



*Section 70(2)*  
*Environmental Protection Act 1986.*

## VEGETATION CONSERVATION NOTICE

CPS 8671/1

**Persons to whom this vegetation conservation notice is given:**  
(being the occupier of the land described below)

Shire of Esperance  
77 Windich Street  
Esperance WA 6450

**Land to which this vegetation conservation notice relates ("the land"):**  
Lot 262 on Deposited Plan 209352 as comprised on Certificate of Title Volume LR3022 Folio 738

**Reasons for which this vegetation conservation notice is given:**  
This vegetation conservation notice is given because I reasonably suspect on the following grounds that unlawful clearing has taken place and is likely to take place on the land:

- The Shire of Esperance 2018 Annual Audit Compliance and Environmental Report for Clearing Permit CPS 5259/1 shows that native vegetation was cleared outside the area authorised by Clearing Permit CPS 5259/1;
- Aerial photography from February 2013 and March 2018 shows that native vegetation was cleared on the land;
- A site inspection of the land by a Department of Water and Environmental Regulation Inspector on 10 September 2018 confirmed that clearing was carried out;
- The clearing was not authorised by Clearing Permit CPS 5259/1;
- The clearing was not for an exempt purpose; and
- The clearing is unauthorised clearing under section 51C of the *Environmental Protection Act 1986*.

### **Requirements of this Notice:**

The persons to whom this vegetation conservation notice is given, and each subsequent owner and occupier of the land who is bound by this vegetation conservation notice, are required to undertake the following specified measures, for a period of ten years from the date this notice is given to re-establish and maintain vegetation on the area affected by the clearing to a condition as near as possible to the condition of the vegetation before the clearing occurred:

#### **1. No unlawful clearing**

Ensure that no further unlawful clearing takes place on the land.

## 2. Extraction of gravel prohibited

Ensure that no further gravel is extracted from within the *specified area*.

## 3. Rehabilitation

Between 1 May 2020 and 30 June 2020 -

- a) reshape the surface of the specified area so that it is consistent with the surrounding 5 metres of uncleared land; and
- b) lay retained vegetative material and stockpiled topsoil within the specified area.

## 4. Monitoring

Commencing 2022, engage an *environmental specialist* to determine the species composition, structure and density of the native vegetation within the *specified area* during the months of September or October of each and every year for a period of ten years.

## 5. Revegetation

Where the species composition, structure, density of the native vegetation within the *specified area* determined under measure 4 is not similar to the pre clearing species composition, structure and density for the 'West Site' described in Schedule 1 - Fisheries Road Gravel Extraction Sites Level 1 Flora and Vegetation Survey, *revegetate* the area by deliberately planting and/or direct seeding native species listed in the column 'West Site' in Appendix 1 of Schedule 1, ensuring only local provenance seeds and propagating material are used.

## 6. Records must be kept

Maintain the following records for a period of 10 years from the date this notice is given:

- a) The dates of *rehabilitation* and *revegetation* activities undertaken;
- b) Species planted or seeded;
- c) The number of each species planted or the quantity of seed for each species sown; and
- d) The species composition, structure, density and *vegetation condition* of native vegetation within the specified area.

## 7. Reporting

For a period of 10 years from the date this notice is given, provide the CEO by 30 June of each year, a written report of records kept under measure 6 of this notice for the period 1 January and 31 December of the preceding year.

## DEFINITIONS

The following meanings are given to terms used in this Notice:

*CEO* means the Chief Executive Officer of the Department of the Public Service of the State through which the *Environmental Protection Act 1986* is administered

*environmental specialist* means a person who holds a tertiary qualification in environmental science or equivalent, and has experience in the assessment of Western Australian native vegetation.

*Keighery scale* means the vegetation condition scale described in *Bushland Plant Survey: A Guide to Plant Community Survey for the Community (1994)* as developed by B.J. Keighery and published by the Wildflower Society of WA (Inc). Nedlands, Western Australia.

*revegetate, revegetated* and *revegetation* means the re-establishment of native vegetation to achieve a

species composition, structure, density and *vegetation condition* of native vegetation similar to pre clearing species composition, structure, density and *vegetation condition*

*specified area* means the portion of Lot 262 on Deposited Plan 209352 bounded by a line joining the Zone 51 GDA 94 points set out in the table below consecutively:

***Specified area***

Point	Northing (m)	Easting (m)
1	6266875	485290
2	6266901	485281
3	6266933	485266
4	6266940	485266
5	6266946	485273
6	6266952	485289
7	6266957	485295
8	6266953	485302
9	6266955	485310
10	6266973	485307
11	6266991	485372
12	6266996	485372
13	6266997	485381
14	6266967	485382
15	6266914	485400
16	6266898	485423
17	6266895	485453
18	6266878	485509
19	6266866	485495

20	6266807	485507
21	6266817	485494
22	6266827	485493
23	6266848	485414
24	6266884	485418
25	6266888	485416
26	6266884	485406
27	6266878	485407
28	6266875	485399
29	6266881	485399
30	6266874	485377
31	6266867	485371
32	6266870	485368
33	6266874	485371
34	6266875	485348
35	6266865	485341
36	6266853	485341
37	6266847	485319
38	6266843	485290

then directly to the point of commencement.

*Vegetation condition* means the rating given to native vegetation using the *Keighery scale* and refers to the degree of change in the structure, density, and species present in the particular vegetation in comparison to undisturbed vegetation of the same type.



Stuart Cowie  
Executive Director  
Compliance and Enforcement

*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

17 January 2020

**Important Information:**

A PERSON WHO IS BOUND BY THIS VEGETATION CONSERVATION NOTICE AND WHO DOES NOT COMPLY WITH THIS VEGETATION CONSERVATION NOTICE COMMITS AN OFFENCE UNDER THE *ENVIRONMENTAL PROTECTION ACT 1986*.

Under section 103 of the *Environmental Protection Act 1986*:

- a person who is aggrieved by a requirement contained in this vegetation conservation notice may within 21 days of being given this notice lodge with the Minister for Environment an appeal in writing setting out the grounds of that appeal; and
- any other person who disagrees with a requirement contained in this vegetation conservation notice may within 21 days of the making of that requirement lodge with the Minister for Environment an appeal in writing setting out the grounds of that appeal.

