Nature Reserve is also listed as a Schedule 1 Area under the EP Act.

Desktop assessments indicate the survey area has potential to include five terrestrial Groundwater Dependent Ecosystems, only one of which is considered to be of high potential for groundwater interaction; bare areas; salt lakes.

Vegetation condition in the survey area ranged from 'good' to 'very good'. Nine introduced species were identified within the survey area.

6 Bibliography

Armstrong, (2012), *Vegetation Survey and Rare Flora search on the Vesuvius Prospect Medcalf Project* Unpublished report prepared for Audalia Resources Limited. Paul Armstrong and Associates.

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

Australian Government (2012), *Atlas of Groundwater Dependent Ecosystems (GDE Atlas), Phase 2 Task 5 Report: Identifying and mapping GDEs*. Prepared by Sinclair Knight Merz.

BC (2013), *Flora of Conservation Significance search of the Medcalf Exploration Project*, May 2013, Botanica Consulting, June 2013

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

BoM, (2017a), *Norseman Aero rainfall station (#12009)*, Bureau of Meteorology
<http://www.bom.gov.au/climate/data/>
Accessed: 23/10/2017

BoM, (2017b), *Atlas of Groundwater Dependent Ecosystems*, Bureau of Meteorology
<http://www.bom.gov.au/water/groundwater/gde/map.shtml>
Accessed: 22/10/2017

Brearley, D.R, Dunlop, N.J and Osborne, J.M, *Biological Survey and Environmental Assessment of the Emily Ann Project Area*. School of Environmental Biology Curtin University of Technology

Campbell, R., Billing, N., Northcote, K., Hubble, G., Isbell, R., Thompson, C., and Bettenay, E., (1975), *A description of Australian Soils*, Canberra: C.S.I.R.O. Division of Soils.

Chinnock, R.J., (2007), *Eremophila and allied Genera – A Monograph of the Myoporaceae*, Rosenberg Publishing Pty. Ltd. NSW.

Cousens, R.D., Dodd, J., Lloyd, S.G., Hussey, B.M.J., and Keighery, G.J. (1997), *Western Weeds – A guide to weeds of Western Australia*, The Plant Protection society of Western Australia, Victoria Park

Cowan, M., Graham, G. & McKenzie, N. (2001). Coolgardie 2 (COO2 – Southern Cross subregion) In *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Department of Conservation and Land Management

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

DAFWA (2011), *Pre-European Vegetation - Western Australia (NVIS Compliant Version GIS file)*, Department of Agriculture and Food Western Australia.

DAFWA (2014), *Soil Landscape System of Western Australia*, Department of Agriculture and Food Western Australia.

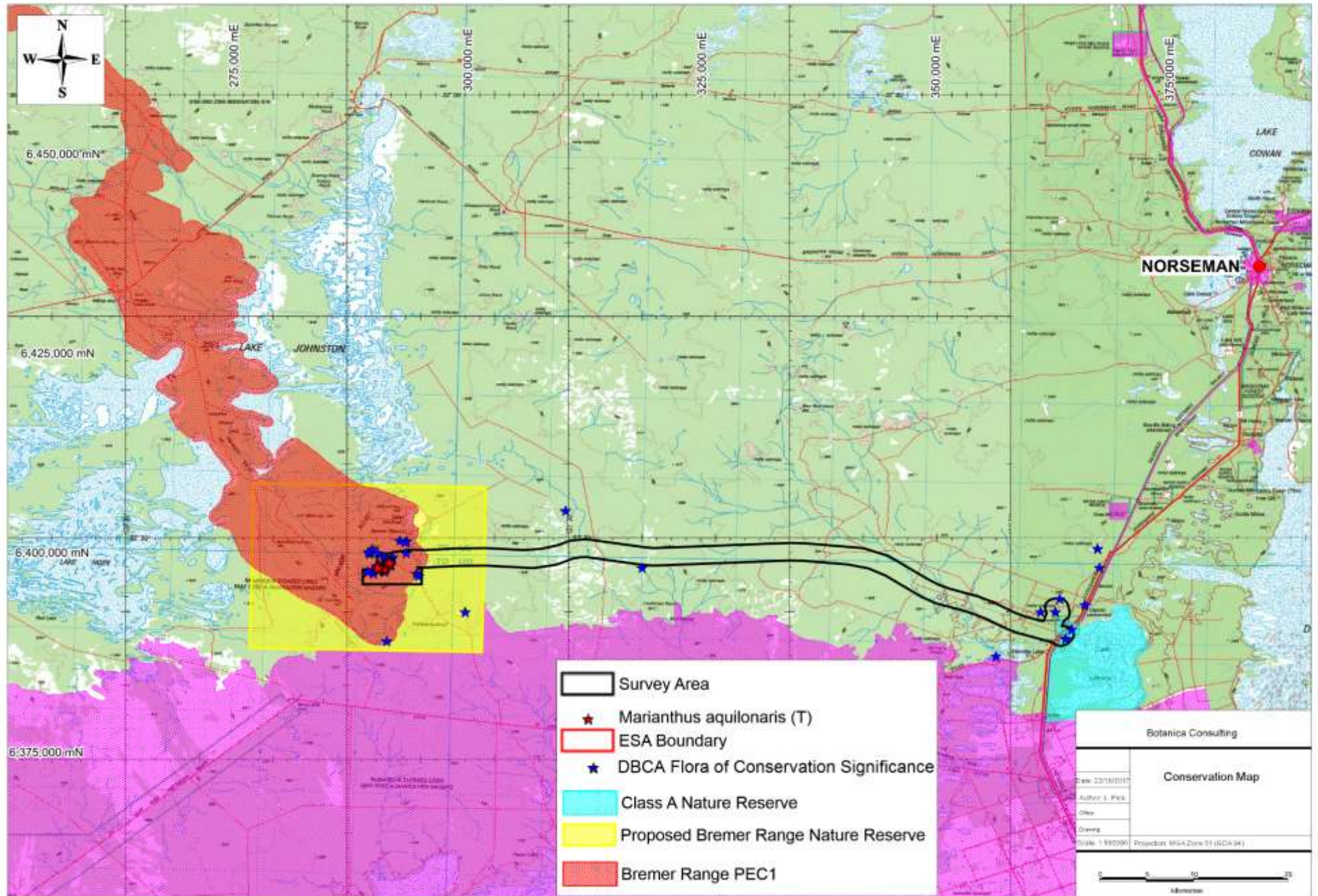
DPIRD (2017), *Declared Organism-database search*, Department of Primary Industries and Regional Development, Western Australia.
<http://www.biosecurity.wa.gov.au/>
Accessed: 20/10/2017

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

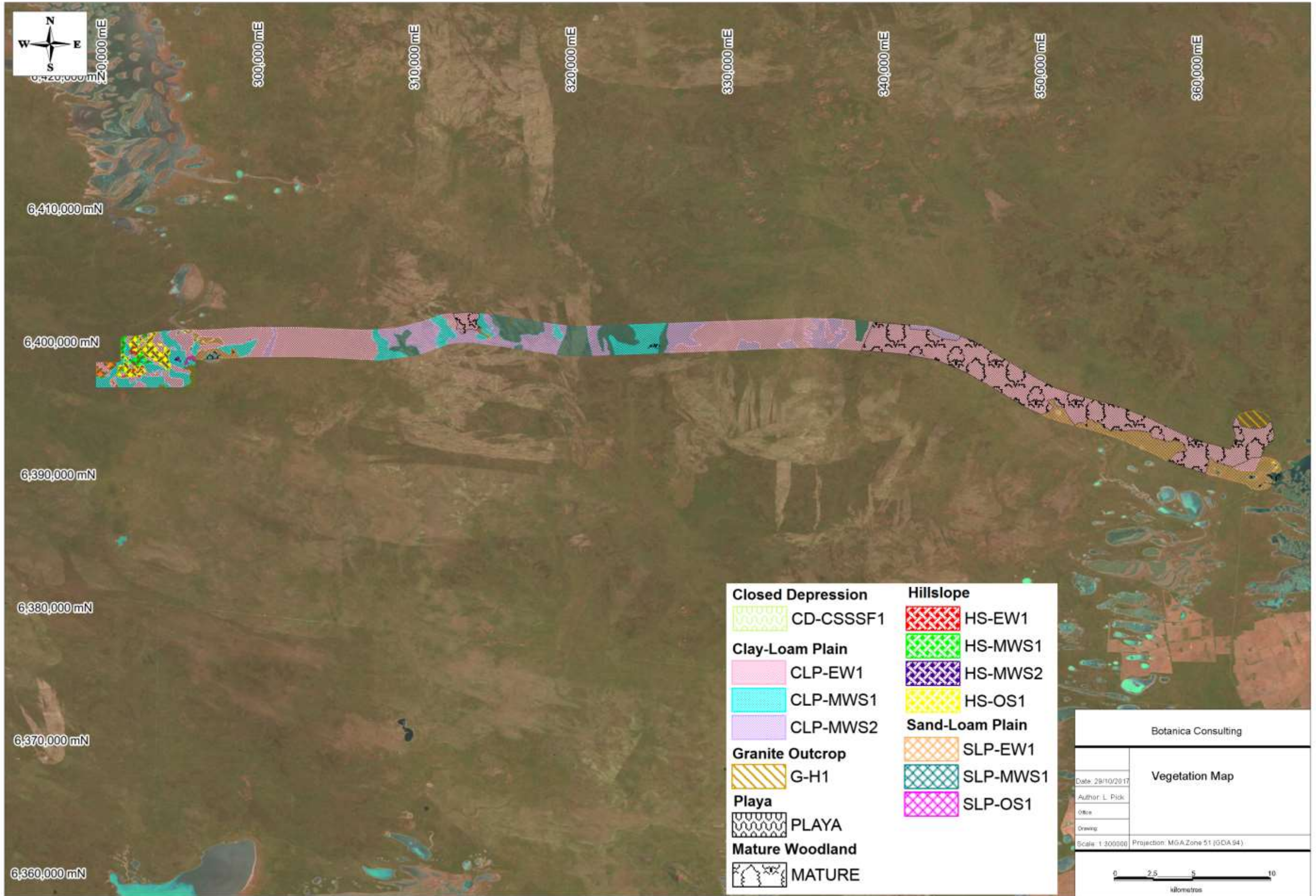
- DotEE, (2017a), *Protected Matters Search Tool, Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment
- DotEE, (2017b), *National Vegetation Information System (NVIS) Major Vegetation Groups, Version 4.2*, Department of the Environment and Energy
- DEC, (2010), *Interim recovery plan No. 303 Bremer Marianthus (Marianthus aquilonaris) Interim Recovery Plan 2010-2014*. Department of Environment and Conservation
- DEC, (2011), *A biodiversity and cultural conservation strategy for the Great Western Woodlands*, Department of Environment and Conservation
- DPaW (2015), *2015 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis)*. Department of Parks and Wildlife
- DPaW, (2017a), *Threatened and Priority Flora Database search results*, Department of Parks and Wildlife
- DPaW, (2017b), *Threatened Ecological Community and Priority Ecological Community database search*, Department of Parks and Wildlife
- DPaW (2017c), *Nature Map Database search*, Department of Parks and Wildlife.
- DPaW & EPA (2016), *Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016*. Department of Parks and Wildlife & Environmental Protection Authority.
- Geoscience Australia (2017), *Groundwater Dependent Ecosystems*. Australian Government
<http://www.ga.gov.au/scientific-topics/water/groundwater/understanding-groundwater-resources/groundwater-dependant-ecosystems>
Accessed: 23/06/2017
- Gibson, N. & Lyons, M.N (1998), *Flora and Vegetation of the Eastern Goldfields Ranges: Part 2. Bremer Range*, Journal of the Royal Society of Western Australia, 81:107-117.
- How, R.A, Newbey, K.R, Dell, J., Muir, B.G & Hnatiuk, R.J, (1988), *The Biological survey of the Eastern Goldfields of Western Australia: Part 4. Lake Johnston-Hyden Study Area* Western Australian Museum Supplement No. 30.
- IUCN, (2008), *Guidelines for Applying Protected Area Management Categories*. International Union for Conservation of Nature
- IUCN (2016), *The IUCN Red List of Threatened Species. Version 2016-3*. International Union for Conservation of Nature.
- Landgate, (2017), *Landgate fire watch database*. Landgate Western Australian Government
http://firewatch.landgate.wa.gov.au/landgate_firewatch_public.asp
Accessed: 29/06/2017
- McKenzie, N.L., May J.E. and McKenna, S, (2002) *Bioregional Summary of the 2002 Biodiversity Audit for Western Australia*.
- Mc Donald, R.C, Isbell, R.F & Speight, J.G (1998), *Australian Soil and Land Survey Field Handbook (3rd edn)*. CSIRO Publishing: Melbourne.
- Tille, P. (2006), *Soil Landscapes of Western Australia's Rangelands and Arid Interior*, Department of Agriculture and Food Western Australia.
- WAHERB, (2017), *Florabase – Information on the Western Australian Flora*, Department of Biodiversity, Conservation and Attractions
<http://florabase.dbcawa.gov.au>
Accessed 29/09/2017

Watson, A., Judd, S., Watson J., Lam, A. and Mackenzie, D., (2008) *The Extraordinary Nature of The Great Western Woodlands*. The Wilderness Society of WA

Appendix 1: Regional map of the survey area including DBCA Flora of Conservation Significance and areas of Conservation Significance



Appendix 2: Vegetation maps of the survey area





6,405,000 mN

295,000 mE

300,000 mE

305,000 mE

6,400,000 mN

6,395,000 mN

6,390,000 mN



Closed Depression	Hillslope
CD-CSSSF1	HS-EW1
Clay-Loam Plain	HS-MWS1
CLP-EW1	HS-MWS2
CLP-MWS1	HS-OS1
CLP-MWS2	Sand-Loam Plain
Granite Outcrop	SLP-EW1
G-H1	SLP-MWS1
Playa	SLP-OS1
PLAYA	

Botanica Consulting	
Vegetation Map 1	
Date: 29/10/2017	
Author: L. Pick	
Office:	
Drawing:	
Scale: 1:75000	Projection: MGA Zone 51 (GDA 94)



310,000 mE

315,000 mE

320,000 mE

325,000 mE

6,405,000 mN

6,400,000 mN

6,395,000 mN



Closed Depression	Hillslope
CD-CSSSF1	HS-EW1
Clay-Loam Plain	HS-MWS1
CLP-EW1	HS-MWS2
CLP-MWS1	HS-OS1
CLP-MWS2	Sand-Loam Plain
Granite Outcrop	SLP-EW1
G-H1	SLP-MWS1
Playa	SLP-OS1
PLAYA	

