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Native Vegetation Clearing Permit [Area Permit] Supporting Documentation

Carey Baptist College, 51 Wright Road,
Harrisdale

DRAFT

Prepared for
Sytka Pty Ltd
by Strategen

January 2017

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**Carey Baptist College, 51 Wright Road,
Harrisdale**

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January 2017

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Client: Sytka Pty Ltd

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
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Appendix 2 Vascular plant taxa recorded within the Survey area
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1. Introduction

1.1 Purpose

This Native Vegetation Clearing Permit (NVCP) application for an area permit has been prepared for assessment and approval to clear vegetation within bushland at Carey Baptist College, located at 51 Wright Road, Harrisdale (Figure 1). An area of approximately 0.6 ha was surveyed to inform the NVCP application process (Survey Area, Figure 1); however, the application relates to an area of approximately 0.3 ha of native vegetation (Proposed Clearing Area, Figure 2).

1.2 Proposal

Carey Baptist College is proposing to clear approximately 0.3 ha of native vegetation adjacent to the school oval. The clearing of vegetation will enable the expansion of the oval including construction of a tennis court and car parking facilities.

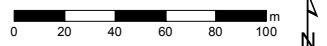
1.3 Location, ownership and tenure

The site is located approximately 20 km south of the Perth CBD, within the bounds of Carey Baptist College. The site is owned and managed by Carey Baptist College.



Figure 1: Survey Area

Scale 1:3,000 at A4



Coordinate System: GDA 1994 MGA Zone 50


Note that positional errors may occur in some areas

Date: 15/09/2016

Author: jcrute

Source: Aerial image: Nearmap, flown 06/2016; Existing cadastre: SLIP, Landgate 2016.

Legend

 Survey Area

2. Overview of existing environment

2.1 Geology, landform and soils

The Survey Area is located within the Swan Coastal Plain which comprises five major geomorphological systems that lie parallel to the coast, namely (from west to east) the Quindalup Dunes, Spearwood Dunes, Bassendean Dunes, Pinjarra Plain and Ridge Hill Shelf (Churchward & McArthur 1980; Gibson et al. 1994). Each major system is composed of further subdivisions in the form of detailed geomorphological units (Churchward & McArthur 1980; Gibson et al. 1994). Beard (1990) describes the Swan Coastal Plain as a low-lying coastal plain, often swampy, with sand hills also containing dissected country rising to the duricrust Dandaragan plateau on Mesozoic, mainly sandy, yellow soils.

The site is situated on the Southern River soil landscape system which contains a sandplain with low dunes and intervening swamps, iron and humus podzol soils, peats and clays (Churchward & McArthur 1980).

2.2 Hydrology

2.2.1 Surface water

No standing water was observed within the Survey Area at the time of the survey.

2.2.2 Groundwater

The maximum groundwater level beneath the Survey Area is modelled to be approximately 5 mAHD (DoW 2016).

2.3 Vegetation

Strategen undertook a flora and vegetation assessment within the Survey Area (Figure 1) on 7 September 2016. The results of the assessment are summarised in the following sections.

2.3.1 Regional vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1:1 000 000) by Beard during the 1970s. This dataset has formed the basis of several regional mapping systems, including physiographic regions defined by Beard (1981); System 6 Vegetation Complex mapping undertaken by Hedde et al. (1980); the biogeographical region dataset (Interim Biogeographic Regionalisation for Australia) for Western Australia (DEE 2016a).

Beard (1990) Botanical Subdistrict

The Survey Area occurs within the Drummond Botanical Subdistrict which is characterised by low *Banksia* woodlands on leached sands; *Melaleuca* swamps on poorly-drained depressions; and *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) woodlands on less leached soils (Beard 1990).

IBRA subregion

Interim Biogeographic Regionalisation for Australia (IBRA) divides Western Australia into 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation (McKenzie *et al.* 2003). The Survey Area is located within the Swan Coastal Plain bioregion, which is dominated by woodlands of *Banksia* and Tuart on sandy soils, Sheoaks on outwash plains and Paperbarks in swampy areas (McKenzie *et al.* 2003).

System 6 mapping

System 6 mapping refers to vegetation mapping undertaken at a Vegetation Complex scale by Heddle *et al.* (1980). This is the primary source of information used to calculate potential impacts of proposals to clear native vegetation on the Swan Coastal Plain. The Survey Area occurs within the Southern River Vegetation Complex which is described as:

Open woodland of *Corymbia calophylla* – *Eucalyptus marginata* – *Banksia* species with fringing woodland of *Eucalyptus rudis* – *Melaleuca raphiophylla* along creek beds.

The percentage of pre-European extent of this vegetation association on each system is presented in Table 1 and is based on the latest GIS-based estimate undertaken by Department of Parks and Wildlife (Table 1; City of Swan 2016). Southern River Vegetation Complex has 17.76% of the pre-European extent remaining on the Swan Coastal Plain and 15.16% remaining within the City of Swan (City of Swan 2016).