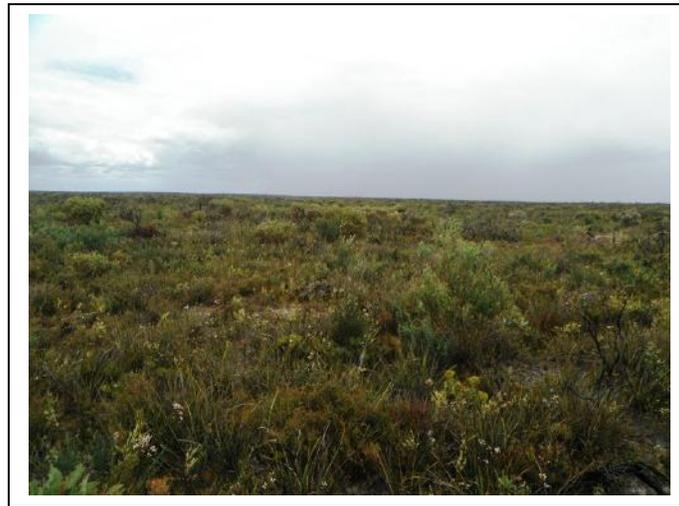
PENDING THE DETERMINATION OF AN APPEAL REFERRED TO ABOVE, THE RELEVANT REQUIREMENTS CONTAINED IN THIS VEGETATION CONSERVATION NOTICE CONTINUE TO HAVE EFFECT.

# **Fisheries Road**

## **Gravel Extraction Sites**

### **Level 1 Flora and Vegetation**

### **Survey**



Report compiled by Tilo Massenbauer for the Esperance Shire Council. November 2012  
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## **EXECUTIVE SUMMARY**

The Esperance Shire has requested various biological surveys as part of their compliance obligations for the purpose of clearing native vegetation to extract road material. The two sites of interest are located east of Esperance on the South Coast of Western Australia. The Fisheries Exchange Road (West site) area (2ha) is located approximately 80 km east-north-east of Esperance and the Fisheries Balladonia Road (East site) area (4 ha) located 100 km east-north-east (Figure 1).

A level 1 flora survey was conducted for both sites during early November 2012 in accordance with the Environmental Protection Authority (EPA) schedule 51, Guidance for the Assessment of Environmental Factors (the Environmental Protection Act 1986) Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia.

The East site comprised entirely of low *Eucalyptus incrassata* mixed heath and 70 identified native flora species. The West site comprised of two different plant communities being a low *Eucalyptus uncinata* open mallee *Nuytsia* mixed closed heath and a *Eucalyptus pleurocarpa* open mallee *Nuytsia* open heath. Of the 59 flora species identified at the West site, three were introduced weed species.

Both the East and West sites are floristically very diverse and occur in a catchment area containing 32 per cent of its original vegetation. They are predominantly in excellent condition with minimal impact on their vegetation structure and composition from current threats. The West site is part of a 142 ha vegetated granite outcrop which has traditionally been used as a gravel resource and the East site is on the southern boundary of a 160,000 ha entirely vegetated Unallocated Crown Land parcel. The area proposed for clearing on the East site is less than 0.1 per cent of its remaining vegetation type in the Catchment area and the West site is only 0.02 per cent.

The P4 listed *Grevillea baxteri* was identified on the southern third of the East site and there are five known populations within a ten kilometre buffer radius. No other DRF, PF, TEC's or their potential habitat were identified during the surveys on the East and West sites.

Natural seed store of the East site is limited due to recent fire. The West site may benefit from managed disturbance due to its high seed store and senescence threat. Both areas are highly susceptible to *Phytophthora cinnamomi* dieback and require implementation of appropriate hygiene protocols if disturbed using machinery.

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### Acknowledgements

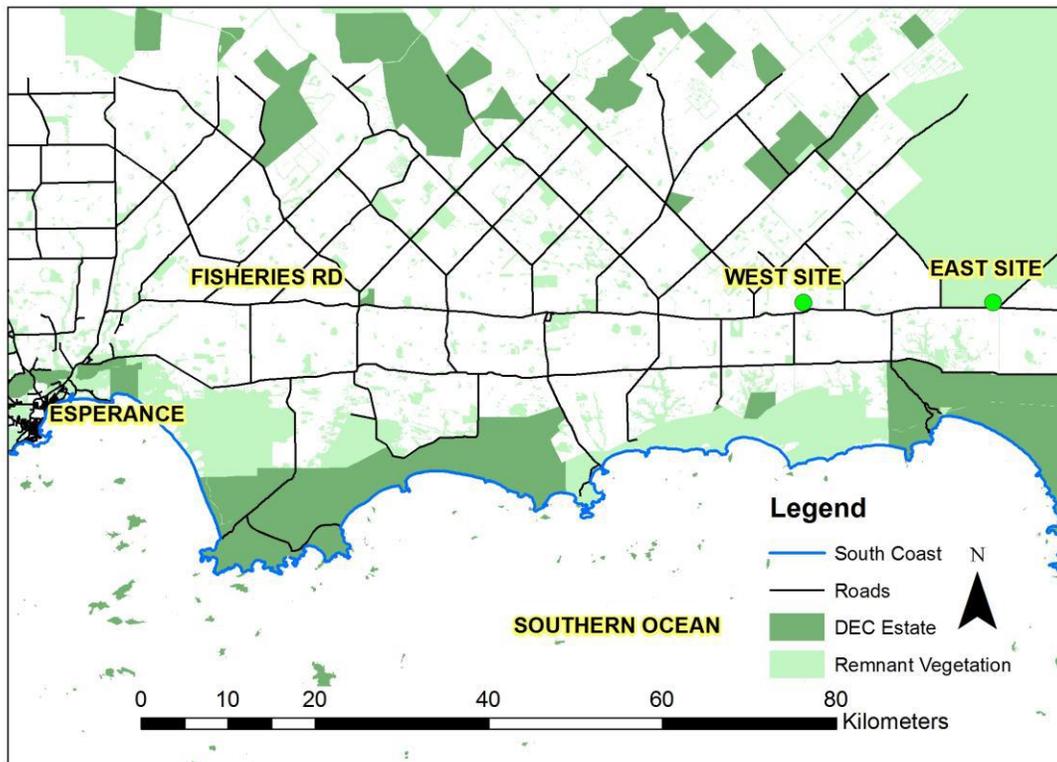
The Author would like to acknowledge the Esperance District DEC Flora Officer for the loan of DRF field reference guides, access to the District Herbarium and providing recommendations in setting DRF search buffer zones for survey sites.

Thank you to the Esperance Shire Council for providing access to GIS software and spatial datasets used within this report.

