

Rehabilitation Plan
Site A – Fisheries Road, near Daniels road, Sandpit
CPS 8884/1



Written by Environmental Coordinator
Julie Waters (BEnvSc, Hons)

Reviewed and developed in consultation with
Leigh Bowerman - Rural Maintenance Supervisor
Katie White, Environmental Officer (BBotSc, Hons)
Dylan Gleave, Manager of Parks and Environment
(BEnvSc, BEnvEng)

October 2020



1 Executive Summary

This 'Rehabilitation Plan' has been undertaken in accordance with the 'DWERs Guide to Preparing Revegetation Plans for Clearing Permits' as part of the Shire of Esperance's 'CPS 8884/1 Strategic Purpose Permit' application to the Department of Water and Environmental Regulation (DWER). The 'Fisheries Road, near Daniels road, Sandpit' is Site A, proposing the clearing of 0.82 ha of native vegetation for the purpose of sand extraction.

2 Revegetation location

'Site A – Fisheries Rd, near Daniels Rd, sandpit' is located ~70 km east of Esperance and 10.8 km east of the Condingup town-site, located within Shire of Esperance managed road reserve. Specifically, it is located on Fisheries Rd, 2.1 km west of Daniels Rd, at straight line kilometre (SLK) 75.40 (Main Roads 2020). A point within the rehabilitation area is -33.747551 S, 122.641850 E (GDA94). The rehabilitation area includes both CPS 8884/1 'Site A – Fisheries Rd, near Daniels Rd, sandpit' as well as the historic sand extraction area enclosed by this application.