Table 1: Pre-European and current extent of Southern River Complex

Vegetation complex	Pre-European extent (ha)	Current extent (ha)	% remaining	Amount proposed to be cleared for Project (ha)	% Current Extent Protected for Conservation within LGA
Southern River	8669.27	1539.91	17.76	0.59	13.64

The Perth Metropolitan Area is considered to be a 'Constrained Area' and as such the minimum requirement the EPA has adopted to protect biodiversity has been modified to retaining at least 10% of the pre-clearing extent of the ecological community. The Southern River Vegetation Complex has 17.76% of its original extent remaining on the Swan Coastal Plain which is above the 10% threshold set by the EPA for clearing vegetation within constrained areas (EPA 2006).

2.3.2 Vegetation assessment

Desktop searches

Database searches of NatureMap (Parks and Wildlife 2007) and the Department of the Environment and Energy (DEE) protected matters database (DEE 2016b) were undertaken to determine the likelihood of any Threatened or Priority flora species within a 3 km radius of the Survey Area (Appendix 1). Additionally, Parks and Wildlife was commissioned to conduct a database search for Threatened and Priority Ecological Communities to determine whether any occurred within a 5 km radius of the Survey Area (Parks and Wildlife 2016).

There are no Environmentally Sensitive Areas (ESAs), as listed under the Environmental Protection (Environmentally Sensitive Areas) Notice 2005, Bush Forever sites or geomorphic wetlands located within the Survey Area. The nearest ESAs are approximately 300 m from the Survey Area and are associated with a Conservation Category Wetland (Landgate 2016), and the buffer of a TEC (Muchea limestone). There are two Bush Forever sites within 1 km of the Survey Area (Figure 2).

While there are no state-listed TECs or PECs within the Survey Area, all areas of *Banksia* woodland on the Swan Coastal Plain have recently been listed as a Threatened Ecological Community under the EPBC Act. The key diagnostic feature is a prominent tree layer of *Banksia* (most commonly *B. attenuata* and *B. menziesii*), with scattered eucalypts and other tree species present among or emerging above the *Banksia* canopy, with a species rich understorey. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range (TSSC 2016). As such, the Survey Area contains the TEC 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region' as listed under the EPBC Act.

No Bush Forever sites are located within the Survey Area. The nearest are located 500 m to the east (Bush Forever site 413 Balannup Lake and Adjacent Bushland, Southern River/Forrestdale) and 300 m to the north of the Survey Area (Bush Forever site 253 Harrisdale Swamp and Adjacent Bushland, Forrestdale).

