

Flora and Vegetation Report

Energy Place Muchea

Shire of Chittering

PMR Quarries

April 2020



Landform Research

TABLE OF CONTENTS

1.0	Project Overview	3
2.1	Methods	4
2.1	Aims of the Survey	4
2.2	Methods of the Survey	4
2.3	Limitations of the Survey	6
3.0	Flora and Vegetation	7
3.1	Community Types	7
3.2	Species List	8
3.3	Plant Density	9
3.4	Vegetation Structure	9
3.5	Vegetation Condition	9
3.6	Significant Vegetation	11
3.7	Threatened or Priority Ecological Communities	13
3.8	Vegetation Representation	13
4.0	Fauna	14
5.0	Wetlands and Riparian Vegetation	14
6.0	Clearing	15
	Impact of Clearing – Conclusions	15
	REFERENCES	17
	TABLES	
Table 1	Limitations of the Survey	6
Table 2	Species List	8
Table 3	Vegetation Structure Condition	9
Table 4	Vegetation Descriptors	10
Table 5	Kaesehagen 1995 Vegetation Condition Score table	11
Table 6	Significant Species	11
Table 7	Status of the Vegetation	13
Table 8	Assessment against the Clearing Principles	16
	ATTACHMENTS	
	Figures	
	Florabase Search	



Prepared by

Lindsay Stephens BSc (Geology), MSc (Plant Ecology)
 Mem Aus Geomechanics Soc – MEIANZ – FIQA - MAIG

U1 49 Birdwood Avenue Como WA 6152
 Tel 08 9474 3978, landform@iinet.net.au

1.0 PROJECT OVERVIEW

BACKGROUND

There is an approved sand pit located on Lots 2233 and 2238, Doyle Road, Muchea that supplied sand to the Great Northern Highway upgrade.

Not all the sand resource has been excavated, and whilst temporary access was obtained by traversing private land, as the pit will continue into the future, access along the gazetted Road, Energy Place is required by the property owner and the Shire of Chittering.

PHYSICAL ENVIRONMENT

Geology - Geomorphology

The land is flat from Brand Highway to the central parts of the road reserve and then rises slightly to the western end.

The soils in the west is sand of Bassendean type sand, overlying alluvial clay subsoils, with deeper sand to the west.

The eastern portion is a thin sheet of leached sand over alluvial sandy clay base subsoils.

Groundwater from the Gnangarra Mound flows east at this location to emerge near the central area as an irregular line of damp soils at the interface with the alluvial clays associated with palaeo-deposits of Ellen Brook. The sand interleaves with the alluvial clays.

There may also be ferricrete and coffee rock that may be causing localised minor confinement of the groundwater.

Climate

The climate of the area is classified as Mediterranean, with dry hot summers and cool wet winters.

Climate data is recorded at Bullsbrook, (Pearce RAAF), Precipitation is 688 mm per annum, of which 89% falls in the months April to October inclusive. At Swan Research Station evaporation exceeds rainfall in all but the four wettest months, and the situation at Bullsbrook can be expected to be similar.

Average maximum temperatures at Bullsbrook reach 33.3 degrees Celsius for the hottest months, January and February, but fall to 17.6 degrees Celsius in July. Average minima for the coldest month August, is 8.2 degrees Celsius.

The climate data for Bullsbrook shows that the predominant summer winds are from the east at 9.00 am and from the south west at 3.00 pm.

In summer wind blows from the east 70% of the time at 9.00 am and from the west/south west for 60% of the time at 15.00 pm. Summer wind speeds tend to be 6 to 10 km/hour at 9.00 am and between 11 and 20 km/hour at 15.00 pm.

The winter wind directions are more even, but there is a slight predominance from the east at 9.00 am and south west at 15.00 pm. The average speeds are between 1 to 10 km/hour.

2.0 Methods

2.1 Aims of the Survey

The aims of the survey were to ;

- Review the published data on the flora and vegetation of the local area.
- Identify the potential for significant species from the available published information, and previous surveys conducted by Landform Research.
- Complete a flora and vegetation study of the road reserve.
- Determine the vegetation condition using field work, aerial and ground photography.
- Map the vegetation communities if applicable.
- Conduct a targeted search for potentially significant species if applicable.
- Provide a list of flora species that occur on the subject land.

2.2 Methods of Survey

Past Studies

Landform Research had completed an earlier study of the whole area including Energy Place previously as part of the applications for the PMR sand pit and in support for the consequent Clearing Permits CPS 7948 and CPS 7806.

The previous studies were completed in August 2016 and 2017 to comply with Environmental Protection Authority (2004) Guidance Statement, *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*, No 5, 1 June 2004.

However a review of the *EPA December 2016 Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* enabled the assessment to be brought into line with the new guidance.

Therefore a Clearing Permit will be required and referral to the Commonwealth under the *EPBC Act 1999* for any listed matters, namely habitat for Black Cockatoos, is considered.

A site inspection of the site was carried out on 31 August 2016 by Lindsay Stephens of Landform Research.

A further vegetation study was completed on 22 August 2017 following a wetter winter in which the spring flowering appears to be earlier. In 2017 there were more species in flower than 2016.

Six 100 m² plots are assessed to provide compliance with EPA updated Guidelines for Flora in 2016 and 2017, but on vegetation to the west which included vegetation similar to that along Energy Place.

In 2016 – 2017 all native species found were recorded as were all exotics including weed species. An assessment was made of the vegetation condition and plant density through four 100 m² plots which included the percentage of soil cover.

Current Study

- **On Ground Assessment**

Lindsay Stephens of Landform Research conducted a vegetation assessment in terms of plant communities, vegetation condition, plant species, and the potential for Rare and Priority Species and Threatened Ecological Communities to be present on this site on 27 March 2020.

A search of Naturemap database was conducted prior to the survey

Energy Place was walked from east to west and then back again.

All native species found were recorded as were the dominating exotics including weed species.

As the vegetation is so altered not all exotic species were listed.

100 m² plots were not required because of the levels of disturbance, exotic species and regrowth.

Only one specimen was collected because all species were well known, but extensive photographs were taken of the vegetation and species.

- **Desktop Reviews**

The DBCA Rare and Priority Flora and Ecological Communities databases were searched through Florabase previously and re- searched in 2020. The Commonwealth EPBC databases were also searched and Naturebase was searched.

The main references for plant identification were knowledge of the assessor, published texts, and Florabase. The species are common colonisers, pasture and regrowth species as well as non local Eucalypts that have been planted and have self germinated. Marchant et al 1987, *Flora of the Perth Region*, Western Australian Herbarium, Barrett and Tay, 2016 *Perth Plants*, Second Edition, CSIRO and Botanic Gardens and Parks Authority, *Flora Base* and other publications.

The EPBC Protected Matters Search Tool 5 km radius was also searched.

Determinations and inferences on the Vegetation Complexes and Floristic Community Types were made in a number of ways, relating to comparisons to published floristics and geomorphic and regolith matching. The following documents were used in the reporting.

- Bush Forever used the same methodology based on comparisons to published floristics and geographic information, Bush Forever 2000, Volume 2 page 310.
- Comparisons were made to published boundaries of Vegetation Complexes in Heddle et al, 1980.
- Comparisons of species were made to the descriptions of Floristic Community Types in Gibson et al 1994, pages 29 to 45. (Gibson, N, Keighery, B.J., Keighery, G.J., Burbidge, A.H. and Lyons, M.N. (1994), *A Floristic Survey of the Swan Coastal Plain*. Unpublished Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia).
- Comparisons of species were made to the sorted table in Gibson et al 1994, Table 12, which shows the species frequency within each Floristic Community Type. Weston 2004 states that Neil Gibson noted that such comparisons are possible.

- Comparisons were made to the descriptions of the Floristic Community Types and maps in Appendix 1 of Gibson et al 2004.
- Comparison to regolith maps such as the 1 : 50 000 Perth Metropolitan Environmental Geology Map Sheets produced by the Western Australian Geological Survey; particularly Fremantle Sheet.
- Comparisons were made to published boundaries of Landforms and Soils in Churchward and McArthur, 1980.
- Soil and regolith mapping and assessment of the geomorphology by Lindsay Stephens at the time of the site inspections. Soil and regolith mapping has been found to be very closely aligned to species composition, through extensive field mapping by Landform Research, with small changes to the clay or sesqui-oxide content being related to the introduction and deletion of particular indicator species.
- Comparisons to databases of Regolith and Vegetation Communities held by Landform Research and the field experience of Lindsay Stephens.

2.3 Limitations of the Survey

Table 1 Survey Data and potential Constraints

Survey	Potential Constraint	Comment
Competency of the assessor	No	<ul style="list-style-type: none"> • The vegetation study was completed by Lindsay Stephens who holds appropriate botanical qualifications and experience with assessing vegetation on the Swan Coastal Plain including studies for CPS 7948 and CPS 7806. • The assessor also has significant knowledge with restoration of local vegetation communities and the non local native species that have been used in the past.
Available published information	Slight	<ul style="list-style-type: none"> • There is a significant amount of published material in local books, backed up by digital on line data with the ability to check at the WA Herbarium if required.
Timing of the Survey	No - slight	<ul style="list-style-type: none"> • The surveys were conducted at an appropriate time of the year considering there had been earlier studies completed in spring 2016 and 2017, and considering that the natural native vegetation is so degraded and almost totally replaced by exotic pasture species, and self seeded local and non local species.. • Considering the nature of the vegetation on site, its level of past and current disturbance, the limitations are not considered significant and the assessment is considered valid.
Adequacy of the survey	No	<ul style="list-style-type: none"> • The vegetation was very degraded and replaced by dense pasture and regrowth and self seeded species that identification of the original plant communities was almost lost. • The road reserve has previously been cleared and a 5 – 8 metre track installed and the proposed clearing will restore that original clearing. • All species recorded during the survey are listed on the species list without detailed searches of the uncommon exotic species contained in the pasture as it was not necessary to develop a list of these.
Vegetation Condition Influences	No	<ul style="list-style-type: none"> • The groundcover has been completely replaced by dense exotic pasture.