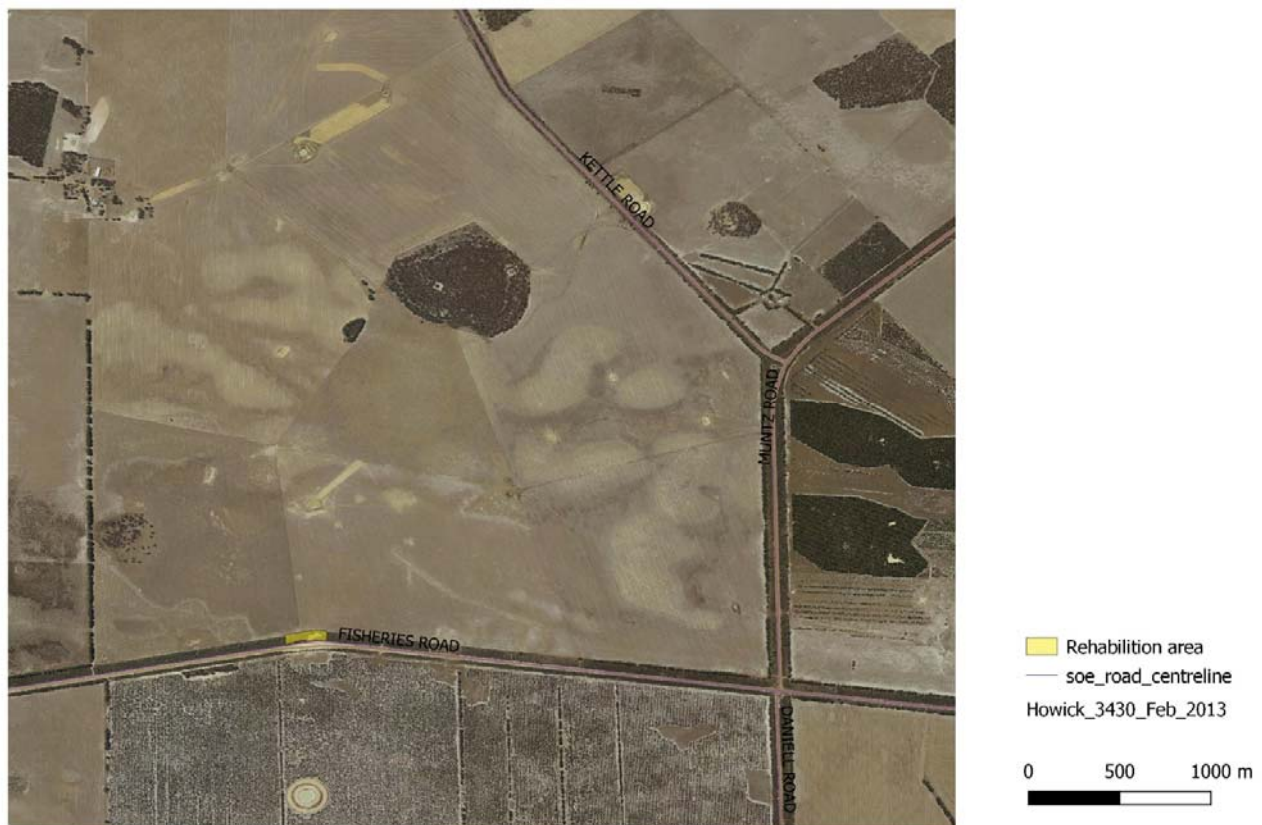


Figure 1. Location of 'Site A – Fisheries Rd, near Daniels Rd, Sandpit' revegetation area CPS 8884/1

2.1 Revegetation area

The proposed clearing permit area (0.82 ha) is currently intact vegetation, and will therefore all need to be rehabilitated. In addition DWER have put a condition to rehabilitate a historic sand extraction area and pull over area adjacent to the proposed clearing area upon completion of extraction activities (approximately 0.6ha). The rehabilitation area covered by this plan totals 1.42ha.

2.2 Revegetation objective

The Shire of Esperance aims to restore the ecological value of the site post sand extraction by rehabilitating areas after sand has been extracted and to carry out rehabilitation of the previously disturbed historic sand extraction area.

3 Background information of the Pre-Clearing Environment

3.1 Hydrology, Climate, Geology, Soils and Topography

The 'Site A - Fisheries Rd, near Daniels Rd, Sandpit' is located within the Munglignup creek catchment area. The climate of the Esperance region is described as Mediterranean, characterized by cool wet winters and dry warm summers. The area receives an average annual rainfall of 500 mm (BoM 2019). The geology of the site is described Schnoknecht et al. (2004) as Quaternary Aeolian sands over Tertiary Sediments, of the Pallinup formation. Topography of 'Site A – Fisheries Rd, near Daniels Rd, Sandpit' is described as gently undulating plains, with minor swales and wet depressions (Schnoknecht et al. 2004). The soil profile of the general area is described as grey deep sandy duplex soils (some gravelly), with associated pale deep sands (LGMap 2019). It was observed during field surveys the site is characterised by deep yellow sand.

3.2 Vegetation Community

The site is located within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) Esperance Plains region (Esp2) and Recherche sub-region. The Esp2 region is described as "Proteaceae Scrub and Mallee heaths on sandplain overlying Eocene sediments, rich in endemics. Herbfields and heaths (rich in endemics) on abrupt granite and quartzite ranges that rise from the plain. Eucalyptus woodlands occur in gullies and alluvial foot-slopes". The site is mapped as Beard (1973) vegetation association (VA) 6048, as determined by WALGA's LGMap (2019). VA 6048 is described as 'shrublands; Banksia scrub-heath on sandplain in the Esperance Plains region'. Only 14.21% of pre-European extent remains within the Esp2 IBRA bioregion and 12.58% in the Shire of Esperance area (DPaW 2017). Less than 1% of its pre-European extent is formally conserved within International Union for Conservation of Nature (IUCN) reserves across Western Australia.

The site was surveyed on 01/10/2019 by Shire of Esperance's Environmental Officer's Julie Waters and Katie White. Results of this survey are in the previously submitted 'Vegetation, Flora, Fauna and Environmental Considerations Report, Site A – Fisheries rd, near Daniels Rd sandpit (2020)'. Vegetation structure and composition was described during the field survey as *Nuytsia floribunda* and *Banksia speciosa* dominated over-story, *Melaleuca striata*, *Allocasuarina humilis* and *Adenanthos cuneatus* dominated mid-story, and *Caustis dioica* and *Anarthria scabra* dominated under-story (Figure 4). It is believed that the Beard (1973) vegetation association 6048 is an appropriate match for the observed vegetation community (Section 2.6). The targeted flora survey recorded a total of 83 species (Appendix 7.1). This shows the site and vegetation community is characterized by high diversity.