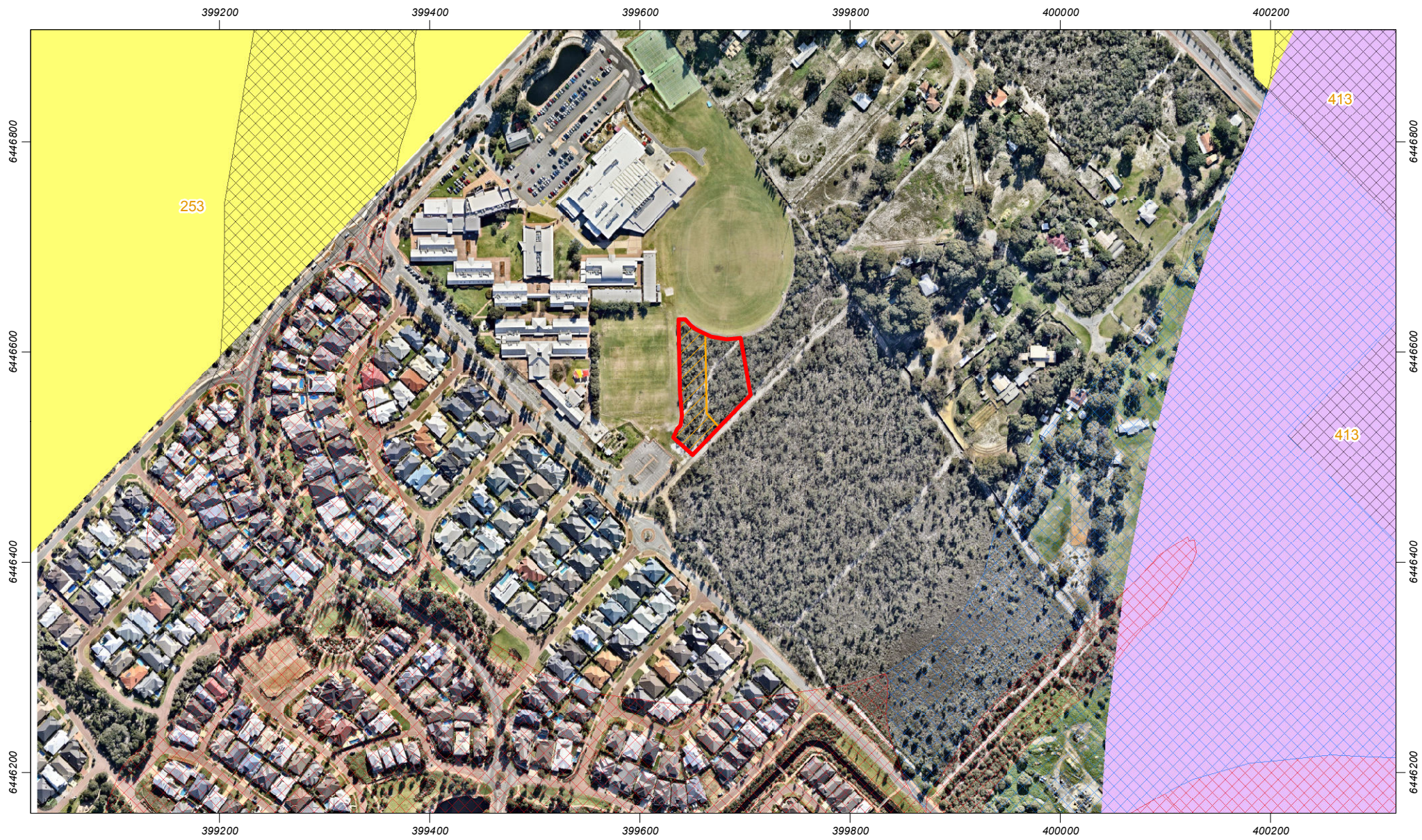


Figure 2: Environmentally Sensitive Areas

Scale 1:5,000 at A4
 0 20 40 60 80 100 m



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas

Date: 26/10/2016

Author: jcrute

Source: Aerial image: Neamap, flown 06/2016; Existing cadastre: SLIP, Landgate 2016.

Legend

- Survey Area
- Proposed clearing area
- Bush Forever sites

Geomorphic wetlands

- Conservation
- Resource Enhancement
- Multiple Use

TEC

- Muchea Limestone



Flora

Three quadrats were sampled within the Survey Area to compile a species list. Additionally, traverses through the Survey Area were undertaken to search for additional species outside the quadrats and any Threatened or Priority Flora species.

A total of 41 native vascular plant taxa from 20 plant families were recorded. The majority of taxa were recorded within the Fabaceae (5 taxa), Myrtaceae (5 taxa) and Proteaceae (6 taxa) families (Appendix 1).

Three exotic taxa were also recorded within the Survey Area (Appendix 1). None of these species are Declared Plant species in Western Australia pursuant to section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) according to the Western Australian Department of Agriculture and Food (DAFWA 2016).

No Threatened flora species as listed under section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or pursuant to Schedule 1 of the *Wildlife Conservation Act 1950* (WC Act) and as listed by Parks and Wildlife (2015) or Priority flora species as listed by Western Australian Herbarium (1998-) were recorded within the Survey Area.

Vegetation types

Three quadrats were sampled within the Survey Area in order to determine vegetation type.

One vegetation type (VT) was mapped (Figure 3), encompassing the entirety of the Survey Area, can be described as *Banksia attenuata* and *Banksia menziesii* open low forest over *Adenanthos cygnorum* and *Melaleuca thymoides* open shrubland over closed understorey of mixed low shrubs and herbs. Plate 1 and Plate 2 illustrate this vegetation type.

Vegetation condition

Vegetation condition within the Survey area was assessed according to the scale of Keighery (1994) and ranged from Degraded to Very Good - Excellent (Table 2; Figure 3).

Vegetation within the south of the Survey Area had been subjected to minor disturbance (rubbish dumping, removal of vegetation, clearing for informal tracks and school activities) and has been mapped as Good condition. Areas with minimal disturbance have been mapped together with comparatively undisturbed areas and are described as Very Good – Excellent condition. Informal tracks have been mapped as Degraded. Plate 1 illustrates areas mapped as Good and Degraded while Plate 2 shows vegetation in Very Good condition.

Table 2: Area (ha) covered by each vegetation condition category within the Survey area

Vegetation Condition	Area (ha)	Percentage of the Survey area (%)
Very Good - Excellent	0.48	81
Good	0.07	12
Degraded	0.04	7
Total	0.59	100



Figure 3: Vegetation type and condition

Scale 1:1,000 at A4
 0 5 10 15 20 25 m



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas

Date: 26/10/2016

Author: jcrute

Source: Aerial image: Neamap, flown 06/2016; Existing cadastre: SLIP, Landgate 2016.

Legend

- Survey Area
- Proposed clearing area

Condition

- Degraded
- Good
- Very Good - Excellent



VT 1: *Banksia attenuata* and *Banksia menziesii*
 open low forest over *Adenanthos cygnorum* and *Melaleuca thymoides*
 open shrubland over closed understorey of mixed low shrubs and herbs



Plate 1: Vegetation in Good condition and track in Degraded condition within Survey Area



Plate 2: Vegetation in Very Good – Excellent condition within Survey Area

2.4 Fauna

Database searches of NatureMap and the DEE protected matters database were undertaken to determine the likelihood of any Threatened or Priority fauna species within a 3 km radius of the Survey area (Appendix 1). The likelihood of these species occurring within the Survey Area is presented in Table 3. Listed marine or wetland species identified in the database searches as being potentially present have not been discussed as it is highly unlikely these species will be present in the site.

