

Trilogy Baseline Study



October 2002

Environmental Management Services



Cover Photo: Remnant patch of Eucalyptus on the proposed Trilogy Pit.

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(SC, JC, MW,DJ)

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Executive Summary

In September 2002 Outback Ecology services was commissioned by Tectonic Resources Pty Ltd to conduct a vegetation survey of the area likely to be impacted by the development of the Trilogy deposit on Myamba farm. Myamba farm is located approximately 25km south of Ravensthorpe on the Hopetoun-Ravensthorpe Road. The purpose of the study was to provide pre-feasibility data encompassing a vegetation and weed survey in the area.

The remnant woodland areas surrounding the proposed pit location were surveyed via four 100 square metre plots, to determine representative floristic and structural data of the area.. A literature search for Declared Rare Flora was also completed by the Department of Conservation and Land Management.

Four species of Eucalypts, were identified in the four plots surveyed on the Myamba form. These included *Eucalyptus scyphocalyx*, *E. phenax* subsp. *phenax*, *E. suggrandis* subsp. *suggrandis* and *E. kessellii*. *E. pleurocarpa* was not included in the survey but was noted in a small patch of remnant vegetation near the proposed pit area.

The absence of mid stratum vegetation on the farm appears to be predominantly due to grazing pressures. Grazing of grasses had occurred recently in most transects, and this made identification of some species impossible.

There were a number of plants of *Carduus* sp. (thistle) on the cleared paddocks in the study area. This species is generally described as an alien species, which is a serious problem in agricultural pastures in Western Australia as they compete with pasture plants for resources (Department of Agriculture, 2002).

There was no declared rare or priority flora (DRF) located on the Myamba farm, although nearby the Kuliba reserve may contain some DRF as described in the CALM study (**Appendix B**). Drainage lines on the Myamba farm appear to run in the direction of the Kuliba reserve. Therefore there is potential for contamination of the Kuliba reserve via the Kuliba river.

A number of recommendations were suggested by Outback Ecology to minimise disturbance of the ecosystems on, and surrounding the Myamba farm.

1.0 Introduction

In September 2002 Outback Ecology services was commissioned by Tectonic Resources Pty Ltd to conduct a vegetation survey of the area likely to be impacted by the development of the Trilogy deposit on Myamba farm. Myamba farm is located approximately 25km south of Ravensthorpe on the Hopetoun-Ravensthorpe Road. The purpose of the study was to provide pre-feasibility data encompassing a vegetation and weed survey in the area. The survey was completed on the 19th of September.

1.1 Climate

The climate of the Ravensthorpe area (including Hopetoun) is typically dominated by hot dry summers and cold wet winters. Mean maximum daily temperatures range from 16.2°C in July to 29.2°C in January. Mean daily minimum temperatures range from 6.6°C in August to 14.5°C in February (Bureau of Meteorology (BOM), 2002). In the twelve months prior to this study (September 2001 – August 2002) a total of 352mm of rainfall was recorded, which was approximately 72mm below average rainfall (**Figure 1**).

