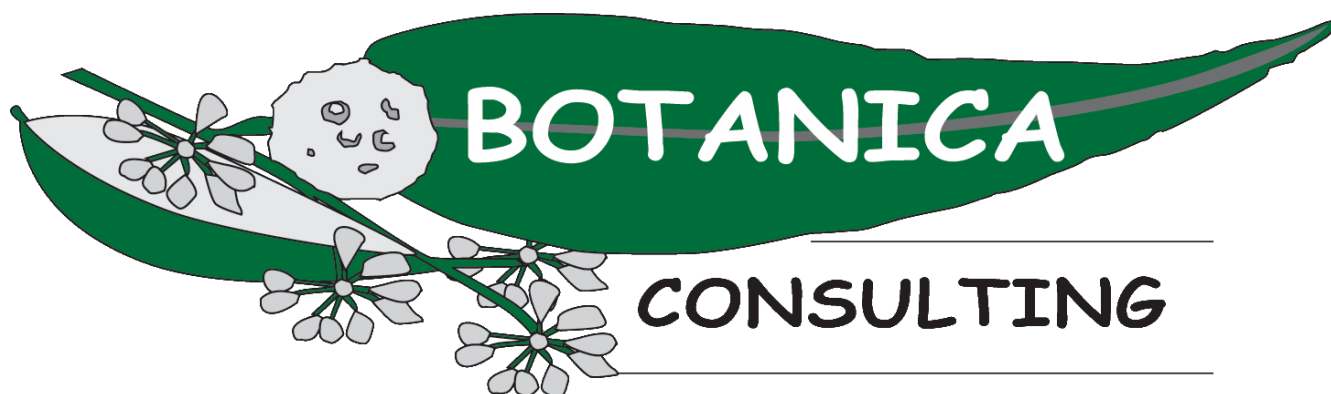




Flora & Vegetation Survey of the Greater North Ironcap Area

Tenements: E77/1764, M77/543, M77/219, M77/544,
M77/582 and M77/99

Prepared For



Final

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Executive Summary

Botanica Consulting was commissioned by Western Areas NL to undertake a Level 1 flora and vegetation survey of the Greater North Ironcap area in spring 2012, located approximately 76km north-east of Hyden. The Greater North Ironcap covers a total area of approximately 1635 ha of which approximately 252ha has been previously surveyed by Botanica Consulting (2011). The remaining 1383ha was surveyed on the 1st to 2nd September 2012. The results of the previous survey was combined with the results of the current survey to provide a flora and vegetation assessment of the entire North Ironcap area.

A total of sixteen vegetation communities were identified within the Greater North Ironcap area:

1. Low scrub of mixed *Allocasuarina* over mixed dwarf scrub;
2. Shrub mallee of *Eucalyptus eremophila* and *E. urna* over heath of *Daviesia nematophylla* & *Melaleuca adnata*;
3. Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta*;
4. Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/ *Leptospermum erubescens*;
5. Forest of *E. melanoxydon* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata*;
6. Heath of *Allocasuarina campestris* and *Hakea kippistiana*;
7. Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*;
8. Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta*;
9. Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/ *Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop;
10. Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora*;
11. Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Acacia intricata*/*Microcybe multiflora*;
12. Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*;
13. Open tree mallee of *E. melanoxydon* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens*;
14. Open tree mallee of *E. livida*/*E. eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia*;
15. Low woodland of *E. salmonophloia*/*E. urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga*; and
16. Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata*.

These sixteen vegetation communities were represented by a total of 46 Families, 107 Genera and 203 Species (including sub-species and variants).

One Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, Section 179 of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* and as listed by the Department of Environment and Conservation, was identified within the Greater North Ironcap area. Five Priority Flora species, *Boronia westringioides* (P2), *Eremophila biserrata* (P4), *Eutaxia acanthoclada* (P4), *Microcorys* sp. Forresteria (V. English 2004) (P4) and *Stylidium sejunctum* (P2) were also recorded within the Greater North Ironcap area.

The Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community has National Environmental Significance as defined by the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* as it contains Threatened Flora listed as vulnerable under Section 179 of the *Environment Protection and Biodiversity Conservation Act 1999*. No Threatened Ecological Communities pursuant to Commonwealth legislation or listed by the Department of Environment and Conservation were recorded within the Greater North Ironcap area. The Greater North Ironcap area is however located within the North Ironcap region of the *Ironcap Hills Vegetation Complexes* which is listed by the Department of Environment and Conservation as a Priority 3 Ecological Community.

Almost the entire Greater North Ironcap area lies within the Lake Cronin Environmentally Sensitive Area and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the Environmental Protection Authority report (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *Conservation Land Management Act 1984* but not formally reserved.

A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap Banded Ironstone Formation located in the north-west region of the Greater North Ironcap area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area).

The entire Greater North Ironcap area is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), fifteen vegetation communities within the Greater North Ironcap area were rated as being in 'very good' health. The remaining vegetation community; Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* was rated as being in 'good' health. Four weed species were identified in the Greater North Ironcap area; *Arctotheca calendula* (Cape weed), *Carpobrotus aequilaterus* (Angular pigface), *Dittrichia graveolens* (Stinkwort) and *Ursinia anthemoides* (Ursinia). According to the Department of Agriculture and Food Western Australia none of these species are listed as Declared Plants.

1 Introduction

1.1 Project Description

Botanica Consulting (BC) was commissioned by Western Areas NL (Western Areas) to undertake a Level 1 flora and vegetation survey of the Greater North Ironcap area. The flora survey was conducted within tenements E77/1764, M77/543, M77/219, M77/544, M77/582 and M77/99 (Figure 1). The aim of the survey was to produce a vegetation map (Appendix 3) and species list (Appendix 4) as well as to document and map locations of any Threatened Ecological Communities (TEC), Threatened or Priority Flora species within the survey area. The entire Greater North Ironcap area covers an area of 1635ha; approximately 1383ha were surveyed from the 1st to 2nd September 2012 and approximately 252ha was previously surveyed by BC in 2011. The results of these previous surveys were combined with the results of the current survey to provide a flora and vegetation assessment of the entire Greater North Ironcap area.

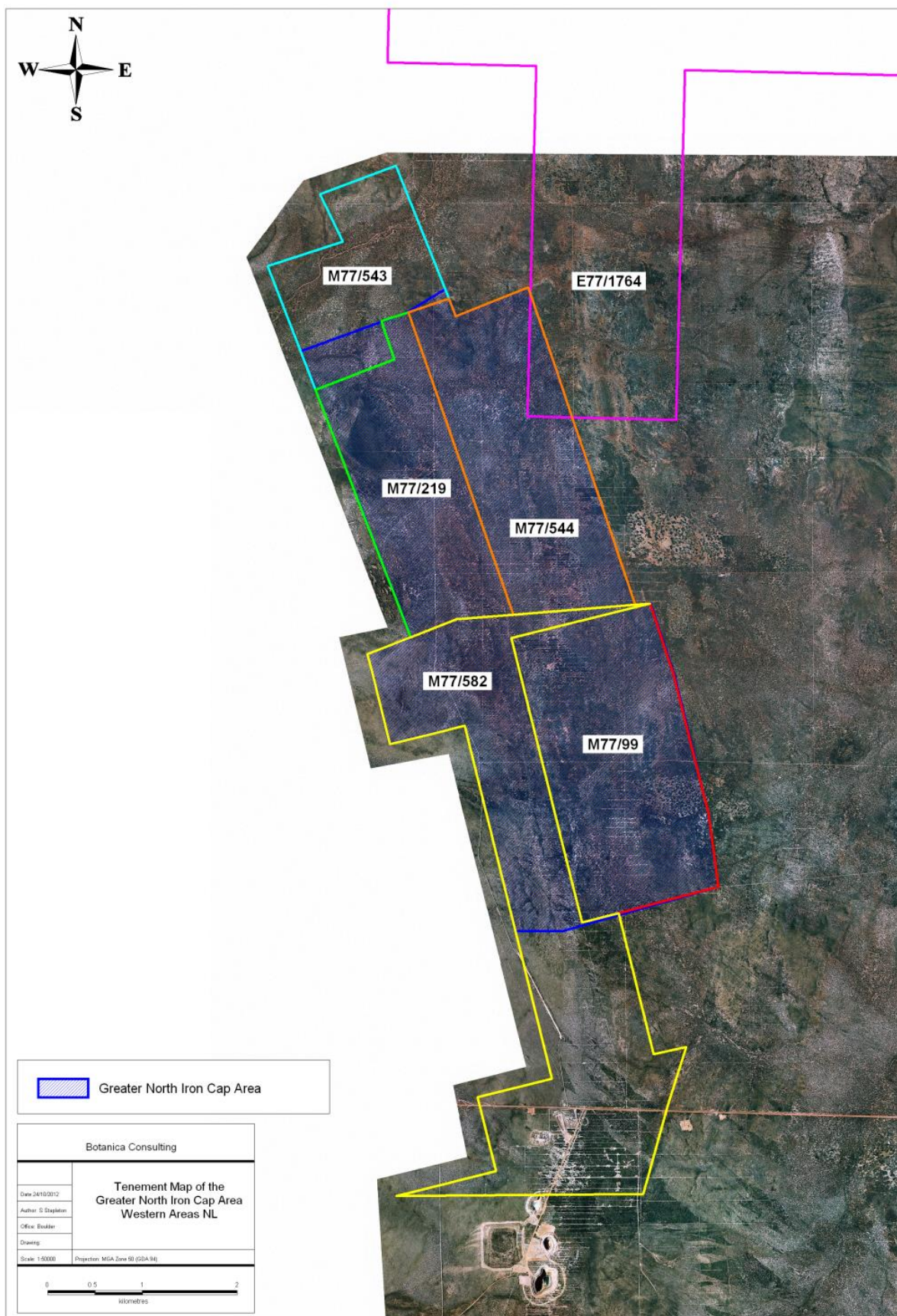


Figure 1: Tenements within the Greater North Ironcap area

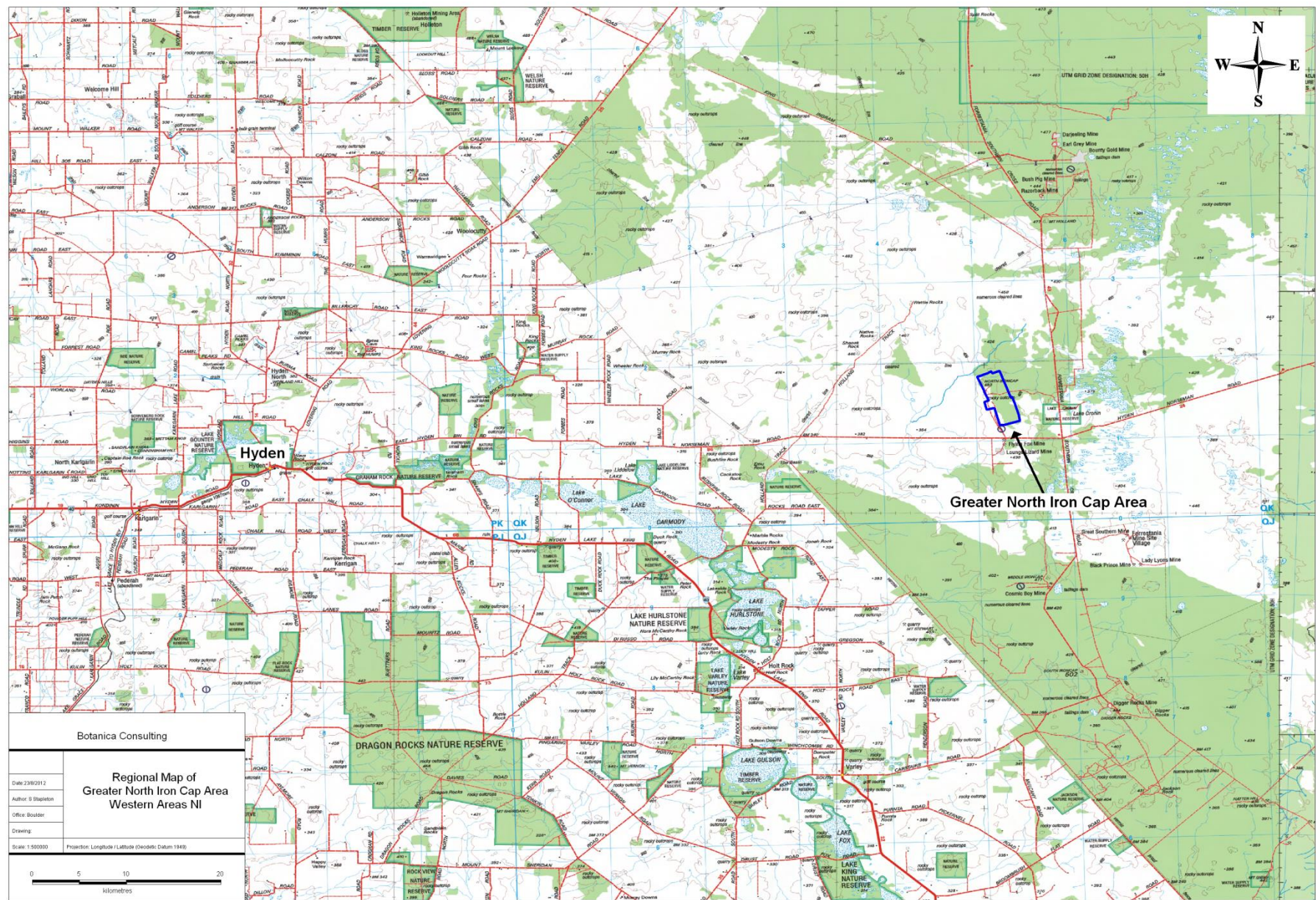


Figure 2: Regional map of the Greater North Ironcap area (survey area not to scale)

1.1 Flora and Vegetation within the Greater North Ironcap area

Table 1 below provides a summary of the vegetation and flora of conservation significance identified within the two flora surveys conducted by BC between 2011 to 2012 within the Greater North Ironcap area.

Table 1: Summary of flora and vegetation recorded within the Greater North Ironcap area

Date	Survey/Report	Vegetation	Flora of Conservation Significance
September 2011	Beautiful Sunday	1. Heath of <i>Allocasuarina campestris</i> and <i>Hakea kippistiana</i> 2. <i>Melaleuca hamata</i>/<i>Acacia eremophila</i> over low grass of <i>Borya constricta</i> 3. Low woodland of <i>E. salmonophloia</i> over mallee of <i>E. cylindrocarpa</i>/<i>E. cylindriflora</i>/<i>E. pileata</i> 4. Forest of <i>E. melanoxylon</i> and <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i> 5. Open low scrub of <i>Acacia hemiteles</i> over very open low grass of <i>Aristida contorta</i> 6. Open mallee of <i>E. livida</i> over heath of <i>Allocasuarina acutivalvis</i> 7. Mallee of <i>E. eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> and <i>Melaleuca adnata</i>	• <i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T) • <i>Eremophila biserrata</i> (P4) • <i>Stylidium sejunctum</i> (P2)
October 2012	Greater North Ironcap	1. Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub; 2. Shrub mallee of <i>E. eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> & <i>Melaleuca adnata</i>; 3. Scrub of <i>Allocasuarina huegeliana</i> over heath of <i>Acacia multispicata</i>/<i>Acacia lasiocalyx</i> and dwarf scrub of <i>Borya constricta</i>/<i>Leptospermum erubescens</i>; 4. Forest of <i>E. melanoxylon</i> and <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>; 5. Low woodland of <i>E. salmonophloia</i> over open tree mallee of <i>E. cylindrocarpa</i>/<i>E. cylindriflora</i>/<i>E. pileata</i>; 6. Open tree mallee of <i>Eucalyptus livida</i> over heath of <i>Acacia steedmanii</i>/<i>Allocasuarina campestris</i> and low heath of <i>Phebalium ambiguum</i>/<i>Acacia sulcata</i> on rock outcrop; 7. Open tree mallee of <i>E. polita</i>/<i>E. salubris</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and heath of <i>Melaleuca adnata</i>/<i>Melaleuca lateriflora</i>/<i>Melaleuca sparsiflora</i>; 8. Open shrub mallee of <i>E. polita</i>/<i>E. platycorys</i>/<i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Acacia intricata</i>/<i>Microcybe multiflora</i>; 9. Regrowth forest of <i>E. salmonophloia</i>/<i>E. salubris</i> over heath of <i>Melaleuca cucullata</i>/<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of	• <i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T) • <i>Boronia westringioides</i> (P2), • <i>Eremophila biserrata</i> (P4) • <i>Eutaxia acanthoclada</i> (P4), • <i>Microcorys</i> sp. Forresteria (V. English 2004) (P4) • <i>Stylidium sejunctum</i> (P2)

Date	Survey/Report	Vegetation	Flora of Conservation Significance
		<i>Wilsonia humilis</i>/<i>Acacia acanthoclada</i>; 10. Open tree mallee of <i>E. melanoxydon</i> over dwarf scrub of <i>Santalum acuminatum</i> and dwarf scrub of <i>Acacia merrallii</i>/<i>Acacia deficiens</i>; 11. Open tree mallee of <i>E. livida</i>/<i>E. eremophila</i> over low scrub of <i>Allocasuarina acutivalvis</i> and dwarf scrub of <i>Dodonaea bursariifolia</i>; 12. Low woodland of <i>E. salmonophloia</i>/<i>E. urna</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia merrallii</i>/<i>Dodonaea stenozyga</i>; and 13. Forest of <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i>/<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Acacia intricata</i>.	

1.2 Previous relevant flora surveys within the surrounding area

Vegetation Survey of the Exploration Drilling Program, Jim's Seeds, Weeds and Trees, February 2006

Jim's Seeds, Weeds and Trees (JSWT) was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey of the North Flying Fox proposed drill lines, located approximately 80km east of Hyden. The survey was conducted on the 1st and 2nd February 2006, covering an area of approximately 17ha.

No Declared Rare Flora (DRF), pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the Department of Environment and Conservation (DEC) were located within the survey area. No Priority Flora species were identified during the survey.

Two vegetation communities were identified in the survey area; *Eucalyptus* mallee woodland and sandplain heath. These vegetation communities were represented by a total of 22 Families, 42 Genera and 81 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the area occurs within the Lake Cronin Environmentally Sensitive Area (ESA), which is listed on the Register of the National Estate (RNE).

Based on Keighery's vegetation health rating scale (1994), both of the vegetation communities were given a health rating of 'good'. No introduced species were identified within the survey area.

This survey occurred approximately 2km south of the Greater North Ironcap area.

North Flying Fox Drill Lines Flora Survey, Jim's Seeds, Weeds and Trees, April 2006

JSWT was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey of the North Flying Fox proposed drill lines, located approximately 100km east of Hyden. The survey was conducted on the 12th April 2005, covering an area of approximately 4.2ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. One Priority Flora species were identified during the survey, *Verticordia mitodes* (P3).

Two vegetation communities were identified in the survey area; *Eucalyptus* mallee woodland and sandplain heath. These vegetation communities were represented by a total of 17 Families, 36 Genera and 69 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the area occurs within the Lake Cronin ESA, which is listed on the RNE.

Based on Keighery's vegetation health rating scale (1994), both of the vegetation communities were given a health rating of 'excellent'. No introduced species were identified within the survey area.

This survey occurs approximately 1km south of the Greater North Ironcap area.

Vegetation Survey of three Proposed Monitoring Bores in the Flying Fox Area, Jim's Seeds, Weeds and Trees, August 2006

JSWT was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey of three proposed monitoring bore sites, located approximately 80km east of Hyden. The survey was conducted on the 10th April 2006, covering an area of approximately 1.24ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. One Priority Flora species were identified during the survey, *Microcorys* sp. Forrestania (P4).

Two vegetation communities were identified in the survey area; *Eucalyptus salmonophloia* woodland and *Acacia* heath. These vegetation communities were represented by a total of 19 Families, 31 Genera and 53 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the area occurs within the Lake Cronin ESA, which is listed on the RNE.

Based on Keighery's vegetation health rating scale (1994), both of the vegetation communities were given a health rating of 'degraded'. One introduced species were identified within the survey area, *Dittrichia graveolens*. According to the Department of Agriculture and Food Western Australia database, none of the species are listed as a Declared Plant.

This survey occurs approximately 3.5km south-east of the Greater North Ironcap area.

Flora and Vegetation Survey of the Flying Fox North East Exploration Area, Botanica Consulting, November 2006

BC was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey of the Flying Fox North East Area, located approximately 80km east of Hyden. The survey was conducted from the 29th to the 30th October 2006, covering an area of approximately 329.8ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. Six Priority Flora species were identified during the survey, *Microcorys* sp. Forrestania (V. English, 2004) (P4), *Boronia westringioides* (P2), *Baekkea* sp. North Ironcap (P2), *Dillwynia acerosa* (P1), *Microcorys pimeleoides* (P1) (no longer Priority) and *Daviesia elongata* subsp. *implexa* (P3).

Four vegetation communities were identified in the survey area; *Eucalyptus salmonophloia* woodland, *Eucalyptus* mallee woodlands, Sandplain Heath and Kwongan vegetation. These vegetation communities were represented by a total of 26 Families, 54 Genera and 132 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the area occurs within the Lake Cronin ESA, which is listed on the RNE.