Table 3: Likelihood of Threatened and Priority Fauna species occurring in Survey Area

Species	Conservation status		Habitat requirements	Likelihood of occurrence in Survey area
	WC Act	EPBC Act		
<i>Apus pacificus</i> (Fork-tailed Swift)	IA	IA	Known from a broad range of habitats, foraging and roosting aerially and only occasionally landing (DEE 2016c).	Possible – species may fly over Survey Area.
<i>Ardea ibis</i> subsp. <i>coromanda</i> (Cattle Egret)	IA	IA	Known from a range of habitats including tropical and temperate grasslands, woodlands and terrestrial wetlands. Common in man-made environments including farms and rubbish tips (DEE 2016c).	Possible due to presence of suitable habitat.
<i>Ardea modesta</i> (Eastern Great Egret)	IA	Marine	Wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). The species usually frequents shallow waters. The Eastern Great Egret may retreat to permanent wetlands or coastal areas when other wetlands are dry (for example, during drought) (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Botaurus poiciloptilus</i> (Australasian Bittern)	Endangered	Endangered	Preferred habitat is wetlands with tall dense vegetation (TSSC 2011).	Unlikely due to absence of preferred habitat.
<i>Calidris ferruginea</i> (Curlew Sandpiper)	Vulnerable	Critically Endangered, IA	This species is migratory. Known habitat includes intertidal mudflats in sheltered coastal areas, such as estuaries and non-tidal swamps and lakes near the coast. The species has been recorded less often inland around lakes, dams and bore drains with bare edges of mud or sand. The distribution of the species is limited by land clearing and disturbance at roost and feeding sites (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Calidris ruficollis</i> (Red-necked Stint)	IA	IA	This species is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DotE 2015b).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Habitat requirements	Likelihood of occurrence in Survey area
	WC Act	EPBC Act		
<i>Calyptrorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo)	T	Vulnerable	Known habitat includes dense Jarrah, Karri and Marri forests receiving more than 600 mm average rainfall annually (DEE 2016c). Although most records are in Jarrah-Marri forests, the subspecies has been observed in a range of other forest and woodland types, including Blackbutt, Wandoo, Tuart, Albany, Yate and Flooded Gum (DEE 2016c).	Possible due to the presence of known foraging habitat species in the Survey Area.
<i>Calyptrorhynchus baudinii</i> (Baudin's Cockatoo, Baudin's Black-Cockatoo, Longbilled Black-Cockatoo)	T	Vulnerable	Known habitat includes remnant eucalypt woodlands, especially Jarrah, Marri and Karri forest. The species is also known from the Perth metropolitan area and in remnant patches of native vegetation on land cleared for development or agriculture (DEE 2016c). Known to utilise <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> as a foraging plant and <i>C. calophylla</i> as breeding habitat (DEC 2011).	Possible due to the presence of known foraging habitat species in the Survey Area.
<i>Calyptrorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo, Carnaby's Cockatoo)	T	Endangered	Known habitat includes remnant eucalypt woodlands, and shrubland or kwongan heathland dominated by proteaceous species. The species is also known from the Perth metropolitan area and in remnant patches of native vegetation on land cleared for agriculture (DEE 2016c). Known to utilise <i>C. calophylla</i> , <i>E. marginata</i> , <i>P. pinaster</i> as a foraging plant, <i>C. calophylla</i> as breeding habitat and <i>C. calophylla</i> , <i>E. marginata</i> , <i>P. pinaster</i> as roosting habitat (DEC 2011).	Highly likely due to presence of suitable foraging habitat and sighting of birds in trees on residential land adjacent to the Survey Area during the survey.
<i>Dasyurus geoffroii</i> (Chuditch, Western Quoll)	T	Vulnerable	Current habitat largely restricted to the southwest forests. The distribution of the species is limited by land clearing and predation by feral cats and foxes (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Falco peregrinus</i> (Peregrine Falcon)	S	-	Found in a range of habitats, in areas of abundant prey and secure nest sites. Prefers coastal and inland cliffs or open woodlands near water (BLA 2016).	Unlikely due to absence of preferred habitat.
<i>Hydromys chrysogaster</i> (Water-rat)	P4	-	Occupies habitats near bodies of fresh, brackish or marine permanent water, in some areas tending to prefer areas of complex riparian vegetation (DEC 2012a).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Habitat requirements	Likelihood of occurrence in Survey area