Sources of plant identification	No	<ul style="list-style-type: none"> Published works, previous surveys, knowledge of the assessor, comparisons to the WA Herbarium voucher specimens. Pressed specimens were collected of the <i>Scaevola</i> to check. Extensive photography of all species was collected.
Follow up work required.	No	<ul style="list-style-type: none"> Not required.

3.0 Flora and Vegetation

3.1 Community Types

The vegetation consists of two key areas. The eastern section where the existing limestone road is already constructed and the western half where the vegetation has previously been cleared and vegetation of local and non local native plants has grown on the pasture dominated ground cover. Figures 1 and 2.

The western half has thicker denser vegetation, dominated by Kikuyu pasture *Cenchrus clandestinus**, with Couch *Cynodon dactylon**, Veldt Grass *Ehrharta spp** and Lupins *Lupinus spp* among other minor exotic species as the ground cover under occasional scattered *Melaleuca preissiana*, widespread *Acacia saligna* regrowth, and self seeded non local eucalyptus such as *Corymbia maculata*, *Eucalyptus camaldulensis*, *Eucalyptus robusta* as well as some *Kunzea glabrescens* and *Taxandria linearifolia*.. Only one local *Eucalyptus tottiana* occurs at the western end and a *Corymbia calophylla* occurs in the central section of the road. Figures 2, 3 4 and 5.

On the eastern half there are isolated Paperbark *Melaleuca preissiana* and Marri *Corymbia calophylla* over pasture and exotics. Figures 2 and 3

In the central west here is a line of planted mixed non local Eucalypts outside the southern edge of the road reserve. These trees are tall and have self seeded into the road reserve forming the tree canopy. The tree belt to the south will be retained as they occur on adjoining land, with the road moving to the northern edge of the road reserve at that point to minimise trimming of the tree belt. Figures 4 and 5.

The vegetation was originally Yanga Complex, as identified by Heddlé et al, 1980, *Vegetation Complexes of the Darling System, Western Australia in Atlas of Natural Resources, Darling System, Western Australia*, Department of Conservation and Environment.

However the vegetation is degraded and replaced by exotic species that it is difficult to ascribe it to the original vegetation communities.

With such alteration to the vegetation and paucity of species, it is difficult to determine the original Floristic Community. The vegetation appears to have been slightly different on the lower slopes and the eastern sand ridge compared to the vegetation on the higher western sand ridge.

The vegetation was originally *Banksia* Shrubland to Woodland and probably had affinities to FCT 23a, 22, 21c and 21a. (Gibson, N, Keighery, B.J., Keighery, G.J., Burbidge, A.H. and Lyons, M.N. 1994).

The lower elevation in the wet areas probably has affinities to FCT 12 (Gibson, N, Keighery, B.J., Keighery, G.J., Burbidge, A.H. and Lyons, M.N. 1994).

Wetlands

3.2 Species List

- The species recorded during the site investigation are listed in Table 1. The survey was targeted at local native taxa.
- The species observed are reduced in number and indicate the level of disturbance to the vegetation on both resources, but particularly the eastern resource where only ten species were identified. Some more scattered plants of additional species are likely to be observed if every metre of the vegetation was walked.
- The species observed are all common species.
- Some species were observed from only one plant.
- The exotic species are the main species. There are others that were not recorded.

Table 2 Species List - August 2016, August 2017, 27 March 2020

Family	Genus Species	Comment
Araceae	<i>Zantedeschia aethiopica</i> *	Scattered
Asteraceae	<i>Conyza spp</i> *	
Goodeniaceae	<i>Scaevola lanceolata</i>	Isolated plants spreading from a wet area north of the road reserve
Fabaceae	<i>Acacia saligna</i>	
	<i>Luminus spp</i> *	
Juncaceae	<i>Juncus pallidus</i>	
Myrtaceae	<i>Comynbia calophylla</i>	
	<i>Corymbia maculata</i> *	
	<i>Eucalyptus camaldulensis</i>	
	<i>Eucalyptus robustus</i> *	
	<i>Eucalyptus rudis</i>	
	<i>Eucalyptus spp</i> *	Eastern states -self seeded from property perimeter to the south
	<i>Eucalyptus tottiana</i>	1 plant
	<i>Kunzea glabrescens</i>	Scattered to a thicket in the west
	<i>Taxandria linearifolia</i>	Scattered to a thicket in the central west
Poaceae	<i>Cenchrus clandestinus</i> *	Widespread thick groundcover
	<i>Cynodon dactylon</i> *	
	<i>Ehrharta calycynus</i> *	Common
	<i>Eragrotis curvula</i> *	
	<i>Hordeum leporinum</i> *	
	<i>Lolium spp</i> *	
Restionaceae	<i>Desmocladius flexuosus</i>	Isolated plants
Solanaceae	<i>Solanum nigrum</i> *	Isolated plants

3.3 Plant Density

The vegetation ranges from isolated to an open regrowth thicket but is generally isolated to scattered. Figures 3, 4 and 5. The most scattered vegetation is not shown.

3.4 Vegetation Structure

Photographs of the vegetation are attached above, which provide information on the vegetation structure. They show that the eastern sand resource is covered by an almost monoculture of *Xanthorrhoea preissii* regrowth and that the western resource is covered by degraded pine plantation with scattered low shrub remnant understory.

The structure of the vegetation is shown in Table 4 under 6.0 Vegetation Condition.

Table 3 Vegetation Structure Condition

VEGETATION STRUCTURE	HEIGHT	Eastern Half	Western Half
Overstorey	> 4 m	Completely Degraded Almost nil	Completely Degraded to Degraded Varies from little cover to cover of exotic and self seeded regrowth.
Tall Shrub layer	2 – 4 m	Completely Degraded Almost nil	Completely Degraded to Good Varies from little cover to cover of exotic and self seeded regrowth.
Lower Shrub Layer	0.5 – 2 m	Completely Degraded Almost nil	Completely Degraded to Degraded Varies from little cover to cover of self seeded regrowth.
Ground Cover	<0.5 m	Completely Degraded Pasture and exotic species	Completely Degraded Dominated by thick pasture

The Vegetation Condition Score used in this study is that used in EPA Guidance 2016

3.5 Vegetation Condition

**VEGETATION CONDITION NOTES –
SOUTH WEST AND INTERZONE BOTANICAL PROVINCES
EPBC Conservation Notice *Banksia* Woodlands Swan Coastal Plain, 2016, Table 3 page 22.**

The vegetation condition mapping used is that used by EPA December 2016 Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, modified from Keighery 1994 and Trudgen 1988.

Additional columns are added from the EPBC Guidelines for the identification of the condition of *Banksia* Woodland 2016.

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (s 266B) Approved Conservation Advice (incorporating listing advice) for the *Banksia* Woodlands of the Swan Coastal Plain ecological community.

The *EPA December 2016 Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* for the Eremaean and Northern Botanical Provinces use a slightly different scale.

Table 4 Vegetation Descriptors

Condition Score	Vegetation Condition	Vegetation Descriptors	Indicative condition measures – thresholds (EPBC Approved Conservation Advice 2016. #	
			Typical native vegetation composition	Typical weed cover
1	Pristine	No obvious signs of disturbance	Native plant species diversity fully retained or almost so	Zero or almost no weed cover - abundance
2	Excellent	Vegetation structure intact. Disturbance only affecting individual species, Weeds are non aggressive species.	High native plant species diversity	Less than 10% weed and exotics
3	Very Good	Vegetation structure altered; Obvious signs of disturbance. For example disturbance to vegetation from repeated fires, dieback, logging and grazing. Aggressive weeds present.	Moderate native plant species diversity	5 – 20% weed and exotics
4	Good	Vegetation structure altered but retains basic structure or ability to regenerate it. Obvious signs of disturbance eg from partial clearing, dieback, logging and grazing. Presence of very aggressive weeds.	Low native plant diversity	5 – 50% weed and exotics
5	Degraded	Vegetation structure severely impacted on by disturbance. Requires intensive management. Disturbance evident such as partial clearing, dieback, logging and grazing. Presence of very aggressive weeds at high density.	Very low native plant diversity	20 – 70% weed and exotics
6	Completely Degraded	Vegetation structure is no longer intact and the area is completely or almost completely without native flora. Equivalent to “parkland cleared”.	Very low to no native species diversity	>70% weed and exotics

The vegetation of the eastern half of the road reserve is “Completely Degraded” with a groundcover of pasture and exotoxic species and isolated Marri *Corymbia calophylla* and Paperbark *Melaleuca preissiana*. Figures 3, 4 and 5.