## **INTRODUCTION**

The Esperance Shire has requested various biological surveys as part of their compliance obligations for the purpose of clearing native vegetation to extract road material. The two sites of interest are located east of Esperance on the South Coast of Western Australia. The Fisheries Exchange Road (West site) area (2ha) is located approximately 80 km east-north-east of Esperance and the Fisheries Balladonia Road (East site) area (4 ha) located 100 km east-north-east (Figure 1).

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**Figure 1 Location of Fisheries Road West and East survey sites**

## **BACKGROUND**

The gravel extraction sites are extensions of existing gravel pits and have the potential to affect a number of possible environmental factors which have been outlined by DEC. These include;

- Declared Rare Flora (DRF) and Priority Flora (PF) within a ten kilometre radius.
- Compliance Level 1 vegetation and flora survey (Level 1 survey) and
- Compliance Carnaby Black Cockatoo (CBC) (endangered *Calyptrorhynchus latirostris*) surveys (CBC).

The focus of this report will be on the DRF, PF and level 1 flora survey. A CBC report outlining additional detailed information will be provided separate to this report.

## **Scope**

As outlined in EPA schedule 51, the scope of the level 1 flora survey is in two parts being;

1. A desktop study for the purposes of gathering background information on the target area, and;
2. Reconnaissance survey to understand the likely presence of vegetation communities and flora species identified from the background study, define flora and vegetation units, their condition and potential impacts.

The survey involves low intensity sampling of flora to produce a species list (Appendix 1), and maps of vegetation types and condition. The approximate survey areas are two hectares at the West site and four hectares at the East site.

## **Catchment landscape context**

Both sites are located within the The Beaumont-Condungup area which begins about 25 km east of Esperance and extends more than 100 km east along Fisheries Road. It covers two broad areas known as the Esperance sandplain and the Esperance mallee, totalling 505,000 hectares (DAFWA 2002). About 32 per cent of the catchment remains vegetated with native vegetation (DAFWA 2002)

## **Climate**

The climate is Mediterranean with cool wet winters and dry warm summers. Both sites receive an average annual rainfall of about 500 mm (DAFWA 2002).

## **Geology**

Both sites have three distinct geologic units emplaced and deposited over three different geologic periods:

- Proterozoic basement rocks of the Albany-Fraser Orogen emplaced 2,400 million years ago;
- Tertiary sediments from the Plantagenet Group (Bremer Basin sediments) deposited about 40 million years ago; and

- Quaternary surficial sediments (sandplain) deposited from 1.6 million years ago to present day.

Proterozoic granite, gneiss and migmatite from the Albany-Fraser Orogen, form the basement rocks that underlie the entire LWC (Morgan & Peers 1973). The coastal headlands, offshore islands and inland palaeo-islands, such as Mount Howick are all surface expressions of these basement rocks.

Tertiary sediments from the Plantagenet Group of the Bremer Basin form a discontinuous cover over the basement rocks (Johnson and Baddock 1998). The Plantagenet Group consists of two distinct formations laid down in a shallow marine environment. These are the Werillup Formation and the Pallinup Siltstone. The Werillup Formation consists of a dark coloured siltstone, sandstone, claystone and lignite (Cockbain 1968) and is restricted to the depressions and valleys (palaeo-channels) in the basement rocks (Short & Skinner 1998). The Pallinup Siltstone is more widespread and consists of siltstone and spongolite overlying either the Werillup Formation sediments or weathered basement rocks (Morgan & Peers 1973).

Quaternary sediments, which form the present day sandplain, occur as a thin (<10 m) surface veneer overlying the Tertiary sediments.

### **Soils and Topography**

The West site is located on a moderately inclined hill slope. It makes up part of the Ney (Ne2) subsystem and soils are a variety of duplex soils and unnamed clays associated with granite and granitic colluvium with associated grey deep sandy duplex soils and pale deep sands on lower slopes (Overheu et al 1993). The site is dominated by grey sandy duplex soils.

The East site is located on a level plain with numerous internally drained swamps. It makes up part of the Esperance (Es5) subsystem and soils are dominated by Grey deep sandy duplex (gravelly) and Grey shallow sandy duplex (Overheu et al 1993). The site is dominated by Grey shallow sandy duplex soils.

### **Vegetation**

Both sites are located within the EPA schedule 51 bioregion Group one which is the Esperance plains (Esp2) IBRA region and Recherche subregion. The West site comprises the Esperance vegetation system, map code nLr xZc and is described by Beard as Shrublands; heath with scattered *Nuytsia floribunda* on sandplain. The East Site comprises the Esperance vegetation system, map code e29SZc and is described by Beard as Shrublands; Eucalyptus incassata mallee-heath.

### **Land use**

The West site is located on Neridup location 262 which is vested as a 142 ha Crown Reserve (32804). The East site is located at the southern end of the 160151 ha Unallocated Crown Land (UCL) parcel. Both sites are used by the Esperance Shire Council as a source of gravel and then revegetated.

## **METHODOLOGY**

### **Desktop study**

A desk top study of existing geospatial information was undertaken prior to the site visit as part of the level 1 survey. This included using a Geographical Information System (GIS) to review existing site digital orthophotos, geology, morphology, wetlands, native vegetation, IBRA classification, DRF, PF and TEC's.

State and Commonwealth database searches for potential DRF, PF, and Threatened Ecological Communities (TEC), within a ten kilometre buffer of the survey sites was undertaken as part of the desktop study. Additional liaison with the Esperance DEC District Flora Officer was conducted to further refine conservation values of interest and to define the ten kilometre buffer due a lack of DRF and PF data across the District.

### **Field investigation**

The preliminary field survey was conducted during late spring on the 6<sup>th</sup> of November 2012. The survey effort comprised of about 1.4 km of survey transect for the East site and 0.9 km for the West site (Figure 2 and 3) and covered an area respectively of 4 ha and 2 ha. The transects were conducted to cover as much area as possible and representative habitats within each site. The length of transect was effected by access within each site pending density of shrublayer vegetation. The Esperance Shire provided coordinates for each site which were uploaded from GIS into a Garmin GPSmap 60CSX unit and a field aerial photo map was used to navigate to different habitat areas. A portable field herbarium was established and a preliminary species list developed.

A list of DRF and PF within a ten kilometre radius of each site was used in the field along with a Threatened and Priority Flora field manual (Adams 2011) provided by the Esperance DEC District Flora Officer. A combination of local botanical knowledge, botanical field guides, the DEC Esperance District Herbarium and Florabase were used to prepare a plant species lists for each site (Appendix 1).