	WC Act	EPBC Act		
<i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)	P5	-	Broad habitat requirements ranging from dense scrubby vegetation and forests, to cropland/pastures containing or adjacent to dense native vegetation. Southern Brown Bandicoots are often associated with wetlands on the Swan Coastal Plain (DEC 2012b).	Unlikely due to absence of preferred habitat.
<i>Leioproctus contrarius</i> (bee)	P3	-	Known to feed on flowers of Goodeniaceae species and <i>Lechenaultia stenosepala</i> (DEC undated).	Unlikely due to absence of preferred habitat.
<i>Leipoa ocellata</i> (Malleefowl)	T	Vulnerable	Occurs in semi-arid and arid zones of temperate Australia, where it occupies shrublands and low woodlands that are dominated by mallee vegetation. It also occurs in other habitat types including eucalypt or native pine <i>Callitris</i> woodlands, acacia shrublands, Broombush, <i>Melaleuca uncinata</i> vegetation or coastal heathlands (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Lerista lineata</i> (Perth Slider, Lined Skink)	P3	-	Restricted to the Swan Coastal Plain south of the Swan River, inhabiting coastal dunes, banksia woodland and suburban gardens (Bush et al. 2010).	Possible due to presence of suitable habitat.
<i>Macropus irma</i> (Western Brush Wallaby)	P4	-	Optimum habitat for the species is open forest or woodland, preferring open, seasonally-wet flats with low grasses and open scrubby thickets (DEC 2012c).	Unlikely due to absence of preferred habitat.
<i>Merops ornatus</i> (Rainbow Bee-eater)	IA	IA	Known habitat is within sandy, disturbed areas throughout Australia (DEE 2016c). Introduced predators and habitat loss remain a key threat to this species (DEE 2016c).	Possible due to the presence of suitable habitat (sandy patches) in the Survey Area.
<i>Motacilla cinerea</i> (Grey Wagtail)	IA	IA	A regular visitor to northern Australia, associated with wetlands and watercourses (DEE undated).	Unlikely due to absence of preferred habitat.
<i>Myrmecobius fasciatus</i> (Numbat, Walpurti)	T	Vulnerable	Current distribution falls within Jarrah Forest subregion, in areas dominated by eucalypts providing hollow logs and branches for shelter and termites for food (TSSC 2014).	Unlikely due to absence of preferred habitat.
<i>Neelaps calonotos</i> (Black-striped Snake)	P3	-	Dunes and sand plains with heath or eucalypt or banksia woodlands (Bush et al. 2010).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Habitat requirements	Likelihood of occurrence in Survey area
	WC Act	EPBC Act		
<i>Neopasiphae simplicior</i> (bee)	T	-	Known only from a single location within Forrestdale Lake Nature Reserve, feeding on <i>Goodenia filiformis</i> , <i>Lobelia tenulor</i> , <i>Angianthus preissianus</i> and <i>Velleia</i> sp. (TSSC 2008).	Unlikely due to absence of preferred habitat.
<i>Numenius madagascariensis</i> (Eastern Curlew, Far Eastern Curlew)	T	Critically Endangered, IA	Feeding and breeding is associated with wetlands, watercourses and marine areas (TSSC 2015).	Unlikely due to absence of preferred habitat.
<i>Oxyura australis</i> (Blue-billed Duck)	P4	-	This species is almost wholly aquatic, and is seldom seen on land. Non-breeding flocks, often with several hundred individuals, congregate on large, deep open freshwater dams and lakes in autumn (DEE 2016b).	Unlikely due to absence of preferred habitat.
<i>Pandion haliaetus</i> (Osprey)	IA	IA	Inhabits areas around shallow waters including suburban environments, building nests high in large trees (BLI 2015).	Unlikely due to absence of preferred habitat.
<i>Plegadis falcinellus</i> (Glossy Ibis)	IA	IA	This species' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Pseudocheirus occidentalis</i> (Western Ringtail Possum)	T	Vulnerable	Largely restricted to the moister south-western corner of Western Australia particularly near coastal areas of <i>Agonis flexuosa</i> woodland and peppermint/uart associations from the Australind/Eaton area to the Waychinicup National Park, but with populations occurring in urban Busselton. The Upper Warren area east of Manjimup is the only place the western ringtail possum survives in the absence of coastal peppermint.	Unlikely due to known distribution and absence of preferred habitat.
<i>Rostratula australis</i> (Australian Painted Snipe)	-	Endangered	Feeding and breeding is associated with wetlands, watercourses, marine areas and man-made areas of standing water including dams and rice crops (TSSC 2013b).	Unlikely due to absence of preferred habitat.