The Western half of the road reserve ranges from “Completely Degraded” to Degraded”, vegetation condition. The better vegetation is predominated by exotic and non local species that have self seeded. Figures 3, 4 and 5.

Another approach is to use the number of remaining species as an indicator of vegetation condition. This provides for a less subjective assessment of the vegetation condition. Kaesehagen, 1995, Bushland Condition Mapping, IN Invasive Weeds and Regenerating Ecosystems in Western Australia, Proceedings of Conference held at Murdoch University, July 1994, Institute for Science and Technology Policy, Murdoch University, 1995. A copy of the Kaesehagen 1995 vegetation condition table is shown below.

On the Kaesehagen Condition Table the eastern half would be classified as Very Poor with the western half being “Poor” to “Very Poor” Condition.

Table 5 Kaesehagen 1995 Vegetation Condition Table

Descriptor	Percentage of species remaining	Comments
Very Good - Excellent	80 – 100%	<ul style="list-style-type: none"> Vegetation structure intact or nearly so. Cover / abundance of weeds less than 5%. No or minimal signs of disturbance.
Fair - Good	50 – 80%	<ul style="list-style-type: none"> Vegetation structure modified. Cover / abundance of weed 5 – 20%, any number of individuals. Minor signs of disturbance
Poor	20 – 50%	<ul style="list-style-type: none"> Vegetation structure completely modified. Cover / abundance of weeds 20 – 60% any number of individuals. Disturbance incidence high
Very Poor	0 – 20%	<ul style="list-style-type: none"> Vegetation structure disappeared. Cover / abundance of weeds 60 – 100% cover, any number of individuals. Disturbance incidence very high.

Exotic Taxa

The pasture species were not identified as there were too many and naming the species did not add to the assessment of the value of the vegetation.

3.6 Significant Vegetation

Declared Rare, Priority or Significant Taxa

No plant recorded is listed as a Threatened or Priority species. The attached database search with a 5 km radius shows only a few taxa.

Table 6 Significant Species

SPECIES	STATE	EPBC	COMMENT
<i>Eryngium pinnatifidum</i> subsp <i>palustre</i>	P3		Distinctive plant that more commonly occurs in gravel.
<i>Platysace ramosissima</i>	P3		Distinctive plant with distinctive foliage. No similar plants were observed.
<i>Hydrocotyle striata</i>	P4		Aquatic plant. Unlikely on the elevated resource land.
<i>Chamaescilla gibsonii</i>	P3		Distinctive plant form. No similar plants were observed
<i>Caustis gigas</i>	P2		Distinctive grass like herb. No similar species were observed
<i>Cyathochaeta teretifolia</i>	P3		Distinctive plant that grows in lower wetter soils that do not occur on the resource area.
<i>Hibbertia helianthemoides</i>	P4		Occurs near the south coast.
<i>Drosera occidentalis</i> subsp <i>occidentalis</i>	P4		The two <i>Drosera</i> observed were climbing common species
<i>Drosera sewelliae</i>	P2		The two <i>Drosera</i> observed were climbing common species
<i>Leucopogon</i> sp <i>Murdoch</i>	P3		No <i>Leucopogon</i> was observed. Grows in winter wet soils which are not present.
<i>Leucopogon squarrosus</i> subsp <i>trigynus</i>	P2		The <i>Leucopogon</i> present has broadly ovate leaves which are not the leaf shape of <i>Leucopogon</i>

			<i>squarrosa</i>
<i>Acacia anomala</i>	T	V	Occurs in on the Gingin scarp in gravel which does not occur on site.
<i>Acacia cummingiana</i>	P3		Occurs in laterite and hills areas.
<i>Acacia drummondii</i> sp affins	P3		Distinctive. No similar foliage was observed
<i>Haemodorum loratum</i>	P3		Distinctive large leafed plant, which was not observed
<i>Verticordia lindleyi</i> subsp <i>lindleyi</i>	P4		<i>Verticordia nitens</i> was observed. <i>Verticordia lindleyi</i> subsp <i>lindleyi</i> grows in winter wet depressions and is unlikely to be present because of the dense pasture. Would normally be observable
<i>Verticordia serrata</i> var <i>linearis</i>	P3		<i>Verticordia nitens</i> was observed. Flowers September to October
<i>Thelymitra stellata</i>	T		No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Adenanthos cygnorum</i> subsp <i>chamaephyton</i>	P3		Distinctive prostrate form of <i>Adenanthos cygnorum</i> , that was not observed. Often associated with gravel.
<i>Grevillea althoferorum</i> subsp <i>fragilis</i>	T		Distinctive leaves. No similar plant was observed
<i>Grevillea canolleana</i>	P2		Distinctive. No similar plant was observed
<i>Persoonia rudis</i>	P3		Distinctive. No similar plant was observed. The timing of the survey was correct for flowering.
<i>Grevillea curviloba</i> subsp <i>curviloba</i>	T		Distinctive. No similar plant was observed
<i>Grevillea curviloba</i> subsp <i>incurva</i>	T		Distinctive. No similar plant was observed
<i>Synaphea grandis</i>	P4		No <i>Synaphea</i> was observed.
<i>Hypolanea robusta</i>	P4		Distinctive. No similar plant was observed
<i>Stylidium paludicola</i>	P3		No <i>Stylidium</i> were observed or are likely with the dense pasture cover
<i>Stylidium squamellosum</i>	P2		No <i>Stylidium</i> were observed or are likely with the dense pasture cover
<i>Andersonia gracilis</i>	T	E	Grows in winter wet, and gravelly sites that do not occur on site. Unlikely.
<i>Anigozanthos viridis</i> subsp <i>terraspectans</i>	T	V	Distinctive. No similar plant was observed
<i>Caladenia huegelii</i>	T	E	No orchid plants or leaves were observed
<i>Chamelaucium</i> sp <i>Gingin</i>	T	E	Distinctive. No similar plant was observed
<i>Conospermum densiflorum</i> subsp <i>unicephalum</i>	T	E	Grows in clay low lying soils further to the north east. Unlikely.
<i>Darwinia foetida</i>	T	CE	No similar plant was observed
<i>Diuris micrantha</i>	T	V	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Diuris purdiei</i>	T	E	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Eleocharis keigheri</i>	T	V	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Eucalyptus leprophloia</i>	T	E	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Eucalyptus x balanties</i>	T	E	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Grevillea corrugata</i>	T	E	Distinctive leaves. No similar plant was observed
<i>Grevillea curviloba</i> subsp <i>curviloba</i>	T	E	Distinctive. No similar plant was observed
<i>Grevillea curviloba</i> subsp <i>incurva</i>	T	E	Distinctive. No similar plant was observed
<i>Lepidosperma rostratum</i>	T	E	Grows in peaty sand and clay which do not occur on site. Unlikely.
<i>Ptychosema pusillum</i>	T	V	Small pea flower that grows further north. Timing of the survey matched the flowering period. Unlikely
<i>Thelymitra dedmaniarum</i>	T	E	No orchid plants or leaves were observed or are likely with the dense pasture cover
<i>Thelymitra stellata</i>	T	E	No orchid plants or leaves were observed or are likely with the dense pasture cover

3.7 Threatened or Priority Ecological Communities

Tumulus Springs Community

The road reserve lies outside the general area where Tumulus Springs Community occurs which is 1.5 km to the south east (Perth to Peel Green Growth Plan Draft 2016).

EPBC Legislation

Databases held under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* were searched.

All *Banksia* Woodlands of the Swan Coastal Plain are now listed as Threatened under the *EPBC Act 1999*.

The vegetation on site is not *Banksia* Woodland and is so degraded and has previously been cleared.

State Legislation

No listed significant plant communities.

3.8 Vegetation Representation

EPA Position Statement No 2, December 2000, *Environmental Protection of Native Vegetation in Western Australia*, specifically targets the retention of native vegetation in the Agricultural Areas in 4.1, *Clearing in the agricultural areas for agricultural purposes*. In 4.3, *Clearing in other areas of Western Australia*, it is unclear what "other areas" refers to, but may refer to retention of a 30% threshold in non agricultural areas.

Section 4.3 *Clearing in other areas of Western Australia*, (EPA Position Statement No 2, December 2000) expects that clearing will not take vegetation types below the 30% of the pre-clearing vegetation as recommended by ANZECC, 1999, *National Framework for the Management and Monitoring of Australia's Native Vegetation*. The National Objectives and Targets for Biodiversity Conservation 2001 - 2005 (Commonwealth of Australia 2001) also recognise 30% as the trigger value.

The threshold for constrained areas such as the Perth Metropolitan Region is placed at 10% by Government, (*Bush Forever 2000*, *CPC 2682/1*, and *EPA Guidance No 10 Level of Assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 Region* page 9).

Table 7 Status of the vegetation (WALGA 2010 and DBCA)

Area	% Remaining of Pre European Vegetation	% Protected in formal conservation areas or some protection
Swan Coastal Plain IBRA Region	39%	37%
Heddl Vegetation Complex	52.05%	62.17%
Bassendean Complex – North		
Mungala Comlex (DBCA)	10.41	5.39%

The Mungala Complex is below the guidelines, but the vegetation on site, whilst possibly being Mungala and Bassendean Complex North (in the west) is so degraded that it has no value. The most cleared section is the eastern half of the road where the Mungala Complex would have originally grown, but is now pasture with isolated *Melaleuca preissiana* and *Corymbia calophylla*.