Figure 2. Preclearing vegetation of 'Site A – Fisheries Rd, near Daniels Rd, Sandpit'



Figure 3. Preclearing vegetation of 'Site A – Fisheries Rd, near Daniels Rd, Sandpit'

3.3 Threatened Ecological Communities

The field survey determined that the previously undisturbed sandpit area (0.82ha) met the Federally listed "Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia" (Kwongkan) Threatened Ecological community (TEC) criteria. Foliage cover of Proteaceae species was greater than 30%.

3.4 Vegetation Condition

The vegetation across the entire 'Site A - Fisheries Rd, near Daniels Rd, Sandpit' (0.082ha) is in excellent condition, with no signs of degradation or disturbance from anthropogenic processes. In the historic sandpit and pullover areas the vegetation is degraded and a number of weeds including African Lovegrass (*Eragrostis curvula*), Fleabane (*Conyza* sp.), *Acacia pycnantha* and Victorian Tea Tree (*Leptospermum laevigatum*) were observed.

3.5 *Phytophthora* Dieback

Very limited data collection on the presence of *Phytophthora cinnamomi* Dieback has been conducted on roadsides in Western Australia. No positive or negative sample points are collated on the Dieback Information Delivery and Management System (DIDMS; GAIA Resources, State NRM & SCNRM 2020). Vegetation is largely *P. cinnamomi* Dieback susceptible, dominated by Proteaceae species. All susceptible species were extremely healthy, showing no signs of stress or key Dieback infection indicators. It is therefore probable the site remains un-infected by *P. cinnamomi*. Appropriate hygiene measures will be employed to limit introduction of infection, including clearing in dry conditions and clean down of vehicles and machinery before entering the site. However, there is always a possibility that introduction will occur during proposed activities.

3.6 Other Ecological impacts

No wetland species or observed water bodies were present within the area. It is highly unlikely that clearing vegetation will result in a significant change to the water table or natural hydrological regimes. The site is long unburnt, with some very large *Banksia speciosa* plants observed to be senescing, likely from old age. Intact vegetation is weed free, but African Lovegrass (*Eragrostis curvula*), Fleabane (*Conyza* sp.), *Acacia pycnantha* and Victorian Tea Tree (*Leptospermum laevigatum*) are observed on peripheries of the disturbed historical sandpit and agricultural boundary. It is highly likely that weeds will be introduced during the proposed clearing activity, due to the surrounding vectors of the adjacent busy Fisheries Rd and neighbouring pastoral land. Large fox holes were observed in the previously excavated sand hill. No other signs of feral animals were observed.

4 Implementation Plan

To meet the objectives of a successful scientific-based Revegetation Plan for CPS 8884/1 'Site A Fisheries road near Daniels road sandpit' numerous factors need to be considered and will be implemented, including the reference site, weed control, pest and disease hygiene practices, site preparation, species selection, completion criteria, monitoring and adaptive management practices in the need of contingency measures. These are outlined in Sections 4.1 to 4.4, with key points highlighted below:

- Revegetation works will consist of spreading the stockpiled cleared vegetation and topsoil containing the natural stored soil seed bank directly from the site accumulated during sand extraction works.
- Revegetation works will be carried out over April-June prior to the onset of the main winter rains in the year post clearing.
- The site will be monitored at 18, 30 and if required 42 months after the rehabilitation is completed, to be measured as successful against the completion criteria.

4.1 Pre-clearing vegetation assessment

The 'Vegetation, Flora, Fauna and Environmental Considerations Report, Site A – Fisheries road near Daniels (2020)' will be used as baseline data to assess against the completion criteria. No other reference site is required due to sufficient information on pre-clearing state.

4.2 Rehabilitation Methodology

The site will be cleared in a single operation. A loader will be used to remove vegetation, topsoil and the overburden (consisting of approximately 300 mm deep of soil). This valuable layer that contains large reservoirs of the soil seed bank and live clonal tissue will be stockpiled separately for re-spreading over the site at the completion of sand extraction activities. The sand layer within the soil profile will then be mined and stockpiled until used offsite in neighbouring road projects. The site is likely to be cleared in one calendar year.