Based on Keighery's vegetation health rating scale (1994), all of these vegetation communities were given a health rating of 'excellent'. No introduced species were identified within the survey area.

This survey occurs directly south of the Greater North Ironcap area.

Vegetation Survey of a Proposed Extension to the Current Clearing Permit Number 691/1 at the Flying Fox mine site, Botanica Consulting, June 2007

BC was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey at the Flying Fox mine site, located approximately 80km east of Hyden. The survey was conducted on the 1st June 2007, covering an area of approximately 46ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. Two Priority Flora species were identified during the survey, *Daviesia elongata* subsp. *implexa* (P3) and *Microcorys lenticularis* (P2).

Two vegetation communities were identified in the survey area; *Eucalyptus* mallee woodland and sandplain heath. These vegetation communities were represented by a total of 20 Families, 24 Genera and 34 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. However the area occurs within the Lake Cronin ESA, which is listed on the Register of the National Estate.

Based on Keighery's vegetation health rating scale (1994), both of the vegetation communities were given a health rating of 'excellent'. No introduced species were identified within the survey area.

This survey occurs approximately 2km south of the Greater North Ironcap area.

Flora and Vegetation Survey within the Greater Flying Fox Area, Botanica Consulting, November 2007

BC was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey at the Flying Fox mine site, located approximately 80km east of Hyden. The survey was conducted on the 8th October 2007, covering an area of approximately 247.83ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. One Priority Flora species were identified during the survey, *Microcorys* sp. *Forrestania* (V. English, 2004) (P4).

Three vegetation communities were identified in the survey area; *Eucalyptus* mallee woodland, Sandplain Heath and Rehabilitation vegetation. These vegetation communities were represented by a total of 24 Families, 47 Genera and 106 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the area occurs within the Lake Cronin ESA, which is listed on the RNE.

Based on Keighery's vegetation health rating scale (1994), two of the vegetation communities were given a health rating of 'very good'. The remaining vegetation community was given a health rating of 'degraded'. No introduced species were identified within the survey area.

This survey occurs approximately 2km south of the Greater North Ironcap area.

Vegetation Survey of New Morning to Spotted Quoll Area, Botanica Consulting, June 2008

BC was commissioned by Western Areas NL to conduct a Level 1 flora and vegetation survey for the Beautiful Sunday area, located 80km east of Hyden, WA. The survey covered an area of 616.7 hectares and was conducted on the 8th and 9th October 2007, 8th November 2007, and 17th and 18th April 2007.

Six vegetation communities were identified within the survey area:

1. *Eucalyptus* woodland;
2. *Eucalyptus* mallee woodland;
3. Salmon gum woodland;
4. Sandplain heath;
5. *Allocasuarina* shrubland; and
6. Rocky Outcrop.

These vegetation communities were represented by a total of 25 Families, 62 Genera and 151 Species (including sub-species and variants).

One DRF, *Eucalyptus steedmanii*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC within the survey area was identified during the survey. Two Priority Flora species, *Eremophila racemosa* (P4) and *Microcorys* sp. Forrestania (V. English 2004) (P4) were also recorded within the survey area.

Based on Keighery (1994), all six vegetation communities were classed as having a 'good' health rating. No introduced species were identified within the survey area.

This survey occurs approximately 3.6km south of the Greater North Ironcap area.

Flora and Vegetation Survey within the Lounge Lizard/Flying Fox Area Proposed Gravel Pit, Botanica Consulting, January 2009

BC was commissioned by Western Areas to undertake a Level 1 flora and vegetation survey of a proposed gravel pit at the Lounge Lizard/Flying Fox mine site, located approximately 80km east of Hyden. The survey was conducted on the 1st October 2008, covering an area of approximately 193ha.

No DRF, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act (1950)* and listed by the DEC were located within the survey area. One Priority Flora species were identified during the survey, *Microcorys* sp. Forresteria (V. English, 2004) (P4),

Two vegetation communities were identified in the survey area; *Eucalyptus* mallee woodland and Sandplain Heath. These vegetation communities were represented by a total of 29 Families, 56 Genera and 135 Species (including sub-species and variants).

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) listed under Commonwealth legislation or listed by the DEC were recorded within the survey area.

Based on Keighery's vegetation health rating scale (1994), both of the vegetation communities were given a health rating of 'very good'. No introduced species were identified within the survey area.

This survey occurs approximately 3.5km south of the Greater North Ironcap area.

New Morning Flora and Vegetation Survey, Botanica Consulting, August 2010

BC was commissioned by Western Areas to conduct a Level 1 flora and vegetation survey for the New Morning area, which is located approximately 140km south of Southern Cross. The survey covered an area of 60 hectares and was conducted from the 26th to 27th of May 2010.

Four vegetation communities were identified within the survey area: *Eucalyptus eremophila* mallee woodland on stony rise, *Acacia/Melaleuca* shrubland, *Allocasuarina/Melaleuca* shrubland and Mallee Woodland over *Melaleuca*. These vegetation communities were represented by a total of 17 Families, 37 Genera and 85 Species (including sub-species and variants).

The DRF species, *Eucalyptus steedmanii*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC was identified within the survey area. One Priority Flora species, *Microcorys* sp. Forresteria (V. English, 2004) (P4), was also recorded within the survey area.

The *Eucalyptus eremophila* mallee Woodland on stony rise vegetation group contains the DRF species *Eucalyptus steedmanii* which has national environmental significance as defined by the *EPBC Act 1999*. There were no TEC as listed by the DEC recorded within the survey area. The survey area is however located within a Priority 3 Ecological Community known as the *Ironcap Hills vegetation complexes*. The entire survey area was located inside the south western corner of the Lake Cronin ESA

which is listed as a RNE. The Lake Cronin RNE does not have formal protection under the *EPBC Act 1999*.

Based on Keighery (1994), all seven vegetation communities were classed as having a 'very good' health rating. One introduced species, *Dittrichia graveolens*, was identified within the survey area. According to the Department of Agriculture and Food Western Australia (DAFWA), this species is not listed as a Declared Plant.

This survey occurs approximately 4.7km south of the Greater North Ironcap area.

New Morning Flora and Vegetation Survey, Botanica Consulting, November 2010

BC was commissioned by Western Areas to conduct a Level 1 flora and vegetation survey for the New Morning area, which is located approximately 140km south of Southern Cross. The survey covered an area of 130 hectares and was conducted on the 10th of September 2010.

Three vegetation communities were identified within the survey area: Mallee woodland, *Acacia steedmanii* subsp. *steedmanii* shrubland and *Allocasuarina* shrubland. These vegetation communities were represented by a total of 20 Families, 33 Genera and 66 Species (including sub-species and variants).

One DRF, *Eucalyptus steedmanii*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC was identified within the survey area. No Priority Flora species were recorded within the survey area.

None of the vegetation communities identified in the survey area are considered to be TECs or contain TECs listed by either the Commonwealth *EPBC Act 1999* or by declaration of the Western Australian Minister for the Environment. There are no PECs as listed by the DEC within the survey area. The northwest corner of the survey area is within the Lake Cronin ESA.

Based on Keighery (1994), all seven vegetation communities were classed as having a 'very good' health rating. No introduced species were identified within the survey area.

This survey occurs approximately 5.8km south of the Greater North Ironcap area.

**Spotted Quoll/Cosmic Boy Haul Road Flora and Vegetation Survey, Botanica Consulting,
January 2011**

BC was commissioned by Western Areas to conduct a level 2 flora and vegetation survey for the Spotted Quoll/Cosmic Boy (SQ/CB) Haul Road area, located approximately 77.3 km east of Hyden, WA. The survey covered an area of 412.4 hectares and was conducted from the 30th of November to the 1st December 2009. This region was visited in January 2011 to re-assess the vegetation composition of the area and establish more quadrats. A total of 27 quadrats were established within the survey area.

Eleven vegetation communities and three sub-communities were identified within the survey area:

1. Rehabilitation Area;
2. *Eucalyptus urna* woodland;
3. *Eucalyptus livida* woodland;
4. *Eucalyptus salubris* woodland;
5. *Eucalyptus eremophila* subsp. *eremophila* and *E. cylindrocarpa* Mallee shrubland;
6. Mixed Mallee shrubland over *Melaleuca* shrubland;
7. Burnt *Eucalyptus salmonophloia* woodland over mixed Mallee shrubland (including sub-groups *Melaleuca hamata* thicket and *Melaleuca lanceolata* thicket);
8. *Eucalyptus salmonophloia* woodland,
9. Mixed Mallee and mixed shrub thicket on Banded Ironstone Ridge,
10. Mixed Mallee shrubland (including sub-group *Eucalyptus horistes* Mallee shrubland); and
11. *Eucalyptus. goniocarpa* shrubland.

These vegetation communities were represented by a total of 27 Families, 60 Genera and 141 Species (including sub-species and variants).

No DRF species pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC within the survey area was identified during the survey. However, Population 2 of the DRF species *Eucalyptus steedmanii* is located approximately 20m north-east and 470m west of the most northern region of the survey area. Four Priority Flora species; *Stenanthemum liberum* (P1), *Stylidium sejunctum* (P2), *Microcorys* sp. Forrestania (V. English, 2004) (P4) and *Eutaxia acanthoclada* (P3) were recorded in the survey area.

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the *E. salmonophloia* woodland vegetation community located within the far northern region of the survey area has a DRF population located approximately 20m north-east and 470m west. Within a minimum 50m boundary surrounding any DRF plant is considered an ESA. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the survey area.

The survey area is however located within the North Ironcap and the Middle Ironcap PEC of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

Based on Keighery (1994), one vegetation community was classed as being 'degraded', three were classed as 'good' and the remaining seven were classed as having a 'very good' health condition. Two introduced species, *Carduus nutans* and *Salvia verbenaca*, were identified within the survey area. According to the DAFWA, neither of these species are listed as Declared Plants.

This survey occurs approximately 8.3km south of the Greater North Ironcap area.

2 Regional Biophysical Environment

2.1 Regional Environment

The Greater North Ironcap area lies on the border of the Coolgardie and Mallee Regions. The Coolgardie Region is part Southwestern Interzone of Western Australia in a region known as the Coolgardie Botanical District (Beard, 1990). The area consists of predominantly eucalypt woodlands, becoming open and with saltbush-bluebush understorey on more calcareous soils (Beard, 1990). The Mallee Region is part of the South-West Province Australia in a region known as the Roe Botanical District. In this area the general cover is mallee with *Eucalyptus eremophila* the most consistent species. Both the Mallee and Coolgardie Regions are further divided into subregions, based on the Interim Biogeographic Regionalisation of Australia (IBRA). The Greater North Ironcap area is located on the border of the Western Mallee (MAL2) and Southern Cross (COO2) subregions, see Figure 3 (Cowan, 2001).

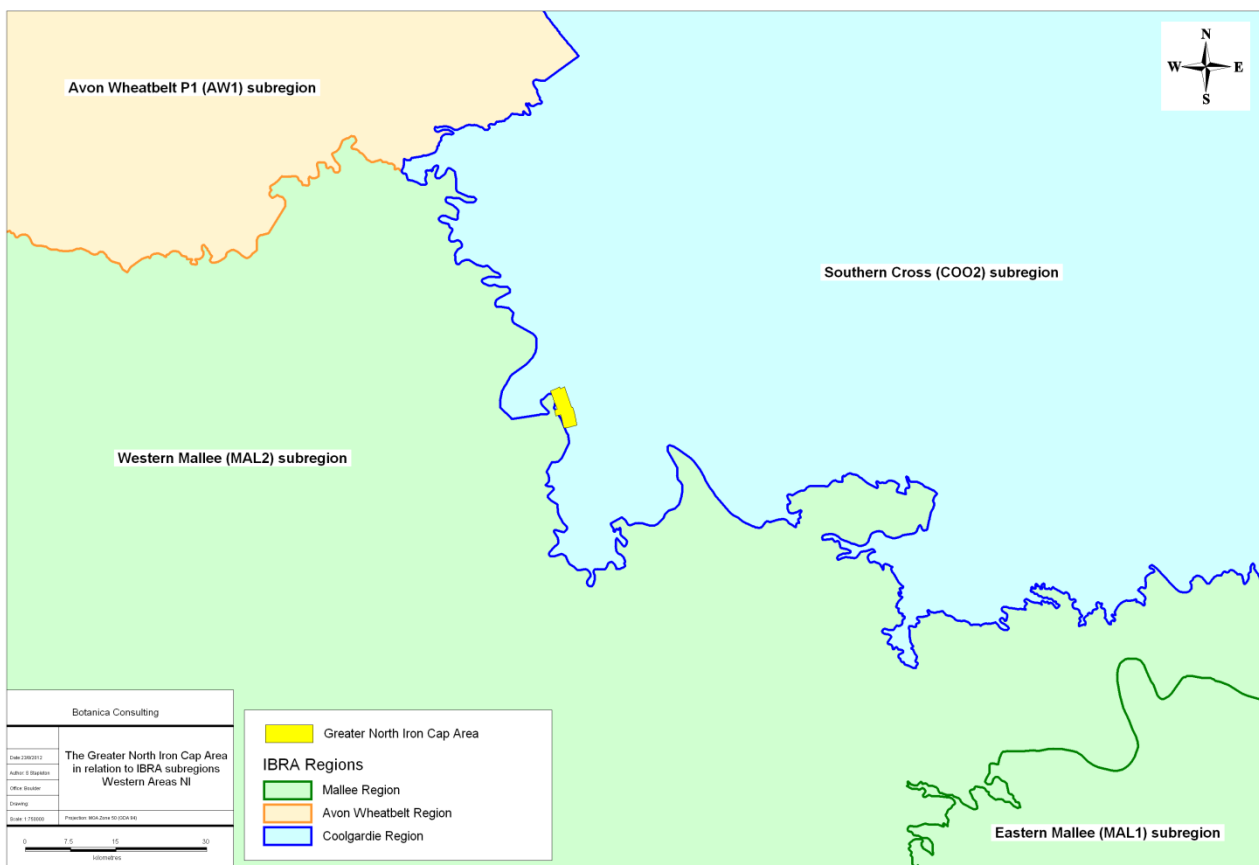


Figure 3: IBRA subregions surrounding the Greater North Ironcap area

2.2 Conservation Areas

Almost the entire Greater North Ironcap area lies within the Lake Cronin Environmentally Sensitive Area (ESA) and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the Environmental Protection Authority report (EPA, 2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *Conservation Land Management (CALM) Act 1984* but not formally reserved.

A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap Banded Ironstone Formation (BIF) located in the north-west region of the Greater North Ironcap area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area). Figure 4 provides a map of the existing and proposed conservation areas in relation to the Greater North Ironcap area.

The Greater North Ironcap area also lies within the Great Western Woodlands. The Great Western Woodlands is considered by The Wilderness Society of WA to be of global biological and conservation importance as one of the largest and healthiest temperate woodlands on Earth, containing many endemic species. The region covers almost 16 million hectares, 160,000 square kilometres, from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east (Figure 5).

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 DEC (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.

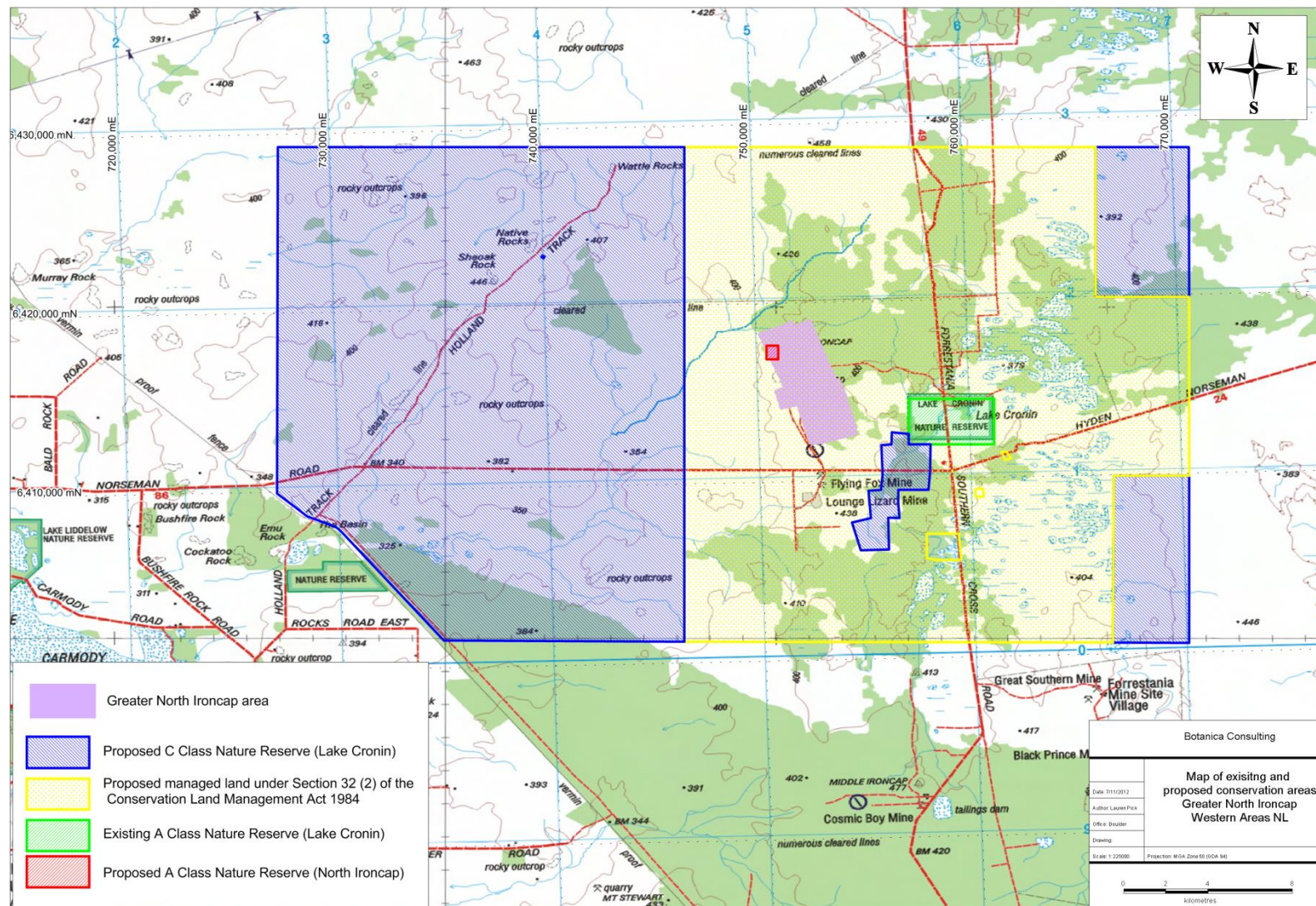


Figure 4: Map of existing and proposed Conservation Areas (EPA, 2009) in relation to the Greater North Ironcap area

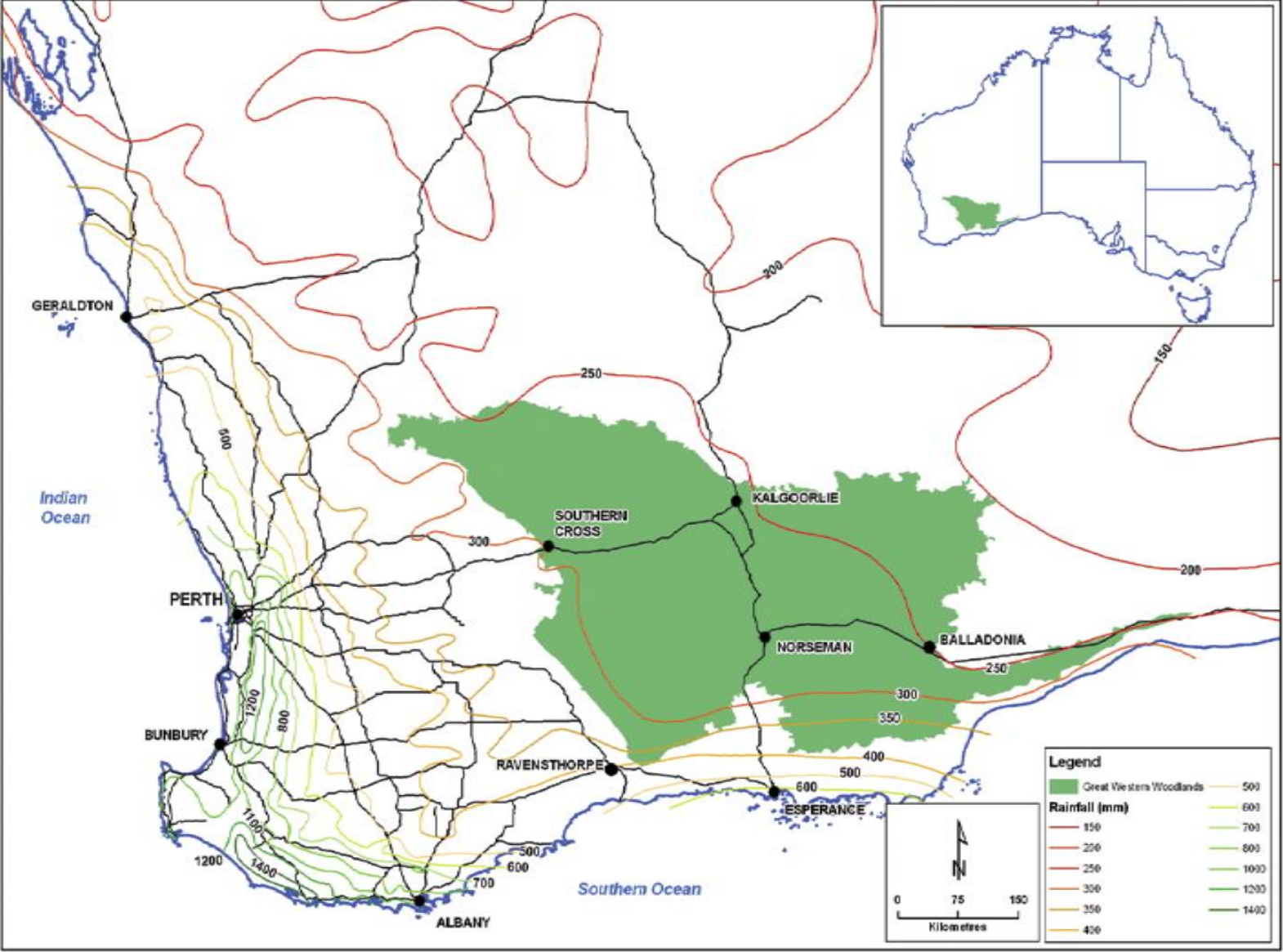


Figure 5: Location map of the Great Western Woodlands (DEC, 2010a).