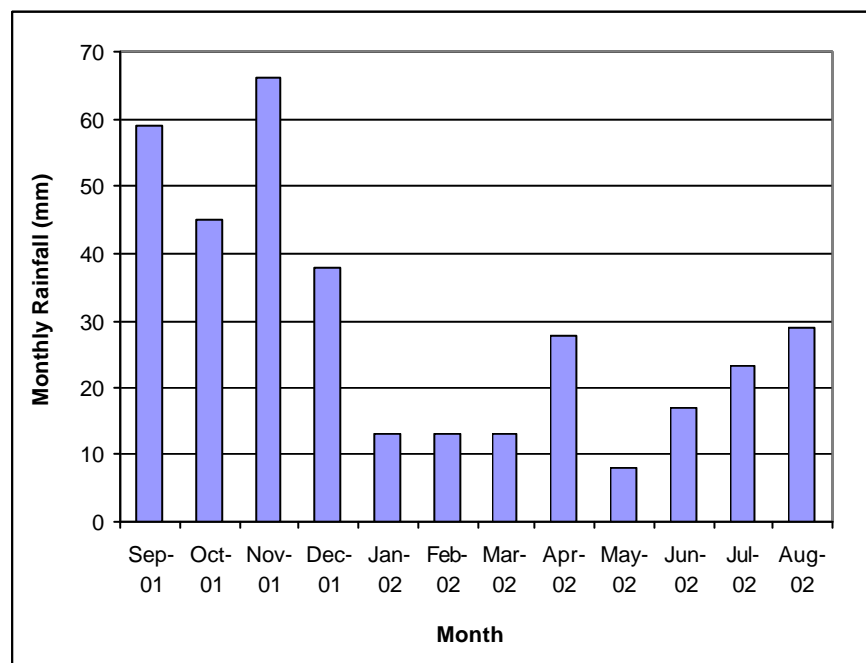


Figure 1. Monthly rainfall in the Ravensthorpe area as recorded by the Bureau of Meteorology in the twelve months prior to monitoring (September 2001 to August 2002)

1.2 Flora and Vegetation

The survey area was located in the Eyre Botanical District within the Esperance Plains Region, as classified by Beard (1990). Vegetation in the area is dominated by Scrub and Mallee heath on the sandplains with scattered eucalypts. The ranges in the Ravensthorpe area are characterised by *Eucalyptus presissiana*, *E. lehmannii* and *Dryandra quercifolia* whereas hill slopes are dominated by *E. nutans* and *E. gardneri*. Woodlands in the area were typified by *E. loxophleba* and *E. salmonophloia* (Beard 1990). There is one endemic species in the area (*E. stoatei*)

1.3 Topography and Soils

The topography of the area consists of sandy clay plains with quartzite ranges. The soils of the Eyre Botanical District were generally described as sand overlaying clay and ironstone gravels (Beard 1990).

2.0 Materials and Methods

Stacey Coxall and Jodie Costello of Outback Ecology Services undertook a vegetation assessment at the Myamba farm on the 19th of September. Aerial photographs provided by Tectonic Resources were used to locate remnant patches of vegetation within the proposed disturbance area. The remnant woodland areas surrounding the proposed pit location were surveyed via four 100 square metre plots, to determine representative floristic and structural data of the area, with transects used to calculate crown cover within these plots. Plots were marked on this aerial map (**Figure 2**), easting and northings are located in **Table 1**. The surrounds of the remnant areas were traversed by foot to locate any plant species not represented in the surveyed areas.

Table 1. Easting and Northing locations of plots Trilogy 1 – 4 (Grid AMG 84).

Plot	Easting	Northing
Trilogy 1	0241747	6261601
Trilogy 2	0241601	6261330
Trilogy 3	0240508	6261040
Trilogy 4	0241128	6260500

A literature search for Declared Rare Flora in between the following co-ordinates 33°44' - 33°51'S and 120°9' - 120°16'E was completed by the Department of Conservation and Land Management (CALM, **Appendix B**). These co-ordinates covered the Myamba farm and surrounding areas, including the Kuliba reserve. The literature search was undertaken in regard to:

- CALM's *Threatened (Declared Rare) Flora* database,
- the *Western Herbarium Specimen* database for Priority species opportunistically collected in the area of interest, and
- the Department's *Declared Rare and Priority Flora List*.