Rehabilitation works will commence at the site between April – June, following the removal of sand from the site. This will involve spreading the stockpiled topsoil containing the soil seed bank from prior to clearing evenly across the site. Despite the intact to disturbed ratio of 4:3, the high seed loading in the cleared vegetation should be sufficient to cover the disturbed areas. The loader will batter the edges of the extracted area to avoid erosion and attempt to blend the area into the natural contours of the surrounding road reserve. Due to its sandy soil the site will not need to be ripped prior to topsoil being spread over the area. No direct tube stock planting or direct seeding will occur immediately, and only be used as a contingency technique if this method fails.

4.3 Weed Control

Weed invasion for the pre-clearing state was mostly limited to the periphery of the site and was mainly dominated by agricultural weeds, such as fleabane and capeweed (Appendix 1, Table 3). Many of these species are short-lived annuals and with

minimal management will be controlled and will not impact on revegetation success. The only environmental weeds of concern within the site are the Golden Wattle, *Acacia pycnantha* and Victorian tea tree *Leptospermum laevigatum* which quickly outcompetes Esperance natives and can dominate the landscape. The following steps will be taken to minimise the risk of introduction and spread of weeds at the site:

- *Acacia pycnantha* and *Leptospermum laevigatum* trees will be removed following best practice methods prior to clearing, and monitored to ensure no germination from the soil seed bank. If *A. pycnantha* or *L. laevigatum* plants are present post-rehabilitation then they will continue to be removed, either manually or chemically.
- All machinery, plant and equipment shall be cleaned down and free of soil and vegetative matter prior to entering and leaving the site.

4.4 Disease Hygiene Management

There are a large number of plant pathogens that can be spread by moving infected soil and plant material. Specifically, of focus is *Phytophthora* Dieback, such as *P. cinnamomi*. The project falls within the rainfall zone in which *Phytophthora* dieback may occur. Hygiene measures to minimise the risk of diseases are a standard part of Shire of Esperance's practices when clearing vegetation, including:

- All machinery, plant and equipment shall be free of soil and vegetative matter prior to entering the road reserve and when leaving the site,
- The movement of soil shall be avoided in wet conditions.

There is an assumption that no dieback is currently present at the site (based on DIDMS information and heathy looking Proteaceous species observed at the site during initial survey). The Shire of Esperance will use best practice clean down to ensure dieback is not introduced into the site due to our operations, however given that the site is on a public road, and accessible by the public, we cannot guarantee that dieback will not be introduced into the site by a member of the public and this may impact upon completion criteria.

5 Completion criteria

Prior to clearing 57% of the site met the Kwongkan TEC criteria, due to Criterion 2a (Foliage cover of Proteaceae species was greater than 30%). A total of eight Proteaceous species were recorded within the application area. The goal of the rehabilitation is to again meet the Kwongkan TEC criteria, however the secondary criterion will be used (2b Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated). The use of diagnostic species is for situations in which the cover of Proteaceae species is reduced due to recent disturbance (e.g. sand extraction) as per the Approved Conservation Advice for Kwongkan (Commonwealth of Australia 2014).

Table 1 – Completion criteria following the SMART (specific, measurable, achievable, relevant, time-bound) principles for the rehabilitation of 'Site A - Fisheries Rd, near Daniels Rd, Sandpit'.

Criterion	Baseline Floristic data	Completion Target	Completion Criteria
1	57% of the Site meets the Key diagnostic characteristics and condition thresholds for Kwongkan TEC. A total of eight Proteaceous species were recorded within the application area.	20% of the Site meets the Key diagnostic characteristics and condition thresholds for Kwongkan TEC using criterion 2b of the Approved Conservation advice for Kwongkan TEC. Note criterion 2b is used due to the disturbance.	20% of the revegetation site has two or more diagnostic Proteaceae species present, (See appendix 2) that are likely to form a significant vegetative component.