Botanica Consulting	
Vegetation Map 2	
Date: 29/10/2017	
Author: L. Pick	
Office	
Drawing	
Scale: 1:75000	Projection: MGA Zone 51 (GDA 94)



335,000 mE

340,000 mE

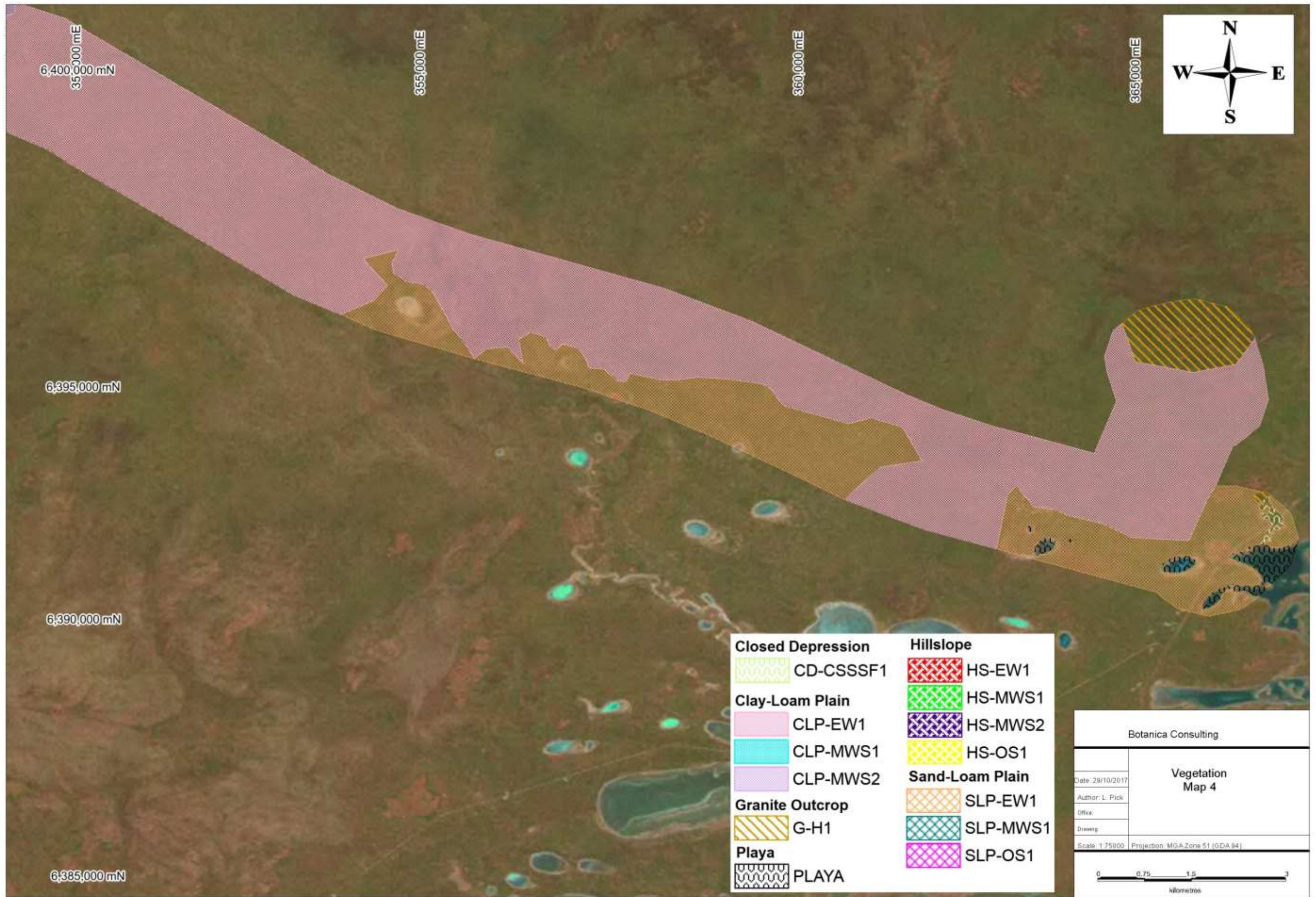
345,000 mE

6,400,000 mN

6,395,000 mN

Botanica Consulting	
Vegetation Map 3	
Date: 29/10/2017	
Author: L. Pick	
Office:	
Drawing:	
Scale: 1:75000	Projection: MGA Zone 51 (GDA 94)

Closed Depression		Hillslope	
	CD-CSSSF1		HS-EW1
	CLP-EW1		HS-MWS1
	CLP-MWS1		HS-MWS2
	CLP-MWS2		HS-OS1
	Granite Outcrop G-H1		SLP-EW1
	Playa PLAYA		SLP-MWS1
			SLP-OS1



Appendix 3: List of species identified within each floristic community

(A) Blue text Denotes Annual species; (W) Green text Denotes Introduced species; (T/P) Red text Denotes Flora of Conservation Significance.

Family	Genus	Taxon	CD-CSSSF1	CLP-EW1	CLP-MWS1	CLP-MWS2	G-H1	HS-EW1	HS-MWS1	HS-MWS2	HS-MWS3	HS-OS1	SLP-EW1	SLP-MWS1	SLP-MWS2	SLP-OS1
Aizoaceae	<i>Disphyma</i>	<i>crassifolium</i>	*			*	*									
Amaranthaceae	<i>Ptilotus</i>	<i>holosericeus</i>		*												
Apiaceae	<i>Platysace</i>	<i>trachymenioides</i>				*										
Apiaceae	<i>Platysace</i>	<i>maxwellii</i>								*						
Apocynaceae	<i>Alyxia</i>	<i>buxifolia</i>		*	*	*			*				*			
Asparagaceae	<i>Lomandra</i>	<i>effusa</i>		*		*							*			
Asphodelaceae	<i>Asphodelus</i>	<i>fistulosus</i> (W)		*												
Asphodelaceae	<i>Bulbine</i>	<i>semibarbata</i> (A)		*					*							
Asteraceae	<i>Asteridea</i>	<i>athrxioides</i> (A)		*	*	*		*	*			*				
Asteraceae	<i>Blennospora</i>	<i>drummondii</i> (A)							*							
Asteraceae	<i>Calotis</i>	<i>hispidula</i> (A)		*					*							
Asteraceae	<i>Centaurea</i>	<i>melitensis</i> (W)										*				
Asteraceae	<i>Cratystylis</i>	<i>conocephala</i>											*			
Asteraceae	<i>Leiocarpa</i>	<i>semicalva</i> subsp. <i>semicalva</i>		*												
Asteraceae	<i>Leucochrysum</i>	<i>fitzgibbonii</i> (A)		*												
Asteraceae	<i>Millotia</i>	<i>major</i> (A)											*			
Asteraceae	<i>Millotia</i>	<i>tenuifolia</i> var. <i>tenuifolia</i> (A)							*							
Asteraceae	<i>Olearia</i>	<i>muelleri</i>		*	*	*		*					*			
Asteraceae	<i>Olearia</i>	<i>ramosissima</i>		*		*							*			
Asteraceae	<i>Olearia</i>	sp. Kennedy Range (G. Byrne 66)										*				
Asteraceae	<i>Olearia</i>	<i>subspicata</i>				*										
Asteraceae	<i>Podolepis</i>	<i>capillaris</i> (A)	*	*	*	*										
Asteraceae	<i>Podotheca</i>	<i>gnaphalioides</i> (A)							*							
Asteraceae	<i>Rhodanthe</i>	<i>pygmaea</i> (A)		*												
Asteraceae	<i>Senecio</i>	<i>pinnatifolius</i>										*				
Asteraceae	<i>Senecio</i>	<i>quadridentatus</i>		*												
Asteraceae	<i>Sonchus</i>	<i>oleraceus</i> (W)		*	*			*				*				
Asteraceae	<i>Waitzia</i>	<i>acuminata</i> (A)		*			*		*							
Asteraceae	<i>Waitzia</i>	<i>fitzgibbonii</i> (A)		*												
Boraginaceae	<i>Halgania</i>	<i>andromedifolia</i>		*	*	*							*			
Boraginaceae	<i>Halgania</i>	<i>cyanea</i>										*				
Boraginaceae	<i>Halgania</i>	<i>integerrima</i>		*		*			*	*	*			*	*	*

Family	Genus	Taxon	CD-CSSSF1	CLP-EW1	CLP-MWS1	CLP-MWS2	G-H1	HS-EW1	HS-MWS1	HS-MWS2	HS-MWS3	HS-OS1	SLP-EW1	SLP-MWS1	SLP-MWS2	SLP-OS1
Goodeniaceae	<i>Anthotium</i>	<i>rubriflorum</i>												*		
Goodeniaceae	<i>Cooperhookia</i>	<i>strophiolata</i>		*		*					*					
Goodeniaceae	<i>Dampiera</i>	<i>angulata</i>		*	*				*		*					*
Goodeniaceae	<i>Dampiera</i>	<i>angulata</i> subsp. Peak Charles (K.R. Newbey 5402)			*	*			*			*				*
Goodeniaceae	<i>Goodenia</i>	<i>affinis</i>		*												
Goodeniaceae	<i>Goodenia</i>	<i>concinna</i>			*											
Goodeniaceae	<i>Goodenia</i>	<i>dyeri</i> (A)		*	*				*			*				
Goodeniaceae	<i>Goodenia</i>	<i>krauseana</i> (A)									*					
Goodeniaceae	<i>Goodenia</i>	<i>pinifolia</i>		*	*	*			*		*		*			
Goodeniaceae	<i>Goodenia</i>	<i>scapigera</i> subsp. <i>scapigera</i>							*							
Goodeniaceae	<i>Scaevola</i>	<i>restiacea</i> subsp. <i>restiacea</i>		*		*										
Goodeniaceae	<i>Scaevola</i>	<i>spinescens</i>		*	*	*		*	*				*		*	
Goodeniaceae	<i>Scaevola</i>	<i>bursariifolia</i>		*												
Gyrostemonaceae	<i>Codonocarpus</i>	<i>cotinifolius</i>								*		*				*
Gyrostemonaceae	<i>Gyrostemon</i>	<i>racemiger</i>											*			
Haloragaceae	<i>Glischrocaryon</i>	<i>flavescens</i>		*										*		
Haloragaceae	<i>Glischrocaryon</i>	<i>roei</i>		*					*		*					
Hemerocallidaceae	<i>Dianella</i>	<i>revoluta</i> var. <i>divaricata</i>		*	*		*		*	*					*	*
Lamiaceae	<i>Hemigenia</i>	<i>teretiuscula</i>			*											
Lamiaceae	<i>Hemigenia</i>	<i>westringioides</i>									*					
Lamiaceae	<i>Prostanthera</i>	<i>grylloana</i>		*												*
Lamiaceae	<i>Prostanthera</i>	<i>althoferi</i>					*									
Lamiaceae	<i>Prostanthera</i>	<i>serpyllifolia</i> subsp. <i>microphylla</i>				*										
Lamiaceae	<i>Teucrium</i>	<i>sp. dwarf</i> (R. Davis 8813) (P1)		*	*						*	*				*
Lamiaceae	<i>Teucrium</i>	<i>sp. Norseman</i> (T.E.H. Aplin 1851)		*								*				
Lamiaceae	<i>Westringia</i>	<i>cephalantha</i>		*	*	*			*		*	*			*	
Lamiaceae	<i>Westringia</i>	<i>rigida</i>		*	*	*	*						*		*	
Lauraceae	<i>Cassytha</i>	<i>melantha</i>				*								*		
Lauraceae	<i>Cassytha</i>	<i>racemosa</i>		*	*				*					*		
Loganiaceae	<i>Phyllangium</i>	<i>sulcatum</i>				*										
Loranthaceae	<i>Amyema</i>	<i>miquelii</i>		*												
Malvaceae	<i>Alyogyne</i>	<i>hakeifolia</i>		*	*			*				*				
Malvaceae	<i>Androcalva</i>	<i>luteiflora</i>	*	*	*											
Malvaceae	<i>Commersonia</i>	<i>craurophylla</i>		*	*				*	*		*				

Family	Genus	Taxon	CD-CSSSF1	CLP-EW1	CLP-MWS1	CLP-MWS2	G-H1	HS-EW1	HS-MWS1	HS-MWS2	HS-MWS3	HS-OS1	SLP-EW1	SLP-MWS1	SLP-MWS2	SLP-OS1
Poaceae	<i>Austrostipa</i>	<i>acrociliata</i>		*	*			*	*			*				
Poaceae	<i>Austrostipa</i>	<i>elegantissima</i>	*	*		*										
Poaceae	<i>Austrostipa</i>	<i>exilis</i>		*	*				*			*				
Poaceae	<i>Austrostipa</i>	<i>hemipogon</i>		*		*							*			
Poaceae	<i>Austrostipa</i>	<i>nitida</i>		*												
Poaceae	<i>Austrostipa</i>	<i>variabilis</i>		*	*							*				
Poaceae	<i>Bromus</i>	<i>arenarius</i> (A)							*							
Poaceae	<i>Bromus</i>	<i>rubens</i> (W)										*				
Poaceae	<i>Eragrostis</i>	<i>falcata</i>	*													
Poaceae	<i>Neurachne</i>	<i>alopecuroidea</i>					*									
Poaceae	<i>Pentameris</i>	<i>airoides</i> (W)		*												
Poaceae	<i>Rostraria</i>	<i>pumila</i> (W)		*												
Poaceae	<i>Rytidosperma</i>	<i>caespitosum</i>		*												
Poaceae	<i>Triodia</i>	<i>irritans</i>		*		*										
Poaceae	<i>Triodia</i>	<i>scariosa</i>								*					*	
Poaceae	<i>Vulpia</i>	<i>?muralis</i> (W)			*											
Polygalaceae	<i>Comesperma</i>	<i>volubile</i>			*	*			*							
Polygalaceae	<i>Muehlenbeckia</i>	<i>adpressa</i>		*												
Portulacaceae	<i>Calandrinia</i>	<i>eremaea</i> (A)							*							
Portulacaceae	<i>Calandrinia</i>	<i>quadri-valvis</i> (A)									*					
Primulaceae	<i>Lysimachia</i>	<i>arvensis</i> (W)		*												
Proteaceae	<i>Banksia</i>	<i>elderiana</i>											*	*		
Proteaceae	<i>Banksia</i>	<i>laevigata</i> subsp. <i>fuscolutea</i>												*		
Proteaceae	<i>Banksia</i>	<i>media</i>											*			
Proteaceae	<i>Grevillea</i>	<i>cagiana</i>											*	*		
Proteaceae	<i>Grevillea</i>	<i>decipiens</i>												*		
Proteaceae	<i>Grevillea</i>	<i>excelsior</i>												*		
Proteaceae	<i>Grevillea</i>	<i>huegelii</i>		*		*									*	
Proteaceae	<i>Grevillea</i>	<i>oligantha</i>												*		
Proteaceae	<i>Grevillea</i>	<i>oncogyne</i>		*		*			*					*		
Proteaceae	<i>Grevillea</i>	<i>pterosperma</i>												*		
Proteaceae	<i>Grevillea</i>	<i>acuaria</i>		*	*	*			*					*		
Proteaceae	<i>Hakea</i>	<i>erecta</i>				*										
Proteaceae	<i>Hakea</i>	<i>pendens</i> (P3)		*	*				*			*				