2.3 Topography & Soils

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). The Western Mallee (MAL2) subregion lies on the south-eastern part of the Yilgarn Craton. It is a gently undulating country of low relief with duplex mallee soil (Beecham & Danks, 2001).

A major greenstone belt, running in a north-south direction, crosses the region and there are localised areas of Banded Iron Formation (BIF) including the North, Middle and South Ironcaps which are relatively small features compared to BIF ranges elsewhere in the Yilgarn Craton however they support a variety of endemic plant species and vegetation communities (Henry-Hall, 1989).

2.4 Vegetation

Vegetation of the Southern Cross subregion in the Coolgardie Botanical District is predominantly Eucalypt woodlands, Mallees, Acacia thickets and scrub heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on the low greenstone hills, valley alluvials and broad plains of calcareous earths. Salt lakes support dwarf shrublands of samphire. The area is rich in endemic *Acacias* (Cowan, 2001). The Western Mallee subregion vegetation commonly includes Mallee over myrtaceous-proteaceous heaths, Melaleuca shrublands, Samphire low shrublands on saline depressions and mixed Eucalypt woodlands. Mallee communities of the Western Mallee subregion occur on a variety of surfaces; *Eucalyptus* woodlands occur mainly on finetextured soils, with scrub-heath on sands and laterite (Beecham & Danks, 2001).

During a biological survey of the 20,300km² within the Lake Johnston-Hyden area (How, Newbey, Dell, Muir & Hnatiuk, 1988) Newbey and Milewski identified seven land units: Breakaway, Granite Exposure, Hill (Banded Ironstone Formation), Salt Lake Features (Saline flats, well-drained flats), Sandplains, Undulating Plain and Broad Valley. According to Newbey and Hnatiuk (1988) these seven land units comprised of 51 vegetation types, including four vegetation complexes; Breakaway complex, Banded Ironstone Formation (BIF) complex, Granite complex and Greenstone complex. Seven of these vegetation types were considered unique to the area; breakaway complex, BIF complex, greenstone complex, *Acacia jennerae* tall shrubland, *Eucalyptus georgei* low woodland, *Eucalyptus* sp. HRN 5603) low woodland and *E. scyphocalyx* Mallee.

The DAFWA GIS file (2011) indicates that the Greater North Ironcap area is within Pre-European Beard vegetation associations Forrestania 511 (COO2), Forrestania 519 (COO2), Forrestania 1413 (COO2), Forrestania 519 (MAL2) and Forrestania 1413 (MAL2). The extent of these vegetation associations as described by the DAFWA is shown in Table 2.

Table 2: Pre-European Beard Vegetation Associations within the survey area (DAFWA, 2011)

IBRA Subregion	Veg association	Pre-European Extent (ha)	Current Extent (ha)	Pre-European extent remaining (%)	% of Current extent within DEC managed lands	Vegetation Description (Beard, 1990)
COO2	Forrestania 511	153 641.65	153 336.64	99.80	9.70	Medium woodland; salmon gum & morrel
	Forrestania 519	196.88	196.88	100	0	Shrublands; mallee scrub, <i>Eucalyptus eremophila</i>
	Forrestania 1413	6298.81	6233.45	98.96	6.80	Shrublands; <i>acacia</i> , <i>casuarina</i> & <i>melaleuca</i> thicket
MAL2	Forrestania 519	17 763.58	17 332.51	97.57	0.72	Shrublands; mallee scrub, <i>Eucalyptus eremophila</i>
	Forrestania 1413	3315.25	3315.25	100	0	Shrublands; <i>acacia</i> , <i>casuarina</i> & <i>melaleuca</i> thicket

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”.

2.5 Climate

The climate of the Southern Cross subregion is characterised as arid to semi-arid Mediterranean with an annual rainfall of 200-300mm (Beard, 1990; Cowan, 2001). The climate of the Western Mallee subregion is characterised as dry warm Mediterranean with an annual rainfall of 300-500mm (Beard, 1990; Beecham & Danks, 2001). Rainfall data for the Lake Carmody weather station (#10565) located approximately 30km south of the Greater North Ironcap area is shown in Figure 6 (Bureau of Meteorology, BOM, 2012).

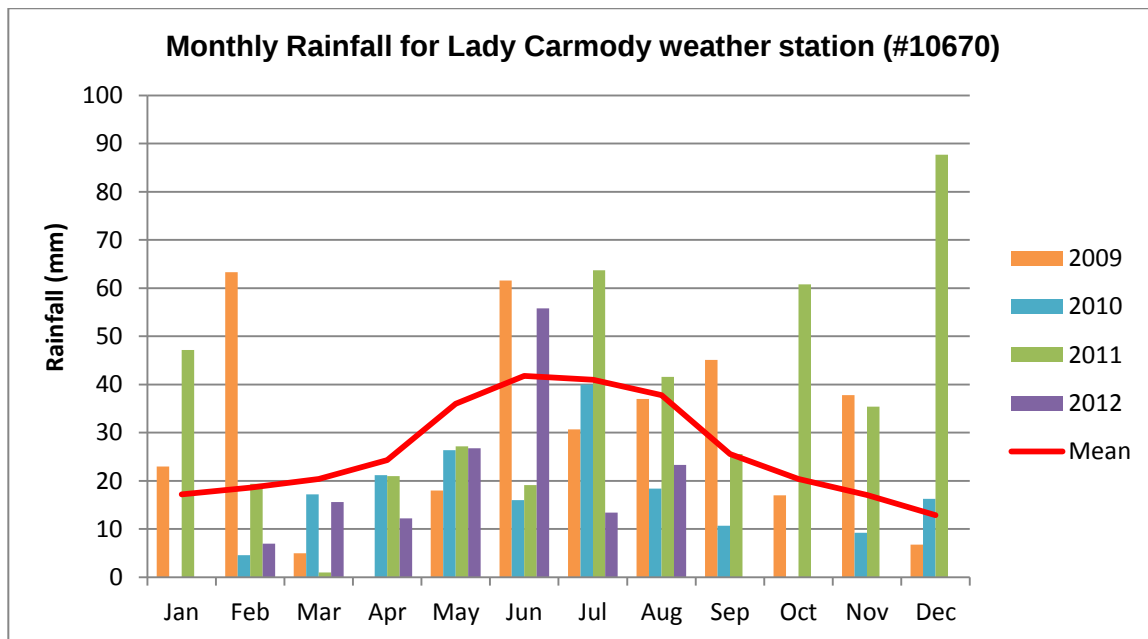


Figure 6: Monthly rainfall from January 2009 to August 2012 and mean monthly rainfall (September 1905 to August 2012) for the Lake Carmody weather station (#10670) (BOM, 2012)

2.6 Land Use

Based on the findings from its 2001 biodiversity audit, CALM identified the dominant land uses of the Southern Cross subregion as 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 Western Mallee subregion is Dry Land agriculture, UCL & Crown Reserves, and roads and other easements.

2.7 Survey Objectives

The objectives of the survey undertaken were to:

- Compile a broad scale vegetation community flora map and species list of the Greater North Ironcap area (Appendix 2);
- Document and map locations of any Threatened or Priority listed flora species located; (Appendix 2 and 4);
- Assess the regional and local conservation status of plant species and ecological communities within the Greater North Ironcap area; and
- Identify and map occurrences of any “Declared and Environmental” weeds within the Greater North Ironcap area.

3 Survey Methodology

3.1 Desktop Assessment

Prior to the field surveys, the results of the combined search of the DEC Flora of Conservation Significance databases (DEC, 2011a), were obtained by BC. These significant flora species were examined on the Western Australian Herbarium's web page (WAHERB, 2012) prior to the surveys to familiarise staff with their appearance. Locations of Threatened Flora and Priority Flora species revealed in the databases search were overlaid on aerial photography of the area. Vegetation descriptions of locations and available pictures of the Priority Flora were obtained from Florabase.

Priority Flora and their respective vegetation types were targeted in the survey area and all areas of occurrence were traversed on foot specifically looking for the Threatened flora associated with that vegetation description. Table 3 lists the definitions of Threatened and Priority ratings under the *Wildlife Conservation Act (1950)* as extracted from Florabase (WAHERB, 2012).

Table 3: Definitions of Rare and Priority Flora Species (WAHERB, 2011).

T: Schedule 1 Threatened Flora (Declared Rare Flora)-extant under the <i>Wildlife Conservation Act 1950</i>
Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X: Schedule 2 Declared Rare flora – Presumed Extinct Taxa under the <i>Wildlife Conservation Act 1950</i>
Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
1: Priority One – Poorly known Species
Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
2: Priority Two – Poorly Known Species
Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
3: Priority Three – Poorly known Species
Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
4: Priority Four – Rare, Near Threatened and other species in need of monitoring

1. Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
2. Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
3. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

5: Priority 5 – Conservation Dependent Species

Species 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.

3.2 Sampling and Analysis Methods

BC was commissioned by Western Areas in 2012 to conduct a Level 1 flora and vegetation survey of 1383ha within the 1635ha Greater North Ironcap area. 252ha of the Greater North Ironcap area has been previously surveyed by BC in 2011. The fieldwork was completed from the 1st to 2nd September 2012. The objective of the survey was to document all observed “Threatened/Declared Rare and Priority Flora” species encountered and the occurrences of any “Environmental or Declared Weeds” observed within or adjacent to the Greater North Ironcap area. The Greater North Ironcap area was traversed by two people via all-terrain vehicle and on foot. Figure 7 provides a map of the areas traversed throughout the survey.

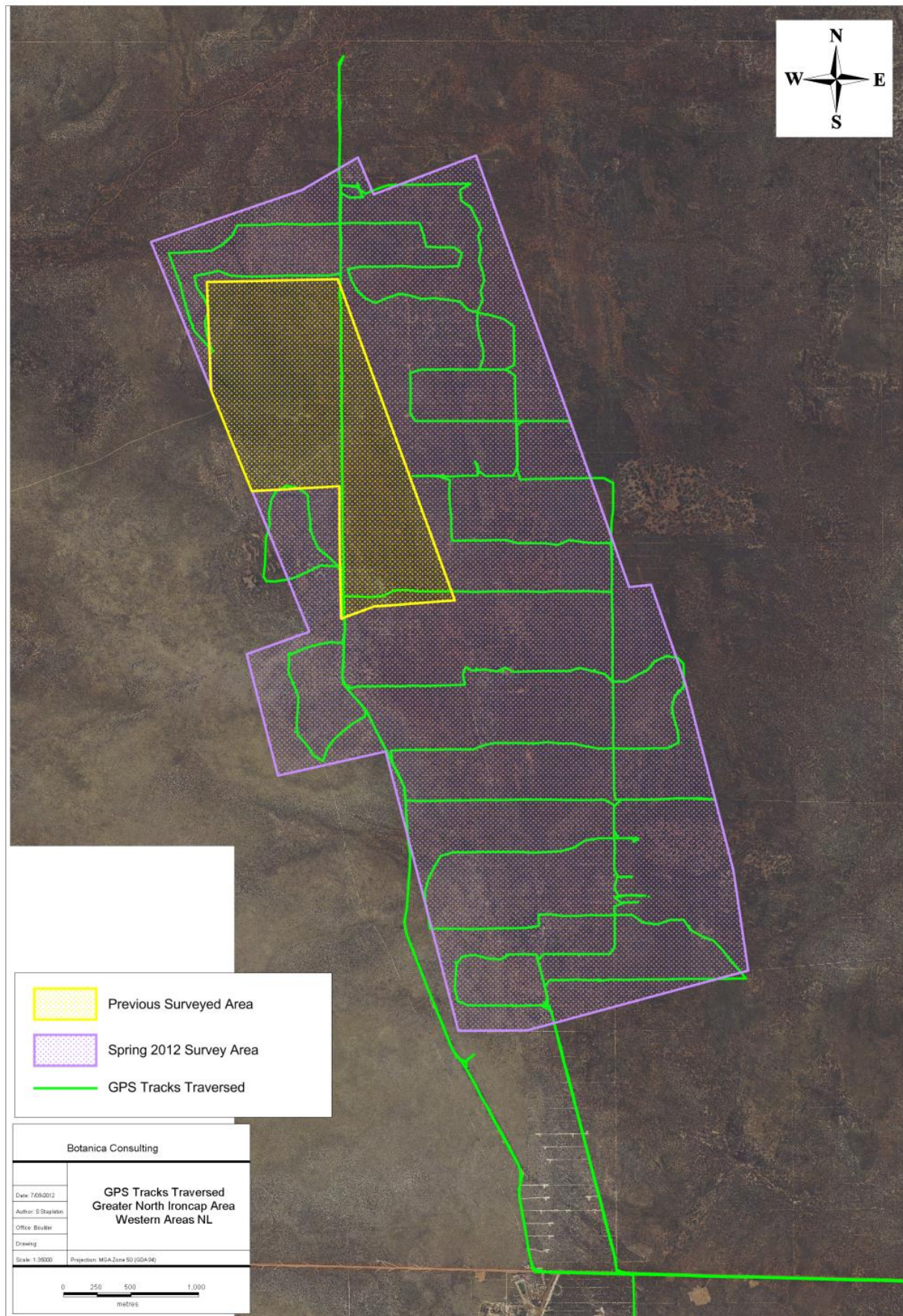


Figure 7: GPS tracks traversed throughout the Spring 2012 survey

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 co-ordinates of the boundaries between existing vegetation communities.

At each sample point, the following information was recorded:

- GPS location;
- Photograph of vegetation;
- Dominant species;
- Collection and documentation of unknown plant specimens; and
- GPS location, photograph and collection of Threatened Flora if encountered.

Unknown specimens collected during the survey were identified with the aid of samples housed at the BC Herbarium and the Western Australian Herbarium. Presence/absence data of species from sample sites of similar vegetation was then compiled forming the best representative vegetation communities. Similar vegetation communities were recognised visually in the field.

3.2.1 Personnel involved

Jim Williams - Environmental Consultant/Botanist (Diploma of Horticulture)
Lauren Pick - Environmental Consultant/Botanist (BSc Conservation Biology)

3.2.2 Scientific licences

Table 4: Scientific licenses of Botanica staff coordinating the Spring 2012 survey

Licensed staff	Permit Number	Valid Until
Jim Williams	SL009978	25-04-2013
Lauren Pick	SL009979	25-04-2013

3.3 Data Analysis Tools

Once the survey was completed the data obtained was analysed to generate a vegetation map (Appendix 3).

3.4 Flora survey limitations and constraints

It is important to note that there are limitations involved with conducting flora surveys, despite the careful planning that is put into their design. Such limitations that can occur are listed in Table 5 below.

Table 5: Limitations and constraints associated with the Spring 2012 survey.

Variable	Impact on Survey outcomes
Access problems	The vegetation within the survey area was dense and therefore ATV and 4WD vehicle was restricted to existing gridlines. All other access in the survey area was by foot.
Experience levels	The BC personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Botanist: Jim Williams Field Staff: Jim Williams & Lauren Pick Data Interpretation: Jim Williams, Lauren Pick & Samantha Stapleton
Timing of survey, weather & season	Fieldwork was completed during the Environmental Protection Authority's (EPA) recommended time period (i.e., Spring) for detecting most ephemeral flora and when the majority of species are in flower (Figure 5) (BOM, 2012).
Sources of information	BC have conducted a number of surveys within the Forrestania region and were also able to obtain information about the area from previous research conducted within the Western Areas tenements and the surrounding region.
Mapping reliability	BC obtained a high resolution ortho aerial image to assist with vegetation mapping.
Area disturbance	The majority of the survey area is in very good condition. The majority of the area was comprised of native vegetation with the only disturbance being historic exploration works in the form of gridlines/access tracks.
Survey Intensity	Survey intensity was appropriate for the size/significance of the area with a Level 1 reconnaissance survey completed in Spring to identify vegetation communities and any Priority Flora. A targeted search to identify all Priority Flora populations was not conducted. Prior to any disturbance a targeted search in those vegetation communities identified as containing Priority Flora should be conducted along any proposed clearing.
Resources	The DEC provided several resources including threatened flora information which were used to complete the survey. Other information was utilised from previous BC surveys in the area.
Completeness	In the opinion of BC the survey area was covered sufficiently in order to identify vegetation assemblages. Many of the plants were in flower due to the time of year and above average rainfall in June; as a result many of the flora species could be fully identified. It is estimated that approximately 90% of the flora within the area were able to be fully identified. The <i>Lepidosperma</i> genus is currently undergoing taxonomical revision and as a result the species <i>Lepidosperma</i> sp. North Ironcap which was identified in the survey has not been formally identified. The vegetation communities 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 communities identified were categorized via comparison to vegetation distributions throughout WA given on Australian Natural Resources Atlas (ANRA, 2012).

4 Results

4.1 Summary

A total of sixteen vegetation communities were identified within the Greater North Ironcap area. These sixteen vegetation communities were represented by a total of 46 Families, 107 Genera and 203 Species (including sub-species and variants).

One Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, Section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), was identified within the Greater North Ironcap area. Five Priority Flora species, *Boronia westringioides* (P2), *Eremophila biserrata* (P4), *Eutaxia acanthoclada* (P4), *Microcorys* sp. *Forresteria* (V. English 2004) (P4) and *Stylidium sejunctum* (P2) were also recorded within the Greater North Ironcap area.

The Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/ *Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contains Threatened Flora under Section 179 of the *EPBC Act 1999*. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the Greater North Ironcap area. The Greater North Ironcap area is however located within the North Ironcap region of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

Almost the entire Greater North Ironcap area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap BIF located in the north-west region of the Greater North Ironcap area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area). It is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), fifteen vegetation communities within the Greater North Ironcap area were rated as being in 'very good' health. The remaining vegetation

community; Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* was rated as being in 'good' health. Four weed species were identified in the Greater North Ironcap area, *Arctotheca calendula* (Cape weed), *Carpobrotus aequilaterus* (Angular pigface), *Dittrichia graveolens* (Stinkwort) and *Ursinia anthemoides* (Ursinia). According to the DAFWA (2012) none of these species are listed as Declared Plants.

4.2 Desktop Assessment

The results of the combined search of the DEC's Flora of Conservation Significance databases (DEC, 2011a) revealed three DEC listings of Threatened or Priority Flora species occur within the Greater North Ironcap area. Three DRF/Threatened Flora and 35 Priority Flora species were listed within a 10km radius of the Greater North Ironcap area. All 38 Flora species have the potential to occur within the Greater North Ironcap area as they occur in similar habitats and vegetation communities to those identified within the Greater North Ironcap area. Table 6 identifies the DEC listed Priority Flora species potentially occurring within the Greater North Ironcap area.

