

Cascade Road Construction Project



Shire of Esperance

Vegetation, Flora, Fauna and Environmental Considerations Report

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EXECUTIVE SUMMARY

A level 1 flora survey was conducted for Cascade Road in February 2017 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, as part of the application to Clear Native Vegetation for a 14.84 km section of road upgrades. Total area of 42.3 hectares, 13.35 hectares of which is native vegetation. The existing road reserve is 95 metres, and the road width is currently 22 metres. The project starts at the end of current bitumen to the Clare Road intersection.

The vegetation in the area is dominated by mallee and mallee-heath vegetation. The desktop survey showed the site not intersecting with the nationally listed 'Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia likely to occur' shapefile, however ground truthing showed that some pockets of Banksia Media dominated mallee heath were within the project area. This project will result in the loss of approximately 2.021ha of this ecological community. No Declared Rare or Priority flora was identified in field surveys.

Weed and dieback control are integral to good environmental management of this project and strict hygiene practices need to be put in place to ensure these are not spread from their existing locations within the project area where the vegetation is in excellent condition.

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INTRODUCTION

The Esperance Shire plans to extend the bitumen north on Cascade Road to Clare Road intersection in the 2017-18 financial year. This is a major transport route to the Cascade CBH grain receival facility and thus gets a high amount of trucks and other traffic.

This survey is part of our compliance obligations for the purpose of clearing native vegetation to construct the road. Cascade Road is located approximately 75km north-east of Esperance north of Cascade townsite on the South Coast of Western Australia. Shire of Esperance has applied for a 30m wide clearing footprint area. The current road is 22m wide and the gazetted road reserve is 95m wide. The survey is restricted to an area 5 m either side of the existing road alignment.

A level 1 flora survey has been undertaken 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.

Figure 1: Location of Cascade Road



BACKGROUND

The road construction project has the potential to affect a number of possible environmental factors. These include;

- Threatened Flora (TF) and Priority Flora (PF) within a ten kilometre radius.
- Threatened Ecological Communities (TEC).

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.

CATCHMENT & LANDSCAPE CONTEXT

Climate

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

Topography

Level plain or plateau of low relief and poor drainage in the very north of the site and gently undulating plain with fixed shallow incised stream channels flowing in a unidirectional pattern towards the major rivers

Geology

Dominantly Tertiary marine sediments with areas of outcropping Proterozoic granite and gneiss.

Soils

Soils in the site are predominately Red-brown uniform siliceous sands. In the very north of the site soils become alkaline grey shallow sandy duplex soils associated calcareous loamy earths and grey non-cracking clays and minor deep sands and ironstone.

Vegetation

Eastern mallee IBRA sub region

The Beard (1972) vegetation mapping of the site is predominantly Eucalyptus open mallee shrubland / Melaleuca open shrubland and Eucalyptus open mallee shrubland. There is a small

section of Shrublands: Tallerack mallee heath (which would class as Kwongkan TEC). Field investigations will determine the extent of this community.

Land use

The site is located within the Cascade Road Shire Road reserve. It is surrounded by mixed cropping grazing land

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 and planted vegetation, IBRA classification, Threatened Flora (TF), Priority Flora (PF) and Threatened Ecological Communities (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 DPaW 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 summer 2017. The survey effort comprised of driving slowly down Cascade road with frequent stops and transects by foot into the roadside vegetation. Each time there was a visible change in vegetation structure, condition or composition it was noted and a foot traverse was undertaken noting species present at the site and taking herbarium specimens. A portable field herbarium was established and a preliminary species list developed.

This initial survey determined which areas were potentially the nationally listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia'.

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 list of TF and PF within a ten kilometre radius of each site was used in the field along with a Threatened and Priority Flora field manual provided by the Esperance DPaW District Flora Officer.

A combination of local botanical knowledge, botanical field guides, the DPaW Esperance District Herbarium and Florabase were used to prepare a plant species lists for each site (Appendix 1). Specific habitats that were likely to contain Priority flora species were extensively searched.

The transects were used to develop a botanical species list, descriptions of vegetation types, structure, condition, threats, soils and landforms. 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.

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. Mapping of site area vegetation type and condition were collated and recorded as polygon shapefiles and attributed with area and perimeter parameters.

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 TF, 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 DPaW District Flora Officer resulted in several known Priority Flora species and sites within a ten kilometre radius of each site (Table 1). Appendix 3 provides a description of each priority conservation status. The site had 9 Priority Flora species recorded within a ten kilometre radius of the survey area.

Table 1: Priority flora sites within a 10 km radius

Taxon	TF	P1	P2	P3	P4
<i>Acacia amyctica</i>			1		
<i>Acacia singular</i>				1	
<i>Banksia xylothemelia</i>				1	
<i>Eremophila chamaephila</i>				1	
<i>Eucalyptus famelica</i>				1	
<i>Eucalyptus stoatei</i>					3
<i>Grevillea aneura</i>					3
<i>Gyrostemon ditrigynus</i>					2
<i>Hypocalymma sp. Cascade</i>			1		
<i>Acacia amyctica</i>			1		
<i>Acacia singular</i>				1	
<i>Banksia xylothemelia</i>				1	
<i>Eremophila chamaephila</i>				1	

RESULTS

Field Flora Survey (TF and PF)

The site was traversed from south to north on 3rd February 2017, this was less than ideal for flora survey however Eucalypts and acacias should be easily identifiable.