Family	Genus	Taxon	CD-CSSSF1	CLP-EW1	CLP-MWS1	CLP-MWS2	G-H1	HS-EW1	HS-MWS1	HS-MWS2	HS-MWS3	HS-OS1	SLP-EW1	SLP-MWS1	SLP-MWS2	SLP-OS1
Proteaceae	<i>Hakea</i>	<i>francisiana</i>									*					
Proteaceae	<i>Hakea</i>	<i>multilineata</i>												*		
Proteaceae	<i>Hakea</i>	<i>scoparia</i>											*			
Proteaceae	<i>Hakea</i>	<i>subsulcata</i>			*				*		*			*		
Proteaceae	<i>Isopogon</i>	<i>scabriusculus</i> subsp. <i>pubifloris</i>											*	*		
Proteaceae	<i>Persoonia</i>	<i>coriacea</i>									*			*		
Proteaceae	<i>Persoonia</i>	<i>helix</i>									*		*	*		
Proteaceae	<i>Persoonia</i>	<i>teretifolia</i>		*										*		
Proteaceae	<i>Petrophile</i>	<i>aculeata</i>											*			
Proteaceae	<i>Petrophile</i>	<i>scabriuscula</i>												*		
Proteaceae	<i>Petrophile</i>	<i>stricta</i>											*			
Pteridaceae	<i>Cheilanthes</i>	<i>sieberi</i> subsp. <i>sieberi</i>					*									
Restionaceae	<i>Desmocladius</i>	<i>myriocladus</i>											*			
Rhamnaceae	<i>Cryptandra</i>	<i>graniticola</i>			*				*							
Rhamnaceae	<i>Pomaderris</i>	<i>forrestiana</i>		*		*										
Rhamnaceae	<i>Spyridium</i>	<i>mucronatum</i> subsp. <i>mucronatum</i>				*										
Rhamnaceae	<i>Stenanthemum</i>	<i>bremereense</i> (P4)		*	*				*		*	*				
Rhamnaceae	<i>Stenanthemum</i>	<i>stipulosum</i>			*				*			*				
Rhamnaceae	<i>Trymalium</i>	<i>myrtillus</i> subsp. <i>myrtillus</i>		*	*				*			*				
Rutaceae	<i>Beyeria</i>	<i>sulcata</i> var. <i>brevipes</i>											*			
Rutaceae	<i>Boronia</i>	<i>inornata</i> subsp. <i>inornata</i>		*	*								*			
Rutaceae	<i>Boronia</i>	<i>ternata</i> var. <i>austrofoliosa</i>		*												
Rutaceae	<i>Boronia</i>	<i>ternata</i> var. <i>ternata</i>											*			
Rutaceae	<i>Drummondita</i>	<i>hassellii</i>				*								*		
Rutaceae	<i>Geijera</i>	<i>linearifolia</i>		*												
Rutaceae	<i>Microcybe</i>	<i>multiflora</i> subsp. <i>multiflora</i>			*	*										
Rutaceae	<i>Microcybe</i>	sp. Windy Hill (G.F. Craig 6583) (P3)			*							*				
Rutaceae	<i>Phebalium</i>	<i>filifolium</i>			*	*			*				*	*		
Rutaceae	<i>Phebalium</i>	<i>elegans</i>		*												
Rutaceae	<i>Phebalium</i>	<i>lepidotum</i>				*										
Rutaceae	<i>Phebalium</i>	<i>tuberculosum</i>							*							
Rutaceae	<i>Philothea</i>	<i>gardneri</i>		*	*				*							
Rutaceae	<i>Philothea</i>	<i>tomentella</i>				*								*		
Santalaceae	<i>Exocarpos</i>	<i>aphyllus</i>		*	*	*			*							

Family	Genus	Taxon	CD-CSSSF1	CLP-EW1	CLP-MWS1	CLP-MWS2	G-H1	HS-EW1	HS-MWS1	HS-MWS2	HS-MWS3	HS-OS1	SLP-EW1	SLP-MWS1	SLP-MWS2	SLP-OS1
Thymelaeaceae	<i>Pimelea</i>	<i>microcephala</i>		*					*			*				
Urticaceae	<i>Parietaria</i>	<i>cardiostegia (A)</i>		*												
Violaceae	<i>Hybanthus</i>	<i>floribundus</i> subsp. <i>curvifolius</i>		*					*				*	*		
Zygophyllaceae	<i>Zygophyllum</i>	<i>apiculatum</i>		*												
Zygophyllaceae	<i>Zygophyllum</i>	<i>fruticosum</i>		*	*							*				

Appendix 4: GPS coordinates of Flora of Conservation Significance locations within the survey area (GDA94)

Taxon	Conservation Code	Zone	Easting	Northing
<i>Acacia hystrix</i> subsp. <i>continua</i>	P1	51 H	364311	6394178
<i>Acacia hystrix</i> subsp. <i>continua</i>	P1	51 H	364335	6394103
<i>Acacia hystrix</i> subsp. <i>continua</i>	P1	51 H	364339	6394087
<i>Acacia hystrix</i> subsp. <i>continua</i>	P1	51 H	364354	6394034
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	295411	6397060
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	295433	6397555
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296307	6396725
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296363	6396733
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296386	6396723
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296394	6397291
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296428	6397334
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296433	6397082
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296439	6397020
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296440	6396991
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	306326	6400407
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	306502	6400342
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	307693	6400484
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	312480	6401508
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	312573	6401535
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	313214	6401540
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	313817	6401400
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	314200	6401441
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	314200	6401441
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	331116	6400733
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	331633	6400290
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	331886	6400229
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	333452	6400766
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	333988	6401082
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	294648	6397759
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	294897	6397313
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	295970	6397770
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	296060	6397855
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	307955	6400171
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	307781	6400297
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	300733	6400801
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	300121	6400797
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	334495	6401106
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	334673	6401204
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	335141	6401241
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	339038	6401272
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	P3	51 H	339405	6401261
<i>Bossiaea flexuosa</i>	P3	51 H	293485	6398566
<i>Brachyloma stenolobum</i>	P1	51 H	318841	6401265
<i>Eucalyptus pterocarpa</i>	P4	51 H	314356	6401382
<i>Eucalyptus rhomboidea</i>	P4	51 H	292585	6398227
<i>Eucalyptus rhomboidea</i>	P4	51 H	292553	6398284
<i>Eucalyptus rhomboidea</i>	P4	51 H	292566	6398288
<i>Eucalyptus rhomboidea</i>	P4	51 H	292567	6398247
<i>Eucalyptus rhomboidea</i>	P4	51 H	292569	6398282
<i>Eucalyptus rhomboidea</i>	P4	51 H	292584	6398231
<i>Eucalyptus rhomboidea</i>	P4	51 H	292584	6398639
<i>Eucalyptus rhomboidea</i>	P4	51 H	292602	6398639
<i>Eucalyptus rhomboidea</i>	P4	51 H	292609	6398257
<i>Eucalyptus rhomboidea</i>	P4	51 H	292616	6398650
<i>Eucalyptus rhomboidea</i>	P4	51 H	292617	6398603

Taxon	Conservation Code	Zone	Easting	Northing
<i>Eucalyptus rhomboidea</i>	P4	51 H	292618	6398263
<i>Eucalyptus rhomboidea</i>	P4	51 H	292621	6398600
<i>Eucalyptus rhomboidea</i>	P4	51 H	292623	6398276
<i>Eucalyptus rhomboidea</i>	P4	51 H	293133	6398759
<i>Eucalyptus rhomboidea</i>	P4	51 H	293137	6398735
<i>Eucalyptus rhomboidea</i>	P4	51 H	293145	6398721
<i>Eucalyptus rhomboidea</i>	P4	51 H	293189	6398692
<i>Eucalyptus rhomboidea</i>	P4	51 H	293265	6398643
<i>Eucalyptus rhomboidea</i>	P4	51 H	293690	6398513
<i>Eucalyptus rhomboidea</i>	P4	51 H	290876	6397785
<i>Eucalyptus rhomboidea</i>	P4	51 H	292661	6398531
<i>Eucalyptus rhomboidea</i>	P4	51 H	291523	6398045
<i>Eucalyptus rhomboidea</i>	P4	51 H	292661	6398531
<i>Eucalyptus rhomboidea</i>	P4	51 H	290876	6397785
<i>Eucalyptus rhomboidea</i>	P4	51 H	291523	6398045
<i>Eucalyptus rhomboidea</i>	P4	51 H	292553	6398284
<i>Eucalyptus rhomboidea</i>	P4	51 H	292566	6398288
<i>Eucalyptus rhomboidea</i>	P4	51 H	292567	6398247
<i>Eucalyptus rhomboidea</i>	P4	51 H	292569	6398282
<i>Eucalyptus rhomboidea</i>	P4	51 H	292584	6398231
<i>Eucalyptus rhomboidea</i>	P4	51 H	292584	6398639
<i>Eucalyptus rhomboidea</i>	P4	51 H	292585	6398227
<i>Eucalyptus rhomboidea</i>	P4	51 H	292602	6398639
<i>Eucalyptus rhomboidea</i>	P4	51 H	292609	6398257
<i>Eucalyptus rhomboidea</i>	P4	51 H	292616	6398650
<i>Eucalyptus rhomboidea</i>	P4	51 H	292617	6398603
<i>Eucalyptus rhomboidea</i>	P4	51 H	292618	6398263
<i>Eucalyptus rhomboidea</i>	P4	51 H	292621	6398600
<i>Eucalyptus rhomboidea</i>	P4	51 H	292623	6398276
<i>Eucalyptus rhomboidea</i>	P4	51 H	293133	6398759
<i>Eucalyptus rhomboidea</i>	P4	51 H	293137	6398735
<i>Eucalyptus rhomboidea</i>	P4	51 H	293145	6398721
<i>Eucalyptus rhomboidea</i>	P4	51 H	293189	6398692
<i>Eucalyptus rhomboidea</i>	P4	51 H	293265	6398643
<i>Eucalyptus rhomboidea</i>	P4	51 H	293690	6398513
<i>Eucalyptus rhomboidea</i>	P4	51 H	293060	6398560
<i>Eucalyptus rhomboidea</i>	P4	51 H	293079	6398547
<i>Eucalyptus rhomboidea</i>	P4	51 H	293140	6398560
<i>Eucalyptus rhomboidea</i>	P4	51 H	293140	6398800
<i>Eucalyptus rhomboidea</i>	P4	51 H	293152	6398546
<i>Eucalyptus rhomboidea</i>	P4	51 H	293460	6398640
<i>Eucalyptus rhomboidea</i>	P4	51 H	293648	6398555
<i>Eucalyptus rhomboidea</i>	P4	51 H	293195	6398500
<i>Eucalyptus rhomboidea</i>	P4	51 H	293857	6398356
<i>Eucalyptus rhomboidea</i>	P4	51 H	292081	6399855
<i>Eucalyptus rhomboidea</i>	P4	51 H	292316	6399461
<i>Eucalyptus rhomboidea</i>	P4	51 H	293184	6398584
<i>Eucalyptus rhomboidea</i>	P4	51 H	293178	6398670
<i>Eucalyptus rhomboidea</i>	P4	51 H	293655	6398591
<i>Eucalyptus rhomboidea</i>	P4	51 H	293427	6398583
<i>Eucalyptus rhomboidea</i>	P4	51 H	293191	6398493
<i>Eucalyptus rhomboidea</i>	P4	51 H	293269	6398368
<i>Eucalyptus rhomboidea</i>	P4	51 H	293194	6398238
<i>Eucalyptus rhomboidea</i>	P4	51 H	293312	6398277
<i>Eucalyptus rhomboidea</i>	P4	51 H	293273	6398348
<i>Eucalyptus rhomboidea</i>	P4	51 H	292930	6398462
<i>Eucalyptus rhomboidea</i>	P4	51 H	293148	6398573
<i>Eucalyptus rhomboidea</i>	P4	51 H	293709	6398537