2	Bare areas within the site account for up to 0.6ha.	There are no bare areas within the site (a bare area is greater than 2m x 2m with no native plants in it)	There is native vegetation cover over the entire site with bare areas limited to less than (4m ²)
3	<i>Acacia pycnatha</i> and Victorian Tea tree (<i>Leptospermum laevigatum</i>) are present at the site but in low density	Significant Environmental weed species are absent from the revegetation site.	No <i>Leptospermum laevigatum</i> or <i>Acacia pycnatha</i> plants are found in the rehabilitation area

6 Monitoring

Monitoring of the rehabilitated area following gravel extraction will determine if completion criteria have been achieved and if contingency measures are required (Section 7). The methodology for monitoring will involve onsite visual assessments to determine whether revegetation has been implemented as planned and that completion criteria have been met, as outlined in Table 1. Three permanent photo points will be set up in the area. Monitoring will occur annually by the Shire of Esperance's Environmental Officers, who have a tertiary level education in Environmental Science or similar qualifications. Monitoring will coincide with the inspection period of the calendar year Annual Compliance report for CPS 8884/1, normally conducted between January and March. This will continue for up to three years following the rehabilitation event or rehabilitation has been deemed successful.

7 Contingency measures

Where monitoring provides information that the completion criteria (identified in Section 5) are not being met then the following contingency measures will be undertaken, until the completion criteria are met:

- If plant composition criteria are not met then specific species will be infill planted / seeded during the next planting season.
- If listed environmental weeds exist in the site then herbicide and or manual control will be applied to affected areas.

7.1 Species selection

Keystone and dominant species will be selected as a contingency measure if respreading topsoil and stockpiled vegetation has unsuccessful germination and does not meet the completion criteria. The incidental species list from the October 2019 survey (Appendix 1) will be the basis for determining species selection for seed and tubestock seedlings, based on availability.

8 Reporting

The Annual Compliance Report for CPS 8884/1 will include a report on revegetation activities, outlining the measurable targets outlined in Table 1 as the completion activities and results of the monitoring. The Annual Compliance report for clearing permits administered by DWER are generally required to be submitted to DWER by 30th June, covering from the 1st January to 31st December of the preceding year.

9 Responsibilities

9.1 Table 1 – Responsibility for Revegetation Activities

Role	Responsible Actions
Rural Maintenance Supervisor	Revegetation implementation, record keeping and internal reporting
Environmental Coordinator / Environmental Officer	Monitoring rehabilitation and assessment against completion criteria Reporting externally (completed through annual reporting of CPS 8884/1)

10 References

- Beard J.S. (1973), *The vegetation of the Esperance and Malcom areas, Western Australia, 1:250 000 series*, Vegmap Publications Perth
- Commonwealth of Australia (2014), *Approved Conservation Advice for Proteaceae Dominated Kwongan Shrublands of the southeast coastal floristic province of Western Australia*, Department of Agriculture, Water and the Environment, <<https://www.environment.gov.au/biodiversity/threatened/communities/pubs/126-conservation-advice.pdf>>
- Commonwealth of Australia, *Environmental Protection and Biodiversity Conservation Act 1999* (Cth), <<https://www.legislation.gov.au/Details/C2019C00275>>
- Department of Agriculture and Food of Western Australia (2002), *Beaumont-Condongup Area: Catchment Appraisal 2002 resource Management technical Report 238*, Department of Agriculture and Food of Western Australia
- Department of Environment Regulation. (2018). *A guide to preparing revegetation plans for clearing permits under Part V of the Environmental Protection Act 1986*. Department of Environment Regulation, Perth, WA. Retrieved from: https://www.der.wa.gov.au/images/documents/our-work/consultation/Revegetation-plan/A_Guide_to_Preparing_Revegetation_Plans_for_Clearing_Permits.pdf
- Department of Parks and Wildlife (2017), *2016 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis – Full Report)*, Government of Western Australia
- Keighery, B. J. (1994). *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, WA.
- Main Roads of Western Australia (2020), *Standard Line Kilometres online application*, Government of Western Australia. < <https://mrapps.mainroads.wa.gov.au/gpsslk>>
- Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil Landscape Mapping in south-western Australia*, Resource management Technical report 20, Department of Agriculture WA.
- Thackway R, Cresswell ID, Shorthouse D, Ferrier S, Hagar T, Pressey T, Wilson P, Fleming M, Howe D, Morgon G, Young P, Copley P, Peters D, Wells P, Miles I, Parkes D, McKenzie N, Thackway R, Kitchin M & Bullen F (1995), *Interim Biogeographic Regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperative Program*, Australia Nature Conservation Agency. <<https://www.environment.gov.au/system/files/resources/4263c26f-f2a7-4a07-9a29-b1a81ac85acc/files/ibra-framework-setting-priorities-nrs-cooperative-program.pdf>>

Appendix 1 - Incidental species list

Table 3. Flora species present within 'Site A Fisheries Road Sandpit' application area.