The western half which was originally likely to have been Bassendean Complex North is also so degraded that it has little value as it is dominated by non local Eucalyptus over pasture with some *Taxandria linearifolia* and *Kunzea glabrescens* in the central sections. Whilst this vegetation is in slightly better condition it is also much better represented and protected.

4.0 Fauna

None of the vegetation is suitable for Black Cockatoo habitat as the cockatoos are not known to feed on the vegetation species on site.

5.0 Wetlands and Riparian Communities

The site is a road reserve with sheeted limestone surface in the east and previously cleared vegetation in the west.

The winter wet area to the north is typified by spreading *Taxandria linearifolia* and includes minor *Scaevola lanceolata*. Figures 3 and 4. This is part of the pasture and has germinated and grown in recent through a lack of cultivation.

An isolated seasonal damp area lies north of the road reserve in the central west, dominated by *Taxandria linearifolia* regrowth. Scattered *Scaevola lanceolata* grow within that vegetation. However the damp area lies north of the road reserve and whilst some minor *Taxandria linearifolia* occur in a small section of the road reserve it is not a defined wetland having been overrun by *Kikuyu*, *Acacia saligna* and non local Eucalypts.

The winter wet area does not really extend into the road reserve but there are scattered *Taxandria linearifolia* in the road reserve at that location.

Groundwater flow is west to east below the proposed floor of the excavations and that flow will be maintained.

6.0 Clearing

Clearing is controlled under the **Environmental Protection (Clearing of Native Vegetation) Regulations 2004**. These regulations provide for a number of principles against which clearing is assessed.

	CLEARING PRINCIPLE (Schedule 5 Environmental Protection Amendment Act, 1986)
1a	High Level of diversity
1b	Significant fauna habitat
1c	Necessary to existence of Rare flora
1d	Threatened Ecological Community
1e	Significant area of vegetation in an area that has been extensively cleared
1f	Wetland or watercourse
1g	Land degradation
1h	Impact on adjacent or nearby conservation areas
1i	Deterioration of underground water
1j	Increase flooding

Although the Clearing Principles consider Biodiversity and other conservation issues, they do not specifically address the issues of the metropolitan area or resource needs. Therefore some additional principles need to be added when considering the need for Basic Raw Materials.

The *Environmental Protection ACT 1986 Section 51O* states that the “CEO may take into account other matters that the “CEO considers relevant” (*EP ACT 1986 Section 51O*). Therefore Section 51O of the *Environmental Protection Act 1986* allows the CEO to take planning matters into account when making clearing decisions, such as a State Planning Policy and community need.

The issue of clearing native vegetation and fauna habitat cannot therefore be considered separately but must be considered in terms of community needs and end use of the site.

Impact of Clearing - Conclusions

The eastern section of the road may not require any clearing, or only the clearing of scattered trees and taller shrubs. The trees are small at 3 – 5 metres with none providing cockatoo habitat function.

The central section dominated by *Acacia saligna* regrowth was previously cleared, probably some 20 years ago. The *Melaleuca preissiana* have grown to be large shrubs to small trees with the *Acacia saligna* being regrowth with deaths and self seeding. The scattered *Taxandria linearifolia* is recent regrowth.

Towards the western end there is scattered *Kunzea glabrescens* regrowth on previously cleared land and one *Eucalyptus tottiana* at the western end of the road reserve.

It is possible that the vegetation may not need a clearing permit because it has previously been cleared and used for pasture and might gain an exemption under *Environmental Protection (Clearing of Native Vegetation) Regulations 2004, Section 5 – Prescribed Clearing Section 51C, Item 14, Clearing to maintain existing cleared areas for pasture, cultivation or forestry*, based on land use.

However the vegetation does lie within a road reserve. Most of the native plants and shrubs in the thicker central section may be exempt under Schedule 2, *Clearing for the maintenance in existing transport corridors* may also apply for some vegetation. This exemption may also apply to some shrubs and trees in the eastern section.

Table 8 Assessment against the Clearing Principles

	CLEARING PRINCIPLE <i>(Schedule 5 Environmental Protection Amendment Act, 1986).</i>	COMMENT
1a	High Level of diversity	<ul style="list-style-type: none"> There is a low level of species diversity <p><i>The proposed clearing is not at variance with this principle.</i></p>
1b	Significant fauna habitat	<ul style="list-style-type: none"> The vegetation does provide a small habitat for fauna, but is fenced and larger fauna are excluded. Large areas of <i>Banksia</i> Woodland lie to the west. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1c	Necessary to existence of Rare flora	<ul style="list-style-type: none"> No Declared Rare flora was found or are likely to occur. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1d	Threatened Ecological Community	<ul style="list-style-type: none"> There are no nearby Threatened ecological communities. Tumulus Springs lie some distance away and <i>Banksia</i> Woodland occurs well to the west. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1e	Significant area of vegetation in an area that has been extensively cleared	<ul style="list-style-type: none"> This represents a very small area of degraded vegetation that is dominated by exotic and non local species. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1f	Wetland or watercourse	<ul style="list-style-type: none"> There are no wetlands on site but a small wet area lies to the north outside the road verge footprint and consists of <i>Taxandria linearifolia</i> regrowth on pasture. <p><i>The proposed clearing is partially at variance with this principle.</i></p>
1g	Land degradation	<ul style="list-style-type: none"> The road was previously cleared. This proposal is to reinstate the past road by widening it and returning it to its past condition. <p><i>The proposed clearing is not at variance with this principle by nature of the excavation.</i></p>
1h	Impact on adjacent or nearby conservation areas	<ul style="list-style-type: none"> There are no nearby reserves. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1i	Deterioration of underground water	<ul style="list-style-type: none"> The clearing and construction of the road will not impact on water resources. <p><i>The proposed clearing is not at variance with this principle.</i></p>
1j	Increase flooding	<ul style="list-style-type: none"> There is no evidence of the existing road impacting on water regimes, flooding or surrounding vegetation. The road footprint was previously cleared to a wider footprint and is being returned to that form <p><i>The proposed clearing is not at variance with this principle.</i></p>

REFERENCES

- ANZECC, 1999, *National Framework for the Management and Monitoring of Australia's Native Vegetation*.
- Beard J S, 1981, *Vegetation Survey of Western Australia 1 : 1 000 000 Swan Sheet*.
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.
- Commonwealth of Australia, 2001, *National Objectives and Targets for Biodiversity Conservation 2001 – 2005*.
- Department of Conservation and Land Management, 1980, *Atlas of Natural Resources of the Darling System*.
- Environmental Protection Authority (2016), *Guidance Statement, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*,
- EPA Guidance Statement No 10, January 2003, *Level of assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 region*.
- Gibson, N, Keighery, B.J., Keighery, G.J., Burbidge, A.H. and Lyons, M.N. (1994), *A Floristic Survey of the Swan Coastal Plain. Unpublished Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia*.
- Hedde et al, 1980, *Vegetation Complexes of the Darling System, Western Australia in Atlas of Natural Resources, Darling System, Western Australia*, Department of Conservation and Environment.
- Kaesehagen, 1995, *Bushland Condition Mapping*, IN *Invasive Weeds and Regenerating Ecosystems in Western Australia*, Proceedings of Conference held at Murdoch University, July 1994, Institute for Science and Technology Policy, Murdoch University.
- Perth Biodiversity Project 2013, *Native vegetation of the Swan Coastal Plain, Western Australia* Local Government Association Perth Western Australia.