Taxon	Conservation Code	Zone	Easting	Northing
<i>Eucalyptus rhomboidea</i>	P4	51 H	293821	6398440
<i>Eucalyptus rhomboidea</i>	P4	51 H	293465	6398605
<i>Eucalyptus rhomboidea</i>	P4	51 H	293415	6398629
<i>Eucalyptus rhomboidea</i>	P4	51 H	293175	6398655
<i>Eucalyptus rhomboidea</i>	P4	51 H	293101	6398542
<i>Eucalyptus rhomboidea</i>	P4	51 H	293061	6398524
<i>Eucalyptus rhomboidea</i>	P4	51 H	293040	6398499
<i>Eucalyptus rhomboidea</i>	P4	51 H	292631	6398495
<i>Eucalyptus rhomboidea</i>	P4	51 H	293276	6398336
<i>Eucalyptus rhomboidea</i>	P4	51 H	293233	6398303
<i>Eucalyptus rhomboidea</i>	P4	51 H	293259	6398304
<i>Eucalyptus rhomboidea</i>	P4	51 H	292720	6398143
<i>Eucalyptus rhomboidea</i>	P4	51 H	292688	6398142
<i>Eucalyptus rhomboidea</i>	P4	51 H	292637	6398175
<i>Eucalyptus rhomboidea</i>	P4	51 H	292580	6398224
<i>Eucalyptus rhomboidea</i>	P4	51 H	292606	6398190
<i>Eucalyptus rhomboidea</i>	P4	51 H	293177	6398488
<i>Eucalyptus rhomboidea</i>	P4	51 H	293129	6398502
<i>Eucalyptus rhomboidea</i>	P4	51 H	290855	6396457
<i>Hakea pendens</i>	P3	51 H	292524	6398251
<i>Hakea pendens</i>	P3	51 H	292532	6398259
<i>Hakea pendens</i>	P3	51 H	292555	6398288
<i>Hakea pendens</i>	P3	51 H	292556	6398268
<i>Hakea pendens</i>	P3	51 H	292565	6398237
<i>Hakea pendens</i>	P3	51 H	292596	6398235
<i>Hakea pendens</i>	P3	51 H	292605	6398265
<i>Hakea pendens</i>	P3	51 H	292633	6398265
<i>Hakea pendens</i>	P3	51 H	292700	6398200
<i>Hakea pendens</i>	P3	51 H	292712	6398176
<i>Hakea pendens</i>	P3	51 H	292964	6398081
<i>Hakea pendens</i>	P3	51 H	292969	6398126
<i>Hakea pendens</i>	P3	51 H	293049	6398445
<i>Hakea pendens</i>	P3	51 H	292513	6398303
<i>Hakea pendens</i>	P3	51 H	292526	6398282
<i>Hakea pendens</i>	P3	51 H	292530	6398302
<i>Hakea pendens</i>	P3	51 H	292534	6398289
<i>Hakea pendens</i>	P3	51 H	292642	6398479
<i>Hakea pendens</i>	P3	51 H	292662	6398482
<i>Hakea pendens</i>	P3	51 H	292528	6398259
<i>Hakea pendens</i>	P3	51 H	292546	6398268
<i>Hakea pendens</i>	P3	51 H	292551	6398276
<i>Hakea pendens</i>	P3	51 H	292552	6398242
<i>Hakea pendens</i>	P3	51 H	292560	6398266
<i>Hakea pendens</i>	P3	51 H	292562	6398281
<i>Hakea pendens</i>	P3	51 H	292562	6398237
<i>Hakea pendens</i>	P3	51 H	292602	6398272
<i>Hakea pendens</i>	P3	51 H	292607	6398250
<i>Hakea pendens</i>	P3	51 H	292673	6398342
<i>Hakea pendens</i>	P3	51 H	292681	6398569
<i>Hakea pendens</i>	P3	51 H	292685	6398563
<i>Hakea pendens</i>	P3	51 H	292699	6398581
<i>Hakea pendens</i>	P3	51 H	292700	6398225
<i>Hakea pendens</i>	P3	51 H	292701	6398520
<i>Hakea pendens</i>	P3	51 H	292704	6398198
<i>Hakea pendens</i>	P3	51 H	292733	6398273
<i>Hakea pendens</i>	P3	51 H	292765	6398403
<i>Hakea pendens</i>	P3	51 H	292770	6398362
<i>Hakea pendens</i>	P3	51 H	292771	6398392

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	292777	6398345
<i>Hakea pendens</i>	P3	51 H	292803	6398132
<i>Hakea pendens</i>	P3	51 H	293177	6398714
<i>Hakea pendens</i>	P3	51 H	293191	6398695
<i>Hakea pendens</i>	P3	51 H	293192	6398754
<i>Hakea pendens</i>	P3	51 H	293225	6398703
<i>Hakea pendens</i>	P3	51 H	293255	6398678
<i>Hakea pendens</i>	P3	51 H	293258	6398663
<i>Hakea pendens</i>	P3	51 H	293258	6398613
<i>Hakea pendens</i>	P3	51 H	293262	6398601
<i>Hakea pendens</i>	P3	51 H	293269	6398613
<i>Hakea pendens</i>	P3	51 H	293275	6398687
<i>Hakea pendens</i>	P3	51 H	293278	6398671
<i>Hakea pendens</i>	P3	51 H	293289	6398668
<i>Hakea pendens</i>	P3	51 H	293333	6398686
<i>Hakea pendens</i>	P3	51 H	293415	6398565
<i>Hakea pendens</i>	P3	51 H	293423	6398443
<i>Hakea pendens</i>	P3	51 H	293424	6398592
<i>Hakea pendens</i>	P3	51 H	293537	6398886
<i>Hakea pendens</i>	P3	51 H	293562	6398500
<i>Hakea pendens</i>	P3	51 H	293721	6398456
<i>Hakea pendens</i>	P3	51 H	293723	6398462
<i>Hakea pendens</i>	P3	51 H	293744	6398452
<i>Hakea pendens</i>	P3	51 H	293753	6398443
<i>Hakea pendens</i>	P3	51 H	292469	6398383
<i>Hakea pendens</i>	P3	51 H	292513	6398303
<i>Hakea pendens</i>	P3	51 H	292524	6398251
<i>Hakea pendens</i>	P3	51 H	292526	6398282
<i>Hakea pendens</i>	P3	51 H	292528	6398259
<i>Hakea pendens</i>	P3	51 H	292530	6398302
<i>Hakea pendens</i>	P3	51 H	292532	6398259
<i>Hakea pendens</i>	P3	51 H	292534	6398289
<i>Hakea pendens</i>	P3	51 H	292546	6398268
<i>Hakea pendens</i>	P3	51 H	292551	6398276
<i>Hakea pendens</i>	P3	51 H	292552	6398242
<i>Hakea pendens</i>	P3	51 H	292555	6398288
<i>Hakea pendens</i>	P3	51 H	292556	6398268
<i>Hakea pendens</i>	P3	51 H	292560	6398266
<i>Hakea pendens</i>	P3	51 H	292562	6398237
<i>Hakea pendens</i>	P3	51 H	292562	6398281
<i>Hakea pendens</i>	P3	51 H	292565	6398237
<i>Hakea pendens</i>	P3	51 H	292596	6398235
<i>Hakea pendens</i>	P3	51 H	292602	6398272
<i>Hakea pendens</i>	P3	51 H	292605	6398265
<i>Hakea pendens</i>	P3	51 H	292607	6398250
<i>Hakea pendens</i>	P3	51 H	292633	6398265
<i>Hakea pendens</i>	P3	51 H	292642	6398479
<i>Hakea pendens</i>	P3	51 H	292662	6398482
<i>Hakea pendens</i>	P3	51 H	292673	6398342
<i>Hakea pendens</i>	P3	51 H	292681	6398569
<i>Hakea pendens</i>	P3	51 H	292685	6398563
<i>Hakea pendens</i>	P3	51 H	292699	6398581
<i>Hakea pendens</i>	P3	51 H	292700	6398200
<i>Hakea pendens</i>	P3	51 H	292700	6398225
<i>Hakea pendens</i>	P3	51 H	292701	6398520
<i>Hakea pendens</i>	P3	51 H	292704	6398198
<i>Hakea pendens</i>	P3	51 H	292712	6398176
<i>Hakea pendens</i>	P3	51 H	292733	6398273

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	292765	6398403
<i>Hakea pendens</i>	P3	51 H	292770	6398362
<i>Hakea pendens</i>	P3	51 H	292771	6398392
<i>Hakea pendens</i>	P3	51 H	292777	6398345
<i>Hakea pendens</i>	P3	51 H	292803	6398132
<i>Hakea pendens</i>	P3	51 H	292964	6398081
<i>Hakea pendens</i>	P3	51 H	292969	6398126
<i>Hakea pendens</i>	P3	51 H	293049	6398445
<i>Hakea pendens</i>	P3	51 H	293177	6398714
<i>Hakea pendens</i>	P3	51 H	293191	6398695
<i>Hakea pendens</i>	P3	51 H	293192	6398754
<i>Hakea pendens</i>	P3	51 H	293225	6398703
<i>Hakea pendens</i>	P3	51 H	293255	6398678
<i>Hakea pendens</i>	P3	51 H	293258	6398613
<i>Hakea pendens</i>	P3	51 H	293258	6398663
<i>Hakea pendens</i>	P3	51 H	293262	6398601
<i>Hakea pendens</i>	P3	51 H	293269	6398613
<i>Hakea pendens</i>	P3	51 H	293275	6398687
<i>Hakea pendens</i>	P3	51 H	293278	6398671
<i>Hakea pendens</i>	P3	51 H	293289	6398668
<i>Hakea pendens</i>	P3	51 H	293333	6398686
<i>Hakea pendens</i>	P3	51 H	293415	6398565
<i>Hakea pendens</i>	P3	51 H	293423	6398443
<i>Hakea pendens</i>	P3	51 H	293424	6398592
<i>Hakea pendens</i>	P3	51 H	293537	6398886
<i>Hakea pendens</i>	P3	51 H	293562	6398500
<i>Hakea pendens</i>	P3	51 H	293721	6398456
<i>Hakea pendens</i>	P3	51 H	293723	6398462
<i>Hakea pendens</i>	P3	51 H	293744	6398452
<i>Hakea pendens</i>	P3	51 H	293753	6398443
<i>Hakea pendens</i>	P3	51 H	292457	6398468
<i>Hakea pendens</i>	P3	51 H	292500	6398480
<i>Hakea pendens</i>	P3	51 H	292600	6398246
<i>Hakea pendens</i>	P3	51 H	292614	6398397
<i>Hakea pendens</i>	P3	51 H	292628	6398244
<i>Hakea pendens</i>	P3	51 H	292638	6398479
<i>Hakea pendens</i>	P3	51 H	292660	6398480
<i>Hakea pendens</i>	P3	51 H	292769	6398393
<i>Hakea pendens</i>	P3	51 H	292820	6398400
<i>Hakea pendens</i>	P3	51 H	292827	6398394
<i>Hakea pendens</i>	P3	51 H	292921	6398386
<i>Hakea pendens</i>	P3	51 H	292968	6398077
<i>Hakea pendens</i>	P3	51 H	292980	6398400
<i>Hakea pendens</i>	P3	51 H	292988	6398397
<i>Hakea pendens</i>	P3	51 H	293099	6398470
<i>Hakea pendens</i>	P3	51 H	293140	6398480
<i>Hakea pendens</i>	P3	51 H	293155	6398480
<i>Hakea pendens</i>	P3	51 H	293165	6398230
<i>Hakea pendens</i>	P3	51 H	293168	6398481
<i>Hakea pendens</i>	P3	51 H	293220	6398640
<i>Hakea pendens</i>	P3	51 H	293235	6398706
<i>Hakea pendens</i>	P3	51 H	293236	6398728
<i>Hakea pendens</i>	P3	51 H	293246	6398391
<i>Hakea pendens</i>	P3	51 H	293255	6398339
<i>Hakea pendens</i>	P3	51 H	293339	6398564
<i>Hakea pendens</i>	P3	51 H	293563	6398401
<i>Hakea pendens</i>	P3	51 H	293764	6398397
<i>Hakea pendens</i>	P3	51 H	292552	6398300

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	294171	6398129
<i>Hakea pendens</i>	P3	51 H	293531	6398477
<i>Hakea pendens</i>	P3	51 H	293266	6398624
<i>Hakea pendens</i>	P3	51 H	293284	6398653
<i>Hakea pendens</i>	P3	51 H	293297	6398437
<i>Hakea pendens</i>	P3	51 H	293096	6398244
<i>Hakea pendens</i>	P3	51 H	292938	6398111
<i>Hakea pendens</i>	P3	51 H	292636	6398252
<i>Hakea pendens</i>	P3	51 H	293076	6399092
<i>Hakea pendens</i>	P3	51 H	293339	6399488
<i>Hakea pendens</i>	P3	51 H	291972	6397402
<i>Hakea pendens</i>	P3	51 H	291803	6397574
<i>Hakea pendens</i>	P3	51 H	294174	6398130
<i>Hakea pendens</i>	P3	51 H	293187	6398448
<i>Hakea pendens</i>	P3	51 H	293188	6398453
<i>Hakea pendens</i>	P3	51 H	293181	6398458
<i>Hakea pendens</i>	P3	51 H	293180	6398464
<i>Hakea pendens</i>	P3	51 H	293170	6398459
<i>Hakea pendens</i>	P3	51 H	293152	6398447
<i>Hakea pendens</i>	P3	51 H	293143	6398444
<i>Hakea pendens</i>	P3	51 H	293108	6398462
<i>Hakea pendens</i>	P3	51 H	293108	6398467
<i>Hakea pendens</i>	P3	51 H	293118	6398487
<i>Hakea pendens</i>	P3	51 H	293120	6398491
<i>Hakea pendens</i>	P3	51 H	293121	6398496
<i>Hakea pendens</i>	P3	51 H	293135	6398509
<i>Hakea pendens</i>	P3	51 H	293293	6398353
<i>Hakea pendens</i>	P3	51 H	293243	6398332
<i>Hakea pendens</i>	P3	51 H	293046	6398220
<i>Hakea pendens</i>	P3	51 H	292998	6398127
<i>Hakea pendens</i>	P3	51 H	292601	6398212
<i>Hakea pendens</i>	P3	51 H	292567	6398225
<i>Hakea pendens</i>	P3	51 H	292565	6398216
<i>Hakea pendens</i>	P3	51 H	292926	6398094
<i>Hakea pendens</i>	P3	51 H	291814	6397489
<i>Hakea pendens</i>	P3	51 H	291760	6397631
<i>Hakea pendens</i>	P3	51 H	291717	6397628
<i>Hakea pendens</i>	P3	51 H	293334	6399465
<i>Hakea pendens</i>	P3	51 H	293314	6399500
<i>Hakea pendens</i>	P3	51 H	293306	6399545
<i>Hakea pendens</i>	P3	51 H	293311	6399550
<i>Hakea pendens</i>	P3	51 H	293329	6399560
<i>Hakea pendens</i>	P3	51 H	293330	6399557
<i>Hakea pendens</i>	P3	51 H	293334	6399548
<i>Hakea pendens</i>	P3	51 H	293336	6399541
<i>Hakea pendens</i>	P3	51 H	293337	6399520
<i>Hakea pendens</i>	P3	51 H	293343	6399517
<i>Hakea pendens</i>	P3	51 H	293349	6399508
<i>Hakea pendens</i>	P3	51 H	293348	6399499
<i>Hakea pendens</i>	P3	51 H	293365	6399537
<i>Hakea pendens</i>	P3	51 H	293334	6399590
<i>Hakea pendens</i>	P3	51 H	293208	6398613
<i>Hakea pendens</i>	P3	51 H	293201	6398643
<i>Hakea pendens</i>	P3	51 H	293193	6398649
<i>Hakea pendens</i>	P3	51 H	293187	6398658
<i>Hakea pendens</i>	P3	51 H	293183	6398666
<i>Hakea pendens</i>	P3	51 H	293178	6398670
<i>Hakea pendens</i>	P3	51 H	293174	6398726