Species	Conservation status		Habitat requirements	Likelihood of occurrence in Survey area
	WC Act	EPBC Act		
<i>Setonix brachyurus</i> (quokka)	T	Vulnerable	Known only from ten locations in Western Australia around the South Coast, Jarrah Forest and Rottnest Island (DEE 2016c).	Unlikely due to known distribution.
<i>Synemon gratiosa</i> (Graceful Sunmoth)	P4	-	Habitat for this species is known from Coastal heathland on Quindalup dunes and Banksia woodland on Spearwood and Bassendean dunes, where <i>Lomandra hermaphrodita</i> is widespread (DEE 2016c).	Unlikely due to absence of preferred habitat.
<i>Tringa nebularia</i> (Common Greenshank, Greenshank)	IA	IA	Feeding and breeding is associated with wetlands, watercourses and marine areas (DEE 2016c).	Unlikely due to absence of preferred habitat.

T – Threatened, S – Other specially protected fauna, P – Priority, IA – Protected under international agreement

3. Assessment against ten clearing principles

An assessment of the proposed clearing against the ten clearing principles outlined in Schedule 5 of the EP Act is provided in Table 4. This assessment demonstrates that the proposed removal of 0.3 ha of native vegetation is not at variance with the any of the clearing principles.

Table 4: Assessment against the ten clearing principles

Principle	Assessment	Conclusion
Native vegetation should not be cleared if it comprises a high level of biological diversity.	The Survey Area does not represent an exceptionally high level of biological diversity. Vegetation in the immediate area has been subject to significant historical disturbance for the purpose of urban development and the Survey Area itself has been subjected to minor disturbance due to its proximity to the school and residential areas. The vegetation type is well represented in similar and better condition in the local area within Bush Forever site 413 (GoWA 2000a, 2000b).	Removal of vegetation within the Survey Area is not considered to be at variance with this principle as it will not result in the removal of vegetation comprising a high level of biological diversity.
Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The Survey Area is small (0.59 ha) and will not result in any further fragmentation of existing habitat, due to the high level of disturbance surrounding the Survey Area. While black cockatoos are likely to forage in the Survey Area; the nature and scale of habitat to be cleared is not considered to be significant. No significant black cockatoo habitat trees were present.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle. Although the Survey Area contains known habitat species for black cockatoos; removal of vegetation will result in the loss of a negligible amount of foraging habitat. Additionally, clearing will not result in further habitat fragmentation due to the location of the Survey Area surrounded by residential areas and roads.
Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No rare flora were identified in the flora survey.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle as no rare flora are present.
Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	No Threatened or Priority Ecological Communities listed under the WC Act are known from within the Survey Area. The Survey Area contains a small amount of Banksia woodland which has recently been listed under the EPBC Act. The proponent proposes to clear 0.3 ha, which is less than the minimum patch size of Very Good to Excellent condition Banksia woodland vegetation that triggers the requirement for referral under the EPBC Act (clearing 0.5 ha in Excellent condition or 1 ha in Very Good condition requires referral).	Removal of vegetation within the Survey Area is not considered to be at variance with this principle. While clearing the vegetation will directly impact an EPBC Act listed TEC, only a small area of vegetation (approximately 0.3 ha in total) will be removed. This is below the condition threshold that triggers the requirement for EPBC Act referral. The proposed clearing represents a small percentage of the TEC in the broader region.

Principle	Assessment	Conclusion
Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	A total of 0.59 ha of vegetation is proposed to be cleared within an area that has historically been disturbed by clearing for urban development is currently surrounded by a school, residential areas, roads and grazing properties. Therefore, although the Survey Area is within a region where vegetation has been largely cleared for urban development, the proposed clearing is not considered large enough to be significant.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle as it will not result in the removal of a significant remnant of vegetation.
Native vegetation should not be cleared if it is growing in or in association with a watercourse or wetland.	Vegetation within the Survey Area is not growing in, or in association with, an environment associated with a watercourse or wetland.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle as vegetation within the proposed clearing is not part of, or in association with, a watercourse or wetland.
Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed clearing will affect a small amount of vegetation in a broader area that is already highly disturbed. The clearing is not likely to cause appreciable land degradation.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle, as the small amount of vegetation to be cleared is unlikely to cause any appreciable land degradation.
Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The Survey Area is not within or directly adjacent to a conservation area. The Survey Area is located approximately 300 m from Bush Forever site 253 and the nearest Conservation Category Wetland, separated by Carey Baptist College buildings and grounds, and 500 m from Bush Forever site 413, separated by rural properties.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle, as the small amount of proposed clearing and distance from these wetlands would not impact on the environmental values of the conservation areas.
Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The amount of vegetation proposed to be cleared is minimal, in an area where substantial amounts of native vegetation have already been removed. The additional clearing of this small area is unlikely to affect surface or underground water quality.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle, as the proposed clearing of native vegetation will affect a relatively small area. Furthermore, the proposed clearing is unlikely to have any impact on the quality of surface water or groundwater.
Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the intensity of flooding.	The proposed clearing will affect a small amount of vegetation and is not part of, or associated with, a flood management zone, a drainage basin or creek line.	Removal of vegetation within the Survey Area is not considered to be at variance with this principle, as the area to be cleared is negligible, and is not expected to cause or exacerbate flooding in the area.

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Appendix 1
Desktop assessment results (Parks and
Wildlife 2007-, DEE 2016)

NatureMap Species Report

Created By Guest user on 14/09/2016

Kingdom Plantae

Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)

Current Names Only Yes

Core Datasets Only Yes

Method 'By Circle'