SAND PIT

SAND PIT

Byrne Rd

Energy Place

Energy Pl

WEST

ENERGY PLACE
MUCHEA

Edwards Close

Horton St

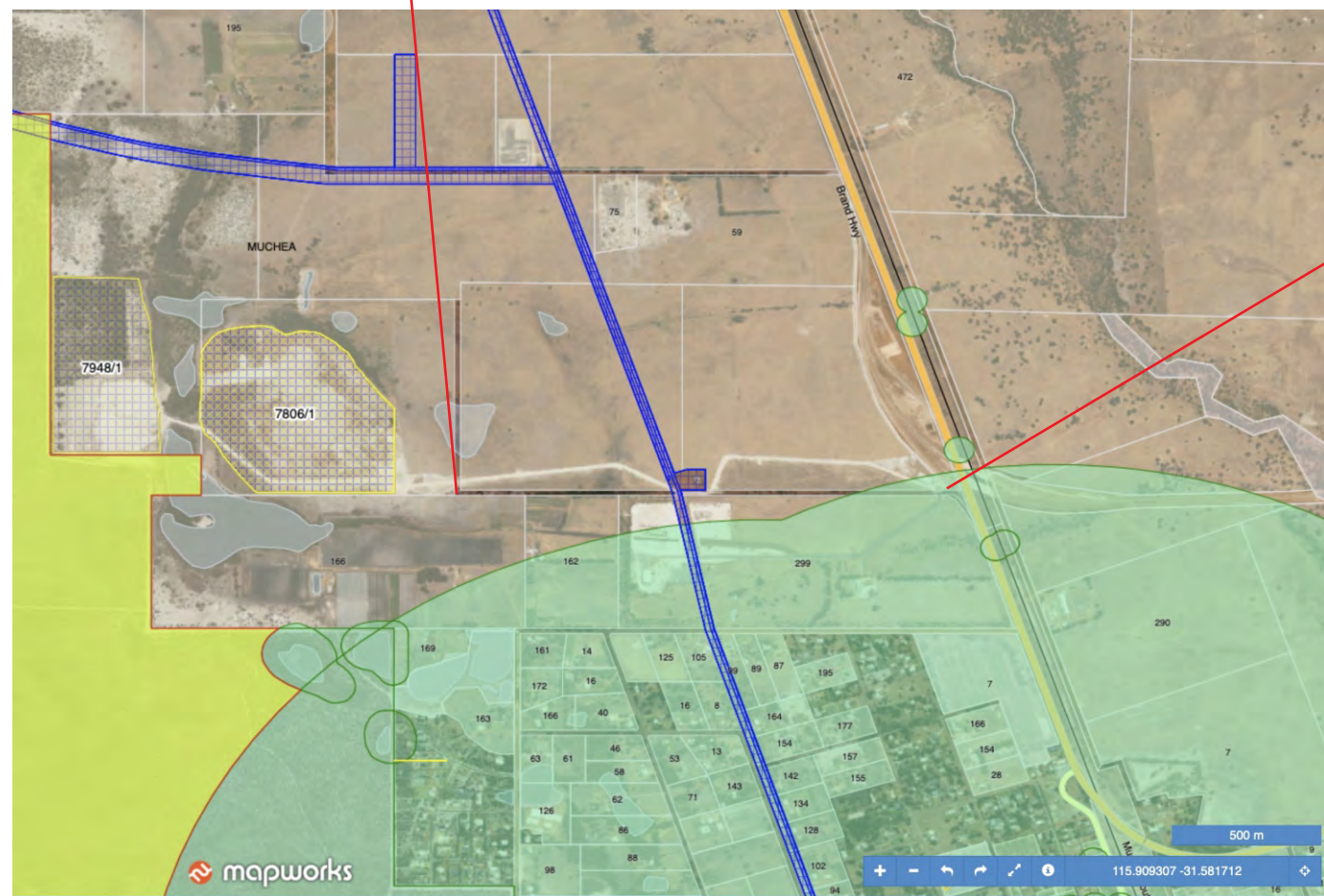
Ellen St

FIGURE 1

Steer St

EAST

Edward St



ENERGY PLACE VEGETATION - OBLIQUE AERIAL FROM THE SOUTH

EXISTING CLEARING PERMITS
DWER DATABASE

FIGURE 2

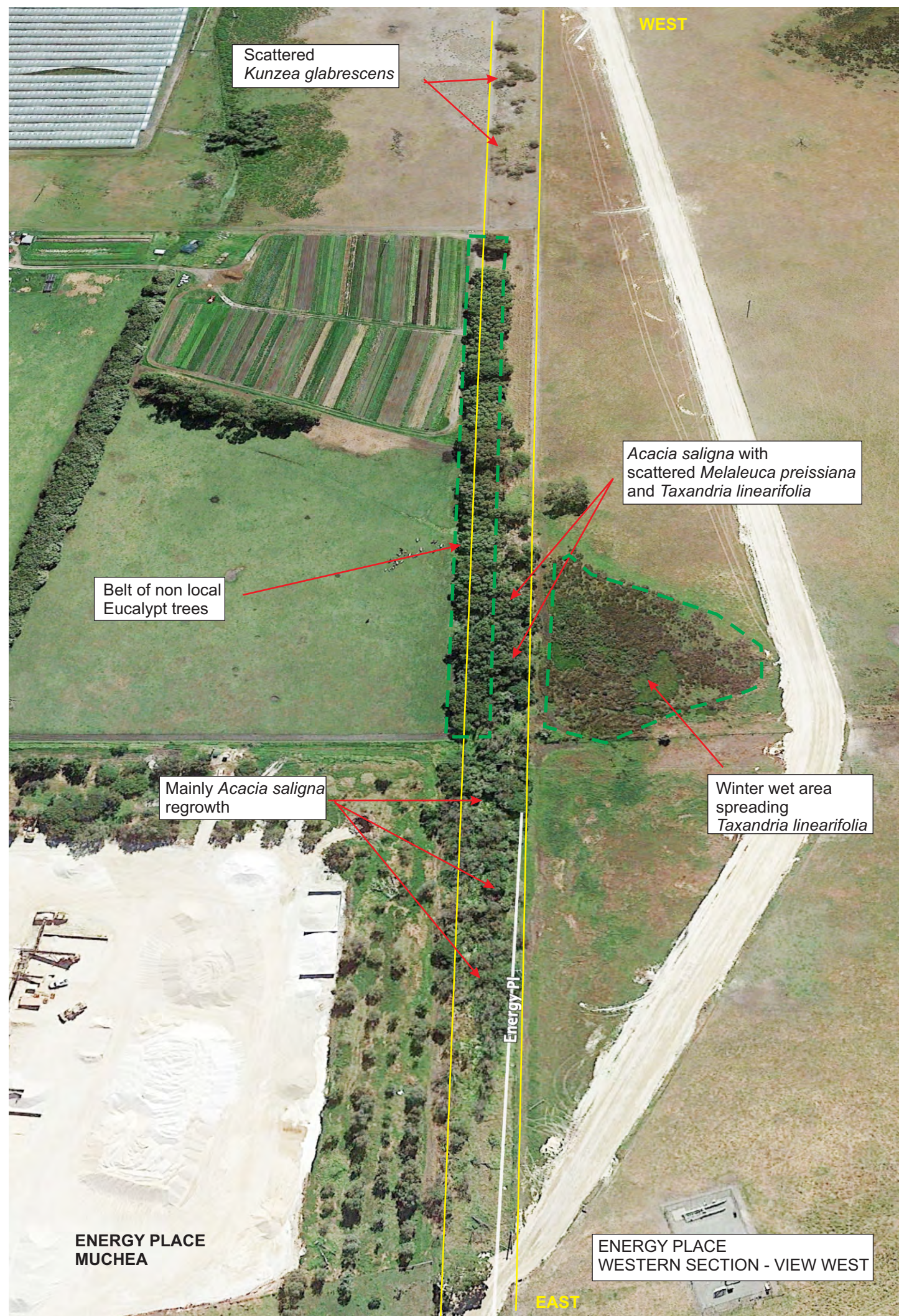


FIGURE 3



Planted row of non local
Eucalypts on the property
to the south

Road reserve

Land to the north

**ENERGY PLACE
MUCHEA**

0 50m

ENERGY PLACE
WESTERN SECTION - VIEW WEST

Winter wet area

FIGURE 4

Acacia saligna and
non local Eucalypt
self seeding and
regrowth



Degraded *Acacia saligna* regrowth
over pasture



Scattered
Melaleuca preissiana
over pasture





**ENERGY PLACE
MUCHEA**



FIGURE 5

Species By Area

Specify a user-defined or predefined area to select.

☒ Show optional criteria

Current Names Only=Yes; Core Datasets Only=Yes;

Selection Type ☐ Predefined ☒ User-defined

Circle

Search Radius km

☒ DMS ☐ Decimal Degrees

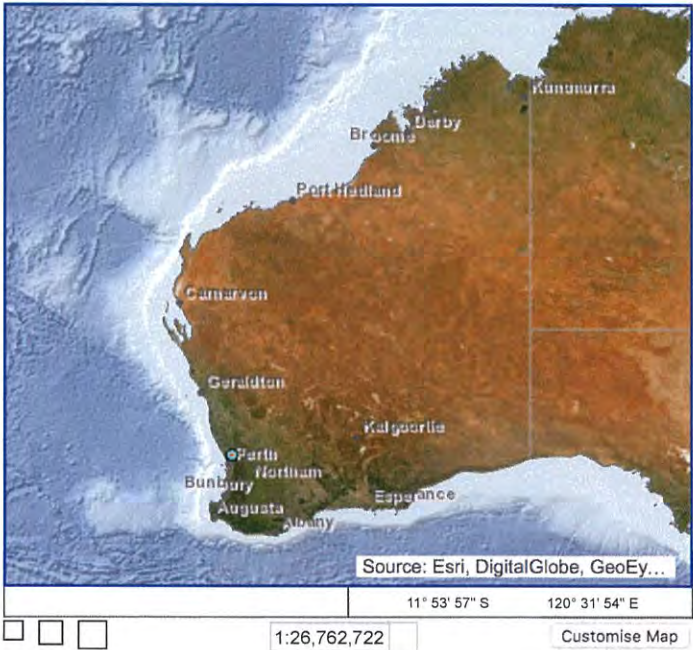
Latitude ° ' "S

Longitude ° ' "E

Group Results By

Species Symbol Classification ☐ Default ☐ Unique ☒ Group By

☐



Search Results

Method="By Circle"; Centre="115° 57' 32" E,31° 34' 05" S; Buffer=5km; Current Names Only=Yes; Core Datasets Only=Yes; Execution Time=1.1s; Group By=Family;