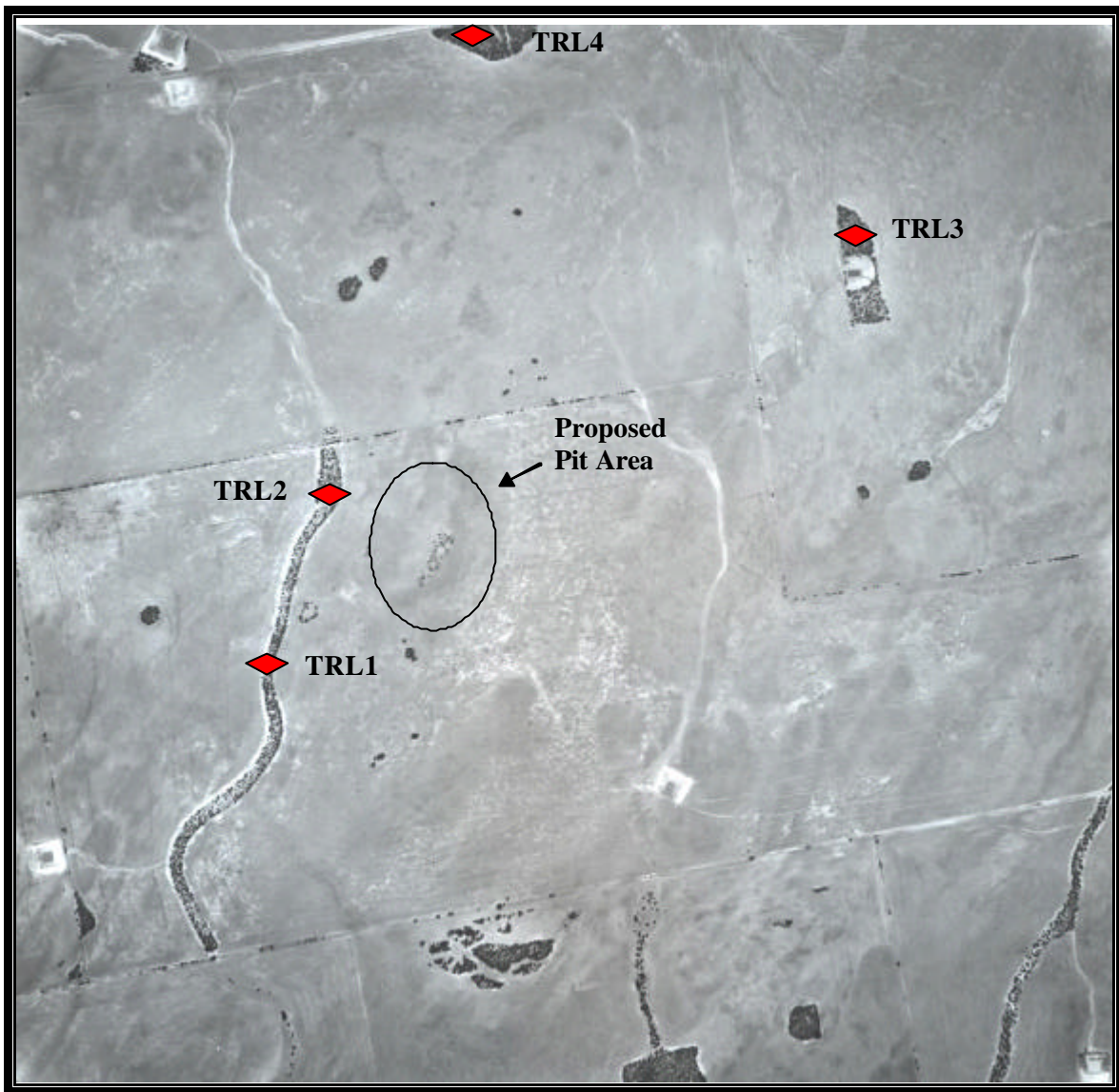


Figure 2. Aerial photo of the Myamba farm with approximate vegetation plot locations marked in red. The proposed pit area is also marked. The DRF study area covered this whole region.

3.0 Results

3.1 Trilogy 1

Vegetation on the Trilogy plot 1 was sparse open mallee forest (McDonald et al. 1998). There was no middle storey vegetation at this site and one lower storey species (*Bromus catharticus*) which was heavily grazed, but the density of this grass was high. Three mallee species were recorded in the survey, and included, *Eucalyptus scyphocalyx*, *Eucalyptus phenax* subsp. *phenax* and *Eucalyptus suggrandis* subsp. *suggrandis*. Upper stratum (mallee species) had a crown cover of approximately 56% in the plot, while the lower stratum species (*Bromus catharticus*) had a crown cover of approximately 4%. There was one weed species (*Carduus* Thistle) recorded in the plot, with a moderate density.