Family	Scientific Name	Common Name	Invasive	Priority
Anarthriaceae	<i>Anarthria scabra</i>			
Anarthriaceae	<i>Lyginia imberbis</i>			
Asparagaceae	<i>Laxmannia brachyphylla</i>	Stilted Paper Lilly		
Asparagaceae	<i>Lomandra hastilis</i>	Mat-rush		
Asteraceae	<i>Arctotheca calendula</i>	Cape weed	*	
Asteraceae	<i>Asteridea nivea</i>			
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	*	
Asteraceae	<i>Conyza sp.</i>	Fleabane	*	
Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersy cudweed		
Asteraceae	<i>Ursinia anthemoides subsp. anthemoides</i>	Ursinia Daisy	*	
Casuarinaceae	<i>Allocasuarina humilis</i>	Dwarf Sheok		
Casuarinaceae	<i>Allocasuarina lehmanniana subsp. ecarinata</i>	Dune Sheoak		
Cyperaceae	<i>Caustis dioica</i>	Puzzle grass		
Cyperaceae	<i>Cyathochaeta equitans</i>	Tibetan Prayer Flag		
Cyperaceae	<i>Ficinia nodosa</i>	Knotted Club Rush		
Cyperaceae	<i>Lepidosperma sp.</i>			
Cyperaceae	<i>Lepidosperma squamatum</i>	Saw Sedge		
Cyperaceae	<i>Mesomelaena stygia</i>			
Cyperaceae	<i>Tricostularia aphylla</i>	Curled Sedge		
Dilleniaceae	<i>Hibbertia andrewsiana</i>			
Dilleniaceae	<i>Hibbertia gracilipes</i>	Australian Butter Cup		
Droseraceae	<i>Drosera sargentii</i>	Pygmy sundew		
Droseraceae	<i>Drosera zonaria</i>	Painted Sundew		
Ericaceae	<i>Andersonia macranthera</i>			
Ericaceae	<i>Lysinema pentapetalum</i>	Curry Flower		
Fabaceae	<i>Acacia cyclops</i>	Coastal Wattle		
Fabaceae	<i>Acacia pycnantha</i>	Golden Wattle	*	
Fabaceae	<i>Aotus sp. Esperance</i>			
Fabaceae	<i>Daviesia articulata</i>	Bitter Pea		
Fabaceae	<i>Daviesia pauciflora</i>			P2
Fabaceae	<i>Daviesia teretifolia</i>			
Fabaceae	<i>Gastrolobium musaceum</i>			
Fabaceae	<i>Gompholobium tomentosum</i>	Hairy Yellow Pea		
Fabaceae	<i>Jacksonia capitata</i>			
Fabaceae	<i>Jacksonia viscosa</i>			
Goodeniaceae	<i>Lechenaultia tubiflora</i>	Heath Leschenaultia		
Haemodoraceae	<i>Conostylis bealiana</i>	Angel trumpets		