Threatened Ecological Communities

The database search the area did not intersect the nationally listed 'Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia likely to occur' shapefile. No other TECs or PECs were identified. During the field survey this community was identified and the extent of the TEC was mapped. 3.42km of the roadside vegetation was classified as TEC. If clearing was to go ahead, approximately 2.02 ha of TEC vegetation would be cleared.

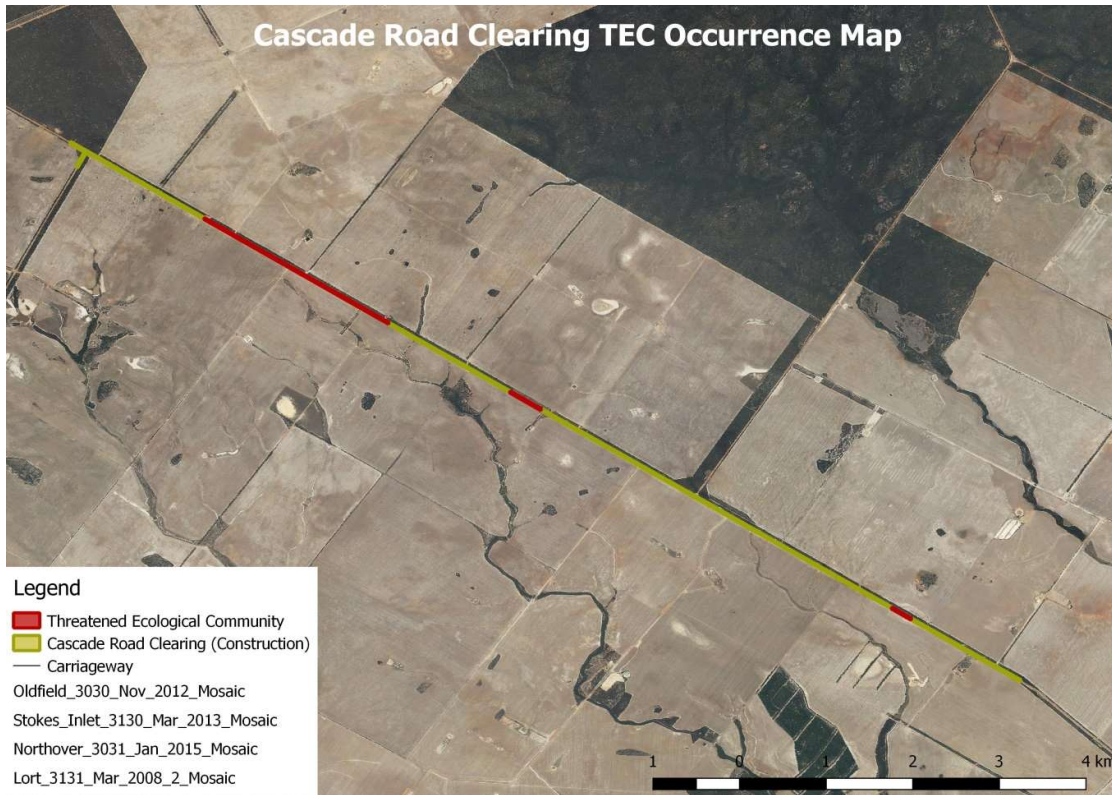


Figure 2: Proteaceae Dominated Kwongkan Shrublands TEC on Cascades rd. Areas classified as TEC (>30% Proteaceous dominated) Highlighted in red. This equates to 3.42 km of the 14.8 km area of road (23%) or 2.02 hectares.