The plot was dissected by a shallow creek bed with sandy white alluvial material in the lower areas (**Plate 1**). In the higher areas the soil was a clay, with a high organic matter content. There was a significant amount of litter present, suggesting relatively high plant productivity and good soil quality.



Plate 1. Plot TRL1 located on the Myamba farm.

3.2 Trilogy 2

The vegetation at this site was also mallee woodland with a total crown cover of 48% (McDonald et al. 1998). The vegetation at this site was dominated by *Eucalyptus phenax* subsp. *phenax* and *Eucalyptus suggrandis* subsp. *suggrandis* (**Plate 2**). Three grass species, *Bromus catharticus*, *Austrodantonia setacea* and an unidentifiable grass species, were recorded in the vegetation plot with a total plant cover of approximately 5%. Generally most grasses were heavily grazed and therefore barely recognisable. Vegetation at this site was generally healthy with abundant new growth.

The soil at this site was organic grey clay. There were no weed species noted at this site.



Plate 2. Plot TRL2 located on the Myamba farm.

3.3 Trilogy 3

The vegetation community of this plot was open mallee woodland (McDonald et al. 1998). There were three species of Eucalypt which contributed to the crown cover of 16% at this site (**Plate 3**). *Eucalyptus suggrandis* subsp. *suggrandis*, *E. scyphocalyx* and *E. kessellii* were all present. Density of the tree species was approximately 5 species per plot (100 square metres), and was composed mainly of *Eucalyptus scyphocalyx*. The lower stratum of vegetation at this site had a cover of approximately 12% and included species 1 and species 3. There was no mid-storey (between 1m and 2m) within the transect.

This plot was located close to the farm dam, with trees close to the dam appear to be stressed or dying. Soils in the area were dark grey/brown loams.



Plate 3. Trilogy plot 3 located on the Myamba farm, showing sparse vegetation cover and density.

3.4 Trilogy 4

Vegetation at the Trilogy 4 plot consisted of an mallee woodland of *Eucalyptus scyphocalyx*, *E. phenax* subsp. *phenax* and *E. suggrandis* subsp. *suggrandis*. The total crown cover of the area was approximately 34%. The density of upper stratum species (mallee) was approximately 16 plants per 100 square metres. The lower stratum of the site was dominated by *Bromus catharticus* and *Panicum* species with a cover of approximately 3.5%.

The soil at this site consisted of a light brown clay, and was very compacted at a depth of 2cm.



Plate 4. Plot Trilogy 4, located on Myamba farm, showing dense vegetation, and high plant crown cover.

3.5 Declared Rare Fauna (DRF)

A total of 66 declared and rare and priority flora species were identified as likely to occur within a six kilometre radius of the farm, although no DRF were found on the farm (**Table 2**). The following is a list of the number of species for each conservation code. Generally the majority of species in the area were Priority 2 and 3. A full description of the conservations codes, species name and locations are presented in **Appendix B**.

The conservation categories are described below:

R: Extant, rare and in danger of extinction or otherwise in need of special protection.

P1: Poorly known, from <5 populations which are under threat.

P2: Poorly known from <5 populations which are not believed to be under immediate threat.

P3: Poorly known from several populations although not believed to under immediate threat.

P4: Described as rare, but adequately surveyed and not threatened.

Table 2. Number of species represented in each conservation category.

Conservation Code	Number of identified species
R – Extant Taxa	9
1 – Priority 1	8
2 – Priority 2	16
3 – Priority 3	20
4 – Priority 4	13

4.0 Discussion

Four species of Eucalypts, were identified in the four plots surveyed on the Myamba farm. These included *Eucalyptus scyphocalyx*, *E. phenax* subsp. *phenax*, *E. suggrandis* subsp. *suggrandis* and *E. kessellii*. *E. pleurocarpa* was not included in the survey but was noted in a small patch of remnant vegetation near the proposed pit area (**Figure 1**). There were approximately 25 plants in total at this stand of vegetation. These *Eucalyptus* were all described as mallee species, which were less than 5m tall and formed a lignotuber (CSIRO, 2002). Generally all mallee species recorded in the study were healthy (with the exception of those surrounding the dam at Trilogy 3) and dense. Those species located around the dam appear to be suffering from the effects of waterlogging and possibly salinity.