The transects were used to develop a botanical species list, descriptions of vegetation types, structure, condition, threats, soils and landforms. Vegetation type and soil descriptions of units identified across each site area were derived from applying the collated field data to the Australian Soil and Land Survey Field Handbook, CSIRO. The vegetation structure was determined by growth form, height class, dominant species, other common species, per cent cover, and health of each stratum. Vegetation condition ratings are derived from Keighery 1994, Appendix 2.

The vegetation was divided into three strata: upper, middle, and lower. Growth forms for each stratum were categorized based on those listed by McDonald *et al.* (1990). The upper stratum may consist of tree, tree mallee, shrub, or mallee shrub. The middle stratum may include shrub, mallee shrub, or heath shrub. The lower stratum include Chenopod shrub, tussock grass, hummock grass, sod grass, sedge, rush, forb, fern, moss, or vine. Definitions for these growth forms can be found on page 65 of *Australian Soil and Land Survey* (McDonald *et al.*, 1990). The height classes for the dominant species were derived from McDonald *et al.* (pg. 67, 1990) and applied to each stratum based on the dominant vegetation.

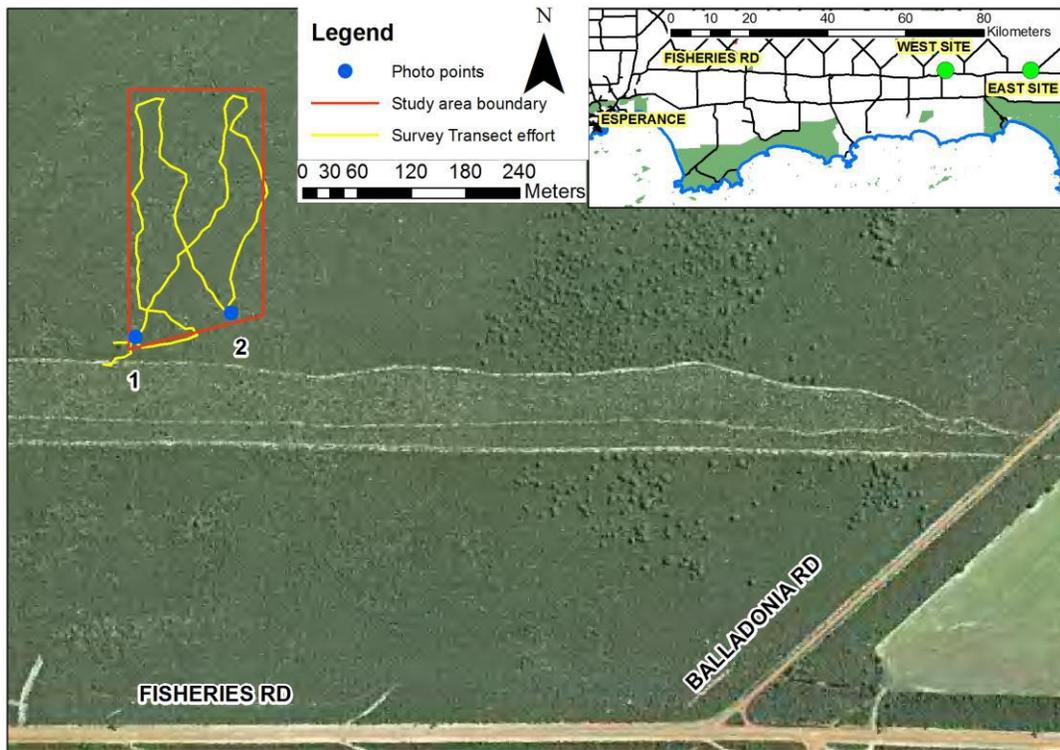


Figure 2 East site survey area and transect effort map

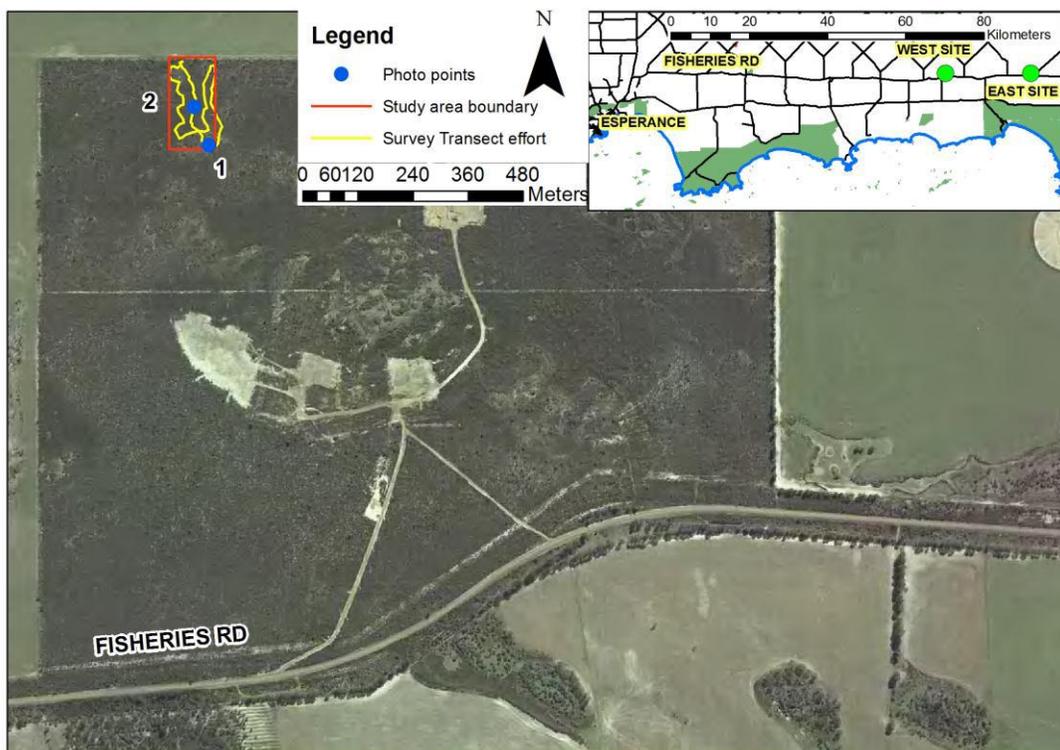


Figure 3 West site survey area and transect effort

The site description consists of a location description, ecological impacts, vegetation structure, condition of vegetation, level of threat to vegetation, and surface and subsurface soil descriptions. The location description included aspects such as topographic position and drainage.

Ecological impacts were listed as being present or absent, and take into account both negative and positive impacts on the vegetation. They included clearing, artificial water way construction, fire, regeneration, waterlogging, senescence, weeds, erosion, sedimentation, rabbits, dieback, and illegal dumping of rubbish.