Table 6: Priority Flora with the potential to occur within the Greater North Ironcap area (DEC, 2011a)

Species	Conservation Code	Description (WAHERB, 2012)
<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.
<i>Eucalyptus steedmanii</i>	T	Tree, 2-8(-12) m high, bark smooth. Fl. white, Jan to Mar. Gravelly loam over ironstone, sand. Low hills, undulating plains.
<i>Paragoodia crenulata</i>	T	No description available
<i>Acacia asepala</i>	2	Diffuse, much-branched shrub, 0.5-1.5 m high. Fl. yellow, Aug. Red-brown sandy loam. Undulating plains, along drainage lines.
<i>Baeckea</i> sp. Blue Haze Mine (P. Armstrong 06/910)	1	No description available
<i>Baeckea</i> sp. Crossroads (B.L. Rye & M.E. Trudgen 241186)	1	No description available
<i>Baeckea</i> sp. Lake Cronin (K.R. Newbey 9191)	1	Upright, spreading, moderately open shrub. Fl. white/pink, Oct. Well-drained gravelly sands. Moderately exposed, gently undulating plain.
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	2	Erect, open shrub, to 0.4 m high. Fl. white/pink, Oct. Red clay. Gently undulating sandplains.
<i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968)	3	Straggly, erect shrub, to 1.5 m high. Fl. pink, Jun. Yellow to orange sandy loam with laterite gravel. Gently undulating sandplains, low ridges, road verges.
<i>Banksia viscida</i>	3	Densely branched, non-lignotuberous shrub, 0.4-1 m high. Fl. yellow-orange, Jul to Oct. Gravelly soils. Lateritic rises.
<i>Bentleya diminuta</i>	2	Rosetted rhizomatous, perennial, herb or shrub, 0.02-0.05 m

Species	Conservation Code	Description (WAHERB, 2012)
		high, growing in small colonies. Fl. white/yellow-green, Sep to Nov. Sandy clay or loam with calcareous nodules.
<i>Boronia westringioides</i>	2	Erect shrub, 0.2-0.75 m high. Fl. pink, Jul to Sep. Loamy sand. Plains.
<i>Calamphoreus inflatus</i>	4	Erect, spreading shrub, 0.4-1.6 m high, to 2 m wide. Fl. blue-purple/green, Oct to Dec or Feb to Mar. Clay loam with ironstone gravel. Flats, disturbed sites.
<i>Comesperma calcicola</i>	3	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.
<i>Conospermum sigmoideum</i>	2	Erect shrub, 0.2-0.5 m high. Fl. blue, Aug to Sep. Yellow sand.
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	3	Mat-forming or upright shrub, 0.1-0.7 m high. Fl. white/cream, Jan to May or Aug or Oct. Sand. Sandplains.
<i>Dampiera scaevolina</i>	1	Erect to ascending perennial, herb or shrub, 0.2-0.5 m high. Fl. blue/white, Sep to Nov. Sandy & gravelly soils.
<i>Daviesia elongata</i> subsp. <i>implexa</i>	3	Spreading or sprawling shrub, 0.4-1 m high. Fl. yellow/orange & red, Sep. Sand & laterite.
<i>Dillwynia acerosa</i>	3	Shrub, to 0.5 m high. Fl. yellow/red, Sep. Gravelly clay with laterite.
<i>Eremophila biserrata</i>	4	Prostrate shrub, to 3 m wide. Fl. green/yellow-green, Sep to Nov or Mar. Sandy or sandy clay soils. Alluvial flats, salt flats & lakes.
<i>Eremophila racemosa</i>	4	Erect shrub, 0.5-1.7 m high. Fl. purple-pink-red/white, Mar or Aug to Dec. Sandy or stony loam, clay loam. Undulating plains, roadsides.
<i>Eucalyptus exigua</i>	3	Mallee, 2-5 m high, bark smooth. Fl. white-cream, Mar. Sandy loam, white sand. Sandplains.
<i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>	1	Mallee or tree, 3-10 m high, bark rough, coarse & flaky on trunk, smooth above. Loam. Swamps, plains.
<i>Eutaxia acanthoclada</i>	3	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.
<i>Eutaxia nanophylla</i>	3	Straggly, rounded shrub, to 0.35 m high. Fl. Yellow & orange & red, Oct to Nov. Clayey sand, red clay, stoney clayey loam. Low-lying areas, damp flats, slopes, undulating plains, low stony ridges.
<i>Gastrolobium tenue</i>	1	Low, bushy shrub, to 0.6 m high. Fl. Orange & red & purple, Sep to Oct. Yellow sand or sandy clay. Undulating dunes, stony outcrops.
<i>Grevillea pilosa</i> subsp. <i>redacta</i>	3	Spreading to prostrate, non-lignotuberous shrub, 0.4-1.2 m high. Fl. red, Feb or Oct or Dec. Sand, laterite.
<i>Haegiela tatei</i>	4	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.
<i>Isolepis australiensis</i>	3	Annual, grass-like or herb (sedge), 0.03-0.055 m high, glumes 0.8-1.2 mm long; stamens 1(-2); style branches 3; nut with abaxial angle acute. Fl. Jun or Sep. Silty sand, sandy clay. Lake margins, pools.
<i>Keraudrenia adenogyna</i>	3	Erect shrub, ca 0.4 m high. Fl. purple-blue, Sep. Heavy loamy

Species	Conservation Code	Description (WAHERB, 2012)
		clay, loamy gravelly soils. Low-lying area.
<i>Microcorys</i> sp. Forrestania (V. English 2004)	4	Prostrate or erect shrub, 0.35-0.4 m high. Fl. white/purple, Jan or Apr. Yellow sandy clay or red-brown clay. Open woodland or cleared areas.
<i>Mirbelia densiflora</i>	3	Erect or straggling shrub, 0.2-1 m high. Fl. yellow-orange, Oct or Jan. Stony loam, loamy sand. Small ridges, breakaways, undulating plains.
<i>Olearia laciniifolia</i>	2	Erect, few-stemmed shrub, 0.6-1.2 m high. Fl. blue/purple & white/yellow, May to Sep. White sand. Around playa lakes.
<i>Pityrodia</i> sp. Yilgarn (A.P. Brown 2679)	3	No description available
<i>Pultenaea daena</i>	3	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.
<i>Stylidium sejunctum</i>	2	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. Membranaceous 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.
<i>Stylidium validum</i>	1	Caespitose perennial, herb, 0.06-0.3 m high, Leaves tufted, oblanceolate, 1.5-10 cm long, 2.2-6 mm wide, apex acute to acuminate, margin entire, glabrous, glaucous. Scape glabrous. Inflorescence paniculate. Fl. white/pink, Sep to Oct. Clayey sand or loam, ironstone, greenstone gravel. Hillslopes and hilltops. Eucalypt woodland, mallee shrubland.
<i>Verticordia gracilis</i>	3	Low, slender shrub, 0.15-0.6 m high. Fl. pink, Oct to Nov. Yellow sand, gravelly sand, sandy loam.

4.3 Conservation Significant Flora Species

One Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was recorded within the Greater North Ironcap area. Five Priority Flora species were identified within the Greater North Ironcap area:

1. *Boronia westringioides* (P2);
2. *Eremophila biserrata* (P4);
3. *Eutaxia acanthoclada* (P4);
4. *Microcorys* sp. Forrestania (V. English 2004) (P4); and
5. *Stylidium sejunctum* (P2).

4.3.1 *Banksia sphaerocarpa* var. *dolichostyla* (T)

This species is described as a lignotuberous shrub which grows up to 1 to 3m high. It produces yellow-orange coloured flowers from March to May, and occurs on Lateritic gravel and grey sand (WAHERB, 2012). It has bluish-green, narrowly linear, toothless, glaucous leaves. Flower heads are golden, erect and spherical. Fruiting cones are spherical with up to 60, often crowded, follicles (DSEWPac, 2008).

This species is distributed between Mt Holland and South Ironcap, within the Forrestania region east of Hyden, Western Australia (Brown *et al.*, 1998). This species is thought to be fire tolerant however it is not known what effect the 1994 fire in the Forrestania region had on the populations or individual plants within them. It grows on iron-capped hills and rises on ironstone (lateritic) soil profiles. Associated vegetation includes low woodland and low shrubland. Associated vegetation species include *Banksia* spp. and *Allocasuarina* spp. (DSEWPac, 2008). This species was identified within the Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community. There are six DEC known locations of this species within the Greater North Ironcap area. BC identified an additional 164 locations of this species in 2011. All except on DEC locations of this species are encompassed in the proposed 'A' Class North Ironcap Nature Reserve (EPA, 2009). GPS locations of this species are provided in Appendix 6.



Plate 1: Image of *Banksia sphaerocarpa* var. *dolichostyla* (T)

4.3.2 *Boronia westringioides* (P2)

This species is described as an erect shrub, which grows between 0.2-0.75 m high. It produces pink flowers from July to September. It occurs on loamy sand of plains (WAHERB, 2012). This species was identified within the Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* vegetation community. There was one DEC known location of this species within the Greater North Ironcap area (DEC, 2011a). BC was unable to confirm this location however BC identified this species approximately 1.2km south-west of the DEC location. GPS locations of this species are provided in Appendix 6.



Plate 2: Image of *Boronia westringioides* (P2)

4.3.3 *Eremophila biserrata* (P4)

This species is described as a prostrate shrub growing up to 3 m wide with green/yellow-green flowers that inhabits sandy or sandy clay soils, alluvial flats, salt flats and lakes (WAHERB, 2012). This species was identified within the Shrub mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata* vegetation community. There are four DEC known locations of this species within the Greater North Ironcap area (DEC, 2011a). BC was able to confirm one of these DEC locations (recorded in 2006) but was unable to identify this species at the three remaining DEC locations which dates back to 1976 and 1990. BC identified an additional two locations of this species in 2011. GPS locations of this species are provided in Appendix 6.



Plate 3: Image of *Eremophila biserrata* (P4)

4.3.4 *Eutaxia acanthoclada* (P3)

This species is described as a compact, mat-forming, prostrate shrub that grows up to 0.3m high. It produces yellow/orange/red flowers from October to November. It grows in light brown sandy clay, shallow sandy loam, red clay over banded ironstone and gravel. It can be found on gently undulating plains (WAHERB, 2012). This species was identified in three vegetation communities: Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*, Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* and Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata*. A total of 13 locations of this species were recorded within the Greater North Ironcap area. GPS locations of this species are provided in Appendix 6.



Plate 4: Image of *Eutaxia acanthoclada* (P3)

4.3.5 *Microcorys* sp. *Forrestania* (V. English 2004) (P4)

This species is described as a prostrate or erect shrub that grows up to 0.35-0.4m high. It produces white/purple flowers in January or April. It grows in yellow sandy clay or red-brown clay, and it can be found in open woodland or cleared areas (WAHERB, 2012). This species is short lived and appears to occur following disturbance. This species was identified in three vegetation communities: Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*, Shrub mallee of *Eucalyptus eremophila* and *Eucalyptus urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata* and Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*. A total of 30 locations of this species were recorded within the Greater North Ironcap area. GPS locations of this species are provided in Appendix 6.



Plate 5: Image taken of *Microcorys* sp. *Forrestania* (V. English 2004) (P4)

4.3.6 *Stylidium sejunctum* (P2)

This species is described as a caespitose perennial herb that reaches heights of 0.25–0.45 metres. The 10–30 mm long and 0.8–4 mm wide leaves are tufted, linear to narrowly oblanceolate, apex acute to mucronate, margin involute and glabrous to scabrous. This species has membranous scale leaves present at base of the mature leaves. The flowers are white, pink and purple and bloom from September through November. It inhabits sites with clayey sand, loam or laterite on outcrops, upper slopes and breakaways (WAHERB, 2012). This species was identified within the Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/ *Allocasuarina campestris* and low heath of *Phebalium ambiguum*/ *Acacia sulcata* on rock outcrop. There are three DEC known locations of the species within the Greater North Ironcap area, two of which were confirmed by BC, the third was located approximately 150m further north of the DEC location. A total of 3 locations of this species were recorded within the Greater North Ironcap area. GPS locations of this species are provided in Appendix 6.



Plate 6: Image of *Stylidium sejunctum* (P2)

4.4 Vegetation Communities

A total of sixteen broad vegetation communities were identified within the Greater North Ironcap area. These included:

1. Low scrub of mixed *Allocasuarina* over mixed dwarf scrub;
2. Shrub mallee of *Eucalyptus eremophila* and *E. urna* over heath of *Daviesia nematophylla* & *Melaleuca adnata*;
3. Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta*;
4. Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/*Leptospermum erubescens*;
5. Forest of *E. melanoxydon* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata*;
6. Heath of *Allocasuarina campestris* and *Hakea kippistiana*;
7. Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*;
8. Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta*;
9. Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop;
10. Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora*;
11. Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Acacia intricata*/*Microcybe multiflora*;
12. Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*;
13. Open tree mallee of *E. melanoxydon* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens*;
14. Open tree mallee of *E. livida*/*E. eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia*;
15. Low woodland of *E. salmonophloia*/*E. urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga*; and
16. Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata*.

These sixteen vegetation communities were represented by a total of 46 Families, 107 Genera and 203 Species (including sub-species and variants). A map showing the vegetation communities present in the survey area is located in Appendix 3.

Table 7: Summary of Vegetation Communities and their areas

Vegetation Community	Area (ha)
Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	28.5
Shrub mallee of <i>Eucalyptus eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> & <i>Melaleuca adnata</i>	219.4
Heath of <i>Allocasuarina campestris</i> / <i>Melaleuca hamata</i> / <i>Acacia eremophila</i> over dwarf scrub of <i>Borya constricta</i>	17.6
Scrub of <i>Allocasuarina huegeliana</i> over heath of <i>Acacia multispicata</i> / <i>Acacia lasiocalyx</i> and dwarf scrub of <i>Borya constricta</i> / <i>Leptospermum erubescens</i>	7
Forest of <i>E. melanoxydon</i> and <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>	4
Heath of <i>Allocasuarina campestris</i> and <i>Hakea kippistiana</i>	10
Low woodland of <i>E. salmonophloia</i> over open tree mallee of <i>E. cylindrocarpa</i> / <i>E. cylindriflora</i> / <i>E. pileata</i>	728.5
Open low scrub of <i>Acacia hemiteles</i> over very open low grass of <i>Aristida contorta</i>	0.5
Open tree mallee of <i>Eucalyptus livida</i> over heath of <i>Acacia steedmanii</i> / <i>Allocasuarina campestris</i> and low heath of <i>Phebalium ambiguum</i> / <i>Acacia sulcata</i> on rock outcrop	47.5
Open tree mallee of <i>E. polita</i> / <i>E. salubris</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and heath of <i>Melaleuca adnata</i> / <i>Melaleuca lateriflora</i> / <i>Melaleuca sparsiflora</i>	15.8
Open shrub mallee of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Acacia intricata</i> / <i>Microcybe multiflora</i>	56.3
Regrowth forest of <i>E. salmonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	431
Open tree mallee of <i>E. melanoxydon</i> over dwarf scrub of <i>Santalum acuminatum</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Acacia deficiens</i>	4.7
Open tree mallee of <i>E. livida</i> / <i>E. eremophila</i> over low scrub of <i>Allocasuarina acutivalvis</i> and dwarf scrub of <i>Dodonaea bursariifolia</i>	11.2
Low woodland of <i>E. salmonophloia</i> / <i>E. urna</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Dodonaea stenozyga</i>	52.85
Forest of <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Acacia intricata</i>	0.6
Total	1635

4.5 Low scrub of mixed *Allocasuarina* over mixed dwarf scrub

4.5.1 Flora

Flora recorded in this vegetation community was represented by 13 Families, 24 Genera and 32 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.5.2 Vegetation

The flora recorded in this vegetation community was representative of Low scrub of mixed *Allocasuarina* over mixed dwarf scrub (Plate 7). The upper storey species included *Allocasuarina campestris*, *Allocasuarina microstachya*, *Acacia lasiocalyx* and *Eucalyptus horistes*. The understorey species included *Lepidosperma* sp. K Boorabbin (K.L. Wilson 2579), *Grevillea shuttleworthiana*, *Melaleuca cordata*, *Schoenus brevisetis*, *Baeckea crispiflora* and *Isopogon scabriusculus* subsp. *pubifloris*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 8. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 8: Vegetation assemblage for Low scrub of *Allocasuarina* over mixed dwarf scrub within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Shrub Form	2-10%	<i>Eucalyptus horistes</i>
Shrubs >2m	10-30%	<i>Allocasuarina campestris</i> <i>Allocasuarina microstachya</i>
Shrub 1-1.5m	2-10%	<i>Acacia lasiocalyx</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Other shrublands vegetation community which, according to ANRA, covers 1.7% of WA (ANRA, 2012).



Plate 7: Low scrub of mixed *Allocasuarina* over mixed dwarf scrub within the survey area

4.6 Shrub mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata*

4.6.1 Flora

Flora recorded in this vegetation community was represented by 20 Families, 46 Genera and 80 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. Two Priority Flora species were identified within this vegetation community; *Eremophila biserrata* (P4) and *Microcorys* sp. Forrestania (V. English, 2004) (P4). The introduced species, *Carpobrotus aequilaterus*, was identified within this vegetation community. According to the DAFWA (2012) this species is not listed as a Declared Plant.

4.6.2 Vegetation

The flora recorded in this vegetation community was representative of Shrub mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata* (Plate 8). The upper storey species included *Eucalyptus gracilis*, *Eucalyptus cylindrocarpa* and *Eucalyptus celastroides*. The mid-storey species included *Daviesia nematophylla*, *Melaleuca adnata*, *Melaleuca hamata* and *Melaleuca pauperiflora* subsp. *fastigiata*. The understorey species included *Acacia erinacea*, *Sclerolaena uniflora*

and *Wilsonia humilis*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 9. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 9: Vegetation assemblage for Shrub mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Shrub Form	30-70%	<i>Eucalyptus eremophila</i> <i>Eucalyptus urna</i>
Shrubs 1-1.5m	30-70%	<i>Daviesia nematophylla</i> <i>Melaleuca adnata</i>
Shrubs 0.5-1m	2-10%	<i>Acacia erinacea</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 8: Shrub mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata* within the survey area

4.7 Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta*

4.7.1 Flora

Flora recorded in this vegetation community was represented by 7 Families, 10 Genera and 10 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.7.2 Vegetation

The flora recorded in this vegetation community was representative of Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta* (Plate 9). The upper storey species included *Allocasuarina campestris*, *Melaleuca hamata*, *Acacia eremophila* and *Santalum acuminatum*. The mid-storey species included *Lepidosperma* sp. A2 Inland Flat (G.J. Keighery 7000), *Melaleuca laxiflora*, *Schoenus calcatus*, *Baeckea crispiflora* and *Goodenia pinifolia*. The understorey only comprised of the species *Borya constricta*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 10. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 10: Vegetation assemblage for Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Shrubs 1-1.5m	30-70% 10-30%	<i>Allocasuarina campestris</i> <i>Melaleuca hamata</i> <i>Acacia eremophila</i>
Shrubs 0-0.5m	30-70% 2-10%	<i>Borya constricta</i> <i>Melaleuca laxiflora</i>
Sedges <0.5m	10-30%	<i>Lepidosperma</i> sp. A2 Inland Flat (G.J. Keighery 7000)

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Heath vegetation community which, according to ANRA, covers 0.7% of WA (ANRA, 2012).



Plate 9: Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta* within the survey area

4.8 Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/ *Leptospermum erubescens*

4.8.1 Flora

Flora recorded in this vegetation community were represented by 15 Families, 23 Genera and 35 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.8.2 Vegetation

The flora recorded in this vegetation community was representative of Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/ *Leptospermum erubescens* (Plate 10). The upper storey species was comprised of *Eucalyptus platycorys* and *Allocasuarina campestris*. The mid-storey species included *Melaleuca laxiflora*, *Melaleuca eleuterostachya*, *Melaleuca acuminata*, *Acacia hemiteles*, *Pimelea microcephala* and *Melaleuca glaberrima*. The understorey species included *Lepidosperma* sp. A2 Inland Flat (G.J. Keighery 7000), *Acacia erinacea*, *Dianella revoluta*, *Phebalium filifolium* and *Thryptomene kochii*.

Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 11. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 11: Vegetation assemblage for Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/*Leptospermum erubescens* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Shrub Form	2-10%	<i>Eucalyptus platycorys</i>
Shrub >2m	10-30%	<i>Allocasuarina huegeliana</i>
Shrub 1-1.5m	30-70%	<i>Acacia lasiocalyx</i> <i>Acacia multispicata</i>
Shrub 0-0.5m	10-30%	<i>Borya constricta</i> <i>Leptospermum erubescens</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Casuarina* forest and woodland vegetation community which, according to ANRA, covers 0.1% of WA (ANRA, 2012).



Plate 10: Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/*Leptospermum erubescens* within the survey area

4.9 Forest of *E. melanoxyton* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata*

4.9.1 Flora

Flora recorded in the vegetation community was represented by 8 Families, 14 Genera and 18 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.9.2 Vegetation

The flora recorded in this vegetation community was representative of Forest of *E. melanoxyton* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata* (Plate 11). The upper storey included *Eucalyptus melanoxyton* and *Eucalyptus urna*. The mid-storey species included *Melaleuca pauperiflora* subsp. *fastigiata* and *Acacia hemiteles*. The understorey species included *Exocarpos aphyllus*, *Olearia muelleri*, *Templetonia sulcata*, *Sclerolaena uniflora*, *Eremophila ionantha* and *Acacia merrallii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 12. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 12: Vegetation assemblage for Forest of *E. melanoxyton* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Trees 5-15m	10-30% 30-70%	<i>Eucalyptus melanoxyton</i> <i>Eucalyptus urna</i>
Shrubs 2m	30-70%	<i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>
Shrubs 0-0.5m	2-10%	<i>Exocarpos aphyllus</i> <i>Olearia muelleri</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* open forest vegetation community which, according to ANRA, covers 0.8% of WA (ANRA, 2012).