Centre 115° 56' 11" E, 32° 06' 46" S

Buffer 5km

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
1.	3237	<i>Acacia benthamii</i>		P2	
2.	141	<i>Aponogeton hexatepalus</i> (Stalked Water Ribbons)		P4	
3.	38481	<i>Austrostipa jacobiana</i>		T	
4.	3178	<i>Byblis gigantea</i> (Rainbow Plant)		P3	
5.	1596	<i>Caladenia huegelii</i> (Grand Spider Orchid)		T	
6.	1637	<i>Diuris purdiei</i> (Purdie's Donkey Orchid)		T	
7.	1639	<i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)		T	
8.	13635	<i>Drakaea micrantha</i>		T	
9.	13191	<i>Drosera occidentalis</i> subsp. <i>occidentalis</i>		P4	
10.	20462	<i>Jacksonia gracillima</i>		P3	
11.	4027	<i>Jacksonia sericea</i> (Waldjumi)		P4	
12.	17976	<i>Meeboldina decipiens</i> subsp. <i>decipiens</i>		P3	
13.	36200	<i>Ornduffia submersa</i>		P4	
14.	11132	<i>Platysace ramosissima</i>		P3	
15.	974	<i>Schoenus benthamii</i>		P3	
16.	980	<i>Schoenus capillifolius</i>		P3	
17.	1008	<i>Schoenus pennisetis</i>		P3	
18.	19704	<i>Stenanthemum sublineare</i>		P2	
19.	18564	<i>Stylidium aceratum</i>		P2	
20.	7756	<i>Stylidium longitubum</i> (Jumping Jacks)		P4	
21.	1334	<i>Thysanotus glaucus</i>		P4	
22.	44444	<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)		P4	
23.	14714	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		P4	

Conservation Codes

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 14/09/16 14:20:10

[Summary](#)

[Details](#)

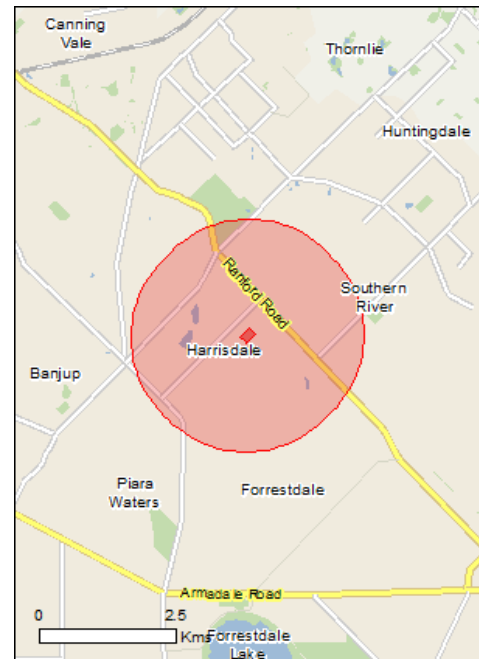
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

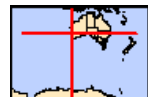
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
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[Coordinates](#)

Buffer: 2.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	19
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	42
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Forrestdale and thomsons lakes	Within 10km of Ramsar

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Roosting known to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Vulnerable	Species or species habitat may occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area
Drakaea elastica Glossy-leafed Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Balannup Lake	WA

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur

Name	Status	Type of Presence
Mus musculus House Mouse [120]		within area Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species

Name	Status	Type of Presence
Olea europaea Olive, Common Olive [9160]		habitat likely to occur within area Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name		State
Gibbs Road Swamp System		WA

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.112716 115.935701,-32.11268 115.93568,-32.11268 115.93568,-32.111953 115.934843,-32.110753 115.936238,-32.111571 115.937161,-32.112716 115.935701

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Parks and Wildlife Commission NT, Northern Territory Government](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Appendix 2
Vascular plant taxa recorded within the
Survey area

Family	Species
Anarthriaceae	<i>Lyginia barbata</i>
Asparagaceae	<i>Lomandra sonderi</i>
Asteraceae	? <i>Hyalosperma cotula</i>
	* <i>Ursinia anthemoides</i>
Casuarinaceae	<i>Allocasuarina humilis</i>
Colchicaceae	<i>Burchardia</i> sp.
Cyperaceae	<i>Schoenus curvifolius</i>
Dasyopogonaceae	<i>Dasyopogon bromeliifolius</i>
Dilleniaceae	<i>Hibbertia hypericoides</i>
	<i>Hibbertia subvaginata</i>
Droseraceae	<i>Drosera macrantha</i>
	<i>Drosera</i> sp. (prostrate)
Ericaceae	<i>Conostephium pendulum</i>
	<i>Leucopogon</i> sp.
Fabaceae	<i>Acacia pulchella</i>
	<i>Bossiaea eriocarpa</i>
	<i>Gastrolobium capitatum</i>
	<i>Gompholobium tomentosum</i>
Haemodoraceae	<i>Jacksonia furcellata</i>
	<i>Anigozanthos humilis</i>
	<i>Anigozanthos manglesii</i>
	<i>Conostylis serrulata</i>
Iridaceae	* <i>Gladiolus</i> sp.
	<i>Patersonia occidentalis</i>
Loranthaceae	<i>Nuytsia floribunda</i>
Myrtaceae	<i>Calytrix</i> sp.
	<i>Eucalyptus todtiana</i>
	<i>Kunzea glabrescens</i>
	<i>Melaleuca thymoides</i>
	<i>Scholtzia</i> sp.
Orchidaceae	<i>Caladenia flava</i>
	<i>Leporella fimbriata</i>
Poaceae	* <i>Ehrharta calycina</i>
Proteaceae	<i>Adenanthos cygnorum</i>
	<i>Banksia attenuata</i>
	<i>Banksia ilicifolia</i>
	<i>Banksia menziesii</i>
	<i>Petrophile linearis</i>
	<i>Stirlingia latifolia</i>
Restionaceae	<i>Desmocladius flexuosus</i>
	<i>Hypolaena exsulca</i>
Rutaceae	<i>Boronia ramosa</i>
	<i>Philothea spicata</i>
Zamiaceae	<i>Macrozamia riedlei</i>