Family	Names	Records
Acanthizidae	3	8
Accipitridae	5	5
Agamidae	1	2
Amaranthaceae	1	1
Anarthriaceae	1	2
Anatidae	5	23
Apiaceae	3	3
Araceae	1	1
Ardeidae	2	4
Artamidae	1	1
Asparagaceae	7	11
Asteraceae	11	16
Bignoniaceae	1	1
Boryaceae	1	1
Cacatuidae	1	1
Campanulaceae	3	5
Campephagidae	1	2
Casuarinaceae	3	3
Celastraceae	1	1
Centropodidae	2	2
Cheluidae	1	1
Chenopodiaceae	1	1
Chironomidae	3	3
Colchicaceae	2	2
Columbidae	2	3
Copepoda	1	1
Corvidae	1	6
Cracticidae	2	6
Crassulaceae	1	2
Cuculidae	2	4
Culicidae	1	1
Cupressaceae	1	3
Cyclopidae	2	2
Cyperaceae	8	12
Dasyopogonaceae	1	2
Dicruridae	3	13
Dilleniaceae	5	9
Diplodactylidae	2	3
Droseraceae	5	6
Dytiscidae	1	1
Elaeocarpaceae	2	4
Elapidae	4	8
Enchytraeidae	1	1
Ericaceae	14	27
Euphorbiaceae	2	2
Fabaceae	35	47
Falconidae	3	4
Gekkonidae	1	2
Geraniaceae	3	3
Goodeniaceae	8	9

Haemodoraceae	13	17
Halcyonidae	2	3
Haloragaceae	1	2
Hemerocallidaceae	4	5
Hirundinidae	2	3
Hydrophilidae	1	1
Hylidae	2	14
Iridaceae	2	4
Juncaceae	1	1
Juncaginaceae	2	2
Lamiaceae	4	6
Lauraceae	2	2
Limnodynastidae	3	17
Lycopodiaceae	2	2
Macarthuriaceae	1	1
Maluridae	2	7
Malvaceae	1	1
Meliphagidae	6	11
Menyanthaceae	1	1
Meropidae	1	2
Myobatrachidae	2	16
Myrtaceae	41	91
Nematoda	1	1
Nemesiidae	1	3
Onagraceae	2	2
Orchidaceae	7	8
Orobanchaceae	1	1
Oxalidaceae	1	1
Pachycephalidae	1	3
Pardalotidae	1	3
Peramelidae	1	1
Peronosporaceae	1	7
Petroicidae	1	1
Phalacrocoracidae	2	2
Phyllanthaceae	1	1
Pittosporaceae	1	1
Plantaginaceae	2	2
Poaceae	11	12
Podargidae	1	1
Podicipedidae	1	5
Polygalaceae	1	1
Polygonaceae	4	4
Primulaceae	1	3
Proteaceae	24	108
Psittacidae	11	65
Pygopodidae	2	7
Ranunculaceae	1	2
Recurvirostridae	1	1
Restionaceae	5	12
Rotifera	1	1
Rutaceae	2	2
Sarcoptiformes	1	1
Schizaeaceae	1	1
Scincidae	4	4
Scrophulariaceae	3	4
Selaginellaceae	1	2
Solanaceae	2	2
Stylidiaceae	18	27
Tamaricaceae	1	1
Threskiornithidae	2	2
Thymelaeaceae	1	2
Urodacidae	1	1
Vespertilionidae	2	2
Xanthorrhoeaceae	1	3
Zosteropidae	1	3
TOTAL	397	806

Acanthizidae

Acanthiza chrysorrhoa Yellow-rumped Thornbill	3
Gerygone fusca Western Gerygone	4
Smicromis brevirostris Weebill	1
3 names, 8 records	

Accipitridae

Accipiter cirrocephalus Collared Sparrowhawk	1
Accipiter fasciatus Brown Goshawk	1
Circus approximans Swamp Harrier	1
Elanus axillaris	1
Elanus caeruleus subsp. axillaris Australian Black-shouldered Kite	1
5 names, 5 records	

Agamidae

Ctenophorus adelaidensis Southern Heath Dragon, Western Heath Dragon	2
1 names, 2 records	

Amaranthaceae

*Amaranthus powellii Powell's Amaranth	1
1 names, 1 records	

Anarthriaceae

Lyginia barbata	2
1 names, 2 records	

Anatidae

Anas castanea Chestnut Teal	1
Anas gracilis Grey Teal	8
Anas superciliosa Pacific Black Duck	5

Chenonetta jubata Australian Wood Duck, Wood Duck	5
Tadorna tadornoides Australian Shelduck, Mountain Duck	4
5 names, 23 records	
Apiaceae	
Actinotus leucocephalus Flannel Flower	1
* Coriandrum sativum Coriander	1
Xanthosia huegeli	1
3 names, 3 records	
Araceae	
Lemna disperma Duckweed	1
1 names, 1 records	
Ardeidae	
Ardea novaehollandiae White-faced Heron	3
Botaurus poiciloptilus Australasian Bittern T	1
2 names, 4 records	
Artamidae	
Artamus cinereus Black-faced Woodswallow	1
1 names, 1 records	
Asparagaceae	
Laxmannia ramosa subsp. <i>ramosa</i>	2
Laxmannia squarrosa	2
Lomandra hermaphrodita	1
Lomandra sericea Silky Mat Rush	1
Thysanotus arbuscula	1
Thysanotus arenarius	3
Thysanotus asper Hairy Fringe Lily	1
7 names, 11 records	
Asteraceae	
* Bidens pilosa Cobbler's Pegs	1
Brachyscome iberidifolia	1
* Cotula coronopifolia Waterbuttons	2
Hyalosperma cotula	1
Millotia myosotidifolia	1
Podolepis gracilis Slender Podolepis	1
Siloxerus humifusus Procrumbent Siloxerus	2
* Sonchus oleraceus Common Sowthistle	2
Trichocline spathulata Native Gerbera	1
* Verbesina encelioides	1
Waitzia suaveolens Fragrant Waitzia	3
11 names, 16 records	
Bignoniaceae	
* Campsis radicans	1
1 names, 1 records	
Boryaceae	
Borya scirpoidea	1
1 names, 1 records	
Cacatuidae	
Eolophus roseicapillus	1
1 names, 1 records	
Campanulaceae	
Isotoma hypocrateriformis Woodbridge Poison	2
Lobelia anceps Angled Lobelia	1
Lobelia tenuior Slender Lobelia	2
3 names, 5 records	
Campephagidae	
Coracina novaehollandiae Black-faced Cuckoo-shrike	2
1 names, 2 records	
Casuarinaceae	
Allocasuarina humilis Dwarf Sheoak	1
Allocasuarina microstachya	1
Casuarina obesa Swamp Sheoak, Kuli	1
3 names, 3 records	
Celastraceae	
Tripterococcus brunonis Winged Stackhouseia	1
1 names, 1 records	
Centrolepidaceae	
Aphelia cyperoides	1
Centrolepis aristata Pointed Centrolepis	1
2 names, 2 records	
Cheluidae	
Chelodina colliei South-western Snake-necked Turtle	1
1 names, 1 records	
Chenopodiaceae	
Salicornia blackiana	1
1 names, 1 records	
Chironomidae	
Chironomus aff. alternans (V24) (CB)	1
Cryptochironomus griseidorsum	1
Orthocladiinae sp.	1
3 names, 3 records	

0 names, 0 records	
Colchicaceae	
Burchardia bairdiae	1
Burchardia multiflora Dwarf Burchardia	1
2 names, 2 records	
Columbidae	
Ocyphaps lophotes Crested Pigeon	2
Phaps chalcoptera Common Bronzewing	1
2 names, 3 records	
Copepoda	
Harpacticoida sp.	1
1 names, 1 records	
Corvidae	
Corvus coronoides Australian Raven	6
1 names, 6 records	
Cracticidae	
Cracticus tibicen Australian Magpie	4
Cracticus torquatus Grey Butcherbird	2
2 names, 6 records	
Crassulaceae	
*Crassula natans	2
1 names, 2 records	
Cuculidae	
Cacomantis pallidus Pallid Cuckoo	3
Chrysococcyx lucidus Shining Bronze Cuckoo	1
2 names, 4 records	
Culicidae	
Culex (Culex) australicus	1
1 names, 1 records	
Cupressaceae	
Callitris pyramidalis Swamp Cypress	3
1 names, 3 records	
Cyclopidae	
Mixocyclops sp.	1
Paracyclops intermedius	1
2 names, 2 records	
Cyperaceae	
Cyathochaeta teretifolia P3	4
*Cyperus tenellus Tiny Flatsedge	1
Isoplepis cernua var. setiformis	1
Lepidosperma sp.	1
Schoenus brevisetis	1
Schoenus curvifolius	2
Schoenus rigens	1
Schoenus sp. G Broad Sheath (K.L. Wilson 2633)	1
8 names, 12 records	
Dasypogonaceae	
Dasypogon bromeliifolius Pineapple Bush	2
1 names, 2 records	
Dicruridae	
Grallina cyanoleuca Magpie-lark	5
Rhipidura albiscapa Grey Fantail	4
Rhipidura leucophrys Willie Wagtail	4
3 names, 13 records	
Dilleniaceae	
Hibbertia huegelii	3
Hibbertia hypericoides Yellow Buttercups	1
Hibbertia hypericoides subsp. hypericoides	2
Hibbertia stellaris Orange Stars	1
Hibbertia subvaginata	2
5 names, 9 records	
Diplodactylidae	
Strophurus spinigerus	2
Strophurus spinigerus subsp. spinigerus	1
2 names, 3 records	
Droseraceae	
Drosera erythrorhiza Red Ink Sundew	1
Drosera glanduligera Pimpernel Sundew	1
Drosera neesii Jewel Rainbow	2
Drosera pallida Pale Rainbow	1
Drosera pulchella Pretty Sundew	1
5 names, 6 records	
Dytiscidae	
Sternopriscus browni	1
1 names, 1 records	
Elaeocarpaceae	
Platytheca galioides	3
Tetratheca hirsuta subsp. hirsuta	1
2 names, 4 records	