Plate 11: Forest of *E. melanoxylon* and *E. urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata* within the survey area

4.10 Heath of *Allocasuarina campestris* and *Hakea kippistiana*

4.10.1 Flora

Flora recorded in this vegetation community was represented by 8 Families, 10 Genera and 12 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community. No introduced species identified within this vegetation community.

4.10.2 Vegetation

The flora recorded in this vegetation community was representative of Heath of *Allocasuarina campestris* and *Hakea kippistiana* (Plate 12). The upper storey species included *Eucalyptus eremophila* and *Eucalyptus livida*. The mid-storey species included *Allocasuarina acutivalvis*, *Melaleuca adnata* and *Hakea kippistiana*. The understorey species included *Hibbertia eatoniae*, *Acacia sulcata*, *Grevillea oncogyne* and *Trymalium myrtillus* subsp. *myrtillus*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 13. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 13: Vegetation assemblage for Heath of *Allocasuarina campestris* and *Hakea kippistiana* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	2-10%	<i>Eucalyptus livida</i>
Shrubs 1.5m-2m	30-70%	<i>Allocasuarina campestris</i> <i>Hakea kippistiana</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Other Shrublands vegetation community which, according to ANRA, covers 1.7% of WA (ANRA, 2012).



Plate 12: Heath of *Allocasuarina campestris* and *Hakea kippistiana* within the survey area.

4.11 Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*

4.11.1 Flora

Flora recorded in the vegetation community was represented by 18 Families, 29 Genera and 57 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. Two Priority Flora species were identified within this vegetation community; *Eutaxia acanthoclada* (P3) and *Microcorys* sp. Forrestania (V. English, 2004) (P4). Four introduced species, *Carpobrotus aequilaterus*, *Arctotheca calendula*, *Dittrichia graveolens* and *Ursinia anthemoides*, were identified within this vegetation community. According to the DAFWA (2012) none of these species are listed as Declared Plants.

4.11.2 Vegetation

The flora recorded in this vegetation community was representative of Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata* (Plate 13). The species in the upper storey included *E. salmonophloia*, *E. salubris*, *E. urna* and *E. melanoxylon*. The mid-storey included *E. cylindrocarpa*, *E. cylindriflora*, *E. pileata*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Melaleuca adnata* and *Atriplex vesicaria*. The understorey species included *Daviesia benthamii*, *Acacia erinacea*, *Wilsonia humilis*, *Eremophila ionantha*, *Acacia deficiens*, *Dodonaea stenozyga*, *Exocarpos aphyllus* and *Grevillea huegelii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 14. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 14: Vegetation assemblage for Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Trees 5-15m	10-30%	<i>Eucalyptus salmonophloia</i>
Mallee Tree Form	30-70%	<i>Eucalyptus cylindrocarpa</i> <i>Eucalyptus cylindriflora</i> <i>Eucalyptus pileata</i>
Shrubs 1-1.5m	10-30%	<i>Daviesia benthamii</i>
Shrubs 0-0.5m	10-30%	<i>Acacia erinacea</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 13: Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/ *E. cylindriflora*/ *E. pileata* within the survey area

4.12 Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta*

4.12.1 Flora

Flora recorded in the vegetation community was represented by 14 Families, 19 Genera and 22 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community during the survey. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.12.2 Vegetation

The flora recorded in this vegetation community was representative of Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta* (Plate 14). The upper storey species included *Acacia hemiteles*, *Allocasuarina helmsii* and *Santalum acuminatum*. The mid-storey included *Calytrix* sp. (sterile) and *Acacia erinacea*. The understorey species included *Aristida contorta*, *Daucus glochidiatus* and *Thryptomene kochii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 15. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 15: Vegetation assemblage for Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Shrubs 2m	2-10%	<i>Acacia hemiteles</i>
Shrub 0-0.5m	10-30%	<i>Calytrix tetragona</i>
Bunch Grass <0.5m	2-10%	<i>Aristida contorta</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Acacia* shrublands vegetation community which, according to ANRA, covers 9.5% of WA (ANRA, 2012).



Plate 14: Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta* within the survey area.

4.13 Open tree mallee of *E. livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop

4.13.1 Flora

Flora recorded in the vegetation community was represented by 25 Families, 36 Genera and 51 Species (Appendix 4).

The Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. The Priority Flora species *Stylidium sejunctum* (P2) was also identified within this vegetation community. Two introduced species, *Carpobrotus aequilaterus* and *Ursinia anthemoides* was identified within this vegetation community.

4.13.2 Vegetation

The flora recorded in this vegetation community was representative of Open tree mallee of *E. livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop (Plate 15). The upper storey was comprised of *Eucalyptus livida*. The mid-storey species included *Allocasuarina campestris*, *Allocasuarina acutivalvis*, *Acacia steedmanii*, *Santalum acuminatum*, *Calothamnus gilesii*, *Dodonaea viscosa*, *Leptospermum erubescens*, *Hakea kippistiana* and *Melaleuca hamata*. The understorey species included *Phebalium ambiguum*, *Acacia sulcata*, *Lepidosperma* sp. North Ironcap (Russell Barrett), *Goodenia pinifolia*, *Olearia pimelioides*, *Melaleuca cordata*, *Dianella revoluta*, *Astroloma serratifolium*, and *Cryptandra wilsonii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 16. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 16: Vegetation assemblage for Open tree mallee of *E. livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus livida</i>
Shrubs 1-1.5m	30-70% 30-70% 10-30%	<i>Acacia steedmanii</i> <i>Allocasuarina campestris</i> <i>Allocasuarina acutivalvis</i>
Shrub 0-0.5m	30-70%	<i>Acacia sulcata</i> <i>Phebalium ambiguum</i>
Sedge < 0.5m	10-30%	<i>Lepidosperma</i> sp. North Ironcap (Russell Barrett)

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Casuarina* forest and woodlands vegetation community which, according to ANRA, covers 0.1% of WA (ANRA, 2012).



Plate 15: Open tree mallee of *E. livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop within the survey area.

4.14 Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora*

4.14.1 Flora

Flora recorded in this vegetation community were represented by 12 Families, 17 Genera and 34 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.14.2 Vegetation

The flora recorded in this vegetation community was representative of Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora* (Plate 16). The upper storey species included *Eucalyptus polita*, *Eucalyptus urna*, *Eucalyptus salubris*, *Eucalyptus salmonophloia* and *Eucalyptus celastroides*. The mid-storey species included *Melaleuca pauperiflora* subsp. *pauperiflora*, *Santalum acuminatum*, *Exocarpos aphyllus*, *Daviesia benthamii* and *Grevillea oncogyne*. The understorey

species included *Microcybe multiflora*, *Melaleuca lateriflora*, *Melaleuca adnata*, *Melaleuca sparsiflora*, *Grevillea huegelii*, *Acacia deficiens*, *Cassythia melantha*, *Dodonaea stenozyga*, *Sclerolaena uniflora*, *Daviesia nematophylla*, *Wilsonia humilis* and *Eremophila dichroantha*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 17. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 17: Vegetation assemblage for Open tree mallee of *Eucalyptus polita*/*Eucalyptus salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus polita</i> <i>Eucalyptus salubris</i>
Shrub >2m	10-30%	<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>
Shrub 1-1.5m	30-70%	<i>Melaleuca adnata</i> <i>Melaleuca lateriflora</i> <i>Melaleuca sparsiflora</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 16: Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*/*Melaleuca sparsiflora* within the survey area

4.15 Open shrub Mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Acacia intricata*/*Microcybe multiflora*

4.15.1 Flora

Flora recorded in this vegetation community were represented by 17 Families, 26 Genera and 44 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Two Priority Flora species were identified within this vegetation community during the survey; *Boronia westringioides* (P2) and *Eutaxia acanthoclada* (P3). No introduced species were identified within this vegetation community.

4.15.2 Vegetation

The flora recorded in this vegetation community was representative of Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* (Plate 17). The upper storey species included *E. platycorys*, *E. polita*, *E. horistes*, *E. salmonophloia* and *Allocasuarina acutivalvis*. The mid-storey species included *Callitris preissii*, *Cassytha melantha*, *Exocarpos aphyllus*, *Acacia eremophila*, *Hakea scoparia*, *Santalum acuminatum*, *Grevillea cagiana*, *Melaleuca lateriflora* and *Melaleuca pauperiflora* subsp. *pauperiflora*. The understorey species included *Gastrolobium spinosum*, *Grevillea huegelii*, *Leptospermum erubescens*, *Melaleuca glaberrima*, *Acacia sphacelata* subsp. *sphacelata*, *Lepidosperma* sp. A2 Inland Flat (G.J. Keighery 7000), *Dianella revoluta* and *Hibbertia eatoniae*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 18. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 18: Vegetation assemblage for Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Shrub Form	10-30%	<i>Eucalyptus platycorys</i> <i>Eucalyptus polita</i> <i>Eucalyptus horistes</i>
Shrub 0.5-1m	30-70%	<i>Melaleuca hamata</i>
Shrub 0-0.5m	10-30%	<i>Acacia intricata</i> <i>Microcybe multiflora</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 17: Open shrub mallee of *E. polita*/*E. platycorys*/*E. horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* within the survey area

4.16 Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*

4.16.1 Flora

Flora recorded in this vegetation community were represented by 19 Families, 25 Genera and 39 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Two Priority Flora species were identified within this vegetation community during the survey; *Eutaxia acanthoclada* (P3) and *Microcorys* sp. Forresteria (V. English, 2004) (P4). No introduced species were identified within this vegetation community.

4.16.2 Vegetation

The flora recorded in this vegetation community was representative of Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* (Plate 18). The species in the upper storey included *E. urna*, *E. salubris* and *E. salmonophloia*. The mid storey species included *Exocarpos aphyllus*, *Melaleuca adnata*, *Cassythra melantha*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Santalum*

acuminatum, *Acacia hemiteles*, *Melaleuca lateriflora*, *Eremophila ionantha*, *Acacia merrallii*, *Daviesia nematophylla* and *Melaleuca eleuterostachya*. The under-storey species included *Acacia deficiens*, *Microcybe multiflora*, *Acacia sphacelata*, *Hybanthus floribundus*, *Cooperhooia strophiolata*, *Eremophila decipiens*, *Grevillea huegelii*, *Olearia muelleri*, *Halgania andromedifolia* and *Cratystylis conocephala*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 19. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 19: Vegetation assemblage for Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree 5-15m	30-70% 30-70% 10-30%	<i>Eucalyptus salubris</i> <i>Eucalyptus salmonophloia</i> <i>Eucalyptus urna</i>
Shrub 1-1.5m	30-70%	<i>Melaleuca cucullata</i> <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>
Shrub 0.5-1m	30-70%	<i>Dodonaea stenozyga</i>
Shrub 0-0.5m	2-10%	<i>Wilsonia humilis</i> <i>Acacia acanthoclada</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 18: Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* within the survey area

4.16.3 Open tree mallee of *E. melanoxydon* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens*

4.16.4 Flora

Flora recorded in this vegetation community were represented by 6 Families, 7 Genera and 8 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.16.5 Vegetation

The flora recorded in this vegetation community was representative of Open tree mallee of *Eucalyptus melanoxydon* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens* (Plate 19). The upper story species was comprised of *Eucalyptus melanoxydon*. The mid-storey species included *Santalum acuminatum* and *Melaleuca pauperiflora* subsp. *pauperiflora*. The understorey species included *Acacia merrallii*, *Acacia deficiens*, *Eremophila ionantha* and *Dodonaea stenozyga*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 20. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 20: Vegetation assemblage for Open tree mallee of *Eucalyptus melanoxydon* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus melanoxydon</i>
Shrub 0.5-1m	10-30%	<i>Santalum acuminatum</i>
Shrub 0-0.5m	10-30%	<i>Acacia merrallii</i> <i>Acacia deficiens</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 19: Open tree mallee of *E. melanoxylo* over dwarf scrub of *Santalum acuminatum* and dwarf scrub of *Acacia merrallii*/*Acacia deficiens* within the survey area

4.17 Open tree mallee of *E. livida*/*E. eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia*

4.17.1 Flora

Flora recorded in this vegetation community were represented by 15 Families, 20 Genera and 28 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.17.2 Vegetation

The flora recorded in this vegetation community was representative of Open tree mallee of *E. livida*/*E. eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia* (Plate 20). The upper storey species was comprised of *Acacia lasiocalyx*, *Eucalyptus salmonophloia*, *Eucalyptus livida* and *Eucalyptus eremophila*. The mid-storey species included *Allocasuarina acutivalvis*, *Santalum spicatum*, *Callitris preissii*, *Melaleuca pungens*, *Daviesia nematophylla*, *Dodonaea stenozyga* and *Scaevola spinescens*. The understorey species included *Lepidosperma* sp. A2 Inland Flat (G.J. Keighery 7000), *Acacia sulcata*, *Acacia eremophila*, *Drummondita hassellii*, *Phebalium filifolium*, *Astroloma serratifolium*, *Melaleuca cordata*, *Dianella revoluta*, *Acacia rendlei* and

Gastrolobium spinosum. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 21. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 21: Vegetation assemblage for Open tree mallee of *Eucalyptus livida*/*Eucalyptus eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus livida</i> <i>Eucalyptus eremophila</i>
Shrub 0.5-1m	10-30%	<i>Allocasuarina acutivalvis</i>
Shrub 0-0.5m	10-30%	<i>Dodonaea bursariifolia</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 20: Open tree mallee of *Eucalyptus livida*/*Eucalyptus eremophila* over low scrub of *Allocasuarina acutivalvis* and dwarf scrub of *Dodonaea bursariifolia* within the survey area

4.18 Low woodland of *E. salmonophloia*/*E. urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga*

4.18.1 Flora

Flora recorded in this vegetation community were represented by 15 Families, 21 Genera and 32 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.18.2 Vegetation

The flora recorded in this vegetation community was representative of Low woodland of *E. salmonophloia*/*E. urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga* (Plate 21). The upper storey comprised of *Eucalyptus salmonophloia* and *Eucalyptus urna*. The mid-storey species included *Exocarpos aphyllus*, *Santalum acuminatum*, *Daviesia nematophylla*, *Melaleuca cucullata*, *Alyxia buxifolia*, *Scaevola spinescens* and *Trymalium myrtillus* subsp. *myrtillus*. The understorey species included *Acacia merrallii*, *Dodonaea stenozyga*, *Sclerolaena diacantha*, *Acacia intricata*, *Atriplex stipitata*, *Austrostipa nitida*, *Wilsonia humilis*, *Eremophila decipiens*, *Microcybe multiflora*, *Melaleuca adnata*, *Maireana trichoptera* and *Solanum orbiculatum*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 22. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 22: Vegetation assemblage for Low woodland of *Eucalyptus salmonophloia*/*Eucalyptus urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree 5-15m	10-30%	<i>Eucalyptus salmonophloia</i> <i>Eucalyptus urna</i>
Shrub >2m	10-30%	<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>
Shrub 0-0.5m	10-30%	<i>Acacia merrallii</i> <i>Dodonaea stenozyga</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 21: Image of Low woodland of *E. salmonophloia*/*E. urna* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and dwarf scrub of *Acacia merrallii*/*Dodonaea stenozyga*

4.19 Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata*

4.19.1 Flora

Flora recorded in this vegetation community were represented by 8 Families, 10 Genera and 14 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community during the survey. No introduced species were identified within this vegetation community.

4.19.2 Vegetation

The flora recorded in this vegetation community was representative of Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata* (Plate 22). The upper story species was comprised of *Eucalyptus salubris*. The mid-storey species included *Melaleuca cucullata*, *Santalum acuminatum*, *Melaleuca adnata*, *Exocarpos aphyllus*, *Melaleuca pauperiflora* subsp. *fastigiata* and *Dodonaea stenozyga*. The understorey species included *Acacia intricata*, *Ptilotus holosericeus*, *Sclerolaena uniflora*, *Acacia erinacea*, *Grevillea acuaria* and *Wilsonia humilis*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in 23. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 23: Vegetation assemblage for Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree 5-15m	10-30%	<i>Eucalyptus salubris</i>
Shrub 1.5-1m	30-70%	<i>Melaleuca cucullata</i> <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>
Shrub 0-0.5m	10-30%	<i>Acacia intricata</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* open forest vegetation community which, according to ANRA, covers 0.8% of WA (ANRA, 2012).



Plate 22: Forest of *E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Acacia intricata* within the survey area

4.20 Vegetation of Conservation Significance

Almost the entire Greater North Ironcap area (1515ha) lies within the Lake Cronin ESA and is located approximately 2.5km west of the current Lake Cronin 'A' Class Nature Reserve. A description of the Lake Cronin Region according to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) and the EPA is provided below;

Lake Cronin is a semi-permanent freshwater lake located in the south western region of the Eastern Goldfields and is the largest freshwater lake in the region. The Lake Cronin area is one of a number of areas in the Wheatbelt region that are significant for rare species, due to widespread clearing in the surrounding landscape, and to the high diversity and level of local endemism. The Lake Cronin area supports extensive shrubland, sandplain and woodland environments, including excellent representation of a range of vegetation types that are now extensively cleared in the Wheatbelt and supports a high number of species that are disjunct. Disjunct populations are those that have become physically separated, resulting in minimal or no gene flow between them, and they are an important precursor to the development of new species. A number of species in Australia have separate eastern and western populations, and some have formed sub-species, reflecting important broader long-term processes such as sea level changes and climatic fluctuations. It also supports a number of species reaching the limit of their distribution range. The number of species at the edge of their range reflects the convergence in the area of the Avon, Mallee and Coolgardie Biogeographic regions.

According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. Lake Cronin is not formally protected under the Commonwealth *EPBC Act 1999*.

The Greater North Ironcap area lies within the Great Western Woodlands, an area recognised as the largest remaining area of intact Mediterranean-climate on Earth, and for its natural and cultural values and its natural resource-related productivity (DEC, 2010a). It is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

There were no TECs listed under Commonwealth legislation or as defined by the DEC located within the Greater North Ironcap area (DEC 2011a; DSEWPaC, 2012). However, the entire Greater North Ironcap area is located within the North Ironcap region of the *Ironcap Hills Vegetation complexes* which is a Priority 3 Ecological Community (DEC, 2011b). The North Ironcap BIF located in the north-west

region of the Greater North Ironcap area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area). Six of the sixteen vegetation communities identified by BC within the Greater North Ironcap area are located within the proposed 'A' Class Nature Reserve:

1. Shrub mallee of *Eucalyptus eremophila* and *E. urna* over heath of *Daviesia nematophylla* & *Melaleuca adnata*;
2. Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta*;
3. Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/*Leptospermum erubescens*;
4. Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*;
5. Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop; and
6. Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*.

The majority of the proposed 'A' Class Nature Reserve (approximately 60%) comprised of the Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community (covered an area of 25.1ha within the proposed 'A' Class Nature Reserve). Approximately 22.4ha of this vegetation community is located outside of the proposed 'A' Class Nature Reserve within the Greater North Ironcap area. The Open tree mallee of *E. livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community also has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contains the entire population of the Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, which is listed as vulnerable under Section 179 of the *EPBC Act 1999*. Within a 50m radius of each Threatened Flora plant is protected as an ESA under Regulation 6 of the *Environmental Protection (Clearing of Native Vegetation) Regulations WA 2004*.

This vegetation community was first described by Newbey and Hnatiuk (1988) during the biological survey of the Lake Johnston-Hyden area as a BIF complex and was considered one of seven unique vegetation communities to the Lake Johnston-Hyden area. None of the other six vegetation communities described by Newbey and Hnatiuk (1988) as unique to the Lake Johnston-Hyden area (breakaway complex, greenstone complex, *Acacia jennerae* tall shrubland, *Eucalyptus georgei* low woodland, *Eucalyptus* sp. HRN 5603 low woodland and *E. scypocalyx* Mallee) were identified within the Greater North Ironcap area. The description of the BIF complex is provided below:

The complex vegetation on banded ironstone formation had a number of species dominant at different sites. Low trees (*Acacia lasiocalyx* and *Eucalyptus flocktoniae* [Merri]) were rare. Mallees of *Eucalyptus* aff. *wandoo* (*E. livida*, *E. capillosa* subsp. *polyclada*) were usually present in small areas partially lateritized, while *E. eremophila* occurred rarely. Tall shrubs that were occasionally present included *Allocasuarina campestris* ssp. *campestris* (also low shrub), *A. corniculata*, *Banksia sphaerocarpa* var. *dolichostyla* (Ironcaps), *Calothamnus quadrifidus* (also low shrub), *Dryandra* aff. *cersioides*, *Grevillea pterosperma*, *Hakea subsulcata*, *H. scoparia*, *Leptospermum erubescens*, *Melaleuca fulgens*, *M. uncinata*, *Santalum acuminatum* and *Trymalium* aff. *ledifolium*; low shrubs were *Acacia sulcata* var. *platyphylla*, *Acacia* sp. (KRN 5226), *Chamelaucium ciliatum* (south), *Cryptandra miliaris*, *Dodonaea adenophora*, *D. amblyophylla* (west), *Dryandra* sp. (KRN 5229), *Melaleuca cordata*, *Phebalium filifolium*, *P. microphyllum*, *P. tuberosum* ssp. *tuberosum*, *P. aff. tuberosum* and *Platysace maxwellii* (west); perennial grasses of *Spartochloa scirpoidea*; and sedges of *Lepidosperma drummondii*, *L. viscidum* var. *viscidum*, *Lepidosperma* sp. (KRN 5232), *Lepidosperma* sp. (KRN 5233) and *Lepidosperma* sp. (KRN 6488).