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	293185	6398734
<i>Hakea pendens</i>	P3	51 H	293762	6398451
<i>Hakea pendens</i>	P3	51 H	293752	6398445
<i>Hakea pendens</i>	P3	51 H	293744	6398451
<i>Hakea pendens</i>	P3	51 H	293737	6398456
<i>Hakea pendens</i>	P3	51 H	293719	6398477
<i>Hakea pendens</i>	P3	51 H	293615	6398501
<i>Hakea pendens</i>	P3	51 H	293572	6398514
<i>Hakea pendens</i>	P3	51 H	293564	6398516
<i>Hakea pendens</i>	P3	51 H	293557	6398523
<i>Hakea pendens</i>	P3	51 H	293531	6398555
<i>Hakea pendens</i>	P3	51 H	293264	6398663
<i>Hakea pendens</i>	P3	51 H	293250	6398670
<i>Hakea pendens</i>	P3	51 H	293244	6398668
<i>Hakea pendens</i>	P3	51 H	293201	6398657
<i>Hakea pendens</i>	P3	51 H	293232	6398636
<i>Hakea pendens</i>	P3	51 H	293242	6398624
<i>Hakea pendens</i>	P3	51 H	293253	6398609
<i>Hakea pendens</i>	P3	51 H	293281	6398610
<i>Hakea pendens</i>	P3	51 H	293270	6398572
<i>Hakea pendens</i>	P3	51 H	293144	6398498
<i>Hakea pendens</i>	P3	51 H	293135	6398494
<i>Hakea pendens</i>	P3	51 H	293124	6398489
<i>Hakea pendens</i>	P3	51 H	293104	6398473
<i>Hakea pendens</i>	P3	51 H	293011	6398367
<i>Hakea pendens</i>	P3	51 H	292651	6398514
<i>Hakea pendens</i>	P3	51 H	292658	6398504
<i>Hakea pendens</i>	P3	51 H	293143	6398440
<i>Hakea pendens</i>	P3	51 H	293151	6398445
<i>Hakea pendens</i>	P3	51 H	293166	6398487
<i>Hakea pendens</i>	P3	51 H	293181	6398493
<i>Hakea pendens</i>	P3	51 H	293438	6398416
<i>Hakea pendens</i>	P3	51 H	293262	6398376
<i>Hakea pendens</i>	P3	51 H	292725	6398305
<i>Hakea pendens</i>	P3	51 H	292764	6398290
<i>Hakea pendens</i>	P3	51 H	292918	6398266
<i>Hakea pendens</i>	P3	51 H	292637	6398231
<i>Hakea pendens</i>	P3	51 H	292607	6398256
<i>Hakea pendens</i>	P3	51 H	292504	6398396
<i>Hakea pendens</i>	P3	51 H	292858	6398298
<i>Hakea pendens</i>	P3	51 H	292874	6398288
<i>Hakea pendens</i>	P3	51 H	293142	6398461
<i>Hakea pendens</i>	P3	51 H	293151	6398469
<i>Hakea pendens</i>	P3	51 H	293165	6398486
<i>Hakea pendens</i>	P3	51 H	293171	6398490
<i>Hakea pendens</i>	P3	51 H	293180	6398494
<i>Hakea pendens</i>	P3	51 H	293455	6398438
<i>Hakea pendens</i>	P3	51 H	293170	6398226
<i>Hakea pendens</i>	P3	51 H	293182	6398230
<i>Hakea pendens</i>	P3	51 H	293022	6398153
<i>Hakea pendens</i>	P3	51 H	292596	6398250
<i>Hakea pendens</i>	P3	51 H	292789	6398052
<i>Hakea pendens</i>	P3	51 H	291844	6397488
<i>Hakea pendens</i>	P3	51 H	291835	6397546
<i>Hakea pendens</i>	P3	51 H	291845	6397571
<i>Hakea pendens</i>	P3	51 H	291737	6397605
<i>Hakea pendens</i>	P3	51 H	291744	6397652
<i>Hakea pendens</i>	P3	51 H	293100	6398554

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	293102	6398554
<i>Hakea pendens</i>	P3	51 H	293231	6398706
<i>Hakea pendens</i>	P3	51 H	293226	6398723
<i>Hakea pendens</i>	P3	51 H	293223	6398726
<i>Hakea pendens</i>	P3	51 H	293211	6398748
<i>Hakea pendens</i>	P3	51 H	293166	6398735
<i>Hakea pendens</i>	P3	51 H	293169	6398720
<i>Hakea pendens</i>	P3	51 H	293178	6398717
<i>Hakea pendens</i>	P3	51 H	293182	6398717
<i>Hakea pendens</i>	P3	51 H	293180	6398722
<i>Hakea pendens</i>	P3	51 H	293183	6398725
<i>Hakea pendens</i>	P3	51 H	293183	6398729
<i>Hakea pendens</i>	P3	51 H	293405	6398617
<i>Hakea pendens</i>	P3	51 H	293228	6398684
<i>Hakea pendens</i>	P3	51 H	292650	6398515
<i>Hakea pendens</i>	P3	51 H	293159	6398442
<i>Hakea pendens</i>	P3	51 H	293162	6398440
<i>Hakea pendens</i>	P3	51 H	293171	6398454
<i>Hakea pendens</i>	P3	51 H	293173	6398462
<i>Hakea pendens</i>	P3	51 H	293174	6398462
<i>Hakea pendens</i>	P3	51 H	293180	6398467
<i>Hakea pendens</i>	P3	51 H	293276	6398457
<i>Hakea pendens</i>	P3	51 H	293282	6398461
<i>Hakea pendens</i>	P3	51 H	293283	6398463
<i>Hakea pendens</i>	P3	51 H	293454	6398494
<i>Hakea pendens</i>	P3	51 H	293742	6398399
<i>Hakea pendens</i>	P3	51 H	293758	6398397
<i>Hakea pendens</i>	P3	51 H	293772	6398385
<i>Hakea pendens</i>	P3	51 H	293819	6398303
<i>Hakea pendens</i>	P3	51 H	293502	6398433
<i>Hakea pendens</i>	P3	51 H	293477	6398428
<i>Hakea pendens</i>	P3	51 H	293477	6398428
<i>Hakea pendens</i>	P3	51 H	293460	6398431
<i>Hakea pendens</i>	P3	51 H	293290	6398423
<i>Hakea pendens</i>	P3	51 H	293286	6398419
<i>Hakea pendens</i>	P3	51 H	293247	6398385
<i>Hakea pendens</i>	P3	51 H	293237	6398387
<i>Hakea pendens</i>	P3	51 H	292910	6398307
<i>Hakea pendens</i>	P3	51 H	292854	6398294
<i>Hakea pendens</i>	P3	51 H	292580	6398532
<i>Hakea pendens</i>	P3	51 H	292918	6398272
<i>Hakea pendens</i>	P3	51 H	293196	6398462
<i>Hakea pendens</i>	P3	51 H	293196	6398465
<i>Hakea pendens</i>	P3	51 H	293168	6398457
<i>Hakea pendens</i>	P3	51 H	293146	6398449
<i>Hakea pendens</i>	P3	51 H	293122	6398481
<i>Hakea pendens</i>	P3	51 H	293145	6398502
<i>Hakea pendens</i>	P3	51 H	293146	6398501
<i>Hakea pendens</i>	P3	51 H	293297	6398283
<i>Hakea pendens</i>	P3	51 H	293300	6398288
<i>Hakea pendens</i>	P3	51 H	293299	6398290
<i>Hakea pendens</i>	P3	51 H	293302	6398294
<i>Hakea pendens</i>	P3	51 H	293342	6398295
<i>Hakea pendens</i>	P3	51 H	293007	6398140
<i>Hakea pendens</i>	P3	51 H	292594	6398228
<i>Hakea pendens</i>	P3	51 H	292569	6398224
<i>Hakea pendens</i>	P3	51 H	292566	6398207
<i>Hakea pendens</i>	P3	51 H	291916	6397710

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	291912	6397708
<i>Hakea pendens</i>	P3	51 H	293330	6399485
<i>Hakea pendens</i>	P3	51 H	293331	6399487
<i>Hakea pendens</i>	P3	51 H	293330	6399491
<i>Hakea pendens</i>	P3	51 H	293335	6399492
<i>Hakea pendens</i>	P3	51 H	293330	6399493
<i>Hakea pendens</i>	P3	51 H	293322	6399506
<i>Hakea pendens</i>	P3	51 H	293315	6399529
<i>Hakea pendens</i>	P3	51 H	293311	6399539
<i>Hakea pendens</i>	P3	51 H	293317	6399567
<i>Hakea pendens</i>	P3	51 H	293317	6399566
<i>Hakea pendens</i>	P3	51 H	293317	6399554
<i>Hakea pendens</i>	P3	51 H	293318	6399552
<i>Hakea pendens</i>	P3	51 H	293323	6399550
<i>Hakea pendens</i>	P3	51 H	293323	6399546
<i>Hakea pendens</i>	P3	51 H	293325	6399542
<i>Hakea pendens</i>	P3	51 H	293327	6399537
<i>Hakea pendens</i>	P3	51 H	293327	6399531
<i>Hakea pendens</i>	P3	51 H	293331	6399513
<i>Hakea pendens</i>	P3	51 H	293333	6399506
<i>Hakea pendens</i>	P3	51 H	293335	6399496
<i>Hakea pendens</i>	P3	51 H	293348	6399486
<i>Hakea pendens</i>	P3	51 H	292934	6398459
<i>Hakea pendens</i>	P3	51 H	293250	6398612
<i>Hakea pendens</i>	P3	51 H	293258	6398617
<i>Hakea pendens</i>	P3	51 H	293263	6398648
<i>Hakea pendens</i>	P3	51 H	293255	6398702
<i>Hakea pendens</i>	P3	51 H	293249	6398714
<i>Hakea pendens</i>	P3	51 H	293227	6398746
<i>Hakea pendens</i>	P3	51 H	293164	6398744
<i>Hakea pendens</i>	P3	51 H	293171	6398730
<i>Hakea pendens</i>	P3	51 H	293170	6398725
<i>Hakea pendens</i>	P3	51 H	293169	6398719
<i>Hakea pendens</i>	P3	51 H	293176	6398715
<i>Hakea pendens</i>	P3	51 H	293190	6398715
<i>Hakea pendens</i>	P3	51 H	293201	6398710
<i>Hakea pendens</i>	P3	51 H	293186	6398740
<i>Hakea pendens</i>	P3	51 H	293217	6398730
<i>Hakea pendens</i>	P3	51 H	293563	6398550
<i>Hakea pendens</i>	P3	51 H	293253	6398713
<i>Hakea pendens</i>	P3	51 H	293242	6398714
<i>Hakea pendens</i>	P3	51 H	293215	6398697
<i>Hakea pendens</i>	P3	51 H	293208	6398696
<i>Hakea pendens</i>	P3	51 H	293180	6398687
<i>Hakea pendens</i>	P3	51 H	293181	6398654
<i>Hakea pendens</i>	P3	51 H	293200	6398656
<i>Hakea pendens</i>	P3	51 H	293239	6398622
<i>Hakea pendens</i>	P3	51 H	292645	6398474
<i>Hakea pendens</i>	P3	51 H	292657	6398466
<i>Hakea pendens</i>	P3	51 H	293168	6398413
<i>Hakea pendens</i>	P3	51 H	293185	6398438
<i>Hakea pendens</i>	P3	51 H	293198	6398460
<i>Hakea pendens</i>	P3	51 H	293259	6398423
<i>Hakea pendens</i>	P3	51 H	293270	6398421
<i>Hakea pendens</i>	P3	51 H	293277	6398428
<i>Hakea pendens</i>	P3	51 H	293529	6398465
<i>Hakea pendens</i>	P3	51 H	293544	6398455
<i>Hakea pendens</i>	P3	51 H	293568	6398439

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	293738	6398383
<i>Hakea pendens</i>	P3	51 H	293629	6398385
<i>Hakea pendens</i>	P3	51 H	293532	6398456
<i>Hakea pendens</i>	P3	51 H	293495	6398449
<i>Hakea pendens</i>	P3	51 H	293296	6398441
<i>Hakea pendens</i>	P3	51 H	293244	6398407
<i>Hakea pendens</i>	P3	51 H	292910	6398311
<i>Hakea pendens</i>	P3	51 H	292640	6398479
<i>Hakea pendens</i>	P3	51 H	292638	6398484
<i>Hakea pendens</i>	P3	51 H	292625	6398556
<i>Hakea pendens</i>	P3	51 H	292642	6398561
<i>Hakea pendens</i>	P3	51 H	292647	6398569
<i>Hakea pendens</i>	P3	51 H	292680	6398563
<i>Hakea pendens</i>	P3	51 H	292647	6398532
<i>Hakea pendens</i>	P3	51 H	292734	6398268
<i>Hakea pendens</i>	P3	51 H	292815	6398227
<i>Hakea pendens</i>	P3	51 H	292727	6398237
<i>Hakea pendens</i>	P3	51 H	292651	6398351
<i>Hakea pendens</i>	P3	51 H	292770	6398272
<i>Hakea pendens</i>	P3	51 H	293167	6398424
<i>Hakea pendens</i>	P3	51 H	293171	6398457
<i>Hakea pendens</i>	P3	51 H	293146	6398445
<i>Hakea pendens</i>	P3	51 H	293130	6398459
<i>Hakea pendens</i>	P3	51 H	293108	6398463
<i>Hakea pendens</i>	P3	51 H	293102	6398469
<i>Hakea pendens</i>	P3	51 H	293101	6398478
<i>Hakea pendens</i>	P3	51 H	293105	6398488
<i>Hakea pendens</i>	P3	51 H	293112	6398499
<i>Hakea pendens</i>	P3	51 H	293128	6398514
<i>Hakea pendens</i>	P3	51 H	293134	6398517
<i>Hakea pendens</i>	P3	51 H	293476	6398336
<i>Hakea pendens</i>	P3	51 H	293464	6398353
<i>Hakea pendens</i>	P3	51 H	293317	6398362
<i>Hakea pendens</i>	P3	51 H	293318	6398357
<i>Hakea pendens</i>	P3	51 H	293313	6398350
<i>Hakea pendens</i>	P3	51 H	293278	6398330
<i>Hakea pendens</i>	P3	51 H	293277	6398309
<i>Hakea pendens</i>	P3	51 H	293306	6398328
<i>Hakea pendens</i>	P3	51 H	293310	6398293
<i>Hakea pendens</i>	P3	51 H	293004	6398138
<i>Hakea pendens</i>	P3	51 H	292980	6398125
<i>Hakea pendens</i>	P3	51 H	292569	6398211
<i>Hakea pendens</i>	P3	51 H	292939	6398103
<i>Hakea pendens</i>	P3	51 H	291807	6397560
<i>Hakea pendens</i>	P3	51 H	293326	6399596
<i>Hakea pendens</i>	P3	51 H	293307	6399549
<i>Hakea pendens</i>	P3	51 H	293311	6399556
<i>Hakea pendens</i>	P3	51 H	293315	6399577
<i>Hakea pendens</i>	P3	51 H	293338	6399577
<i>Hakea pendens</i>	P3	51 H	293344	6399574
<i>Hakea pendens</i>	P3	51 H	293345	6399562
<i>Hakea pendens</i>	P3	51 H	293343	6399549
<i>Hakea pendens</i>	P3	51 H	293352	6399541
<i>Hakea pendens</i>	P3	51 H	293349	6399538
<i>Hakea pendens</i>	P3	51 H	293350	6399525
<i>Hakea pendens</i>	P3	51 H	293365	6399530
<i>Hakea pendens</i>	P3	51 H	293357	6399544
<i>Hakea pendens</i>	P3	51 H	293355	6399555