The absence of mid stratum vegetation on the farm appears to be predominantly due to grazing pressures. Grazing of grasses had occurred recently in most transects, and this made identification of some species impossible.

There were a number of plants of *Carduus* sp. (thistle) on the cleared paddocks in the study area. This species is generally described as an alien species, which is a serious problem in agricultural pastures in Western Australia as they compete with pasture plants for resources (Department of Agriculture, 2002). The seed of this species is designed with a parachute which is very effective for wind dispersal.

There was no declared rare or priority flora (DRF) located on the Myamba farm, although nearby the Kuliba reserve may contain some DRF as described in the CALM study (**Appendix B**). Drainage lines on the Myamba farm appear to run in the direction of the Kuliba reserve. Therefore there is potential for contamination of the Kuliba reserve via the Kuliba river which runs to the east of the proposed mine. There were nine species of Extant taxa recorded in the study. These are species which have been extensively searched for and are described as rare and close to extinction. These species generally need special protection.

4.0 Recommendations

The following is a list of recommendations made as a result of this baseline study. Implementing these recommendations will reduce the impact of mining in the Myamba study area.

With regards to the vegetation survey;

- Clearing – Vegetation clearing should be minimised to those areas of the tenement required for operations. The removal of vegetation may result in wind/dust erosion if the soil surface is not adequately covered.
- Topsoil Stockpiles – Stockpiled topsoil should be stored for a limited time as seed viability and biological soil processes deteriorate with time. Topsoil stockpiles should be approximately 1 - 1.5m in height to enable soil aeration and limit seed deterioration.
- Revegetation – The use of provenance seed should be undertaken in all site revegetation.
- Exploration Rehabilitation – The ripping of all gridlines after the exploration programme should invigorate plant colonisation and establishment in these areas. All drill holes should be capped with the PVC collars removed to minimise the entrapment of native fauna. Similarly, costeans should be filled to avoid fauna injuries.
- Any seepage or discharges to creek should be monitored to minimise risk of contamination to downstream vegetation (particularly Kuliba reserve).
- Care should be taken to avoid exposing existing vegetation to waterlogging or salinity. Local changes in hydrology appear likely to have impacted on native trees near the dam.

5.0 References

Department of Agriculture (2002). *What Thistle is that?* Available online,
<http://www.agric.wa.gov.au/programs/app/weeds/thistle.htm>

CSIRO, 2002. EUCLID, *Eucalypts of Southern Australia*, Interactive cd. CSIRO Publishing Australia.

MacDonald, R.C. Isbell, R.F. Speight, J.G. Walker, J. Hopkins, M.S. (1998) *Australian Soil and Land Survey – Field Handbook*. CSIRO, Australia.

Appendix A. Species list of the Myamba farm study area.

Species List

Austrodantonia setacea

Bromus catharticus

Eucalyptus kessellii

Eucalyptus phenax subsp. *phenax*

Eucalyptus scyphocalyx

Eucalyptus suggrandis subsp. *suggrandis*

Panicum sp.

Appendix B. Declared Rare Flora Study.

2001F001173VO3
John Riley
(08) 9334 0123
(08) 9334 0278

Outback Ecology Services
20 Bowman Street
SOUTH PERTH WA 6151

Attention: Stacey Coxall

Dear Ms Coxall

REQUEST FOR RARE FLORA INFORMATION

I refer to your request of 24 October 2002 for information on rare flora in the Ravensthorpe area. The search co-ordinates used were 33° 44' - 33° 51' S and 120° 9' - 120° 16' E.

A search was undertaken for this area of (1) the Department's *Threatened (Declared Rare) Flora* database (for results, if any, see "Summary of Threatened Flora Data" – coordinates are GDA94), (2) the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, if any, see "WAHERB Specimen Database General Enquiry" – coordinates are AGD84) and (3), the Department's *Declared Rare and Priority Flora List* [this list, which may also be used as a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, if any, see "Declared Rare and Priority Flora List"]. Please note that no records were produced from (1) above.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point which refers to the requirement to undertake field investigations for the accurate determination of rare flora occurrence at a site. *The information supplied should be regarded as an indication only of the rare flora that may be present and may be used as a target list in any surveys undertaken.*

Your receipt for \$200 (plus GST) to supply this information is enclosed.