* denotes introduced species

Appendix 3
Quadrat data

Quadrat	GPS Zone 50H		Introduced?	Species	% cover	Comments	
	Easting	Northing					
1	399653	6446524		<i>Banksia menziesii</i>	30		
				<i>Banksia attenuata</i>	30		
				<i>Macrozamia riedlei</i>	2		
				<i>Banksia ilicifolia</i>	2		
				<i>Adenanthos cygnorum</i>	2		
				<i>Acacia pulchella</i>	1		
				<i>Melaleuca thymoides</i>	5		
				<i>Stirlingia latifolia</i>	1		
				<i>Conostylis serrata</i>	0.1		
				<i>Bossiaea eriocarpa</i>	0.1		
				<i>Anigozanthos humilis</i>	5		
				<i>Hibbertia hypericoides</i>	1		
				<i>Anigozanthos manglesii</i>	0.5		
				<i>Gompholobium tomentosum</i>	0.01		
				<i>Philotheca spicata</i>	0.01		
				<i>Hypolaena exsulca</i>	0.01		
				<i>Scholtzia</i> sp.	0.1	no flowers	
				<i>Calytrix</i> sp.	0.05	no flowers	
				<i>Caladenia flava</i>	0.01		
				<i>Drosera macrantha</i>	0.05		
				<i>Drosera</i> sp. (prostrate)	0.05	no flowers	
				<i>Petrophile linearis</i>	0.01		
				<i>Nuytsia floribunda</i>	0.1		
				*	<i>Ursinia anthemoides</i>	2	
				*	<i>Ehrharta calycina</i>	10	
				*	<i>Gladiolus</i> sp.	2	
					<i>Desmocladius flexuosus</i>	0.1	
		<i>Leucopogon</i> sp.	0.05	no flowers			
		<i>Patersonia occidentalis</i>	0.1				
		<i>Burchardia</i> sp.	0.05	no flowers			
2	399673	6446598		<i>Banksia menziesii</i>	30		
				<i>Banksia attenuata</i>	30		
				<i>Allocasuarina fraseri</i>	2		
				<i>Hibbertia subvaginata</i>	1		
				<i>Boronia ramosa</i>	0.05		
				<i>Acacia pulchella</i>	1		
				<i>Kunzea glabrescens</i>	0.5		
				<i>Lomandra sonderi</i>	0.25		
				<i>Leucopogon</i> sp.	0.05	no flowers	
				<i>Hibbertia hypericoides</i>	0.1		
				<i>Drosera macrantha</i>	0.01		
				<i>Calytrix</i> sp.	0.05	no flowers	
				<i>Petrophile linearis</i>	0.01		
				<i>Scholtzia</i> sp.	0.1	no flowers	
				<i>Macrozamia riedlei</i>	1		
				<i>Conostephium pendulum</i>	0.01		
				<i>Gastrolobium capitatum</i>	0.1		
	<i>Lyginia barbata</i>	0.1					

Quadrat	GPS Zone 50H		Introduced?	Species	% cover	Comments
				<i>Adenanthos cygnorum</i>	15	
			*	<i>Dasyogon bromeliifolius</i>	0.01	
			*	<i>Philothea spicata</i>	0.01	
				<i>Gladiolus</i> sp.	0.05	
				<i>Ursinia anthemoides</i>	0.05	
				<i>Schoenus curvifolius</i>	0.01	
				<i>Caladenia flava</i>	0.05	
3	399680	6446543		<i>Banksia attenuata</i>	15	
				<i>Banksia menziesii</i>	15	
				<i>Banksia ilicifolia</i>	15	
				<i>Melaleuca thymoides</i>	15	
				<i>Jacksonia furcellata</i>	5	
				<i>Petrophile linearis</i>	0.01	
				<i>Leucopogon</i> sp.	0.05	
				<i>Anigozanthos humilis</i>	0.1	
				<i>Calytrix</i> sp.	0.1	
				<i>Lyginia barbata</i>	0.1	
				<i>Hibbertia hypericoides</i>	0.1	
				? <i>Hyalosperma cotula</i>	0.02	flowers not open
				<i>Eucalyptus todtiana</i>	10	
				<i>Lomandra sonderi</i>	0.1	
				<i>Drosera macrantha</i>	0.01	
				<i>Philothea spicata</i>	0.01	
				<i>Caladenia flava</i>	0.05	
			*	<i>Ursinia anthemoides</i>	0.05	
			*	<i>Gladiolus</i> sp.	0.05	
				<i>Anigozanthos manglesii</i>	0.05	
				<i>Gompholobium tomentosum</i>	0.01	
				<i>Patersonia occidentalis</i>	0.05	
				<i>Schoenus curvifolius</i>	0.01	