The condition of vegetation is a subjective assessment of how healthy the vegetation is at the time of the survey. This was based on the amount of dead or dying plants throughout the stratum compared to the amount of living plants and weed cover. This was categorized as “Excellent,” “Very Good,” “Good,” “Degraded,” or “Completely Degraded.” The categories are derived from Keighery 1994, and outlined in further detail in Appendix 2.

All field data collected relating to vegetation type, condition, transect coverage, and photo points have been collated into GIS shapefiles and used as part of the analysis. The survey transect coverage has attributed length to assist in defining survey effort undertaken. Mapping of site area vegetation type and condition were collated and recorded as polygon shapefiles and attributed with area and perimeter parameters.

The GIS vegetation type and condition database files were exported into Microsoft Excel, whereby pivot table functionality was used to summarise parameters and proportional statistics for further analysis.

### **Analysis methodology**

Findings from the desktop study and field survey were reviewed against whether each site would affect any of the following environmental values:

- The presence or absence of DRF, PF and TEC's and
- The area and condition of remnant vegetation.

## RESULTS

### Desktop study

The Declared and endangered flora list (DEFL) database search and liaison with the Esperance DEC District Flora Officer resulted in several known PF species and sites within a ten kilometre radius of each site (Table 1). Appendix 3 provides a description of each priority conservation status. The East site had 11 PF species and 31 sites and the West site had five PF species and seven sites recorded within a ten kilometre radius of each survey area. The database search resulted in no known occurrences of TECs within the vicinity of both sites.

**Table 1 PF sites within a 10 km radius of each survey area**

**Fisheries Balladonia Road (East site)**

Taxon	Number of PF Sites				Total
	P 1	P 2	P 3	P 4	
<i>Caladenia arrecta</i>				1	1
<i>Caladenia exstans</i>				2	2
<i>Eucalyptus balanopelex</i>	1				1
<i>Eucalyptus semiglobosa</i>			1		1
<i>Grevillea baxteri</i>				5	5
<i>Hibbertia hamata</i>			1		1
<i>Kennedia beckxiana</i>				10	10
<i>Leucopogon florulentus</i>			1		1
<i>Microtis media subsp. quadrata</i>				1	1
<i>Myriophyllum petraeum</i>				5	5
<i>Paracaleana parvula</i>		3			3
<b>Grand Total</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>24</b>	<b>31</b>

**Fisheries Exchange Road (West site)**

Taxon	Number of PF Sites				Total
	P1	P2	P 3	P 4	
<i>Caladenia exstans</i>				2	2
<i>Grevillea baxteri</i>				1	1
<i>Hibbertia hamata</i>			1		1
<i>Kennedia beckxiana</i>				2	2
<i>Lasiopetalum parvuliflorum</i>			1		1
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>5</b>	<b>7</b>

## Field survey East site

The East site had 70 species of flora identified during the flora survey (Appendix 1). As the site had been burnt within the last three years some of the vegetation had yet to develop fruit which made some identification difficult in the advent of no flowers. The presence of about 20 juvenile Priority 4 listed *Grevillea baxteri* plants were identified and were located in southern third of the study area (Appendix 4). All species identified excluding *Grevillea baxteri* are considered to be common to the area (Appendix 1) and no weeds were present. No evidence of DRF or TEC's and their associated habitat were identified within the survey area. The site comprised of low *Eucalyptus incrassata* mixed heath.

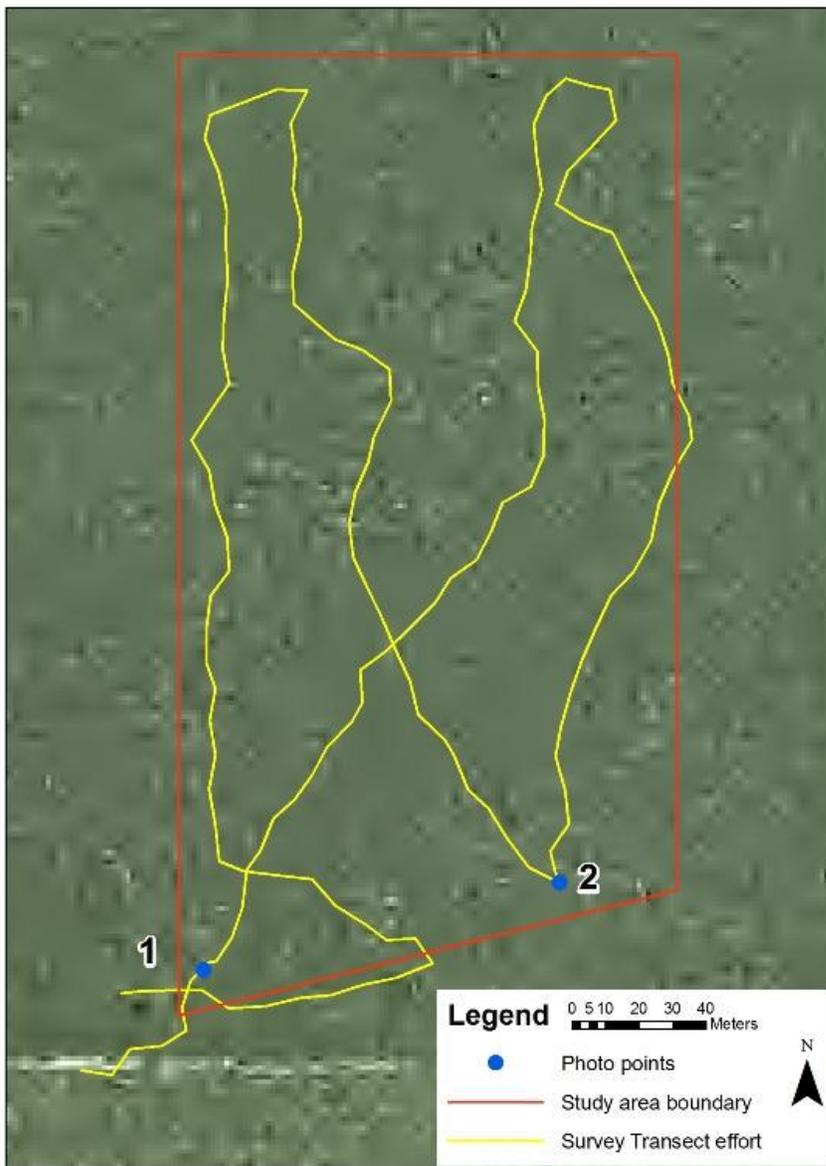
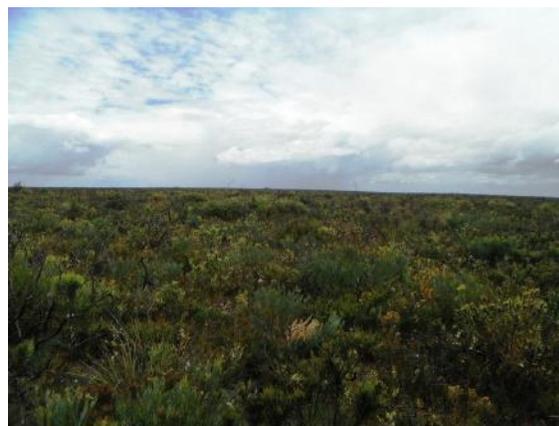