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	293344	6399568
<i>Hakea pendens</i>	P3	51 H	293335	6399580
<i>Hakea pendens</i>	P3	51 H	293330	6399586
<i>Hakea pendens</i>	P3	51 H	293284	6398318
<i>Hakea pendens</i>	P3	51 H	293078	6399096
<i>Hakea pendens</i>	P3	51 H	291957	6398380
<i>Hakea pendens</i>	P3	51 H	291915	6398374
<i>Hakea pendens</i>	P3	51 H	291952	6398383
<i>Hakea pendens</i>	P3	51 H	291949	6398387
<i>Hakea pendens</i>	P3	51 H	291947	6398393
<i>Hakea pendens</i>	P3	51 H	291953	6398397
<i>Hakea pendens</i>	P3	51 H	291956	6398397
<i>Hakea pendens</i>	P3	51 H	291938	6398418
<i>Hakea pendens</i>	P3	51 H	291947	6398433
<i>Hakea pendens</i>	P3	51 H	291938	6398440
<i>Hakea pendens</i>	P3	51 H	291989	6398547
<i>Hakea pendens</i>	P3	51 H	291987	6398552
<i>Hakea pendens</i>	P3	51 H	291984	6398554
<i>Hakea pendens</i>	P3	51 H	292084	6398557
<i>Hakea pendens</i>	P3	51 H	292088	6398560
<i>Hakea pendens</i>	P3	51 H	292069	6398529
<i>Hakea pendens</i>	P3	51 H	292064	6398532
<i>Hakea pendens</i>	P3	51 H	292062	6398535
<i>Hakea pendens</i>	P3	51 H	292061	6398534
<i>Hakea pendens</i>	P3	51 H	292059	6398537
<i>Hakea pendens</i>	P3	51 H	292052	6398532
<i>Hakea pendens</i>	P3	51 H	292055	6398528
<i>Hakea pendens</i>	P3	51 H	292057	6398529
<i>Hakea pendens</i>	P3	51 H	292057	6398526
<i>Hakea pendens</i>	P3	51 H	292057	6398525
<i>Hakea pendens</i>	P3	51 H	292055	6398524
<i>Hakea pendens</i>	P3	51 H	292056	6398521
<i>Hakea pendens</i>	P3	51 H	292053	6398520
<i>Hakea pendens</i>	P3	51 H	292050	6398523
<i>Hakea pendens</i>	P3	51 H	292047	6398520
<i>Hakea pendens</i>	P3	51 H	292053	6398518
<i>Hakea pendens</i>	P3	51 H	292055	6398517
<i>Hakea pendens</i>	P3	51 H	292057	6398519
<i>Hakea pendens</i>	P3	51 H	292057	6398517
<i>Hakea pendens</i>	P3	51 H	292054	6398508
<i>Hakea pendens</i>	P3	51 H	292047	6398508
<i>Hakea pendens</i>	P3	51 H	292044	6398509
<i>Hakea pendens</i>	P3	51 H	292044	6398507
<i>Hakea pendens</i>	P3	51 H	292043	6398506
<i>Hakea pendens</i>	P3	51 H	292048	6398503
<i>Hakea pendens</i>	P3	51 H	292048	6398501
<i>Hakea pendens</i>	P3	51 H	292044	6398501
<i>Hakea pendens</i>	P3	51 H	292038	6398501
<i>Hakea pendens</i>	P3	51 H	292031	6398505
<i>Hakea pendens</i>	P3	51 H	292041	6398487
<i>Hakea pendens</i>	P3	51 H	291952	6398375
<i>Hakea pendens</i>	P3	51 H	291951	6398378
<i>Hakea pendens</i>	P3	51 H	291951	6398377
<i>Hakea pendens</i>	P3	51 H	291950	6398379
<i>Hakea pendens</i>	P3	51 H	291948	6398377
<i>Hakea pendens</i>	P3	51 H	291948	6398377
<i>Hakea pendens</i>	P3	51 H	291947	6398374
<i>Hakea pendens</i>	P3	51 H	291949	6398374

Taxon	Conservation Code	Zone	Easting	Northing
<i>Hakea pendens</i>	P3	51 H	291946	6398383
<i>Hakea pendens</i>	P3	51 H	291946	6398381
<i>Hakea pendens</i>	P3	51 H	291944	6398383
<i>Hakea pendens</i>	P3	51 H	291944	6398383
<i>Hakea pendens</i>	P3	51 H	291945	6398382
<i>Hakea pendens</i>	P3	51 H	291944	6398381
<i>Hakea pendens</i>	P3	51 H	291948	6398384
<i>Hakea pendens</i>	P3	51 H	291947	6398386
<i>Hakea pendens</i>	P3	51 H	291943	6398391
<i>Hakea pendens</i>	P3	51 H	291943	6398392
<i>Hakea pendens</i>	P3	51 H	291938	6398397
<i>Hakea pendens</i>	P3	51 H	291936	6398397
<i>Hakea pendens</i>	P3	51 H	291936	6398393
<i>Hakea pendens</i>	P3	51 H	291934	6398399
<i>Hakea pendens</i>	P3	51 H	291933	6398400
<i>Hakea pendens</i>	P3	51 H	291933	6398401
<i>Hakea pendens</i>	P3	51 H	291934	6398403
<i>Hakea pendens</i>	P3	51 H	291934	6398403
<i>Hakea pendens</i>	P3	51 H	291934	6398406
<i>Hakea pendens</i>	P3	51 H	291937	6398409
<i>Hakea pendens</i>	P3	51 H	291936	6398412
<i>Hakea pendens</i>	P3	51 H	291952	6398380
<i>Hakea pendens</i>	P3	51 H	291951	6398388
<i>Hakea pendens</i>	P3	51 H	292052	6398565
<i>Hakea pendens</i>	P3	51 H	292058	6398556
<i>Hakea pendens</i>	P3	51 H	292055	6398550
<i>Hakea pendens</i>	P3	51 H	292062	6398552
<i>Hakea pendens</i>	P3	51 H	292065	6398549
<i>Hakea pendens</i>	P3	51 H	292069	6398551
<i>Hakea pendens</i>	P3	51 H	292066	6398554
<i>Hakea pendens</i>	P3	51 H	292065	6398556
<i>Hakea pendens</i>	P3	51 H	292070	6398530
<i>Hakea pendens</i>	P3	51 H	292066	6398528
<i>Hakea pendens</i>	P3	51 H	292082	6398544
<i>Hakea pendens</i>	P3	51 H	292084	6398541
<i>Hakea pendens</i>	P3	51 H	292064	6398532
<i>Hakea pendens</i>	P3	51 H	291937	6398421
<i>Hakea pendens</i>	P3	51 H	292063	6398528
<i>Hakea pendens</i>	P3	51 H	292025	6398439
<i>Hakea pendens</i>	P3	51 H	292005	6398407
<i>Hakea pendens</i>	P3	51 H	292076	6398525
<i>Hakea pendens</i>	P3	51 H	292070	6398529
<i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)	P1	51 H	291105	6397457
<i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)	P1	51 H	291515	6397356
<i>Stenanthemum bremerense</i>	P4	51 H	292501	6398349
<i>Stenanthemum bremerense</i>	P4	51 H	292508	6398242
<i>Stenanthemum bremerense</i>	P4	51 H	292509	6398246
<i>Stenanthemum bremerense</i>	P4	51 H	292511	6398269
<i>Stenanthemum bremerense</i>	P4	51 H	292514	6398271
<i>Stenanthemum bremerense</i>	P4	51 H	292516	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	292526	6398237
<i>Stenanthemum bremerense</i>	P4	51 H	292534	6398282
<i>Stenanthemum bremerense</i>	P4	51 H	292540	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292546	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292546	6398279
<i>Stenanthemum bremerense</i>	P4	51 H	292548	6398255
<i>Stenanthemum bremerense</i>	P4	51 H	292549	6398366
<i>Stenanthemum bremerense</i>	P4	51 H	292555	6398288

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	292556	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292560	6398266
<i>Stenanthemum bremerense</i>	P4	51 H	292562	6398293
<i>Stenanthemum bremerense</i>	P4	51 H	292563	6398246
<i>Stenanthemum bremerense</i>	P4	51 H	292565	6398237
<i>Stenanthemum bremerense</i>	P4	51 H	292569	6398282
<i>Stenanthemum bremerense</i>	P4	51 H	292573	6398286
<i>Stenanthemum bremerense</i>	P4	51 H	292575	6398329
<i>Stenanthemum bremerense</i>	P4	51 H	292576	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292582	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	292585	6398227
<i>Stenanthemum bremerense</i>	P4	51 H	292593	6398357
<i>Stenanthemum bremerense</i>	P4	51 H	292602	6398368
<i>Stenanthemum bremerense</i>	P4	51 H	292605	6398265
<i>Stenanthemum bremerense</i>	P4	51 H	292612	6398383
<i>Stenanthemum bremerense</i>	P4	51 H	292614	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	292617	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	292620	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	292621	6398440
<i>Stenanthemum bremerense</i>	P4	51 H	292623	6398276
<i>Stenanthemum bremerense</i>	P4	51 H	292626	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292630	6398412
<i>Stenanthemum bremerense</i>	P4	51 H	292633	6398265
<i>Stenanthemum bremerense</i>	P4	51 H	292633	6398450
<i>Stenanthemum bremerense</i>	P4	51 H	292635	6398262
<i>Stenanthemum bremerense</i>	P4	51 H	292640	6398425
<i>Stenanthemum bremerense</i>	P4	51 H	292640	6398437
<i>Stenanthemum bremerense</i>	P4	51 H	292642	6398479
<i>Stenanthemum bremerense</i>	P4	51 H	292645	6398313
<i>Stenanthemum bremerense</i>	P4	51 H	292649	6398436
<i>Stenanthemum bremerense</i>	P4	51 H	292650	6398321
<i>Stenanthemum bremerense</i>	P4	51 H	292651	6398477
<i>Stenanthemum bremerense</i>	P4	51 H	292653	6398242
<i>Stenanthemum bremerense</i>	P4	51 H	292662	6398482
<i>Stenanthemum bremerense</i>	P4	51 H	292671	6398455
<i>Stenanthemum bremerense</i>	P4	51 H	292673	6398334
<i>Stenanthemum bremerense</i>	P4	51 H	292677	6398425
<i>Stenanthemum bremerense</i>	P4	51 H	292680	6398487
<i>Stenanthemum bremerense</i>	P4	51 H	292688	6398351
<i>Stenanthemum bremerense</i>	P4	51 H	292695	6398201
<i>Stenanthemum bremerense</i>	P4	51 H	292695	6398203
<i>Stenanthemum bremerense</i>	P4	51 H	292699	6398359
<i>Stenanthemum bremerense</i>	P4	51 H	292700	6398200
<i>Stenanthemum bremerense</i>	P4	51 H	292710	6398336
<i>Stenanthemum bremerense</i>	P4	51 H	292713	6398202
<i>Stenanthemum bremerense</i>	P4	51 H	292715	6398729
<i>Stenanthemum bremerense</i>	P4	51 H	292721	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292722	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	292726	6398248
<i>Stenanthemum bremerense</i>	P4	51 H	292731	6398126
<i>Stenanthemum bremerense</i>	P4	51 H	292734	6398426
<i>Stenanthemum bremerense</i>	P4	51 H	292740	6398206
<i>Stenanthemum bremerense</i>	P4	51 H	292757	6398435
<i>Stenanthemum bremerense</i>	P4	51 H	292760	6398202
<i>Stenanthemum bremerense</i>	P4	51 H	292765	6398403
<i>Stenanthemum bremerense</i>	P4	51 H	292767	6398378
<i>Stenanthemum bremerense</i>	P4	51 H	292770	6398362
<i>Stenanthemum bremerense</i>	P4	51 H	292771	6398392

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	292774	6398204
<i>Stenanthemum bremerense</i>	P4	51 H	292777	6398343
<i>Stenanthemum bremerense</i>	P4	51 H	292778	6398224
<i>Stenanthemum bremerense</i>	P4	51 H	292778	6398272
<i>Stenanthemum bremerense</i>	P4	51 H	292779	6398438
<i>Stenanthemum bremerense</i>	P4	51 H	292779	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	292780	6398175
<i>Stenanthemum bremerense</i>	P4	51 H	292781	6398126
<i>Stenanthemum bremerense</i>	P4	51 H	292782	6398345
<i>Stenanthemum bremerense</i>	P4	51 H	292784	6398360
<i>Stenanthemum bremerense</i>	P4	51 H	292785	6398151
<i>Stenanthemum bremerense</i>	P4	51 H	292785	6398315
<i>Stenanthemum bremerense</i>	P4	51 H	292787	6398293
<i>Stenanthemum bremerense</i>	P4	51 H	292791	6398275
<i>Stenanthemum bremerense</i>	P4	51 H	292803	6398132
<i>Stenanthemum bremerense</i>	P4	51 H	292962	6398157
<i>Stenanthemum bremerense</i>	P4	51 H	292969	6398104
<i>Stenanthemum bremerense</i>	P4	51 H	292969	6398193
<i>Stenanthemum bremerense</i>	P4	51 H	293017	6398281
<i>Stenanthemum bremerense</i>	P4	51 H	293024	6398256
<i>Stenanthemum bremerense</i>	P4	51 H	293042	6398303
<i>Stenanthemum bremerense</i>	P4	51 H	293060	6399064
<i>Stenanthemum bremerense</i>	P4	51 H	293085	6398358
<i>Stenanthemum bremerense</i>	P4	51 H	293099	6398444
<i>Stenanthemum bremerense</i>	P4	51 H	293384	6398528
<i>Stenanthemum bremerense</i>	P4	51 H	293387	6398443
<i>Stenanthemum bremerense</i>	P4	51 H	293389	6398478
<i>Stenanthemum bremerense</i>	P4	51 H	293403	6398457
<i>Stenanthemum bremerense</i>	P4	51 H	293408	6398415
<i>Stenanthemum bremerense</i>	P4	51 H	293412	6398372
<i>Stenanthemum bremerense</i>	P4	51 H	293412	6398454
<i>Stenanthemum bremerense</i>	P4	51 H	293413	6398352
<i>Stenanthemum bremerense</i>	P4	51 H	293417	6398547
<i>Stenanthemum bremerense</i>	P4	51 H	293419	6398322
<i>Stenanthemum bremerense</i>	P4	51 H	293422	6398285
<i>Stenanthemum bremerense</i>	P4	51 H	293425	6398465
<i>Stenanthemum bremerense</i>	P4	51 H	293459	6398294
<i>Stenanthemum bremerense</i>	P4	51 H	293488	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	293516	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	293538	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	293554	6398509
<i>Stenanthemum bremerense</i>	P4	51 H	293559	6398483
<i>Stenanthemum bremerense</i>	P4	51 H	293577	6398444
<i>Stenanthemum bremerense</i>	P4	51 H	293581	6398463
<i>Stenanthemum bremerense</i>	P4	51 H	293582	6398286
<i>Stenanthemum bremerense</i>	P4	51 H	293585	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	293603	6398284
<i>Stenanthemum bremerense</i>	P4	51 H	293612	6398284
<i>Stenanthemum bremerense</i>	P4	51 H	293615	6398446
<i>Stenanthemum bremerense</i>	P4	51 H	293632	6398446
<i>Stenanthemum bremerense</i>	P4	51 H	293664	6398466
<i>Stenanthemum bremerense</i>	P4	51 H	293672	6398464
<i>Stenanthemum bremerense</i>	P4	51 H	293677	6398274
<i>Stenanthemum bremerense</i>	P4	51 H	293685	6398475
<i>Stenanthemum bremerense</i>	P4	51 H	292092	6397335
<i>Stenanthemum bremerense</i>	P4	51 H	292638	6398479
<i>Stenanthemum bremerense</i>	P4	51 H	292660	6398160
<i>Stenanthemum bremerense</i>	P4	51 H	292660	6398400