According to the DAFWA (2011) the BIF complex within the Greater North Ironcap area is classified as the pre-european vegetation association Forrestania 1413; Shrublands; *Acacia*, *Casuarina* & *Melaleuca* thicket which is represented in both the Southern Cross and Western Mallee subregion. The total current extent of this vegetation association within the Forrestania system (of both subregions) is 9614ha of which 423ha is located within DEC managed lands (6.8%). Under the EPAs *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region* (EPA, 2009), a further 2653ha of this vegetation association is proposed to be protected within the Lake Cronin Region either a 'A' Class Nature Reserve, 'C' Class Nature Reserve or managed under Section 33(2) of the *Conservation Land Management Act 1984* but not formally reserved (Figure 8).

Results of DEC database search for locations of the Threatened Flora species *Banksia shaperocarpa* var. *dolichostyla* (T) and from BC recorded locations of this species (submitted to the DEC) revealed that vegetation association Forrestania 1413 supports a number of populations of this species within the Forrestania region (Figure 8).

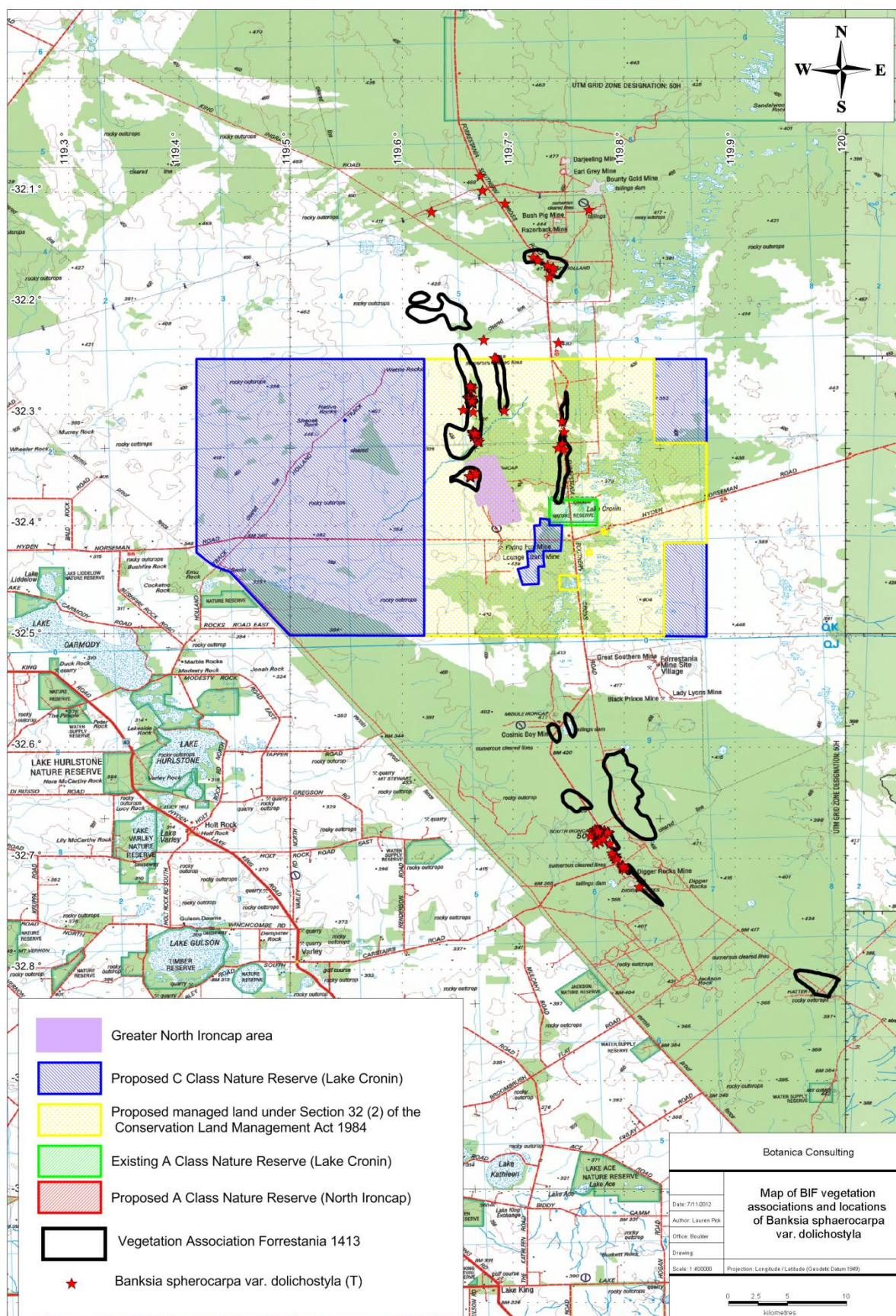


Figure 8: Regional map of vegetation association Forrestania 1413 (Banded Ironstone Complex) and *Banksia sphaerocarpa* var. *dolichostyla* (T) populations in relation to existing and proposed conservation areas.

4.21 Vegetation condition

Based on Keighery's vegetation health rating scale (1994), fifteen vegetation communities within the Greater North Ironcap area were rated as in 'very good' health. A 'very good' health rating indicates that vegetation is altered due to obvious signs of disturbance, in this instance as a result of exploration activities (access tracks/gridlines etc.). The remaining vegetation community; Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* was rated as being in 'good' health. A 'good' health rating depicts that although the vegetation structure has been affected by multiple disturbances, in this instance as a result of exploration activities (access tracks/gridlines etc.) and fire, it retains its basic structure and has ability to regenerate.

4.22 Introduced Plant Species

Four weed species were identified in the Greater North Ironcap area, *Arctotheca calendula* (Cape weed), *Carpobrotus aequilaterus* (Angular pigface), *Dittrichia graveolens* (Stinkwort) and *Ursinia anthemoides* (Ursinia). According to the DAFWA (2012) none of these species are listed as Declared Plants. Descriptions of these species are provided below.

4.22.1 *Carpobrotus aequilaterus* (Angular Pigface)

This species is described as a prostrate, spreading, succulent, perennial herb. It can grow up to 0.1m high and to 2m long. It has pink/purple-blue flowers in February or August, or October to November. It grows in sand and clay. *Carpobrotus aequilaterus* was located in two vegetation communities: Shrub Mallee of *E. eremophila* and *E. urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata*; and Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop.



Plate 23: Image of *Carpobrotus aequilaterus* (Angular Pigface)

4.22.2 *Arctotheca calendula* (Cape Weed)

This species is described as a decumbent or ascending annual herb that grows between 0.03-0.3m high. It has yellow flowers from August to November and is a weed of roadsides, waste places and cultivated land. *Arctotheca calendula* was located in only one vegetation community, Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*.



Plate 24: Image of *Arctotheca calendula* (Cape Weed)

4.22.3 *Dittrichia graveolens* (Stinkwort)

This species is described as an erect, bushy, viscid, annual herb that grows up to 0.1-0.5m high. It has yellow/yellow-white flowers from January to November, and grows in a variety of soils. It is a weed of waste grounds, along rivers and roadsides. *Dittrichia graveolens* was located in only one vegetation community, Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*.



Plate 25: Image of *Dittrichia graveolens* (Stinkwort)

4.22.4 *Ursinia anthemoides* (Ursinia)

This species is described as a slender, erect annual herb that grows up to 0.1-0.5m high. It has yellow/orange/cream-white flowers from July to December (No image available). It is a weed of roadsides and waste places. *Ursinia anthemoides* was located in two vegetation community, Low woodland of *E. salmonophloia* over mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*; and Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop.

5 Relevant Legislation and Compliance with Recognised Standards

5.1 Commonwealth Legislation

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The aim of this Act is to protect matters of national environmental significance, and is used by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) to list threatened species and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The Act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance.

The Greater North Ironcap area has national environmental significance under the *EPBC Act 1999* as it contains Threatened Flora listed as vulnerable under the *EPBC Act 1999*.

5.2 State Legislation

Clearing of Native Vegetation

The *Environmental Protection (Clearing of Native Vegetation) Regulations WA 2004* establish that any clearing of native vegetation in Western Australia requires a permit from the DEC. Under Section 51A of the *WA Environmental Protection Act, 1986 (EP Act)* native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the EP Act defines clearing as “...the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above”.

Regulation 6 of the 2004 Regulations defines ESA as “...the area covered by vegetation within 50 m of *Rare Flora*, to the extent to which the vegetation is continuous with the vegetation in which the *Rare Flora* is located”.

A clearing permit must be granted prior to any clearing within a minimum of 50 m surrounding all populations of Threatened/DRF. The area covered by a TEC is also considered an ESA wherein clearing cannot occur unless a clearing permit is granted. Exploration activities are exempt from the requirement for clearing permits if undertaken pursuant to a Mining Act approval, for example through a “Programme of Work” provided the area involved does not occur in an ESA.

The Greater North Ironcap area contains Threatened Flora. Almost the entire Greater North Ironcap area (1515 ha) lies within the Lake Cronin ESA and is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Conservation and Land Management Act WA 1984

Under Section 33(2) of the *CALM Act 1984* land that is not formally reserved under the *CALM Act 1984* can be managed under the *CALM Act 1984* if it is not the subject of a management plan; or it is the subject of a management plan that, due to an exemption given under section 57A(2), was not prepared in accordance with section 56(2). The management of the land and its associated forest produce, fauna and flora shall be carried out in a manner that protects and conserves the value of the land to the culture and heritage of Aboriginal persons, in particular from any material adverse effect caused by entry on or the use of the land by other persons, the taking or removal of the land's fauna, flora or forest produce or adverse effect on the protection or conservation of the land's fauna and flora.

According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved.

Environmental Protection Act WA 1986

The *Environmental Protection (EP) Act 1986* includes requirements relating to the protection of DRF and TEC, and to the assessment of applications for clearing permits. TEC are protected even where exemptions for a clearing permit may apply. The *EP Act 1986* enforces both financial and/or imprisonment penalties on those who unlawfully damage a TEC.

The Greater North Ironcap area does not contain any TEC however it does contain Threatened Flora as listed under the *EPBC Act 1999* and by the DEC (Atkins, 2012).

Wildlife Conservation Act WA 1950

The DEC uses the provisions of this Act to list flora taxa as protected and the level of protection assigned to such flora. Flora species are classified as DRF when their populations are geographically restricted or are threatened by local processes. Under this Act, all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) are protected throughout the State. Financial penalties pursuant to the Act can be imposed if threatened plant species are collected without an appropriate licence.

DEC Priority lists

The DEC lists 'Priority' flora species which are under consideration for declaration as Rare Flora. Species classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 species are considered to have been adequately surveyed but may become vulnerable or rare in future years. Priority 4 species are also species that have been removed from the threatened species list in the past 5 years. Priority 5 species are those species which are not currently threatened but are likely to become threatened within 5 years due to a specific conservation program.

The DEC also lists PEC as a mechanism for identifying communities that may need monitoring before possible nomination for TEC status. These priority species and communities have no formal legal protection until they are endorsed by the Minister as being Declared Rare Flora and TEC respectively.

Results from the DEC database searches identified three Threatened/DRF species and 38 Priority Flora species recorded within a 10km radius of the Greater North Ironcap area. One of the Threatened Flora and five Priority Flora species listed were identified within the Greater North Ironcap area. The Greater North Ironcap area is located within the Northern Ironcap region of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

5.3 EPA Position Statements

The EPA develops Position Statements to inform the public about environmental issues facing Western Australia and the plans for the future to ensure protection and ecological sustainability of environmentally important ecosystems. It provides a set of principles to assist the public and decision-makers on their responsibilities for managing land with care. These principles also provide the basis for the Environmental Protection Authority to evaluate and report upon achieving environmental and ecological sustainability and the protection of natural resources.

Position Statement No. 2 *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000) outlines EPA policy on the protection of native vegetation in Western Australia, particularly in the agricultural area. It identifies basic elements that the EPA should consider when assessing proposals that impact on biological diversity. These include comparison of all proposal options; avoidance of species and community extinctions; an expectation that implementing the proposal will not take a vegetation type below the "threshold level" of 30%; and that proponents should demonstrate that on- and off-site impacts can be managed.

According to DAFWA (2011), the Greater North Ironcap area occurs in pre-European Beard vegetation association Forrestania 511, 519 and 1413 within the Southern Cross (COO2) subregion, of which 99.80%, 100% and 98.96 of the original vegetation extent remains respectively. It also occurs in vegetation association Forrestania 519 and 1413 within the Western Mallee (MAL2) subregion, of which 97.57% and 100% of the original vegetation extent remains respectively.

Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection* establishes that the EPA has adopted the definition and principles of biological diversity as defined in the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia, 1996), and has stipulated the following requirements:

- the quality of information and scope of field surveys should meet standards, requirements and protocols as determined and published by the EPA; and
- the IBRA regionalisations should be used as the largest unit for environmental impact assessment (EIA) decision-making in relation to the conservation of biodiversity.

Pursuant to the IBRA regionalisations, 26 bioregions in WA, which are affected by a range of different threatening processes and have varying levels of sensitivity to impact, have been identified. Terrestrial biological surveys should provide sufficient information to address both biodiversity conservation and ecological functional values within the context of proposals and the results of surveys should be publicly available.

The flora survey of the Greater North Ironcap area was planned and implemented as far as practicable according to the EPA Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004). Also, the IBRA regionalisations have been used in preparing the report to identify the conservation status of the area and identify the main threats to the biodiversity of plant species in the region.

5.4 Native Vegetation Clearing Principles

Based on the outcomes from the surveys undertaken, as presented in this report, BC provides the following comments regarding the native vegetation clearing principles:

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

The woodlands of the Southern Cross subregion have a very high diversity of Eucalypts with as many as 170 species occurring within the subregion. The subregion also has a high diversity of Acacia species however most species (excluding Threatened and Priority Flora species) are wide ranging and usually occur in at least one, and often several, adjoining subregions (Cowan, 2001). With the exception of granite outcrops vegetation of the Western Mallee subregion is not considered to comprise of a high level of biodiversity however it does contain a high number of endemic species (Beecham & Danks, 2001).

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

One Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), was identified within one of the sixteen vegetation communities identified within the Greater North Ironcap area.

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

No TEC listed under the *EPBC Act 1999* (DSEWPaC, 2012) or by the DEC (2011b) occur within the Greater North Ironcap area.

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

According to DAFWA (2011), the Greater North Ironcap area occurs in pre-European Beard vegetation association Forrestania 511, 519 and 1413 within the Southern Cross (COO2) subregion, of which 99.80%, 100% and 98.96 of the original vegetation extent remains respectively. It also occurs in vegetation association Forrestania 519 and 1413 within the Western Mallee (MAL2) subregion, of which 97.57% and 100% of the original vegetation extent remains respectively.

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

No vegetation communities identified within the Greater North Ironcap area were found to be growing in, or in association with, an environment associated with a watercourse or wetland.

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

Almost the entire Greater North Ironcap area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. An area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved.

A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap BIF located in the north-west region of the Greater North Ironcap area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area). Clearing of the North Ironcap BIF and within the surrounding proposed 'A' Class Nature Reserve is likely to impact on the conservation values of the area and should be avoided.

6 Conclusions and Recommendations

6.1 Conclusions

Sixteen vegetation communities were identified within the Greater North Ironcap area. These sixteen vegetation communities were represented by a total of 46 Families, 107 Genera and 203 Species (including sub-species and variants).

One Threatened Flora species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), was identified within the Greater North Ironcap area. Five Priority Flora species, *Boronia westringioides* (P2), *Eremophila biserrata* (P4), *Eutaxia acanthoclada* (P4), *Microcorys* sp. *Forrestania* (V. English 2004) (P4) and *Stylidium sejunctum* (P2) were also recorded within the Greater North Ironcap area.

The Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contains Threatened Flora listed as vulnerable under Section 179 of the *EPBC Act 1999*. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the Greater North Ironcap area. The Greater North Ironcap area is however located within the North Ironcap region of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

Almost the entire Greater North Ironcap area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin A Class Nature Reserve. An area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater North Ironcap area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed C Class Nature Reserve is also proposed in the surrounding area. The North Ironcap BIF is also proposed to be reserved in a small A Class Nature Reserve, covering an area of 42.5ha (30.9ha within the Greater North Ironcap area). The Greater North Ironcap area is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), fifteen vegetation communities within the Greater North Ironcap area were rated as being in 'very good' health. The remaining vegetation community; Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* was rated as being in 'good' health. Four weed species were identified in the Greater North Ironcap area; *Arctotheca calendula* (Cape weed), *Carpobrotus aequilaterus* (Angular pigface),

Dittrichia graveolens (Stinkwort) and *Ursinia anthemoides* (Ursinia). According to the DAFWA (2012) none of these species are listed as Declared Plants.

6.2 Recommendations

- No clearing within the Greater North Ironcap area is permitted until a clearing permit has been granted as the Greater North Ironcap area is located within a proposed A Class Nature Reserve; proposed managed land under Section 33(2) of the *CALM Act 1984*; Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*; ESA and contains Threatened Flora.
- Consultation with the DEC is recommended prior to any clearing within the Greater North Ironcap area as it occurs within the boundary of a PEC. Although PEC's are not formally protected they are of conservation significance and are being considered to be formally protected under the *EPBC Act 1999* as TEC's.
- As Threatened Flora and Priority Flora have been identified within the Greater North Ironcap area, targeted searches of all proposed areas to be cleared should be conducted prior to any clearing.
- No disturbance to any Threatened Flora is permitted. Should disturbance to Threatened Flora be unavoidable an application to impact Threatened Flora must be submitted to the DEC in conjunction with the clearing permit application.
- Disturbance to Priority Flora identified within survey should be avoided. If disturbance is unavoidable an application to impact Priority Flora must be submitted to the DEC.

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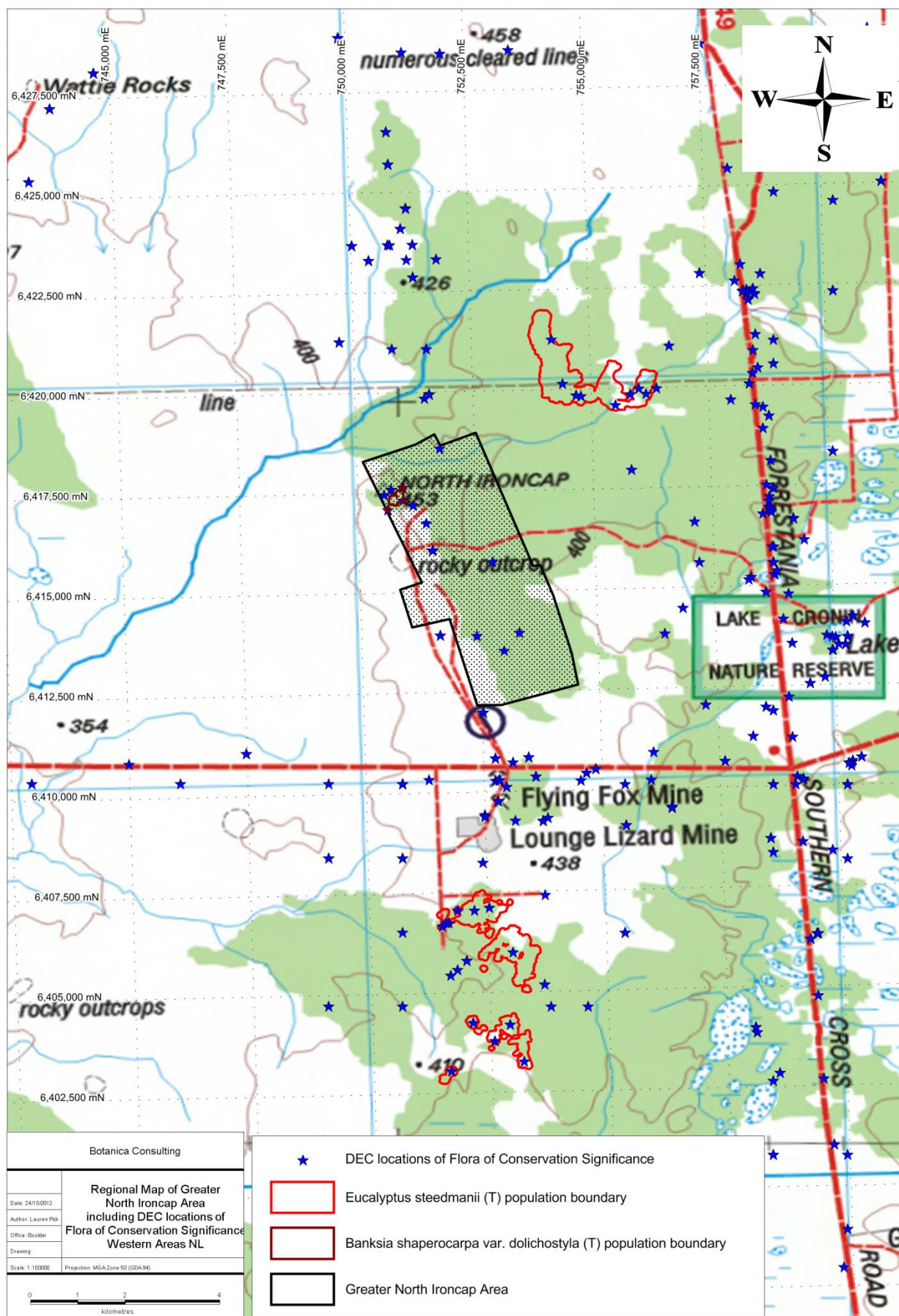
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Accessed 26/09/2012