It would be appreciated if any populations of rare flora encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss rare flora management, please contact my Principal Botanist, Dr Ken Atkins, on (08) 9334 0425.

Yours faithfully

.....
for Keiran McNamara
ACTING EXECUTIVE DIRECTOR

26 November, 2002
Attached

ATTACHMENT

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

RARE FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Executive Director, Department of Conservation and Land Management, Attention: Administrative Officer Flora, Wildlife Branch.
2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Executive Director, Department of Conservation and Land Management.
3. Specific locality information for Declared Rare Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for DRF may not be used in public reports without the written permission of the Executive Director, Department of Conservation and Land Management. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Department is to be contacted for guidance on the presentation of rare flora information.
4. Note that the Department of Conservation and Land Management respects the privacy of private landowners who may have rare flora on their property. Rare flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Conservation and Land Management.
5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Conservation and Land Management accepts no responsibility for this.
6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
7. It should be noted that the supplied data do not necessarily represent a comprehensive listing of the rare flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.
8. Acknowledgment of the Department of Conservation and Land Management as source of the data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Conservation and Land Management, Attention: Principal Botanist, Wildlife Branch.

**THE DEPARTMENT OF CONSERVATION AND LAND
MANAGEMENT**

DECLARED RARE AND PRIORITY FLORA LIST

for Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

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: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

WAHERB SPECIMEN DATABASE
GENERAL ENQUIRY

Acacia disticha
Maslin (Mimosaceae)
CONSERVATION STATUS:P2
Coll.: G. Craig 2011 Date: 08 09 1992 (PERTH 02467798)
LOCALITY Creek line in tributary of Steere River, c. halfway between Kundip Mine and Elverton Mine, Ravensthorpe Range
WA
LAT 33 Deg 50 Min 17.000 Sec S LONG 120 Deg 9 Min 23.000 Sec E
Shrub to 1.2 m tall. Fleshy lime green phyllodes, stems reddish. Limestone soil. With
Hybanthus floribundus.
Abundance: common

Acacia empelioclada
Maslin (Mimosaceae)
CONSERVATION STATUS:P4
Coll.: E. Wittwer 393a Date: 27 08 1965 (PERTH 306770)
LOCALITY 22 miles S of Ravensthorpe WA
LAT 33 Deg 51 Min 0.000 Sec S LONG 120 Deg 10 Min 0.000 Sec E
Bushy undershrub 4 - 5 ft. Flowers bright yellow. Limestone breakaway.
Previous det.: *Acacia empelioclada*

Beyeria sp.A Ravensthorpe(A.S.George 9474)
PN (Euphorbiaceae)
CONSERVATION STATUS:P1
Coll.: A.S. George 9474 Date: 01 08 1969 (PERTH 05126754)
LOCALITY ca 7 miles E along Jerdacuttup Road from turnoff 13 miles S of Ravensthorpe, on Hopetoun road WA
LAT 33 Deg 45 Min 0.000 Sec S LONG 120 Deg 16 Min 0.000 Sec E
Erect shrub 60 cm tall. In clay. Among mallees.
Previous det.: *Beyeria* sp.