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	292660	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	292740	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	292740	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	292740	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	292820	6398080
<i>Stenanthemum bremerense</i>	P4	51 H	292820	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	292900	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	292900	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	292980	6398160
<i>Stenanthemum bremerense</i>	P4	51 H	292980	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293009	6398398
<i>Stenanthemum bremerense</i>	P4	51 H	293060	6398160
<i>Stenanthemum bremerense</i>	P4	51 H	293060	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	293060	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293092	6398471
<i>Stenanthemum bremerense</i>	P4	51 H	293099	6398470
<i>Stenanthemum bremerense</i>	P4	51 H	293140	6398160
<i>Stenanthemum bremerense</i>	P4	51 H	293140	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	293140	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293220	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293220	6398560
<i>Stenanthemum bremerense</i>	P4	51 H	293220	6398640
<i>Stenanthemum bremerense</i>	P4	51 H	293300	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293300	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293333	6398487
<i>Stenanthemum bremerense</i>	P4	51 H	293380	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293380	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293380	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	293399	6398528
<i>Stenanthemum bremerense</i>	P4	51 H	293460	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293460	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293460	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	293540	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	293620	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293620	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	293700	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293700	6398400
<i>Stenanthemum bremerense</i>	P4	51 H	293764	6398397
<i>Stenanthemum bremerense</i>	P4	51 H	293780	6398320
<i>Stenanthemum bremerense</i>	P4	51 H	293940	6398480
<i>Stenanthemum bremerense</i>	P4	51 H	292552	6398300
<i>Stenanthemum bremerense</i>	P4	51 H	294171	6398129
<i>Stenanthemum bremerense</i>	P4	51 H	293531	6398477
<i>Stenanthemum bremerense</i>	P4	51 H	293297	6398437
<i>Stenanthemum bremerense</i>	P4	51 H	293096	6398244
<i>Stenanthemum bremerense</i>	P4	51 H	292636	6398252
<i>Stenanthemum bremerense</i>	P4	51 H	293160	6400198
<i>Stenanthemum bremerense</i>	P4	51 H	292014	6399912
<i>Stenanthemum bremerense</i>	P4	51 H	292090	6397585
<i>Stenanthemum bremerense</i>	P4	51 H	291159	6397732
<i>Stenanthemum bremerense</i>	P4	51 H	290916	6397715
<i>Stenanthemum bremerense</i>	P4	51 H	290353	6397986
<i>Stenanthemum bremerense</i>	P4	51 H	290667	6398167
<i>Stenanthemum bremerense</i>	P4	51 H	290825	6398084
<i>Stenanthemum bremerense</i>	P4	51 H	292042	6398684
<i>Stenanthemum bremerense</i>	P4	51 H	292005	6398705
<i>Stenanthemum bremerense</i>	P4	51 H	291952	6398714
<i>Stenanthemum bremerense</i>	P4	51 H	291861	6398800

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	291874	6398319
<i>Stenanthemum bremerense</i>	P4	51 H	291857	6398353
<i>Stenanthemum bremerense</i>	P4	51 H	291855	6398337
<i>Stenanthemum bremerense</i>	P4	51 H	291841	6398332
<i>Stenanthemum bremerense</i>	P4	51 H	291859	6398321
<i>Stenanthemum bremerense</i>	P4	51 H	291856	6398305
<i>Stenanthemum bremerense</i>	P4	51 H	291847	6398356
<i>Stenanthemum bremerense</i>	P4	51 H	291854	6398382
<i>Stenanthemum bremerense</i>	P4	51 H	291847	6398386
<i>Stenanthemum bremerense</i>	P4	51 H	292037	6398669
<i>Stenanthemum bremerense</i>	P4	51 H	292020	6398673
<i>Stenanthemum bremerense</i>	P4	51 H	291990	6398677
<i>Stenanthemum bremerense</i>	P4	51 H	291951	6398690
<i>Stenanthemum bremerense</i>	P4	51 H	291943	6398695
<i>Stenanthemum bremerense</i>	P4	51 H	291928	6398696
<i>Stenanthemum bremerense</i>	P4	51 H	291843	6398799
<i>Stenanthemum bremerense</i>	P4	51 H	291827	6398816
<i>Stenanthemum bremerense</i>	P4	51 H	291814	6398821
<i>Stenanthemum bremerense</i>	P4	51 H	291825	6398903
<i>Stenanthemum bremerense</i>	P4	51 H	291828	6398889
<i>Stenanthemum bremerense</i>	P4	51 H	291829	6398873
<i>Stenanthemum bremerense</i>	P4	51 H	291840	6398838
<i>Stenanthemum bremerense</i>	P4	51 H	291855	6398821
<i>Stenanthemum bremerense</i>	P4	51 H	291874	6398801
<i>Stenanthemum bremerense</i>	P4	51 H	291935	6398715
<i>Stenanthemum bremerense</i>	P4	51 H	291949	6398709
<i>Stenanthemum bremerense</i>	P4	51 H	291973	6398693
<i>Stenanthemum bremerense</i>	P4	51 H	292009	6398666
<i>Stenanthemum bremerense</i>	P4	51 H	292038	6398635
<i>Stenanthemum bremerense</i>	P4	51 H	291884	6398959
<i>Stenanthemum bremerense</i>	P4	51 H	291839	6398944
<i>Stenanthemum bremerense</i>	P4	51 H	291896	6398884
<i>Stenanthemum bremerense</i>	P4	51 H	291942	6398832
<i>Stenanthemum bremerense</i>	P4	51 H	291970	6398803
<i>Stenanthemum bremerense</i>	P4	51 H	292011	6398743
<i>Stenanthemum bremerense</i>	P4	51 H	290864	6397705
<i>Stenanthemum bremerense</i>	P4	51 H	291003	6397503
<i>Stenanthemum bremerense</i>	P4	51 H	291017	6397468
<i>Stenanthemum bremerense</i>	P4	51 H	290997	6397412
<i>Stenanthemum bremerense</i>	P4	51 H	293060	6399064
<i>Stenanthemum bremerense</i>	P4	51 H	292540	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292546	6398279
<i>Stenanthemum bremerense</i>	P4	51 H	292555	6398288
<i>Stenanthemum bremerense</i>	P4	51 H	292556	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292563	6398246
<i>Stenanthemum bremerense</i>	P4	51 H	292565	6398237
<i>Stenanthemum bremerense</i>	P4	51 H	292573	6398286
<i>Stenanthemum bremerense</i>	P4	51 H	292575	6398329
<i>Stenanthemum bremerense</i>	P4	51 H	292576	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292585	6398227
<i>Stenanthemum bremerense</i>	P4	51 H	292605	6398265
<i>Stenanthemum bremerense</i>	P4	51 H	292617	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	292620	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	292633	6398265
<i>Stenanthemum bremerense</i>	P4	51 H	292635	6398262
<i>Stenanthemum bremerense</i>	P4	51 H	292653	6398242
<i>Stenanthemum bremerense</i>	P4	51 H	292677	6398425
<i>Stenanthemum bremerense</i>	P4	51 H	292700	6398200

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	292731	6398126
<i>Stenanthemum bremerense</i>	P4	51 H	292734	6398426
<i>Stenanthemum bremerense</i>	P4	51 H	292757	6398435
<i>Stenanthemum bremerense</i>	P4	51 H	292779	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	292962	6398157
<i>Stenanthemum bremerense</i>	P4	51 H	292969	6398193
<i>Stenanthemum bremerense</i>	P4	51 H	292969	6398104
<i>Stenanthemum bremerense</i>	P4	51 H	293017	6398281
<i>Stenanthemum bremerense</i>	P4	51 H	293024	6398256
<i>Stenanthemum bremerense</i>	P4	51 H	293042	6398303
<i>Stenanthemum bremerense</i>	P4	51 H	293085	6398358
<i>Stenanthemum bremerense</i>	P4	51 H	293099	6398444
<i>Stenanthemum bremerense</i>	P4	51 H	292501	6398349
<i>Stenanthemum bremerense</i>	P4	51 H	292508	6398242
<i>Stenanthemum bremerense</i>	P4	51 H	292509	6398246
<i>Stenanthemum bremerense</i>	P4	51 H	292511	6398269
<i>Stenanthemum bremerense</i>	P4	51 H	292514	6398271
<i>Stenanthemum bremerense</i>	P4	51 H	292516	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	292534	6398282
<i>Stenanthemum bremerense</i>	P4	51 H	292549	6398366
<i>Stenanthemum bremerense</i>	P4	51 H	292593	6398357
<i>Stenanthemum bremerense</i>	P4	51 H	292602	6398368
<i>Stenanthemum bremerense</i>	P4	51 H	292612	6398383
<i>Stenanthemum bremerense</i>	P4	51 H	292621	6398440
<i>Stenanthemum bremerense</i>	P4	51 H	292630	6398412
<i>Stenanthemum bremerense</i>	P4	51 H	292633	6398450
<i>Stenanthemum bremerense</i>	P4	51 H	292640	6398437
<i>Stenanthemum bremerense</i>	P4	51 H	292640	6398425
<i>Stenanthemum bremerense</i>	P4	51 H	292642	6398479
<i>Stenanthemum bremerense</i>	P4	51 H	292649	6398436
<i>Stenanthemum bremerense</i>	P4	51 H	292651	6398477
<i>Stenanthemum bremerense</i>	P4	51 H	292662	6398482
<i>Stenanthemum bremerense</i>	P4	51 H	292671	6398455
<i>Stenanthemum bremerense</i>	P4	51 H	292680	6398487
<i>Stenanthemum bremerense</i>	P4	51 H	292526	6398237
<i>Stenanthemum bremerense</i>	P4	51 H	292546	6398268
<i>Stenanthemum bremerense</i>	P4	51 H	292548	6398255
<i>Stenanthemum bremerense</i>	P4	51 H	292560	6398266
<i>Stenanthemum bremerense</i>	P4	51 H	292562	6398293
<i>Stenanthemum bremerense</i>	P4	51 H	292569	6398282
<i>Stenanthemum bremerense</i>	P4	51 H	292582	6398240
<i>Stenanthemum bremerense</i>	P4	51 H	292614	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	292623	6398276
<i>Stenanthemum bremerense</i>	P4	51 H	292626	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292645	6398313
<i>Stenanthemum bremerense</i>	P4	51 H	292650	6398321
<i>Stenanthemum bremerense</i>	P4	51 H	292673	6398334
<i>Stenanthemum bremerense</i>	P4	51 H	292688	6398351
<i>Stenanthemum bremerense</i>	P4	51 H	292695	6398203
<i>Stenanthemum bremerense</i>	P4	51 H	292695	6398201
<i>Stenanthemum bremerense</i>	P4	51 H	292699	6398359
<i>Stenanthemum bremerense</i>	P4	51 H	292710	6398336
<i>Stenanthemum bremerense</i>	P4	51 H	292713	6398202
<i>Stenanthemum bremerense</i>	P4	51 H	292715	6398729
<i>Stenanthemum bremerense</i>	P4	51 H	292721	6398296
<i>Stenanthemum bremerense</i>	P4	51 H	292722	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	292726	6398248
<i>Stenanthemum bremerense</i>	P4	51 H	292740	6398206