Figure 4 Fisheries Balladonia Rd (East site) survey site map

### ***Eucalyptus incrassata* open low mixed heath**

The East site was comprised entirely of *Eucalyptus incrassata* mallee open low mixed heath on a flat sandplain with shallow (<10cm) grey sandy gravel duplex soils. Even though the site had been burnt within the last three years the regeneration and condition of the vegetation is excellent with no evidence of weeds, dieback, or over grazing from the adjacent gravel pits (Appendix 3). The canopy was dominated by very sparse (2-10 per cent cover) *Eucalyptus incrassata* and *Eucalyptus extrica* mallee (<2m), with a mid-dense (60 per cent) open low (<1m) heath dominated by various Hakeas, Verticordia, Petrophile, Allocasuarina, Isopogon, Melaleuca, Taxandria, Micromyrtus and Xanthorrhoea species. The ground cover was made up of a sparse mix of Thysanotus, Lepidobolus, Anarthria, Anigozanthos, Patersonia, *Caustis dioica*, *Desmocladius asper*, *Banksia repens*, *Banksia obtusa*, and mixed herbs. Refer to plates Plates 1 and 2.



**Plate 1. Photo point 1, North West Aspect**

**Plate 2. Photo points, North East Aspect**

### **Field survey West site**

The site had 59 species of flora identified during the flora survey (Appendix 1). The site showed evidence of being long unburnt (>30 years) with some *Banksia* and *Hakea* species senescing. All species identified are considered to be common to the area (Appendix 1). Three agricultural grass weed species were present on the northern boundary of the site. No evidence of DRF, PF or TEC's and their associated habitat were identified within the survey area. The site comprised of two different plant communities being a low *Eucalyptus uncinata* open mallee *Nuytsia* mixed closed heath and a *Eucalyptus pleurocarpa* open mallee *Nuytsia* open heath (Figure 5).



Figure 5 Fisheries Exchange Rd (West site) survey site map

***Eucalyptus uncinata* open mallee *Nuytsia* mixed closed heath**

A large proportion of the West site comprises 1.7 ha of *Eucalyptus uncinata* open mallee *Nuytsia* mixed closed heath on a moderately inclined hill slope with shallow (<10cm) grey sandy gravel duplex soils. Even though there is evidence of early senescence due to lack of fire over a prolonged period the vegetation structure at the canopy mid and ground layers is in excellent condition with no evidence of weeds, dieback, or over grazing from the adjacent gravel pits (Appendix 3). The canopy was dominated by very sparse (2-10 per cent cover) *Eucalyptus uncinata* mallee and *Nuytsia floribunda* (<4m), with a dense (75 per cent) closed (<1.5m) heath dominated by *Banksia armata* var. *armata* with a mix of various Hakeas, Verticordia, Petrophile, Allocasuarina, Isopogon, Melaleuca, Taxandria, Micromyrtus and Xanthorrhoea species. The ground cover was made up of a sparse mix of Thysanotus, Lepidobolus, Anarthria, Anigozanthos, Patersonia, *Caustis dioica*, *Desmocladius asper*, *Banksia repens*, *Banksia obtusa*, and mixed herbs. Refer to plates Plates 3 and 4.



Plate 3. Photo point 1, North West Aspect

Plate 4. Photo points, North West Aspect

### ***Eucalyptus pleurocarpa* open mallee *Nuytsia* mixed open heath**

At the northern end of the West site is a 0.3 ha area of *Eucalyptus pleurocarpa* open mallee *Nuytsia* mixed open heath (Tallerack heath) at a break in slope from a moderately inclined hill slope to a flat toe slope with (> 50 cm) grey deep sandy gravel duplex soils. This vegetation type backs onto private farmland and is affected by agricultural weeds, senescence, and over grazing by rabbits resulting in vegetation structure impacts and a condition rating of very good to good (Appendix 3). The canopy is dominated by very sparse (2-10 per cent cover) *Eucalyptus pleurocarpa* and *Eucalyptus uncinata* mallee (<4m), with a mid-dense (40 per cent) open (<1.5m) heath dominated by with a mix of various *Banksias*, *Hakeas*, *Verticordia*, *Petrophile*, *Allocasuarina*, *Isopogon*, *Melaleuca*, *Taxandria*, *Micromyrtus* and *Xanthorrhoea* species. The ground cover was made up of a sparse mix of *Thysanotus*, *Lepidobolus*, *Anarthria*, *Anigozanthos*, *Patersonia*, *Caustis dioica*, *Desmocladius asper*, *Banksia repens*, *Banksia obtusa*, and mixed herbs.

### **Local scale of vegetation extent East site**

Of the East site, only 15 per cent of *Eucalyptus incrassata* mallee-heath remains in the Beaumont Condingup catchment area (DAFWA 2002). Beards pre-clearing records show of the original 18,106 ha of this vegetation type in the catchment area, 2,716 ha remain. The four hectare area proposed for clearing is about 0.1 per cent of the remaining *Eucalyptus incrassata* mallee-heath in the Catchment area. It is important to note that the survey site is part of the vegetated 160,151 UCL macro corridor linking the Esperance sandplain continuously to the northern mallee, woodlands and rangelands.

### **Local scale of vegetation extent West site**

Of the West site, only 14 per cent of the Heath with scattered *Nuytsia floribunda* on sandplain and 13 per cent of Tallerack mallee-heath remains in the Beaumont Condingup catchment area (DAFWA 2002). Beards pre-clearing records show of the original 57,910 ha of Heath with scattered *Nuytsia floribunda* on sandplain in the catchment area, 8,107 ha remain. Beards pre-clearing records also show of the original 72,020 ha of Tallerack mallee-heath in the catchment area, 9,363 ha remain. The two hectare area proposed for clearing is about 0.02 per cent of the remaining Heath with scattered *Nuytsia floribunda* on sandplain and 0.003 per cent of Tallerack mallee-heath in the Catchment area.