DECL

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

ARED RARE AND PRIORITY FLORA LIST

23 August 2001

SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
<i>Acacia argutifolia</i>	4	SC	S of Ravensthorpe	Jul-Jan
<i>Acacia bifaria</i>	3	SC	Ravensthorpe, Fitzgerald	Aug-Oct, Dec
<i>Acacia durabilis</i>	3	SC	Ravensthorpe Range, Jerdacuttup	Oct-Apr
<i>Acacia errabunda</i>	3	WB, SC	Ravensthorpe, Jerramungup, Broomehill	Aug-Sep
<i>Acacia improcera</i>	3	WB, SC	Ravensthorpe, Frank Hann N.P., Lake King, Mount Glasse, Grass Patch, Sheoak Hill	Jul-Aug
<i>Acacia laricina</i> var. <i>crassifolia</i>	2	SC	Mt Desmond, Mt Short, Ravensthorpe Range, Kundip	Sep-Nov
<i>Acacia moirii</i> subsp. <i>dasycarpa</i>	4	SC, WB	Jerdacuttup, East Mt Barren, Fitzgerald River NP, Newdegate-Lake King, Hopetoun	
<i>Acacia newbeyi</i>	3	WB, SC	Nyabing, Boxwood Hills, Ravensthorpe, Ongerup, Dragon Rocks	
<i>Acacia ophiolithica</i>	3	SC	Ravensthorpe Range, Oldfield River, Bandalup Hill	Aug-Oct
<i>Acacia</i> sp. Ravensthorpe (BR Maslin 5463) [? <i>excentrica</i>]	3	SC	Ravensthorpe Range	Aug-Oct
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	R	SC, WB	Ravensthorpe-Esperance, Newdegate	Jul-Sep
<i>Astartea</i> sp. Jerdacuttup (A Strid 21898)	1	SC	Ravensthorpe, Jerdacuttup	Jan-Mar
<i>Austrostipa exilis</i>	2	SC,*	Cocklebidy, Marra Bridge-Pallinup River, Ravensthorpe, Fitzgerald River NP, Needilup, SE of Lake Grace, Wickepin	-
<i>Banksia laevigata</i> subsp. <i>laevigata</i>	4	SC	Fitzgerald River N.P., Ravensthorpe	-
<i>Boronia oxyantha</i> var. <i>brevicalyx</i>	3	SC	Ravensthorpe, Ongerup, Boxwood Hill,	-

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

Calochilus sp. Hopetoun (H Taylor s.n.) [aff. campestris]	2	SC	Fitzgerald River N.P., Bandalup Hill Hopetoun, Stirling Range N.P., Eyre	Sep
Chorizema ulotropis	4	SC,SW	Jerramungup, Ongerup, Ravensthorpe, Young River, Dwellingup, Wandering	
Comesperma lanceolatum	2	SC	Cape Riche, Hopetoun, Mt Maxwell, Mt Merivale	Nov
Conostylis lepidospermoides	R	SC,WB	E, NE and NW of Ravensthorpe	Sep-Oct
Dampiera deltoidea	4	SC	Thumb Pk, Mt Desmond, Fitzgerald River, Ravensthorpe, Bandalup Hill	Sep-Nov
Dampiera orchardii	2	SF,SC,W B,GLD	Tone R., Oldfield R., Ravensthorpe, Lake King, Lake Johnston	Oct-Nov
Daviesia megacalyx	R	SC	Ravensthorpe Range	Aug-Sep
Daviesia newbeyi	2	SC	near Barker Lake, Fitzgerald River NP, Ravensthorpe, Near Mt Buraminya	
Daviesia pauciflora	2	SC	Cascades, Ravensthorpe, Esperance, Scaddan	Oct-Jan
Dryandra corvijuga	1	SC	Mt Short, Ravensthorpe Range, Mt Desmond	Sep-Oct
Dryandra ferruginea subsp. chelomacarpa	3	WB,SC	Newdegate, Ravensthorpe	Jul-Sep
Dryandra ferruginea subsp. flavescens	3	SC,WB	Ravensthorpe, Lake King, Frank Hann, Forrestania, Hatters Hill	Aug
Dryandra foliosissima	2	WB,SC	Tarin Rock, Ravensthorpe	Jun

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

24/10/2002

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
DECLARED RARE AND PRIORITY FLORA LIST
23 August 2001