Elapidae	
Brachyurophis semifasciatus Southern Shovel-nosed Snake	3
Echiopsis curta Bardick	1
Elapognathus coronatus Crowned Snake	2
Neelaps calonotos Black-striped Snake, black-striped burrowing snake P3	2
4 names, 8 records	
Enchytraeidae	
Enchytraeidae sp.	1
1 names, 1 records	
Ericaceae	
Andersonia heterophylla	4
Astroloma xerophyllum	3
Brachyloma preissii Globe Heath	1
Conostephium minus Pink-tipped Pearl flower	4
Conostephium pendulum Pearl Flower	3
Conostephium preissii	1
Leucopogon conostephioides	2
Leucopogon gracillimus	1
Leucopogon leptanthus	1
Leucopogon oxycedrus	1
Leucopogon sprengeioides	2
Leucopogon squarrosus subsp. trigynus P2	1
Lysinema pentapetalum	2
Styphelia ciliosa	1
14 names, 27 records	
Euphorbiaceae	
*Euphorbia terracina Geraldton Carnation Weed	1
Monotaxis occidentalis	1
2 names, 2 records	
Fabaceae	
Acacia anomala Grass Wattle T	2
Acacia applanata	1
Acacia drewiana subsp. drewiana	6
Acacia drummondii subsp. affinis P3	1
Acacia huegelii	1
Acacia pulchella Prickly Moses	2
Acacia saligna subsp. saligna	1
Bossiaea eriocarpa Common Brown Pea	3
Cristonia biloba subsp. biloba	1
Daviesia angulata	1
Daviesia brachyphylla	1
Daviesia hakeoides subsp. hakeoides	1
Daviesia incrassata subsp. incrassata	1
Daviesia longifolia	1
Daviesia physodes	1
Euchilopsis linearis Swamp Pea	1
Gastrolobium calycinum York Road Poison	1
Gastrolobium retusum	1
Gastrolobium spinosum Prickly Poison	1
*Genista linifolia Flaxleaf Broom	2
Gompholobium confertum	1
Gompholobium scabrum	1
Gompholobium tomentosum Hairy Yellow Pea	1
Isotropis cuneifolia Granny Bonnets	1
Isotropis cuneifolia subsp. glabra P3	1
Jacksonia floribunda Holly Pea	2
Jacksonia furcellata Grey Stinkwood	1
Jacksonia sternbergiana Stinkwood, Kapur	1
*Lotus subbiflorus	1
*Medicago polymorpha Burr Medic	1
*Melilotus indicus	2
*Ornithopus compressus Yellow Serradella	1
Pultenaea reticulata	1
Sphaerolobium linophyllum	1
*Vicia sativa Common Vetch	1
35 names, 47 records	
Falconidae	
Falco cenchroides Australian Kestrel, Nankeen Kestrel	2
Falco longipennis Australian Hobby	1
Falco peregrinus Peregrine Falcon S	1
3 names, 4 records	
Gekkonidae	
Underwoodisaurus milii Barking Gecko	2
1 names, 2 records	
Geraniaceae	
*Erodium botrys Long Storksbill	1
*Geranium molle Dove's Foot Cranesbill	1
*Pelargonium x hortorum	1
3 names, 3 records	
Goodeniaceae	
Lechenaultia biloba Blue Leschenaultia	1
Lechenaultia expansa	1
Lechenaultia floribunda Free-flowering Leschenaultia	1
Scaevola anchusifolia	1
Scaevola glandulifera Viscid Hand-flower	1
Scaevola lanceolata Long-leaved Scaevola	1
Scaevola phlebopetala Velvet Fanflower	2
Verreauxia reinwardtii Common Verreauxia	1

8 names, 9 records	
Haemodoraceae	
Anigozanthos humilis Catspaw	1
Anigozanthos humilis subsp. humilis	1
Anigozanthos manglesii var. x angustifolius	1
Anigozanthos viridis subsp. viridis	2
Conostylis aculeata subsp. aculeata	1
Conostylis aculeata subsp. preissii	1
Conostylis candicans Grey Cottonhead	2
Conostylis candicans subsp. candicans	2
Conostylis juncea	1
Haemodorum simplex	1
Haemodorum spicatum Mardja	1
Macropidia fuliginosa Black Kangaroo Paw	1
Phlebocarya ciliata	2
13 names, 17 records	
Halcyonidae	
* Dacelo novaeguineae Laughing Kookaburra	2
Todiramphus sanctus Sacred Kingfisher	1
2 names, 3 records	
Haloragaceae	
Gonocarpus pithyoides	2
1 names, 2 records	
Hemerocallidaceae	
Corynotheca micrantha Sand Lily	1
Hensmania turbinata	2
Tricoryne elatior Yellow Autumn Lily	1
Tricoryne tenella	1
4 names, 5 records	
Hirundinidae	
Hirundo neoxena Welcome Swallow	1
Petrochelidon nigricans Tree Martin	2
2 names, 3 records	
Hydrophilidae	
Paracymus pygmaeus	1
1 names, 1 records	
Hylidae	
Litoria adelaidensis Slender Tree Frog	7
Litoria moorei Motorbike Frog	7
2 names, 14 records	
Iridaceae	
* Gladiolus undulatus Wild Gladiolus	2
Patersonia occidentalis Purple Flag, Koma	2
2 names, 4 records	
Juncaceae	
Juncus caespiticius Grassy Rush	1
1 names, 1 records	
Juncaginaceae	
Cycnogeton lineare	1
Triglochin centrocarpa	1
2 names, 2 records	
Lamiaceae	
Cyanostegia angustifolia Tinsel-flower	1
Hemandra pungens Snakebush	1
Hemigenia barbata	3
Lachnostachys verbascifolia var. verbascifolia	1
4 names, 6 records	
Lauraceae	
Cassytha flava Dodder Laurel	1
Cassytha racemosa Dodder Laurel	1
2 names, 2 records	
Limnodynastidae	
Heleioporus eyrei Moaning Frog	9
Limnodynastes dorsalis Western Banjo Frog	6
Neobatrachus pelobatoides Humming Frog	2
3 names, 17 records	
Lycopodiaceae	
Lycopodiella serpentina	1
Phylloglossum drummondii Pigmy Clubmoss	1
2 names, 2 records	
Macarthuraceae	
Macarthuria apetala	1
1 names, 1 records	
Maluridae	
Malurus pulcherrimus Blue-breasted Fairy-wren	1
Malurus splendens Splendid Fairy-wren	6
2 names, 7 records	
Malvaceae	
Thomasia grandiflora Large Flowered Thomasia	1
1 names, 1 records	

Meliphagidae

Acanthorhynchus superciliosus	Western Spinebill	1
Anthochaera carunculata	Red Wattlebird	3
Anthochaera lunulata	Western Little Wattlebird	1
Lichmera indistincta	Brown Honeyeater	4
Manorina flavigula	Yellow-throated Miner	1
Phylidonyris novaehollandiae	New Holland Honeyeater	1

6 names, 11 records

Menyanthaceae

Ornduffia submersa	P4	1
------------------------------------	----	---

1 names, 1 records

Meropidae

Merops ornatus	Rainbow Bee-eater	2
--------------------------------	-------------------	---

1 names, 2 records

Myobatrachidae

Crinia glauerti	Clicking Frog	6
Crinia insignifera	Squelching Froglet	10

2 names, 16 records

Myrtaceae

Babingtonia camphorosmae	Camphor Myrtle	1
Beaufortia elegans	Elegant Beaufortia	6
Beaufortia macrostemon	Darling Range Beaufortia	1
Calothamnus lateralis		1
Calothamnus sanguineus	Silky-leaved Blood flower, Pindak	4
Calytrix angulata	Yellow Starflower	1
Calytrix flavescens	Summer Starflower	3
Calytrix sapphirina		1
Calytrix sylvana		1
Calytrix variabilis		2
Darwinia foetida	T	16
Darwinia thymoides		1
Eremaea asterocarpa	subsp. asterocarpa	1
Eremaea purpurea		5
Eucalyptus tottiana	Coastal Blackbutt	1
Hypocalymma angustifolium	White Myrtle, Kudjid	2
Hypocalymma angustifolium	subsp. Dandaragan plateau (S. Patrick 702A)	1
Hypocalymma robustum	Swan River Myrtle	1
Kunzea glabrescens	Spearwood	1
Kunzea micrantha	subsp. petiolata	1
Kunzea recurva		1
Leptospermum erubescens	Roadside Teatree	1
Leptospermum laevigatum	Coast Teatree	1
Melaleuca concreta		1
Melaleuca huegelii	Chenille Honey Myrtle	1
Melaleuca lateritia	Robin Redbreast Bush	1
Melaleuca osullivanii		1
Melaleuca raphiophylla	Swamp Paperbark	1
Melaleuca ryeae		2
Melaleuca seriata		2
Melaleuca viminea	subsp. viminea	1
Regelia ciliata		3
Scholtzia involucrata	Spiked Scholtzia	1
Taxandria linearifolia		1
Verticordia densiflora	var. densiflora	4
Verticordia insignis	subsp. insignis	3
Verticordia nitens	Morrison Featherflower, Kodjeningara	4
Verticordia ovalifolia		3
Verticordia pennigera		1
Verticordia plumosa	var. brachyphylla	1
Verticordia serrata	var. linearis P3	6