### **Vegetation condition rating East site**

The East site had been burnt within the last three years with very good natural regeneration of the vegetation structure resulting in an excellent condition rating and there being no evidence of weeds, dieback, or rabbits from the adjacent gravel pits.

### **Vegetation condition rating West site**

The East site's two different vegetation types had differing vegetation condition ratings. The *Eucalyptus uncinata* open mallee Nuytsia mixed closed heath has evidence of early senescence due to lack of fire over a prolonged period but the vegetation structure at the canopy mid and ground layers is in excellent condition with no evidence of weeds, dieback, over grazing from the adjacent gravel pits. The *Eucalyptus pleurocarpa* open mallee Nuytsia mixed open heath borders onto private farmland and is affected by agricultural weeds, senescence, and over grazing by rabbits resulting in vegetation structure impacts and a lesser condition rating of very good to good.

### **Threats East site**

The East site is at threat from the potential introduction of *Phytophthora cinnamomi* dieback from earth moving machinery in adjacent gravel pits. It is also at risk from the reoccurrence of wildfire during dry summer drought conditions coinciding with its low current seed store due to the recent fire regeneration. An immediate threat is clearing for the purposes of accessing gravel.

### **Threats West site**

The West site is at threat from the potential introduction of *Phytophthora cinnamomi* dieback from earth moving machinery in adjacent gravel pits. An immediate threat is clearing for the purposes of accessing gravel. The northern section of the site adjacent to farmland is at threat from weeds and over grazing from rabbits. The lack of fire resulting in vegetation senescence is also threatening the biodiversity values of the site.

## **CONCLUSION**

Both the East and West sites are floristically very diverse and occur in a catchment area containing 32 per cent of its original vegetation. They are predominantly in excellent condition with minimal impact on their vegetation structure and composition from current threats. The West site is part of a 142 ha vegetated granite outcrop which has traditionally been used as a gravel resource and the East site is on the southern boundary of a 160,000 ha vegetated UCL parcel. The area proposed for clearing on the East site is less than 0.1 per cent of its remaining vegetation type in the Catchment area and the West site is only 0.02 per cent.

The P4 *Grevillea baxteri* was identified on the southern third of the East site and there are five known populations within a ten kilometre buffer radius. No other DRF, PF, TEC's or their potential habitat were identified during the surveys.

Natural seed store of the East site is limited due to recent fire. The West site may benefit from managed disturbance due to its high seed store and senescence threat. Both areas are highly susceptible to *Phytophthora cinnamomi* dieback and require implementation of appropriate hygiene protocols if disturbed using machinery.

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## Appendix 1: Species list for surveyed study area

### Legend

- Status refers to conservation status
- \* refers an introduced weed species
- 1 refers to species presence, and blank is absent.

Family	Taxon	Status	East site	West site
<b>Anarthriaceae</b>	<i>Anarthria laevis</i>		1	1
<b>Asparagaceae</b>	<i>Thysanotus triandrus</i>		1	1
	<i>Thysanotus plumosa</i>		1	1
	<i>Thysanotus sparteus</i>		1	1
<b>Campanulaceae</b>	<i>Lobelia rarifolia</i>		1	
<b>Casuarinaceae</b>	<i>Allocasuarina humilis</i>		1	1
	<i>Allocasuarina thuyoides</i>		1	1
<b>Cyperaceae</b>	<i>Caustis dioica</i>		1	1
	<i>Mesomelaena stygia</i>			
	<i>stygia</i>		1	1
	<i>Mesomelaena tetragona</i>		1	
<b>Dilleniaceae</b>	<i>Hibbertia gracilipes</i>		1	
	<i>Hibbertia rostellata</i>		1	
<b>Epacridaceae</b>	<i>Leucopogon sp</i>			1
	<i>Leucopogon crassifolius</i>		1	
<b>Ericaceae</b>	<i>Lysinema ciliatum</i>		1	1
<b>Fabaceae</b>	<i>Chorizema obtusifolium</i>		1	
	<i>Daviesia apiculata</i>		1	
	<i>Daviesia incrassata</i>		1	
	<i>Jacksonia capitata</i>		1	1
<b>Goodeniaceae</b>	<i>Goodenia pterigosperma</i>		1	
	<i>Lechenaultia formosus</i>		1	
	<i>Dampiera sp</i>		1	
	<i>Cooperhooikia strophiolata</i>			1
	<i>Goodenia incana</i>			1
<b>Haemodoraceae</b>	<i>Anigozanthos rufus</i>		1	1
	<i>Conostylis breviscapa</i>		1	
<b>Haloragaceae</b>	<i>Glischrocaryon roei</i>		1	1
<b>Iridaceae</b>	<i>Patersonia lanata</i>		1	1
<b>Loranthaceae</b>	<i>Cassytha sp</i>		1	1
	<i>Nuytsia floribunda</i>			1
<b>Mimosaceae</b>	<i>Acacia cyclops</i>		1	
	<i>Acacia mutabilis</i>			1
<b>Myrtaceae</b>	<i>Astartea fascicularis</i>		1	1

Family	Taxon	Status	East site	West site
<b>Myrtaceae cont.</b>	<i>Baeckea sp</i>			1
	<i>Baeckea sp crispiflora</i>		1	
	<i>Beaufortia micranthera</i>		1	
	<i>Calothamnus gracilis</i>		1	
	<i>Calytrix decandra</i>		1	
	<i>Conothamnus aureus</i>			1
	<i>Eucalyptus angulosa</i>			1
	<i>Eucalyptus extrica</i>		1	
	<i>Eucalyptus incrassata</i>		1	1
	<i>Eucalyptus pleurocarpa</i>			1
	<i>Eucalyptus uncinata</i>			1
	<i>Leptospermum spinescens</i>		1	1
	<i>Melaleuca pulchella</i>		1	1
	<i>Melaleuca rigidifolia</i>		1	
	<i>Melaleuca scabra</i>			1
	<i>Melaleuca striata</i>			1
	<i>Melaleuca subtrigona</i>		1	
	<i>Micromyrtus imbricata</i>		1	1
	<i>Phymatocarpus maxwellii</i>		1	
	<i>Taxandria spathulata</i>		1	1
<i>Verticordia brownii</i>		1	1	
<i>Verticordia plumosa</i>		1	1	
<b>Orchidaceae</b>	<i>Thelymitra sp</i>			1
<b>Poaceae</b>	* <i>Eragrostis curvula</i>			1
	* <i>Lolium multiflorum</i>			1
	* <i>Rostraria cristata</i>			1
	<i>Stipa sp</i>		1	1
	<i>Themeda triandra</i>			1
<b>Proteaceae</b>	<i>Adenanthos cuneatus</i>		1	1
	<i>Banksia armata var armata</i>			1
	<i>Banksia cuneata</i>		1	
	<i>Banksia media</i>			1
	<i>Banksia nivea</i>		1	1
	<i>Banksia obtusa</i>		1	1
	<i>Banksia repens</i>		1	1
	<i>Conothamnus distichum</i>		1	
	<i>Grevillia baxteri</i>	P4	1	
	<i>Grevillia oligantha</i>			1
	<i>Hakea bicornata</i>			1
	<i>Hakea commutata</i>		1	