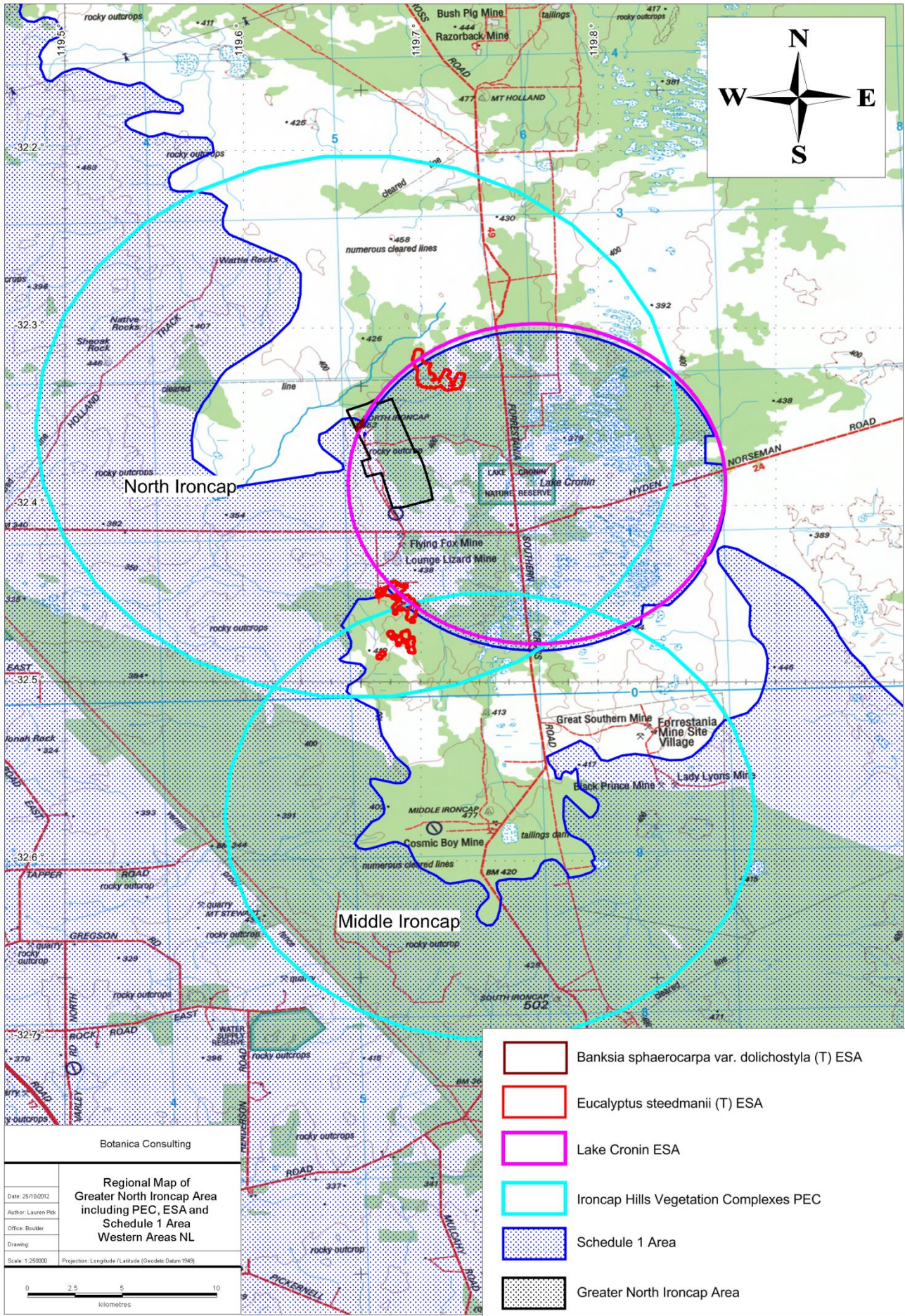
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8 Appendices

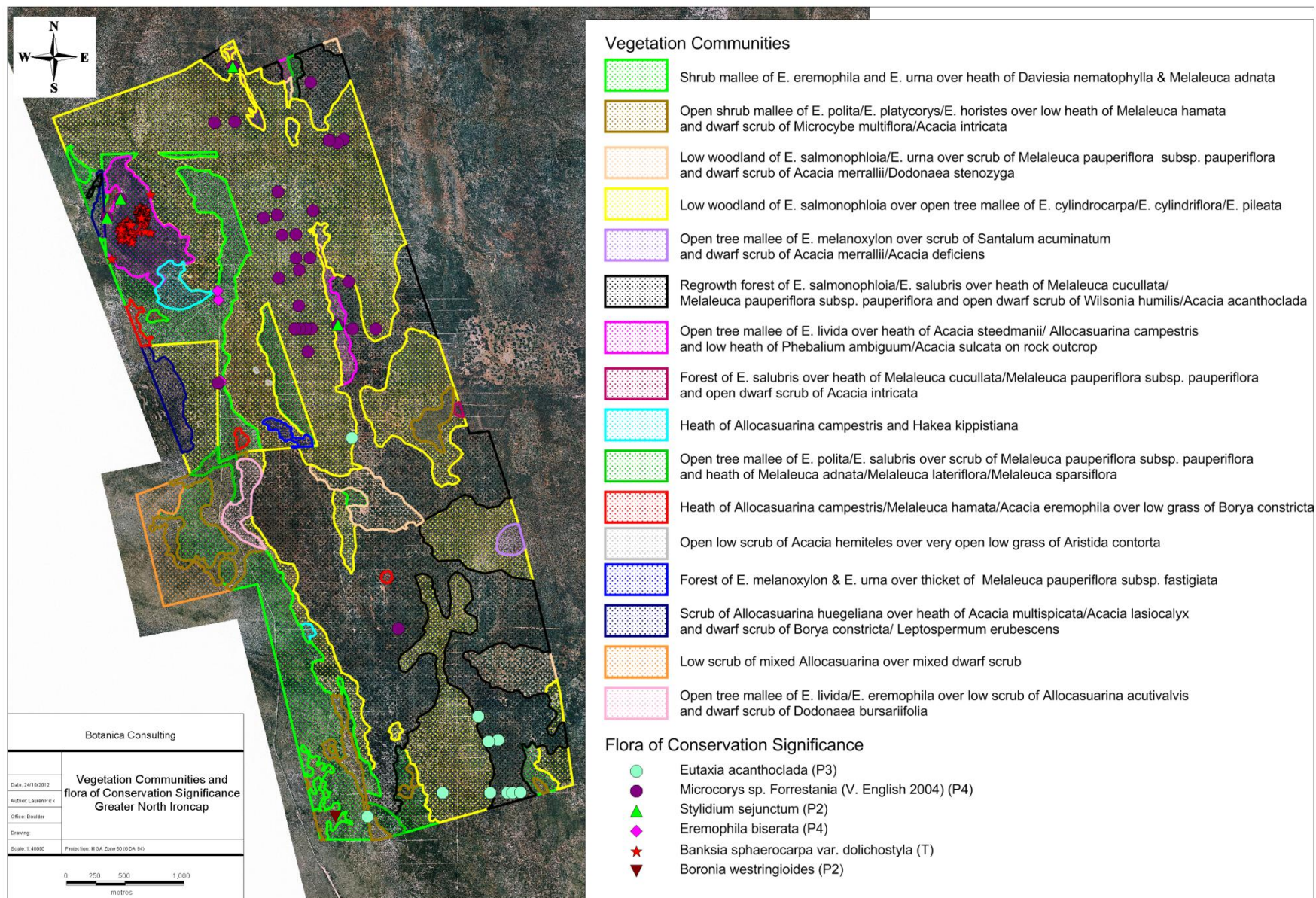
Appendix 1: Regional map of the Greater North Ironcap area including DEC Flora of Conservation Significance locations (survey area not to scale).



Appendix 2: Regional map of the Greater North Ironcap including PEC, Lake Cronin ESA & Schedule 1 Area (survey area not to scale).



Appendix 3: Vegetation map of the Greater North Ironcap area including Flora of Conservation Significance



Appendix 4: List of species identified within each vegetation community

Red Text (P) denotes Priority Flora species (WAHERB, 2012); Red Text (T) denotes Threatened Flora species (Atkins, 2012); Green Text (W) denotes introduced species (WAHERB, 2012).

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of E. eremophila and E. urna over heath of Daviesia nematophylla & Melaleuca adnata	Heath of Allocasuarina campestris/Melaleuca hamata/Acacia eremophila over low grass of Borya constricta	Scrub of Allocasuarina huegeliana over heath of Acacia multispicata/Acacia lasiocalyx and dwarf scrub of Borya constricta / Leptospermum erubescens	Forest of E. melanoxylon & E. urna over thicket of Melaleuca pauperiflora subsp. fastigiata	Heath of Allocasuarina campestris and Hakea kippistiana	Low woodland of E. salmonophloia over open tree mallee of E. cylindrocarpa/E. cylindriflora/E. pileata	Open low scrub of Acacia hemiteles over very open low grass of Aristida contorta	Open tree mallee of E. livida over heath of Acacia steedmanii/ Allocasuarina campestris and low heath of Phebalium ambiguum/Acacia sulcata on rock outcrop	Open tree mallee of E. polita/E. salubris over scrub of Melaleuca pauperiflora subsp. pauperiflora and heath of Melaleuca adnata/Melaleuca lateriflora/Melaleuca sparsiflora	Open shrub mallee of E. polita/E. platycorys/E. horistes over low heath of Melaleuca hamata and dwarf scrub of Microcybe multiflora/Acacia intricata	Regrowth forest of E. salmonophloia/E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Wilsonia humilis/Acacia acanthoclada	Open tree mallee of E. melanoxylon over scrub of Santalum acuminatum and dwarf scrub of Acacia merrallii/Acacia deficiens	Open tree mallee of E. livida/E. eremophila over low scrub of Allocasuarina acutivalvis and dwarf scrub of Dodonaea bursariifolia	Low woodland of E. salmonophloia/E. urna over scrub of Melaleuca pauperiflora subsp. pauperiflora and dwarf scrub of Acacia merrallii/Dodonaea stenozyga	Forest of E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Acacia intricata
Aizoaceae	Carpobrotus	aequilaterus (W)		*					*		*							
Amaranthaceae	Ptilotus	gaudichaudii (A)								*								
Amaranthaceae	Ptilotus	holosericeus								*								*
Apiaceae	Daucus	glochidiatus (A)								*								
Apiaceae	Platysace	trachymenioides	*															
Apiaceae	Platysace	maxwellii																
Apocynaceae	Alyxia	buxifolia															*	
Araliaceae	Hydrocotyle	rugulosa (A)								*								
Asparagaceae	Lomandra	effusa		*					*									
Asteraceae	Arctotheca	calendula (W)							*									
Asteraceae	Asteridea	athrixoides (A)															*	
Asteraceae	Brachyscome	ciliaris (A)								*								
Asteraceae	Cratystylis	conocephala												*				
Asteraceae	Dittrichia	graveolens (W)							*									
Asteraceae	Hyalosperma	demissum (A)								*								
Asteraceae	Isoetopsis	graminifolia (A)								*								

[illegible]

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of <i>E. eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> & <i>Melaleuca adnata</i>	Heath of <i>Allocasuarina campestris</i> / <i>Melaleuca hamata</i> / <i>Acacia eremophila</i> over low grass of <i>Borya constricta</i>	Scrub of <i>Allocasuarina huegeliana</i> over heath of <i>Acacia multispicata</i> / <i>Acacia lasiocalyx</i> and dwarf scrub of <i>Borya constricta</i> / <i>Leptospermum erubescens</i>	Forest of <i>E. melanoxylon</i> & <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>	Heath of <i>Allocasuarina campestris</i> and <i>Hakea kippistiana</i>	Low woodland of <i>E. salmonophloia</i> over open tree mallee of <i>E. cylindrocarpal</i> / <i>E. cylindrifloral</i> / <i>E. pileata</i>	Open low scrub of <i>Acacia hemiteles</i> over very open low grass of <i>Aristida contorta</i>	Open tree mallee of <i>E. livida</i> over heath of <i>Acacia steedmanii</i> / <i>Allocasuarina campestris</i> and low heath of <i>Phebalium ambiguum</i> / <i>Acacia sulcata</i> on rock outcrop	Open tree mallee of <i>E. polita</i> / <i>E. salubris</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and heath of <i>Melaleuca adnata</i> / <i>Melaleuca lateriflora</i> / <i>Melaleuca sparsiflora</i>	Open shrub mallee of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Regrowth forest of <i>E. salmonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Open tree mallee of <i>E. melanoxylon</i> over scrub of <i>Santalum acuminatum</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Acacia deficiens</i>	Open tree mallee of <i>E. livida</i> / <i>E. eremophila</i> over low scrub of <i>Allocasuarina acutivalvis</i> and dwarf scrub of <i>Dodonaea bursarifolia</i>	Low woodland of <i>E. salmonophloia</i> / <i>E. urna</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Dodonaea stenozyga</i>	Forest of <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Acacia intricata</i>
Ericaceae	<i>Leucopogon</i>	sp. Wheatbelt (S. Murray 257)											*					
Ericaceae	<i>Lysinema</i>	<i>ciliatum</i>		*														
Euphorbiaceae	<i>Bertya</i>	<i>virgata</i>											*					
Fabaceae	<i>Acacia</i>	<i>acanthoclada</i>							*			*		*				
Fabaceae	<i>Acacia</i>	<i>assimilis</i>	*	*									*					
Fabaceae	<i>Acacia</i>	<i>collettioides</i>		*														
Fabaceae	<i>Acacia</i>	<i>deficiens</i>		*					*			*	*	*	*		*	
Fabaceae	<i>Acacia</i>	<i>eremophila</i>		*	*	*					*	*	*			*		
Fabaceae	<i>Acacia</i>	<i>erinacea</i>		*		*			*	*	*			*		*	*	*
Fabaceae	<i>Acacia</i>	<i>fragilis</i>									*							
Fabaceae	<i>Acacia</i>	<i>hemiteles</i>		*		*	*		*	*		*	*	*			*	
Fabaceae	<i>Acacia</i>	<i>intricata</i>		*			*		*			*	*	*			*	*
Fabaceae	<i>Acacia</i>	<i>lasiocalyx</i>	*	*		*										*		
Fabaceae	<i>Acacia</i>	<i>merinthophora</i>	*															
Fabaceae	<i>Acacia</i>	<i>merrallii</i>		*			*		*					*	*		*	
Fabaceae	<i>Acacia</i>	<i>multispicata</i>				*												
Fabaceae	<i>Acacia</i>	<i>rendlei</i>							*							*		
Fabaceae	<i>Acacia</i>	<i>sphacelata</i> subsp. <i>sphacelata</i>		*					*	*	*		*	*				
Fabaceae	<i>Acacia</i>	<i>steedmanii</i>									*							
Fabaceae	<i>Acacia</i>	<i>sulcata</i>						*			*					*		
Fabaceae	<i>Acacia</i>	<i>sulcata</i> var. <i>platyphylla</i>		*								*						

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of E. eremophila and E. urna over heath of Daviesia nematophylla & Melaleuca adnata	Heath of Allocasuarina campestris/Melaleuca hamata/Acacia eremophila over low grass of Borya constricta	Scrub of Allocasuarina huegeliana over heath of Acacia multispicata/Acacia lasiocalyx and dwarf scrub of Borya constricta / Leptospermum erubescens	Forest of E. melanoxydon & E. urna over thicket of Melaleuca pauperiflora subsp. fastigiata	Heath of Allocasuarina campestris and Hakea kippistiana	Low woodland of E. salmonophloia over open tree mallee of E. cylindrocarpal.E. cylindrifloraE. pileata	Open low scrub of Acacia hemiteles over very open low grass of Aristida contorta	Open tree mallee of E. livida over heath of Acacia steedmanii/ Allocasuarina campestris and low heath of Phebalium ambiguum/Acacia sulcata on rock outcrop	Open tree mallee of E. polita/E. salubris over scrub of Melaleuca pauperiflora subsp. pauperiflora and heath of Melaleuca adnata/Melaleuca lateriflora/Melaleuca sparsiflora	Open shrub mallee of E. polita/E. platycorys/E. horistes over low heath of Melaleuca hamata and dwarf scrub of Microcybe multiflora/Acacia intricata	Regrowth forest of E. salmonophloia/E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Wilsonia humilis/Acacia acanthoclada	Open tree mallee of E. melanoxydon over scrub of Santalum acuminatum and dwarf scrub of Acacia merrallii/Acacia deficiens	Open tree mallee of E. livida/E. eremophila over low scrub of Allocasuarina acutivalvis and dwarf scrub of Dodonaea bursarifolia	Low woodland of E. salmonophloia/E. urna over scrub of Melaleuca pauperiflora subsp. pauperiflora and dwarf scrub of Acacia merrallii/Dodonaea stenozyga	Forest of E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Acacia intricata
Fabaceae	Bossiaea	leptacantha					*											
Fabaceae	Daviesia	benthamii		*					*			*						
Fabaceae	Daviesia	nematophylla		*					*			*		*		*	*	
Fabaceae	Eutaxia	acanthoclada (P3)							*				*	*				
Fabaceae	Gastrolobium	melanocarpum		*														
Fabaceae	Gastrolobium	spinosum		*									*			*		
Fabaceae	Gompholobium	gompholobioides		*														
Fabaceae	Jacksonia	nematoclada		*														
Fabaceae	Leptosema	daviesioides				*												
Fabaceae	Mirbelia	trichocalyx	*															
Fabaceae	Mirbelia	floribunda	*															
Fabaceae	Senna	artemisioides subsp. filifolia		*														
Fabaceae	Templetonia	sulcata		*			*		*									
Geraniaceae	Pelargonium	havlasae							*					*				
Goodeniaceae	Cooperhookeya	strophiolata												*				
Goodeniaceae	Dampiera	angulata subsp. Peak Charles (K.R. Newbey 5402)									*					*		
Goodeniaceae	Goodenia	berardiana (A)							*									
Goodeniaceae	Goodenia	cynopotamica (A)							*									
Goodeniaceae	Goodenia	pinifolia			*	*					*							
Goodeniaceae	Scaevola	restiacea													*			
Goodeniaceae	Scaevola	spinescens		*					*							*	*	

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of <i>E. eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> & <i>Melaleuca adnata</i>	Heath of <i>Allocasuarina campestris</i> / <i>Melaleuca hamata</i> / <i>Acacia eremophila</i> over low grass of <i>Borya constricta</i>	Scrub of <i>Allocasuarina huegeliana</i> over heath of <i>Acacia multispicata</i> / <i>Acacia lasiocalyx</i> and dwarf scrub of <i>Borya constricta</i> / <i>Leptospermum erubescens</i>	Forest of <i>E. melanoxylon</i> & <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>	Heath of <i>Allocasuarina campestris</i> and <i>Hakea kippistiana</i>	Low woodland of <i>E. salmonophloia</i> over open tree mallee of <i>E. cylindrocarpa</i> / <i>E. cylindriflora</i> / <i>E. pileata</i>	Open low scrub of <i>Acacia hemiteles</i> over very open low grass of <i>Aristida contorta</i>	Open tree mallee of <i>E. livida</i> over heath of <i>Acacia steedmanii</i> / <i>Allocasuarina campestris</i> and low heath of <i>Phebalium ambiguum</i> / <i>Acacia sulcata</i> on rock outcrop	Open tree mallee of <i>E. polita</i> / <i>E. salubris</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and heath of <i>Melaleuca adnata</i> / <i>Melaleuca lateriflora</i> / <i>Melaleuca sparsiflora</i>	Open shrub mallee of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Regrowth forest of <i>E. salmonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Open tree mallee of <i>E. melanoxylon</i> over scrub of <i>Santalum acuminatum</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Acacia deficiens</i>	Open tree mallee of <i>E. livida</i> / <i>E. eremophila</i> over low scrub of <i>Allocasuarina acutivalvis</i> and dwarf scrub of <i>Dodonaea bursarifolia</i>	Low woodland of <i>E. salmonophloia</i> / <i>E. urna</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Dodonaea stenozyga</i>	Forest of <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Acacia intricata</i>
Haloragaceae	<i>Haloragis</i>	<i>hamata</i>												*				
Hemerocallidaceae	<i>Dianella</i>	<i>revoluta</i>		*		*			*		*		*				*	
Lamiaceae	<i>Microcorys</i>	sp. <i>Forrestania</i> (V. English, 2004) (P4)		*					*					*				
Lauraceae	<i>Cassytha</i>	<i>melantha</i>	*						*		*	*	*	*				
Malvaceae	<i>Commersonia</i>	<i>craurophylla</i>								*								
Malvaceae	<i>Lasiopetalum</i>	<i>ferricollinum</i>									*							
Malvaceae	<i>Lawrenzia</i>	<i>glomerata</i>								*								
Myrtaceae	<i>Baeckea</i>	<i>crispiflora</i>	*		*	*												
Myrtaceae	<i>Balaustion</i>	<i>pulcherrimum</i>		*														
Myrtaceae	<i>Beaufortia</i>	<i>interstans</i>		*														
Myrtaceae	<i>Calothamnus</i>	<i>quadrifidus</i>		*							*							
Myrtaceae	<i>Calytrix</i>	<i>tetragona</i>								*								
Myrtaceae	<i>Cyathostemon</i>	<i>tenuifolius</i>		*								*						
Myrtaceae	<i>Eucalyptus</i>	<i>albida</i>		*														
Myrtaceae	<i>Eucalyptus</i>	<i>celastroides</i>		*					*			*						
Myrtaceae	<i>Eucalyptus</i>	<i>cylindriflora</i>							*									
Myrtaceae	<i>Eucalyptus</i>	<i>cylindrocarpa</i>		*					*									
Myrtaceae	<i>Eucalyptus</i>	<i>eremophila</i>		*				*	*		*						*	
Myrtaceae	<i>Eucalyptus</i>	<i>gracilis</i>		*					*									
Myrtaceae	<i>Eucalyptus</i>	<i>horistes</i>	*										*					
Myrtaceae	<i>Eucalyptus</i>	<i>livida</i>							*		*						*	
Myrtaceae	<i>Eucalyptus</i>	<i>melanoxylon</i>					*		*						*			