Haemodoraceae	<i>Conostylis phathyrantha</i>			
Hemerocallidaceae	<i>Johnsonia acaulis</i>	Hooded Lily		
Hemerocallidaceae	<i>Tricoryne elatior</i>	Yellow Autumn Lily		
Iridaceae	<i>Patersonia lanata</i>	Wooly Patersonia		
Iridaceae	<i>Patersonia occidentalis</i>	Purple Flag		
Juncaceae	<i>Juncus kraussii subsp. australiensis</i>	Snogerup		
Juncaceae	<i>Juncus pallidus</i>	Pale Rush		
Lamiaceae	<i>Microcorys barbata</i>			
Loranthaceae	<i>Nuytsia floribunda</i>	Christmas tree, Monji Tree, Cabbage Tree		
Myrtaceae	<i>Beaufortia empetrifolia</i>	South Coast Beaufortia		
Myrtaceae	<i>Calothamnus gracilis</i>	One-sided Bottle Brush		
Myrtaceae	<i>Calytrix decrandra</i>	Pink Starflower		
Myrtaceae	<i>Chamelaucium megalopetalum</i>	Large Wax flower		
Myrtaceae	<i>Conothamnus aureus</i>			
Myrtaceae	<i>Eucalyptus angulosa</i>	Ridge fruited Mallee		
Myrtaceae	<i>Eucalyptus pileata</i>	Capped Mallee		
Myrtaceae	<i>Eucalyptus quadrans</i>			
Myrtaceae	<i>Leptospermum laevigatum</i>	Victorian Tae Tree	*	
Myrtaceae	<i>Leptospermum spinescens</i>			
Myrtaceae	<i>Melaleuca striata</i>			
Myrtaceae	<i>Melaleuca thymoides</i>			
Myrtaceae	<i>Meleleuca fulgens</i>	Scarlet Honey Myrtle		
Myrtaceae	<i>Micromyrtus elobata</i>			
Myrtaceae	<i>Phymatocarpus maxwellii</i>			
Myrtaceae	<i>Rinzia dimorphandra</i>	Esperance Rinzia		
Myrtaceae	<i>Taxandria spathulata</i>			
Myrtaceae	<i>Verticordia densiflora</i>	Compacted Feather Flower		
Orchidaceae	<i>Caladenia heberleana</i>	Esperance King Spider		
Orchidaceae	<i>Diuris laxiflora</i>	Bee orchid		
Orchidaceae	<i>Elythranthera brunonis</i>	Purple Enamel Orchid		
Orchidaceae	<i>Microtis media subsp. media</i>	Mignonette Orchid		
Poaceae	<i>Amphipogon turbinatus</i>	Mulga Fox Tail		
Poaceae	<i>Briza maxima</i>	Blowfly grass	*	
Proteaceae	<i>Adenanthos cuneatus</i>	Coastal jugflower		
Proteaceae	<i>Banksia obovata</i>	Wedge-leaved Dryandra		
Proteaceae	<i>Banksia pulchella</i>	Teasel Banksia		
Proteaceae	<i>Banksia speciosa</i>	Showy Banksia		
Proteaceae	<i>Hakea nitida</i>	Frog Hakea		
Proteaceae	<i>Isopogon polycephalus</i>	Clustered Coneflower		
Proteaceae	<i>Synaphea favosa</i>			
Proteaceae	<i>Synaphea oligantha</i>			
Restionaceae	<i>Chordifex crispatus</i>			

Restionaceae	<i>Desmocladus flexuosus</i>			
Restionaceae	<i>Hypolaena fastigiata</i>			
Rutaceae	<i>Boronia ramosa</i> subsp. <i>anethifolia</i>			
Stylidiaceae	<i>Stylidium macranthum</i>	Crab claws		

Appendix 2 - Key diagnostic characteristics of the Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia

(Adapted from Approved Conservation Advice for Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia (Commonwealth of Australia, 2014).

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).

Table 4: List of diagnostic species (Esperance (east))

<i>Adenanthos cuneatus</i>
<i>Banksia alliacea</i>
<i>Banksia armata</i>
<i>Banksia cirsioides</i>
<i>Banksia media</i>
<i>Banksia nivea</i>
<i>Banksia nutans</i>
<i>Banksia obovata</i>
<i>Banksia occidentalis</i>
<i>Banksia petiolaris</i>
<i>Banksia pilostylis</i>
<i>Banksia plumosa</i>
<i>Banksia prolata</i>
<i>Banksia pulchella</i>
<i>Banksia speciosa</i>
<i>Banksia tenuis</i>
<i>Grevillea concinna</i>
<i>Hakea cinerea</i>
<i>Hakea corymbosa</i>
<i>Hakea drupacea</i>
<i>Hakea nitida</i>
<i>Hakea obliqua</i>
<i>Hakea pandanycarpa</i>
<i>Hakea trifurcata</i>
<i>Isopogon formosus</i>
<i>Isopogon heterophyllus</i>
<i>Isopogon polycephalus</i>
<i>Isopogon trilobus</i>
<i>Lambertia inermis</i>