Page 2

SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
Dryandra meganotia	3	WB,SC	Kulin-Pingrup, Yilliminning, Ravensthorpe, Nyabing, Harrismith, Badgebup	Oct
Eremophila denticulata subsp. denticulata	R	SC	W of Ravensthorpe	Oct-Jan
Eremophila serpens	4	WB,SC	Hyden-Newdegate, Esperance, Lake Magenta, Ravensthorpe, Lake Milarup	Jan-Dec
Eremophila verticillata	R	WB	NW of Ravensthorpe	Oct-Jan
Eucalyptus angustissima subsp. quaerenda	3	WB,SC	Lake Chinokup, Ravensthorpe, Hatters Hill, Pallarup, Pingrup, Phillips River	
Eucalyptus bennettiae x	R	SC	Ravensthorpe Range	Jun-Sep
Eucalyptus depauperata	3	WB,SC	Lake Ace, Lake King, Ravensthorpe, Lort River	Dec-Feb
Eucalyptus desmondensis	4	SC	Mt Desmond, Ravensthorpe	Mar-Nov
Eucalyptus stoataptera x	2	SC	Jerdacuttup, Hopetoun	-
Goodenia phillipsiae	1	SC	Ravensthorpe	
Gyrostemon ditrigynus	4	WB,SC	Lake King, Cascades North, Forrestania, - Ravensthorpe, Pingaring, Mt Ridley	
Hakea acuminata	2	SC	Fitzgerald River NP, Hopetoun	
Hakea brachyptera	3	WB,SC	Lake Magenta, Lake Cairlocup, Ravensthorpe, ?Tambellup, ?Ongerup	
Lechenaultia acutiloba	3	SC,WB	Jerramungup, Ravensthorpe, Cairlocup, Lake Magenta, Hopetoun, West River	Oct-Dec
Lechenaultia superba	4	SC	W of Hopetoun	Jan-Dec
Levenhookia octomaculata	3	MW,SC,C F	Kalbarri, Northampton, Bolgart, Canna, Lesueur, Ravensthorpe, Wicherina,	Nov

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

			Dinninup, Perenjori	
<i>Levenhookia pulcherrima</i>	2	SC	Mt Gibbs, Ravensthorpe	Oct-Nov
<i>Marianthus villosus</i>	R	SC	Ravensthorpe	Aug-Sep
<i>Melaleuca penicula</i>	2	SC	Fitzgerald River N.P., Ravensthorpe	Nov
<i>Melaleuca sculponeata</i>	1	SC,WB	W of Ravensthorpe, Lake King	-
<i>Melaleuca similis</i>	1	SC	Young River, Ravensthorpe	
<i>Melaleuca stramentosa</i>	1	SC	Ravensthorpe	Oct
<i>Microcorys pimeleoides</i>	1	SC	Ravensthorpe Range, Bandalup Hill	Oct-Nov
<i>Micromyrtus racemosa</i> var. <i>carinata</i> ms	3	SC	Ravensthorpe	Apr,May, Aug,Sep
<i>Opercularia hirsuta</i>	2	SC	Ravensthorpe, Peak Charles, Esperance	Sep-Oct
<i>Persoonia brevirhachis</i>	2	WB,SC	Lake Grace, Ravensthorpe	-
<i>Pimelea physodes</i>	4	SC	Ravensthorpe, Fitzgerald River NP, Bremer Bay	
<i>Pterostylis</i> sp. Ongerup (KR Newbey 4874) [aff. <i>pusilla</i>]	4	SC	Cape Arid, Stirling Range N.P., Ravensthorpe, Ongerup	Aug-Oct
<i>Sphaerolobium validum</i> ms	3	SC	Bremer Bay, Wellstead, Fitzgerald River NP, Ravensthorpe, Broomehill	Sep-Oct
<i>Spyridium glaucum</i>	3	SC	Ravensthorpe Range, Mt Short, Bandalup Hill	Sep-Nov
<i>Spyridium mucronatum</i> subsp. <i>recurvum</i>	3	WB,SC	Borden, Lake Magenta, Ravensthorpe	Sep-Dec
<i>Stylidium galioides</i>	R	SC	W of Hopetoun	Sep-Nov
<i>Thelymitra psammophila</i>	R	SC	Stirling Range-Ravensthorpe	Sep-Oct
<i>Thysanotus brachiatus</i>	2	SC	Munmlinup, Ravensthorpe, Hopetoun, Dalyup	

24/10/2002

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23 August 2001**

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SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
Verticordia integra	4	WB,SC	Newdegate - Lake King - Ravensthorpe, Dragon Rocks	Nov