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of <i>E. eremophila</i> and <i>E. urna</i> over heath of <i>Daviesia nematophylla</i> & <i>Melaleuca adnata</i>	Heath of <i>Allocasuarina campestris</i> / <i>Melaleuca hamata</i> / <i>Acacia eremophila</i> over low grass of <i>Borya constricta</i>	Scrub of <i>Allocasuarina huegeliana</i> over heath of <i>Acacia multispicata</i> / <i>Acacia lasiocalyx</i> and dwarf scrub of <i>Borya constricta</i> / <i>Leptospermum erubescens</i>	Forest of <i>E. melanoxylon</i> & <i>E. urna</i> over thicket of <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>	Heath of <i>Allocasuarina campestris</i> and <i>Hakea kippistiana</i>	Low woodland of <i>E. salmonophloia</i> over open tree mallee of <i>E. cylindrocarpa</i> / <i>E. cylindriflora</i> / <i>E. pileata</i>	Open low scrub of <i>Acacia hemiteles</i> over very open low grass of <i>Aristida contorta</i>	Open tree mallee of <i>E. livida</i> over heath of <i>Acacia steedmanii</i> / <i>Allocasuarina campestris</i> and low heath of <i>Phebalium ambiguum</i> / <i>Acacia sulcata</i> on rock outcrop	Open tree mallee of <i>E. polita</i> / <i>E. salubris</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and heath of <i>Melaleuca adnata</i> / <i>Melaleuca lateriflora</i> / <i>Melaleuca sparsiflora</i>	Open shrub mallee of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Regrowth forest of <i>E. salmonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Open tree mallee of <i>E. melanoxylon</i> over scrub of <i>Santalum acuminatum</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Acacia deficiens</i>	Open tree mallee of <i>E. livida</i> / <i>E. eremophila</i> over low scrub of <i>Allocasuarina acutivalvis</i> and dwarf scrub of <i>Dodonaea bursarifolia</i>	Low woodland of <i>E. salmonophloia</i> / <i>E. urna</i> over scrub of <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and dwarf scrub of <i>Acacia merrallii</i> / <i>Dodonaea stenozyga</i>	Forest of <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Acacia intricata</i>	
Myrtaceae	<i>Eucalyptus</i>	<i>pileata</i>		*					*										
Myrtaceae	<i>Eucalyptus</i>	<i>platycorys</i>		*		*							*						
Myrtaceae	<i>Eucalyptus</i>	<i>polita</i>										*	*						
Myrtaceae	<i>Eucalyptus</i>	<i>protensa</i>															*		
Myrtaceae	<i>Eucalyptus</i>	<i>salmonophloia</i>							*			*	*	*		*	*		
Myrtaceae	<i>Eucalyptus</i>	<i>salubris</i>							*			*	*	*				*	
Myrtaceae	<i>Eucalyptus</i>	<i>urna</i>		*			*		*			*	*	*		*	*		
Myrtaceae	<i>Leptospermum</i>	<i>spinescens</i>		*															
Myrtaceae	<i>Leptospermum</i>	<i>erubescens</i>		*		*			*		*		*						
Myrtaceae	<i>Melaleuca</i>	<i>acuminata</i>		*		*			*										
Myrtaceae	<i>Melaleuca</i>	<i>adnata</i>		*				*	*			*	*	*			*	*	
Myrtaceae	<i>Melaleuca</i>	<i>cardiophylla</i>		*															
Myrtaceae	<i>Melaleuca</i>	<i>cordata</i>	*	*							*	*				*			
Myrtaceae	<i>Melaleuca</i>	<i>cucullata</i>							*			*		*			*	*	
Myrtaceae	<i>Melaleuca</i>	<i>eleuterostachya</i>				*								*					
Myrtaceae	<i>Melaleuca</i>	<i>glaberrima</i>				*							*						
Myrtaceae	<i>Melaleuca</i>	<i>hamata</i>		*	*	*					*		*				*		
Myrtaceae	<i>Melaleuca</i>	<i>lateriflora</i>		*					*		*	*	*						
Myrtaceae	<i>Melaleuca</i>	<i>laxiflora</i>			*	*								*					
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>fastigiata</i>		*			*		*			*	*	*				*	
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>pauperiflora</i>							*			*	*	*	*		*	*	

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of E. eremophila and E. urna over heath of Daviesia nematophylla & Melaleuca adnata	Heath of Allocasuarina campestris/Melaleuca hamata/Acacia eremophila over low grass of Borya constricta	Scrub of Allocasuarina huegeliana over heath of Acacia multispicata/Acacia lasiocalyx and dwarf scrub of Borya constricta / Leptospermum erubescens	Forest of E. melanoxylon & E. urna over thicket of Melaleuca pauperiflora subsp. fastigiata	Heath of Allocasuarina campestris and Hakea kippistiana	Low woodland of E. salmonophloia over open tree mallee of E. cylindrocarpa/E. cylindriflora/E. pileata	Open low scrub of Acacia hemiteles over very open low grass of Aristida contorta	Open tree mallee of E. livida over heath of Acacia steedmanii/ Allocasuarina campestris and low heath of Phebalium ambiguum/Acacia sulcata on rock outcrop	Open tree mallee of E. polita/E. salubris over scrub of Melaleuca pauperiflora subsp. pauperiflora and heath of Melaleuca adnata/Melaleuca lateriflora/Melaleuca sparsiflora	Open shrub mallee of E. polita/E. platycorys/E. horistes over low heath of Melaleuca hamata and dwarf scrub of Microcybe multiflora/Acacia intricata	Regrowth forest of E. salmonophloia/E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Wilsonia humilis/Acacia acanthoclada	Open tree mallee of E. melanoxylon over scrub of Santalum acuminatum and dwarf scrub of Acacia merrallii/Acacia deficiens	Open tree mallee of E. livida/E. eremophila over low scrub of Allocasuarina acutivalvis and dwarf scrub of Dodonaea bursariifolia	Low woodland of E. salmonophloia/E. urna over scrub of Melaleuca pauperiflora subsp. pauperiflora and dwarf scrub of Acacia merrallii/Dodonaea stenozyga	Forest of E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Acacia intricata
Myrtaceae	Melaleuca	pungens														*		
Myrtaceae	Melaleuca	sparsiflora										*						
Myrtaceae	Thryptomene	kochii		*		*				*								
Myrtaceae	Verticordia	sp. (sterile)	*															
Orchidaceae	Caladenia	flava									*							
Orchidaceae	Caladenia	hirta subsp. hirta				*												
Orchidaceae	Caladenia	roei				*												
Orchidaceae	Corunastylis	tepperi										*						
Orchidaceae	Diuris	sp. Eastern Wheatbelt (aff. corymbosa)									*							
Orchidaceae	Ericksonella	saccharata				*					*							
Orchidaceae	Pterostylis	sp. inland (A.C. Beauglehole 11880)				*												
Orchidaceae	Pheladenia	deformis				*												
Poaceae	Aristida	contorta (A)								*								
Poaceae	Austrostipa	nitida							*								*	
Poaceae	Spartochloa	scirpoidea									*							
Polygalaceae	Comesperma	volubile									*		*					
Polygalaceae	Comesperma	brownii		*														
Polygalaceae	Comesperma	volubile									*					*		
Portulacaceae	Calandrinia	eremaea (A)								*								
Proteaceae	Banksia	sphaerocarpa var. dolichostyla (T)									*							

Family	Genus	Species	Low scrub of mixed Allocasuarina over mixed dwarf scrub	Shrub mallee of E. eremophila and E. urna over heath of Daviesia nematophylla & Melaleuca adnata	Heath of Allocasuarina campestris/Melaleuca hamata/Acacia eremophila over low grass of Borya constricta	Scrub of Allocasuarina huegeliana over heath of Acacia multispicata/Acacia lasiocalyx and dwarf scrub of Borya constricta / Leptospermum erubescens	Forest of E. melanoxylon & E. urna over thicket of Melaleuca pauperiflora subsp. fastigiata	Heath of Allocasuarina campestris and Hakea kippistiana	Low woodland of E. salmonophloia over open tree mallee of E. cylindrocarpa/E. cylindriflora/E. pileata	Open low scrub of Acacia hemiteles over very open low grass of Aristida contorta	Open tree mallee of E. livida over heath of Acacia steedmanii/ Allocasuarina campestris and low heath of Phebalium ambiguum/Acacia sulcata on rock outcrop	Open tree mallee of E. polita/E. salubris over scrub of Melaleuca pauperiflora subsp. pauperiflora and heath of Melaleuca adnata/Melaleuca lateriflora/Melaleuca sparsiflora	Open shrub mallee of E. polita/E. platycorys/E. horistes over low heath of Melaleuca hamata and dwarf scrub of Microcybe multiflora/Acacia intricata	Regrowth forest of E. salmonophloia/E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Wilsonia humilis/Acacia acanthoclada	Open tree mallee of E. melanoxylon over scrub of Santalum acuminatum and dwarf scrub of Acacia merrallii/Acacia deficiens	Open tree mallee of E. livida/E. eremophila over low scrub of Allocasuarina acutivalvis and dwarf scrub of Dodonaea bursariifolia	Low woodland of E. salmonophloia/E. urna over scrub of Melaleuca pauperiflora subsp. pauperiflora and dwarf scrub of Acacia merrallii/Dodonaea stenozyga	Forest of E. salubris over heath of Melaleuca cucullata/Melaleuca pauperiflora subsp. pauperiflora and open dwarf scrub of Acacia intricata
Restionaceae	Lepidobolus	chaetocephalus				*												
Rhamnaceae	Cryptandra	myriantha		*					*				*				*	
Rhamnaceae	Cryptandra	wilsonii									*							
Rhamnaceae	Stenanthemum	tridentatum									*							
Rhamnaceae	Trymalium	myrtillus subsp. myrtillus						*									*	
Rutaceae	Boronia	inornata subsp. leptophylla										*						
Rutaceae	Drummondita	hassellii		*							*						*	
Rutaceae	Microcybe	multiflora		*							*	*	*	*			*	
Rutaceae	Phebalium	ambiguum		*							*	*	*	*			*	
Rutaceae	Phebalium	filifolium	*	*		*						*	*	*		*		
Santalaceae	Exocarpos	aphyllus		*			*		*			*	*	*			*	*
Santalaceae	Exocarpos	sparteus										*						
Santalaceae	Leptomeria	preissiana		*														
Santalaceae	Santalum	acuminatum	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Santalaceae	Santalum	spicatum														*		
Sapindaceae	Dodonaea	bursariifolia							*		*						*	
Sapindaceae	Dodonaea	inaequifolia															*	
Sapindaceae	Dodonaea	ptarmicaefolia												*				
Sapindaceae	Dodonaea	stenozyga		*					*			*		*	*	*	*	*
Sapindaceae	Dodonaea	viscosa									*							
Scrophulariaceae	Eremophila	biserrata (P4)		*														
Scrophulariaceae	Eremophila	decipiens					*		*					*			*	

Appendix 5: DEC Threatened Flora Database search results within 10km of the Greater North Ironcap (DEC, 2011a)

Species	Conservation Code
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i>	T
<i>Eucalyptus steedmanii</i>	T
<i>Paragoodia crenulata</i>	T
<i>Acacia asepala</i>	2
<i>Baeckea</i> sp. Blue Haze Mine (P. Armstrong 06/910)	1
<i>Baeckea</i> sp. Crossroads (B.L. Rye & M.E. Trudgen 241186)	1
<i>Baeckea</i> sp. Lake Cronin (K.R. Newbey 9191)	1
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	2
<i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968)	3
<i>Banksia viscida</i>	3
<i>Bentleya diminuta</i>	2
<i>Boronia westringioides</i>	2
<i>Calamphoreus inflatus</i>	4
<i>Comesperma calcicola</i>	3
<i>Conospermum sigmoideum</i>	2
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	3
<i>Dampiera scaevolina</i>	1
<i>Daviesia elongata</i> subsp. <i>implexa</i>	3
<i>Dillwynia acerosa</i>	3
<i>Eremophila biserrata</i>	4
<i>Eremophila racemosa</i>	4
<i>Eucalyptus exigua</i>	3
<i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>	1
<i>Eutaxia acanthoclada</i>	3
<i>Eutaxia nanophylla</i>	3
<i>Gastrolobium tenue</i>	1
<i>Grevillea pilosa</i> subsp. <i>redacta</i>	3
<i>Haegiela tatei</i>	4
<i>Isolepis australiensis</i>	3
<i>Keraudrenia adenogyna</i>	3
<i>Microcorys</i> sp. Forrestania (V. English 2004)	4
<i>Mirbelia densiflora</i>	3
<i>Olearia laciniifolia</i>	2
<i>Pityrodia</i> sp. Yilgarn (A.P. Brown 2679)	3
<i>Pultenaea daena</i>	3

Species	Conservation Code
<i>Stylidium sejunctum</i>	2
<i>Stylidium validum</i>	1
<i>Verticordia gracilis</i>	3

Appendix 6: GPS coordinates of Flora of Conservation Significance identified within the Greater North Ironcap area

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750912	6417329
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750886	6417385
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750886	6417385
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750882	6417399
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750891	6417400
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750903	6417397
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750909	6417410
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750913	6417411
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750913	6417421
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750911	6417422
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750915	6417425
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750921	6417436
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750916	6417455
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750909	6417458
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750905	6417456
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750907	6417454
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750903	6417456
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750901	6417456
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750900	6417456
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750901	6417460
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750902	6417461
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750904	6417460
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750907	6417461
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750909	6417461
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750910	6417463
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750910	6417463
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750908	6417465
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750906	6417465
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750907	6417469
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750906	6417470
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750910	6417476
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750909	6417482
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750907	6417482
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750921	6417510
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750894	6417516
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750893	6417515
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750885	6417518
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750881	6417516
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750879	6417515
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750871	6417516
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750867	6417523
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750872	6417527
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750874	6417501
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750873	6417496
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750874	6417495
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750882	6417489
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750883	6417483
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750885	6417482

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750888	6417481
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750889	6417480
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750891	6417473
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750893	6417471
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750888	6417472
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750885	6417471
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750884	6417470
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750872	6417473
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750868	6417478
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750867	6417478
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750866	6417479
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750866	6417480
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750864	6417480
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750861	6417483
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750859	6417482
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750855	6417485
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750851	6417488
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750857	6417476
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750858	6417466
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750859	6417464
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750861	6417464
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750864	6417463
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750867	6417461
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750868	6417458
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750868	6417455
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750874	6417451
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750876	6417450
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750877	6417447
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750881	6417443
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750884	6417442
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750886	6417439
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750886	6417437
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750883	6417432
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750893	6417430
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750901	6417431
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750902	6417430
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750901	6417424
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750898	6417424
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750892	6417422
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750891	6417418
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750888	6417418
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750886	6417416
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750888	6417413
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750891	6417408
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750894	6417409
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750892	6417401
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750882	6417400
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750859	6417327
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750854	6417326
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750813	6417319

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750812	6417318
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750808	6417307
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750793	6417305
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750789	6417307
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750768	6417294
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750766	6417289
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750763	6417271
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750753	6417273
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750752	6417273
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750749	6417276
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750748	6417279
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750748	6417282
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750734	6417286
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750730	6417282
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417282
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750723	6417292
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750723	6417294
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417296
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417296
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417296
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417300
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750717	6417303
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750725	6417312
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417311
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750730	6417312
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750725	6417324
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750717	6417319
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750711	6417327
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750710	6417328
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750702	6417317
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750702	6417317
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750702	6417317
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750709	6417341
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750713	6417344
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750714	6417349
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750714	6417350
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750710	6417355
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750721	6417362
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750729	6417360
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750726	6417379
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750725	6417381
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750723	6417386
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750742	6417391
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750751	6417391
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750755	6417405
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750762	6417418
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750768	6417410
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750779	6417399
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750780	6417399
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750782	6417398

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750783	6417398
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750784	6417396
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750783	6417396
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750785	6417394
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750786	6417392
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750786	6417391
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750792	6417380
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750792	6417378
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750707	6417258
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750710	6417274
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750717	6417271
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750756	6417275
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750779	6417262
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750791	6417250
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750798	6417238
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	N	50H	750799	6417237
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	Y	50H	750958	6417642
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	Y	50H	750704	6417603
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	Y	50H	750958	6417319
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> (T)	Y	50H	750630	6417095
<i>Boronia westringioides</i> (P2)	N	50 H	752529	6412362
<i>Eremophila biserrata</i> (P4)	N	50H	751553	6416036
<i>Eremophila biserrata</i> (P4)	N	50H	751528	6416823
<i>Eremophila biserrata</i> (P4)	N	50H	751537	6416745
<i>Eremophila biserrata</i> (P4)	Y	50H	751555	6416060
<i>Eutaxia acanthoclada</i> (P3)	N	50H	752798	6412364
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753436	6412565
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753838	6412565
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753985	6412567
<i>Eutaxia acanthoclada</i> (P3)	N	50H	754030	6412568
<i>Eutaxia acanthoclada</i> (P3)	N	50H	754098	6412569
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753907	6413014
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753827	6413000
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753059	6413960
<i>Eutaxia acanthoclada</i> (P3)	N	50H	752668	6415577
<i>Eutaxia acanthoclada</i> (P3)	N	50H	753738	6413213
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	753059	6413960
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752830	6415721
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752228	6415782
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752405	6416098
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752488	6416097
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752295	6416306
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752872	6416500
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752675	6416501
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752326	6416502
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752274	6416502
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752223	6416502
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752183	6416502
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752216	6416696
<i>Microcorys</i> sp. Forresteria (V. English 2004) (P4)	N	50H	752641	6416902

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752220	6416998
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752193	6417100
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752311	6417100
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752338	6417504
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752193	6417301
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752074	6417297
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752033	6417465
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752041	6417664
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	751531	6416040
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752319	6418593
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	751500	6418250
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	751676	6418255
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752595	6418106
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752545	6418077
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752475	6418100
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752046	6416932
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	751918	6417443
<i>Stylidium sejunctum</i> (P2)	N	50H	751658	6418724
<i>Stylidium sejunctum</i> (P2)	N	50H	752549	6416534
<i>Stylidium sejunctum</i> (P2)	Y	50H	750704	6417603
<i>Stylidium sejunctum</i> (P2)	Y	50H	750589	6417443

Appendix 7: Muir Life Form/Height Class (Muir, 1977).

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70% -100%	MID DENSE 30% -70%	SPARSE 10% -30%	VERY SPARSE 2% -10%
Trees > 30m Trees 15 – 30m Trees 5 – 15m Trees < 5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
Mallee Tree Form Mallee Shrub Form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs > 2m Shrubs 1.5 – 2m Shrubs 1 – 1.5m Shrubs 0.5 – 1m Shrubs 0 – 0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
Mat Plants Hummock Grass Bunch grass >0.5m Bunch grass < 0.5m Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-dense Hummock Grass Tall Grass Low Gras Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
Sedges > 0.5m Sedges < 0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
Ferns Mosses, liverworts	Dense ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

Appendix 8: Keighery Health rating scale (1994).

Health Rating	Health Description	Definition
6	Pristine	No obvious signs of disturbance
5	Excellent	Vegetation intact despite disturbance affect, weeds are non-aggressive individual species
4	Very Good	Vegetation altered due to obvious signs of disturbance
3	Good	Structure affected multiple disturbances. Retains basic structure, has ability to regenerate
2	Degraded	Structure severely disturbed. Can regeneration to good condition, but requires intensive management
1	Completely Degraded	Completely bare no native species