<b>Family</b>	<b>Taxon</b>	<b>Status</b>	<b>East site</b>	<b>West site</b>
<b>Proteaceae cont.</b>	<i>Hakea corymbosa</i>		1	1
	<i>Hakea ferruginea</i>		1	
	<i>Hakea multilineata</i>		1	
	<i>Hakea nitida</i>			1
	<i>Hakea obliqua sp obliqua</i>			1
	<i>Hakea pandanicaarpa</i>		1	
	<i>Hakea prostrata</i>		1	1
	<i>Hakea ruscifolia</i>		1	
	<i>Hakea trilobus</i>		1	
	<i>Hakea trifurcata</i>			1
	<i>Hakea varia</i>			1
	<i>Isopogon trilobus</i>		1	
	<i>Isopogon polycephalus</i>		1	
	<i>Petrophile teretifolia</i>		1	
	<i>Petrophile fastigiata</i>			1
<i>Synaphea favosa</i>		1		
<b>Polygalaceae</b>	<i>Comesperma virgatum</i>		1	
<b>Restionaceae</b>	<i>Desmocladius asper</i>		1	1
<b>Rubiaceae</b>	<i>Opercularia vaginata</i>		1	
<b>Rutaceae</b>	<i>Boronia sp</i>		1	
<b>Thymelaeaceae</b>	<i>Pimelea angustifolia</i>			1
	<i>Pimelea brachyphylla</i>		1	
<b>Xanthorrhoeaceae</b>	<i>Xanthorrhoea preissii</i>		1	1

## Appendix 2: Bushland Condition Ratings<sup>1</sup>

Condition	Description
Excellent	Vegetation structure intact, with disturbance affecting individual species and weeds consist of non-aggressive species. 1 – 5% weed cover
Very Good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing. 5 – 25% weed cover
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing. 25 – 50% weed cover
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing. 50 – 75% weed cover
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely, or almost completely, without native species. These areas are often described as “parkland cleared” with the flora comprising weed or crop species with isolated native trees or shrubs. 75 – 100% weed cover

<sup>1</sup> Adapted from Keighery, 1994 and the Braun-Blanquet Scale of Cover Abundance [from Mueller-Dombois and Ellenberg, 1974]

## **Appendix 3 Conservation status descriptions**

Definitions of conservation codes given to declared rare and priority flora.  
KJ Atkins, 15 July 1998, Department of Conservation and Land Management

### **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.

### **P1: Priority One – Poorly Known Taxa**

Taxa that are known from one or a few (generally less than five) 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, or the plants are under threat, e.g. from disease, grazing by feral animals. 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.

### **P2: Priority Two – Poorly Known Taxa**

Taxa which are known from one or a few (generally less than five) 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.

### **P3 Priority Three – Poorly Known Taxa**

Taxa that are known from several populations, and the taxa are believed to be not under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally more than five), 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.

### **P4 Priority Four – Rare Taxa**

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

Note: The need for further survey of poorly known taxa is prioritised into the three categories depending on the perceived urgency for determining the conservation status of those taxa, as indicated by the apparent degree of threat to the taxa on the current information.

## Appendix 4: *Grevillea baxteri* R.Br. Cape Arid Grevillea

DEC Flora Base

Conservation Code: [Priority Four](#)

Naturalised Status: Native to Western Australia



### Brief Description

Grazyna Paczkowska, Friday 4 August 1995

Erect to spreading shrub, 0.8-3.6 m high. Fl. green-yellow-orange-brown-red, Feb or May to Jul or Sep to Dec. Sand. Sandplains.

### Distribution

**Beard's Provinces:** South-West Province.

**IBRA Regions:** Esperance Plains, Mallee.

**IBRA Subregions:** Eastern Mallee, Recherche.

**IMCRA Regions:** Eucla, WA South Coast.

**Local Government Areas (LGAs):** Esperance.



### Scientific Description

Chris Hollister and Nicholas S. Lander, Tuesday 8 April 2008

**Habit and leaf form.** Shrubs, 0.8–3.6 m high. Branchlets not glaucous. *Leaves* simple, 60–120 mm long overall. Leaf blade dissected, subpinnatisect, not further divided. Leaf lobes 25–80 mm long, 1–1.5 mm wide. Margins revolute, enclosing the lower surface of the leaf blade, forming two grooves with the midvein. Hairs straight.

**Inflorescence and floral features.** Inflorescence terminal; a raceme. *Flowers* cream or orange or brown, very irregular. Pedicel 1.5–2 mm long. Perianth 8–12 mm long, simple-hairy, 4-partite; lobes all free. Stamens 4. Pistil 20–25 mm long, stipitate; stipe 0.9–1.5 mm long. Ovary hairy. Styles hairy, red. *Pollen presenter* oblique.

**Fruit features.** Fruit ribbed or ridged, ellipsoidal, simple hairy, not viscid, 14–20 mm long.

**Flowering Time.** July, or August, or September, or October, or November.

**Habitat.** Amongst tall trees, or low trees; in gravelly soil, or sand; occupying heathlands.

**Distribution.** Western Australia. Western Australian Botanical Province(s): Eremaean and South-west; IBRA Bioregions ER: COO; IBRA Bioregions SW: MAL and ESP. Western Australian native; endemic to Western Australia.

**Etymology.** *baxteri*: *William Baxter*, who collected plants in southern Western Australia from 1823–29 for Henschman's Nursery, London, as well as the Botanic Gardens, Sydney.

Descriptions were generated using DELTA format and DELTA software: Dallwitz (1980) and Dallwitz, Paine and Zurcher (1993 onwards, 1995 onwards, 1998)