Taxon	Conservation Code	Zone	Easting	Northing
<i>Stenanthemum bremerense</i>	P4	51 H	292760	6398202
<i>Stenanthemum bremerense</i>	P4	51 H	292765	6398403
<i>Stenanthemum bremerense</i>	P4	51 H	292767	6398378
<i>Stenanthemum bremerense</i>	P4	51 H	292770	6398362
<i>Stenanthemum bremerense</i>	P4	51 H	292771	6398392
<i>Stenanthemum bremerense</i>	P4	51 H	292774	6398204
<i>Stenanthemum bremerense</i>	P4	51 H	292777	6398343
<i>Stenanthemum bremerense</i>	P4	51 H	292778	6398272
<i>Stenanthemum bremerense</i>	P4	51 H	292778	6398224
<i>Stenanthemum bremerense</i>	P4	51 H	292779	6398438
<i>Stenanthemum bremerense</i>	P4	51 H	292780	6398175
<i>Stenanthemum bremerense</i>	P4	51 H	292781	6398126
<i>Stenanthemum bremerense</i>	P4	51 H	292782	6398345
<i>Stenanthemum bremerense</i>	P4	51 H	292784	6398360
<i>Stenanthemum bremerense</i>	P4	51 H	292785	6398315
<i>Stenanthemum bremerense</i>	P4	51 H	292785	6398151
<i>Stenanthemum bremerense</i>	P4	51 H	292787	6398293
<i>Stenanthemum bremerense</i>	P4	51 H	292791	6398275
<i>Stenanthemum bremerense</i>	P4	51 H	292803	6398132
<i>Stenanthemum bremerense</i>	P4	51 H	293384	6398528
<i>Stenanthemum bremerense</i>	P4	51 H	293387	6398443
<i>Stenanthemum bremerense</i>	P4	51 H	293389	6398478
<i>Stenanthemum bremerense</i>	P4	51 H	293403	6398457
<i>Stenanthemum bremerense</i>	P4	51 H	293408	6398415
<i>Stenanthemum bremerense</i>	P4	51 H	293412	6398372
<i>Stenanthemum bremerense</i>	P4	51 H	293412	6398454
<i>Stenanthemum bremerense</i>	P4	51 H	293413	6398352
<i>Stenanthemum bremerense</i>	P4	51 H	293417	6398547
<i>Stenanthemum bremerense</i>	P4	51 H	293419	6398322
<i>Stenanthemum bremerense</i>	P4	51 H	293422	6398285
<i>Stenanthemum bremerense</i>	P4	51 H	293425	6398465
<i>Stenanthemum bremerense</i>	P4	51 H	293459	6398294
<i>Stenanthemum bremerense</i>	P4	51 H	293488	6398283
<i>Stenanthemum bremerense</i>	P4	51 H	293516	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	293538	6398278
<i>Stenanthemum bremerense</i>	P4	51 H	293554	6398509
<i>Stenanthemum bremerense</i>	P4	51 H	293559	6398483
<i>Stenanthemum bremerense</i>	P4	51 H	293577	6398444
<i>Stenanthemum bremerense</i>	P4	51 H	293581	6398463
<i>Stenanthemum bremerense</i>	P4	51 H	293582	6398286
<i>Stenanthemum bremerense</i>	P4	51 H	293585	6398441
<i>Stenanthemum bremerense</i>	P4	51 H	293603	6398284
<i>Stenanthemum bremerense</i>	P4	51 H	293612	6398284
<i>Stenanthemum bremerense</i>	P4	51 H	293615	6398446
<i>Stenanthemum bremerense</i>	P4	51 H	293632	6398446
<i>Stenanthemum bremerense</i>	P4	51 H	293664	6398466
<i>Stenanthemum bremerense</i>	P4	51 H	293672	6398464
<i>Stenanthemum bremerense</i>	P4	51 H	293677	6398274
<i>Stenanthemum bremerense</i>	P4	51 H	293685	6398475
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292830	6397963
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292838	6397951
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292842	6397991
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292879	6397940
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292908	6397946
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292936	6397945
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292830	6397963
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292838	6397951
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292842	6397991

Taxon	Conservation Code	Zone	Easting	Northing
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292879	6397940
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292908	6397946
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292936	6397945
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292372	6397248
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292635	6397323
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292693	6397243
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	291464	6397113
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	292047	6397098
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	291159	6397733
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	295833	6398354
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	295859	6398258
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	295884	6398258
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	295893	6398268
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	295921	6398272
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	296059	6398125
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	296516	6398352
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	291988	6398322
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	P1	51 H	291973	6398351

Appendix 5: GPS Coordinates of Quadrat Locations (GDA 94)

Quadrat	Zone	Easting	Northing	Vegetation Code
Q1	51 H	292552	6398300	HS-MWS1
Q2	51 H	292473	6398150	CLP-EW1
Q3	51 H	292460	6397913	CLP-EW1
Q4	51 H	292011	6397454	CLP-EW1
Q5	51 H	291972	6397402	HS-MWS1
Q6	51 H	292866	6397429	CLP-EW1
Q7	51 H	293435	6397935	CLP-MWS1
Q8	51 H	293532	6397393	CLP-EW1
Q9	51 H	294045	6398312	CLP-EW1
Q10	51 H	294677	6397679	CLP-MWS1
Q11	51 H	294674	6397286	CLP-EW1
Q12	51 H	294204	6397689	CLP-MWS1
Q13	51 H	294171	6398129	HS-MWS1
Q14	51 H	293531	6398477	HS-MWS1
Q15	51 H	293485	6398566	CLP-EW1
Q16	51 H	293266	6398624	HS-MWS1
Q17	51 H	293284	6398653	HS-MWS1
Q18	51 H	293195	6398500	CLP-MWS1
Q19	51 H	293297	6398437	CLP-MWS1
Q20	51 H	293096	6398244	CLP-MWS1
Q21	51 H	292938	6398111	HS-MWS1
Q22	51 H	292636	6398252	HS-MWS1
Q23	51 H	292670	6398645	HS-MWS1
Q24	51 H	292571	6398758	CLP-EW1
Q25	51 H	293076	6399092	HS-MWS1
Q26	51 H	293339	6399488	HS-MWS1
Q27	51 H	294218	6399275	CLP-EW1
Q28	51 H	294101	6400232	CLP-EW1
Q29	51 H	293857	6398356	CLP-MWS1
Q30	51 H	294198	6398343	CLP-MWS1
Q31	51 H	293677	6398574	CLP-MWS1
Q32	51 H	293064	6399515	CLP-EW1
Q33	51 H	293160	6400198	HS-MWS1
Q34	51 H	292852	6400067	CLP-MWS1
Q35	51 H	292270	6399913	CLP-EW1
Q36	51 H	292014	6399912	HS-MWS1
Q37	51 H	292081	6399855	CLP-MWS1
Q38	51 H	292316	6399461	CLP-MWS1
Q39	51 H	292471	6398867	CLP-EW1
Q40	51 H	292320	6398662	CLP-MWS1
Q41	51 H	292267	6398290	CLP-MWS1
Q42	51 H	293982	6398914	HS-OS1
Q43	51 H	294201	6398699	HS-OS1
Q44	51 H	294502	6398681	HS-OS1
Q45	51 H	294600	6398867	HS-OS1
Q46	51 H	294900	6398659	HS-OS1
Q47	51 H	294547	6398362	HS-OS1
Q48	51 H	294812	6398073	HS-OS1

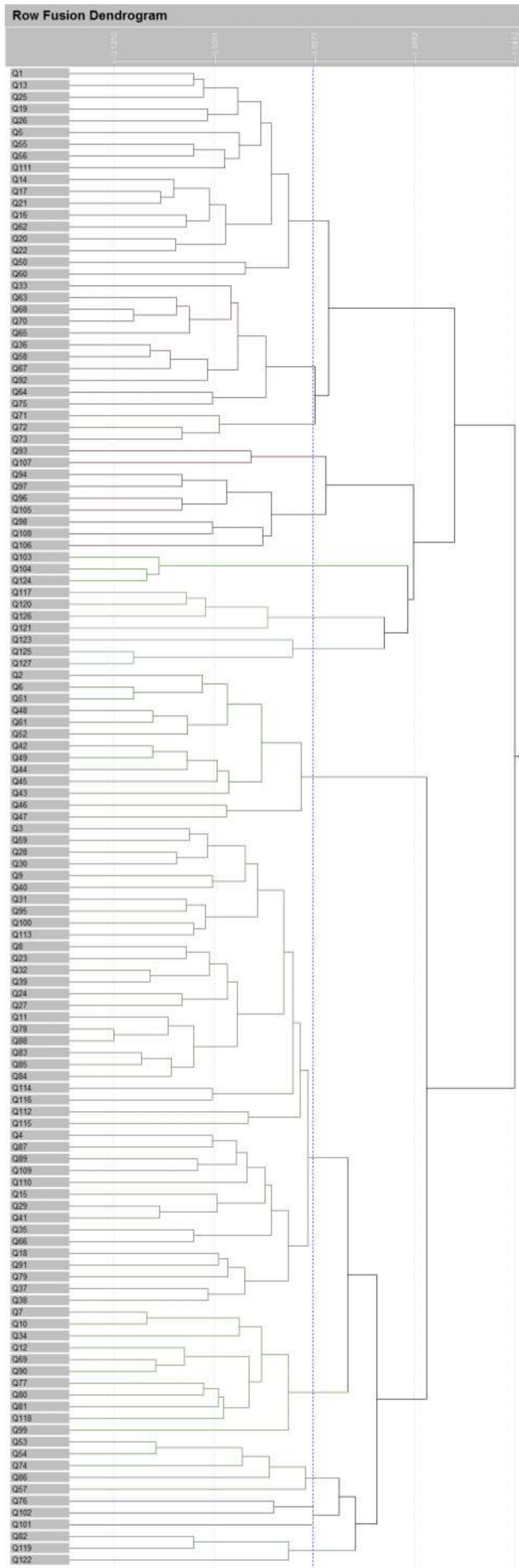
Quadrat	Zone	Easting	Northing	Vegetation Code
Q49	51 H	293412	6399031	HS-OS1
Q50	51 H	293647	6399831	HS-OS1
Q51	51 H	292673	6399552	HS-OS1
Q52	51 H	292675	6399553	HS-OS1
Q53	51 H	292024	6398236	HS-OS1
Q54	51 H	291808	6397889	HS-EW1
Q55	51 H	291838	6397696	HS-MWS1
Q56	51 H	291803	6397574	HS-MWS1
Q57	51 H	292089	6397584	HS-OS1
Q58	51 H	292090	6397585	HS-MWS1
Q59	51 H	292595	6397712	HS-EW1
Q60	51 H	292765	6398065	HS-MWS1
Q61	51 H	293111	6397786	HS-EW1
Q62	51 H	292643	6398139	HS-MWS1
Q63	51 H	291159	6397733	HS-MWS3
Q64	51 H	291159	6397732	HS-MWS3
Q65	51 H	290916	6397715	HS-MWS3
Q66	51 H	290696	6397682	CLP-EW1
Q67	51 H	290353	6397986	HS-MWS3
Q68	51 H	290824	6398083	HS-MWS3
Q69	51 H	291105	6397457	CLP-MWS1
Q70	51 H	290990	6397366	HS-MWS3
Q71	51 H	295493	6398731	HS-MWS2
Q72	51 H	295583	6398507	HS-MWS2
Q73	51 H	296027	6398295	SLP-OS1
Q74	51 H	296059	6398125	CLP-MWS1
Q75	51 H	296432	6398448	SLP-OS1
Q76	51 H	296095	6397992	SLP-MWS2
Q77	51 H	295815	6397717	CLP-MWS1
Q78	51 H	295579	6397717	CLP-EW1
Q79	51 H	295380	6398298	CLP-MWS1
Q80	51 H	295443	6397561	CLP-MWS1
Q81	51 H	296124	6397061	CLP-MWS1
Q82	51 H	296317	6396863	SLP-MWS2
Q83	51 H	295667	6396671	CLP-EW1
Q84	51 H	295411	6396851	CLP-EW1
Q85	51 H	295086	6396671	CLP-EW1
Q86	51 H	294214	6396899	CLP-MWS1
Q87	51 H	294092	6396780	CLP-MWS1
Q88	51 H	293101	6396808	CLP-EW1
Q89	51 H	291456	6396796	CLP-EW1
Q90	51 H	290818	6396442	CLP-MWS1
Q91	51 H	290434	6396631	CLP-MWS1
Q92	51 H	290425	6398264	CLP-EW1
Q93	51 H	317314	6399925	SLP-MWS1
Q94	51 H	315797	6400845	CLP-MWS2
Q95	51 H	314356	6401382	CLP-EW1
Q96	51 H	312909	6401524	CLP-EW1
Q97	51 H	310842	6400384	CLP-MWS2
Q98	51 H	309908	6400622	SLP-MWS1

Quadrat	Zone	Easting	Northing	Vegetation Code
Q99	51 H	307251	6400342	CLP-EW1
Q100	51 H	304706	6399751	CLP-EW1
Q101	51 H	301565	6400625	CLP-MWS2
Q102	51 H	298940	6400214	CLP-EW1
Q103	51 H	296417	6400370	CD-CSSSF1
Q104	51 H	295333	6400501	CD-CSSSF1
Q105	51 H	317990	6400604	CLP-MWS2
Q106	51 H	319408	6401384	CLP-MWS1
Q107	51 H	320536	6400903	SLP-MWS1
Q108	51 H	322397	6400387	SLP-MWS1
Q109	51 H	325996	6400235	CLP-MWS1
Q110	51 H	329524	6400310	CLP-EW1
Q111	51 H	332202	6400305	CLP-MWS2
Q112	51 H	336893	6401824	CLP-MWS2
Q113	51 H	342546	6400640	CLP-EW1
Q114	51 H	347515	6398673	CLP-EW1
Q115	51 H	349075	6397708	CLP-EW1
Q116	51 H	350677	6396555	CLP-EW1
Q117	51 H	351226	6396346	SLP-EW1
Q118	51 H	351635	6396222	CLP-EW1
Q119	51 H	353587	6395427	CLP-EW1
Q120	51 H	358732	6393384	SLP-EW1
Q121	51 H	356086	6394538	CLP-EW1
Q122	51 H	364074	6391449	CLP-EW1
Q123	51 H	314565	6401266	G-H1
Q124	51 H	296319	6399094	CD-CSSSF1
Q125	51 H	316537	6401758	G-H1
Q126	51 H	364176	6390690	SLP-EW1
Q127	51 H	364037	6394852	G-H1

Appendix 6: Vegetation Condition Rating

Vegetation Condition Rating	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	/
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	/	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix 7: PATN Analysis Results

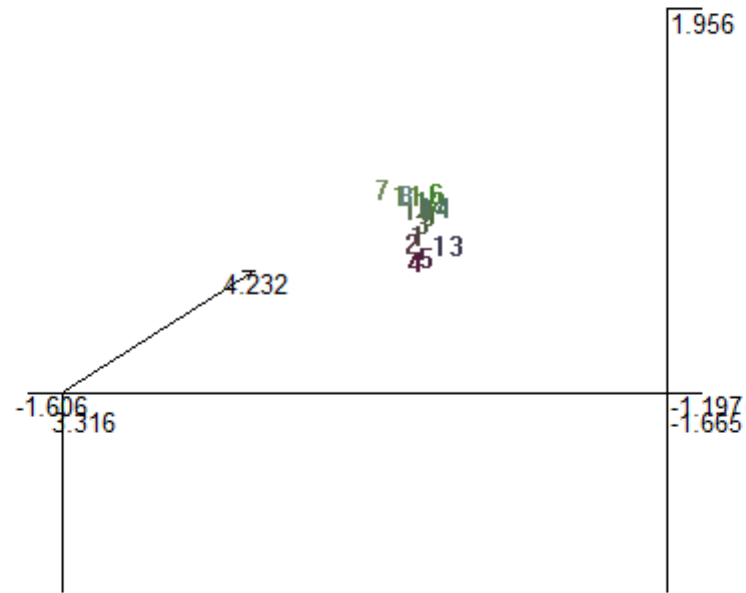


Stress: 0.2856

LEGEND

- Group 1
- Group 2
- Group 3
- Group 4
- Group 5
- Group 6
- Group 7
- Group 8
- Group 9
- Group 10
- Group 11
- Group 12
- Group 13
- Group 14

PATN groups



Appendix 8: Quadrat Datasheets

Provided as separate document

Appendix 9: Quadrat Photographs

Provided as separate document