Kilometres from end of existing bitumen	Notes	Vegetation Condition (Kieghery Scale)	Meets TEC definition (Y/N)	Vegetation Description	Species Present
0-1.4		Excellent	No	Mallee over Melaleuca shrubland	<i>Eucalyptus forrestiana</i> , <i>Eucalyptus phaenophylla</i> , <i>Melaleuca societalis</i> , <i>Cathytha</i> sp., <i>Davesia benthamii ancanthoclada</i> , <i>Eucalyptus platypus</i> , <i>Acacia pingulosa</i> ssp. <i>teretifolia</i> , <i>Grevillea pectinata</i> , <i>Melaleuca pentagona</i> var. <i>pentagona</i> , <i>Melaleuca sheathiana</i>
1.4-1.7		Excellent	Yes	Tallerack and Banksia media heath	<i>Banksia media</i> , <i>Eucalyptus plurocarpa</i> , <i>Eucalyptus flockoniae</i> ssp. <i>hebes</i> , <i>Melaleuca thyoides</i> , <i>Conostylis</i> sp., <i>Hakea corymbosa</i> , <i>Allocasurina</i> sp., <i>Davesia teretifolia</i> , <i>Desmocladius</i> sp., <i>Acacia pingulosa</i> ssp. <i>teretifolia</i> , <i>Austrostipa</i> sp. <i>Phymatacarpus maxwellii</i> , <i>Stachystemon bractyphyllis</i>
1.7-4.5	Edwards Rd intersection @4.5km	Excellent	No	Mallee over Melaleuca shrubland	<i>Eucalyptus forrestiana</i> , <i>Eucalyptus phaenophylla</i> , <i>Melaleuca societalis</i> , <i>Davesia benthamii ancanthoclada</i> , <i>Acacia pingulosa</i> ssp. <i>teretifolia</i> ,
4.5-6.6	Small 100m patch of Banksia media at 545	Excellent	No	Eucalyptus woodland over Melaleuca shrubland	<i>Eucalyptus forrestiana</i> , <i>Melaleuca cucullata</i> , <i>Melaleuca podiocarpa</i> , <i>Melaleuca teuthidoides</i> , <i>Davesia benthamii ancanthoclada</i> , <i>Melaleuca undulata</i>
6.6-7.1	Revegetated gravel pit	Good	Yes	Heath	<i>Banksia media</i> , <i>Melaleuca glaberima</i> , <i>Hakea florida</i> , <i>Isopogon trilobus</i> , <i>Melaleuca johnsonii</i> , <i>Hakea laurina</i> (dead), <i>Davesia lancifolia</i> , <i>Billardiera coriacea</i> , <i>Acacia gonophylla</i>
7.1-10.6	Small 100m patch of		No – Not 30%	Mallee over Melaleuca shrubland	<i>Eucalyptus forrestiana</i> , <i>Eucalyptus phaenophylla</i> , <i>Melaleuca</i> sp.

	Banksia media at 548 both sides of road		proteaceous cover		
10.6-11.4				Mallee over Melaleuca shrubland	<i>Eucalyptus pleurocarpa</i> , <i>Melaleuca uncinata</i> , <i>Hakea florida</i>
11.4-13.1	Burnt recently	-	Unlikely	Eucalyptus woodland over Melaleuca shrubland	Unable to Identify anything at this time as burnt in last 6 months.

Threats

The site is virtually weed free at present. African Love grass is present further south on Cascade road and this needs to be managed to prevent its spread to this uninfested area.

Areas of Proteaceae Dominated Kwongkan Shrublands TEC are at threat from the potential introduction of *Phytophthora cinnamomi* dieback from earth moving machinery. Due to this, strict hygiene guidelines need to be in place to ensure it stays out of the area.

CONCLUSION

The proposed road construction project on Cascade Road will result in the clearing of approximately 13.35 hectares of native vegetation. The roadside vegetation on Cascade road is excellent condition and some of these include areas of the Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia.

2.02 hectares are part of the Threatened Ecological Community “Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia”. Whilst the proposal will reduce the extent of the ecological community by 2.02 ha, it will not significantly impact on other criteria eg: fragment or increase fragmentation of the ecological community, as the road already passes through it. No Declared Rare Flora or priority was identified in field surveys.

Areas of Proteaceae Dominated Kwongkan Shrublands TEC containing *Banksia media* is highly susceptible to *Phytophthora cinnamomi* dieback and requires implementation of appropriate hygiene protocols if disturbed using machinery. Weed management protocols will also need to be implemented as part of this project to ensure African love grass and other weeds are not spread.

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APPENDICES

Appendix 1: Bushland Condition Ratings¹

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

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

Appendix 2 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

TF: Threatened 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 3 - Extract from: *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (s266B) Approved Conservation Advice for Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia*

A patch must include the following key diagnostic characteristics to be considered the ecological community:

1) Occurs within the Southeast Coastal Floristic Province (*sensu* Hopper and Gioia, 2004; relating to south west Australian phytogeographic boundaries. Includes the islands of the Recherche Archipelago).

AND

2a) Characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (crowns measured as if they are opaque),

OR

2b) Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated (see list of diagnostic species in Table 1). The use of diagnostic species is for situations in which the cover of Proteaceae species is reduced due to recent disturbance (e.g. fire).

List of diagnostic species

Esperance (east)

Adenanthos cuneatus

Banksia alliacea

Banksia armata

Banksia cirsioides

Banksia media

Banksia nivea

Banksia nutans

Banksia obovata

Banksia occidentalis

Banksia petiolaris

Banksia pilostylis

Banksia plumosa

Banksia prolata

Banksia pulchella

Banksia speciosa

Banksia tenuis

Grevillea concinna

Hakea cinerea

Hakea corymbosa

Hakea drupacea

Hakea nitida

Hakea obliqua

Hakea pandanicarpa

Hakea trifurcata

Isopogon formosus

Isopogon heterophyllus

Isopogon polycephalus

Isopogon trilobus

Lambertia inermis