41 names, 91 records

Nematoda

Nematoda sp.		1
------------------------------	--	---

1 names, 1 records

Nemesiidae

Aname mainae		3
------------------------------	--	---

1 names, 3 records

Onagraceae

Epilobium billardiernum	Glabrous Willow Herb	1
---	----------------------	---

*Oenothera laciniata		1
--------------------------------------	--	---

2 names, 2 records

Orchidaceae

Caladenia paludosa		1
Calochilus uliginosus		1
Diuris drummondii	Tall Donkey Orchid T	2
Leporella fimbriata	Hare Orchid	1
Microtis media	subsp. media	1
Prasophyllum cyphochilum	Pouched Leek Orchid	1
Thelymitra benthamiana	Leopard Orchid	1

7 names, 8 records

Orobanchaceae

*Bellardia viscosa		1
------------------------------------	--	---

1 names, 1 records

Oxalidaceae

*Oxalis purpurea	Largeflower Wood Sorrel	1
----------------------------------	-------------------------	---

1 names, 1 records

Pachycephalidae	
Pachycephala rufiventris Rufous Whistler	3
1 names, 3 records	
Pardalotidae	
Pardalotus striatus Striated Pardalote	3
1 names, 3 records	
Peramelidae	
Isodon fusciventer Quenda, southwestern brown bandicoot P4	1
1 names, 1 records	
Peronosporaceae	
Phytophthora cinnamomi	7
1 names, 7 records	
Petroicidae	
Petroica boodang Scarlet Robin	1
1 names, 1 records	
Phalacrocoracidae	
Phalacrocorax melanoleucos Little Pied Cormorant	1
Phalacrocorax melanoleucos subsp. melanoleucos Little Pied Cormorant	1
2 names, 2 records	
Phyllanthaceae	
Poranthera microphylla Small Poranthera	1
1 names, 1 records	
Pittosporaceae	
Billardiera fraseri Elegant Pronaya	1
1 names, 1 records	
Plantaginaceae	
Gratiola pubescens	1
* Misopates orontium Lesser Snapdragon	1
2 names, 2 records	
Poaceae	
Amphipogon turbinatus	1
Austrostipa flavescens	2
Austrostipa tenuifolia	1
* Briza maxima Blowfly Grass	1
* Cenchrus ciliaris Buffel Grass	1
* Chloris gayana Rhodes Grass	1
* Chloris virgata Feathertop Rhodes Grass	1
Dactyloctenium radulans Button Grass	1
* Melinis repens	1
Poa poliformis Coastal Poa	1
Rytidosperma caespitosum	1
11 names, 12 records	
Podargidae	
Podargus strigoides Tawny Frogmouth	1
1 names, 1 records	
Podicipedidae	
Tachybaptus novaehollandiae Australasian Grebe, Black-throated Grebe	5
1 names, 5 records	
Polygalaceae	
Comesperma scoparium Broom Milkwort	1
1 names, 1 records	
Polygonaceae	
Muehlenbeckia adpressa Climbing Lignum	1
* Rumex conglomeratus Clustered Dock	1
* Rumex crispus Curled Dock	1
* Rumex hypogaeus	1
4 names, 4 records	
Primulaceae	
* Lysimachia arvensis Pimpernel	3
1 names, 3 records	
Proteaceae	
Adenanthos cygnorum Common Woollybush	1
Adenanthos drummondii	1
Adenanthos obovatus Basket Flower	1
Banksia attenuata Slender Banksia, Piara	2
Banksia bipinnatifida subsp. multifida	1
Banksia menziesii Firewood Banksia	2
Conospermum canaliculatum	1
Conospermum canaliculatum subsp. canaliculatum	1
Conospermum huegelii Slender Smokebush	1
Conospermum stoechadis subsp. sclerophyllum	1
Conospermum triplinervium Tree Smokebush	3
Grevillea curviloba	1
Grevillea curviloba subsp. curviloba T	10
Grevillea curviloba subsp. incurva T	56
Grevillea obtusifolia Obtuse Leaved Grevillea	8
Grevillea pilulifera Woolly-flowered Grevillea	2
Hakea cristata Snail Hakea	1
Hakea erinacea Hedge-hog Hakea	1
Persoonia comata	1
Petrophile linearis Pixie Mops	4

Petrophile seminuda	3
Petrophile striata	1
Stirlingia latifolia Blueboy	3
Synaphea gracillima	2
24 names, 108 records	
Psittacidae	
Barnardius zonarius	3
Cacatua galerita Sulphur-crested Cockatoo	1
* Cacatua galerita subsp. galerita Sulphur-crested Cockatoo	3
Cacatua pastinator Western Long-billed Corella	2
Cacatua roseicapilla Galah	1
Cacatua sanguinea Little Corella	1
* Cacatua tenuirostris Eastern Long-billed Corella	1
Calyptorhynchus banksii Red-tailed Black-Cockatoo	1
Calyptorhynchus banksii subsp. naso Forest Red-tailed Black Cockatoo T	1
Calyptorhynchus latirostris Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo T	50
Platycercus zonarius Australian Ringneck, Ring-necked Parrot	1
11 names, 65 records	
Pygopodidae	
Lialis burtonis	3
Pygopus lepidopodus Common Scaly Foot	4
2 names, 7 records	
Ranunculaceae	
* Ranunculus muricatus Sharp Buttercup	2
1 names, 2 records	
Recurvirostridae	
Himantopus himantopus Black-winged Stilt	1
1 names, 1 records	
Restionaceae	
Alexgeorgea nitens	2
Chordifex microcodon	1
Cytogonidium leptocarpoides	3
Dielsia stenostachya	5
Leptocarpus scariosus	1
5 names, 12 records	
Rotifera	
Rotifera sp.	1
1 names, 1 records	
Rutaceae	
Boronia purdieana Winter Boronia	1
Philotheca spicata Pepper and Salt	1
2 names, 2 records	
Sarcoptiformes	
Oribatida sp.	1
1 names, 1 records	
Schizaeaceae	
Schizaea fistulosa Narrow Comb Fern	1
1 names, 1 records	
Scincidae	
Cryptoblepharus buechananii	1
Ctenotus australis	1
Egernia napoleonis	1
Lerista lineopunctulata	1
4 names, 4 records	
Scrophulariaceae	
* Dischisma capitatum Woolly-headed Dischisma	1
Eremophila glabra subsp. albicans	2
Myoporum caprarioides Slender Myoporum	1
3 names, 4 records	
Selaginellaceae	
Selaginella gracillima Tiny Clubmoss	2
1 names, 2 records	
Solanaceae	
* Nicotiana glauca Tree Tobacco	1
* Solanum nigrum Black Berry Nightshade	1
2 names, 2 records	
Stylidiaceae	
Levenhookia stipitata Common Stylewort	1
Stylidium affine Queen Triggerplant	1
Stylidium albolilacinum	2
Stylidium amoenum Lovely Triggerplant	1
Stylidium androsaceum	1
Stylidium brunonianum Pink Fountain Triggerplant	1
Stylidium calcaratum Book Triggerplant	1
Stylidium crossocephalum Posy Triggerplant	3
Stylidium cygnorum	2
Stylidium dichotomum Pins-and-needles	3
Stylidium diuroides Donkey Triggerplant	1
Stylidium diuroides subsp. diuroides	1
Stylidium divaricatum Daddy-long-legs	1
Stylidium hispidum White Butterfly Triggerplant	1
Stylidium recurvum	2

Stylidium repens Matted Triggerplant	2
Stylidium roseolatum Pink-wing Triggerplant	1
Stylidium schoenoides Cow Kicks	2
18 names, 27 records	
Tamaricaceae	
* Tamarix parviflora	1
1 names, 1 records	
Threskiornithidae	
Platalea flavipes Yellow-billed Spoonbill	1
Threskiornis spinicollis Straw-necked Ibis	1
2 names, 2 records	
Thymelaeaceae	
Pimelea imbricata var. piligera	2
1 names, 2 records	
Urodacidae	
Urodacus novaehollandiae	1
1 names, 1 records	
Vespertilionidae	
Nyctophilus geoffroyi subsp. geoffroyi Lesser Long-eared Bat	1
Nyctophilus gouldi Gould's Long-eared Bat	1
2 names, 2 records	
Xanthorrhoeaceae	
Chamaescilla gibsonii P3	3
1 names, 3 records	
Zosteropidae	
Zosterops lateralis Grey-breasted White-eye, Silvereye	3
1 names, 3 records	
Conservation Status	
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	

wa.gov.au
[DBCA Home](#) [Privacy](#) [Disclaimer](#) [Copyright](#) [Registration](#) [Feedback](#)

Except where otherwise stated, all contents copyright Government of Western Australia. All rights reserved.



Department of Biodiversity,
Conservation and Attractions

