Greenbushes to Kirup Pipeline Route
Vegetation, Flora and Fauna Assessment

October 2013

Prepared for
Water Corporation

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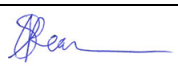
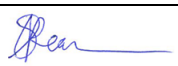
B	20/01/2014	R. Oma	S. Pearse	
0	29/01/2014	R. Oma	S. Pearse	

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Abbreviations

Abbreviation	Definition
Astron	Astron Environmental Services
BOM	Bureau of Meteorology
CR	Critically Endangered
cm	Centimetres
DAFWA	Department of Agriculture and Food Western Australia
DBH	Diameter at breast height
DEC	Department of Environment and Conservation (now DPaW or DER)
DER	Department Environmental Regulation
DPaW	Department of Parks and Wildlife
DoE	Department of the Environment
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DoE)
EN	Endangered
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
m	Metres
mm	Millimetres
MNES	Matters of national environmental significance (under the EPBC Act)
P	Priority
PEC	Priority ecological community
TEC	Threatened ecological community
VU	Vulnerable
WALGA	Western Australian Local Government Association
WC Act	*Wildlife Conservation Act 1950*

Executive Summary

The Water Corporation is in the process of finalising a planned pipeline route between Greenbushes and Kirup and is seeking the option that will have the least impact upon the ecology of the local area. A flora, vegetation, fauna and fauna habitat assessment was conducted over the proposed alignment in peak spring (14 to 17 October 2013). The results and recommendations arising from the field survey will assist the Water Corporation in selecting an alignment that seeks to minimise impact to the local environment. The alignment follows existing tracks and cleared areas; the impact to flora, vegetation and habitat is likely to be very limited.

Two-hundred-and-six vascular plant taxa representing 128 genera from 48 families were recorded within the survey area with 28 taxa being weeds. The flora and vegetation recorded are typical of the southern jarrah forest and no conservation significant flora or vegetation was recorded. A number of conservation significant flora taxa were listed from the database search results for the survey areas; however suitable habitat for the majority of these taxa was not found. Where potential habitat occurred, the area was intensively searched but none of these taxa were found. Three collections will be lodged with the WA Herbarium due to the atypical characteristics of the collections (*Caladenia ?ferruginea* (atypical colouring); *Synaphea gracillima* (leaf apex atypical) and *Stylidium scandens* (significant range extension)).

Three fauna habitats were recorded in the survey area: high quality jarrah-marri woodland (particularly around Greenbushes and Mullalyup), flooded gum creeklines and cleared areas. Thirty-four fauna species were recorded during the fauna assessment, comprising three amphibian species, 28 bird species and three mammal species. Four species of which, are listed under state and federal legislation and have conservation significance: Baudin's black cockatoo (*Calyptorhynchus baudinii*), forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*), eastern great egret (*Ardea modesta*) and quenda (*Isoodon obesulus fusciventer*).

Baudin's and the forest red-tailed black cockatoos were both present within the survey area. At the time of survey they were observed overflying, foraging and roosting in small flocks and pairs. Two hundred and nine eucalypt trees (jarrah or marri) with a DBH greater than 50 cm diameter at breast height were recorded with 10 trees containing hollows. Of the 209 total trees recorded, only 185 trees (including seven trees containing potential hollows and 178 trees without hollows) were located within the alignment, with the others located adjacent to the survey area. No breeding black cockatoos were observed during the survey. Breeding habitat is considered limited as most trees did not contain hollows and were relatively young trees of uniform height and width, measuring just over 500 mm DBH.

All jarrah-marri woodland in good condition or better, within the survey area (10.52 ha of a total corridor of 20.3 ha) would be considered medium to high value foraging habitat for the black cockatoo species. Evidence of foraging by black cockatoos was recorded throughout the survey area. Black cockatoo species were regularly observed feeding within the alignment near the golf course and along Cirillo Road.

Astron advises that the project may pose a risk of impact to the black cockatoo species; depending on the number of recorded habitat trees which may require removal for the pipeline. The project may be at variance to Principle B of the 10 Clearing Principles, if clearing of more than one hectare of quality foraging habitat and clearing of breeding habitat (which includes all trees over 500 mm DBH of species known to support breeding) is proposed. Therefore, referral to the Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* may be required, depending on final alignment selection and tree removal. The tree and habitat loss could be reduced by minimising clearing where possible, in particular habitat trees.

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1 Introduction

1.1 Project Background

The Water Corporation proposes, as part of the Bridgetown Regional Water Supply Scheme, to link and improve the water supply to seven towns: Greenbushes, Balingup, Mullalyup, Kirup, Bridgetown, Hester and Boyup Brook in the south-west of Western Australia (herein referred to as the 'survey area'; Figure 1).

The survey alignment is approximately 20 kilometres (km) long; the corridor was generally 10 metres (m) in width (wider in some areas to accommodate potential variations in alignment) and the total area of survey was 35.66 hectares (ha). The vegetated area is 20 ha and only 10.5 ha remains in good condition or better. The Water Corporation intend to utilise existing tracks and cleared areas (which exist for the entire alignment) for the pipeline; and seek to minimise any clearing which may be required to install the infrastructure.

Astron Environmental Services (Astron) understands the Water Corporation are in the process of finalising a planned alignment and are seeking to utilise the option that will have the least impact upon the ecology of the local area.

The results and recommendations arising from the field survey will assist the Water Corporation in selecting an alignment that seeks to minimise impact to the local environment. Scope and Objectives

Astron was commissioned by Water Corporation to undertake the following scope of works:

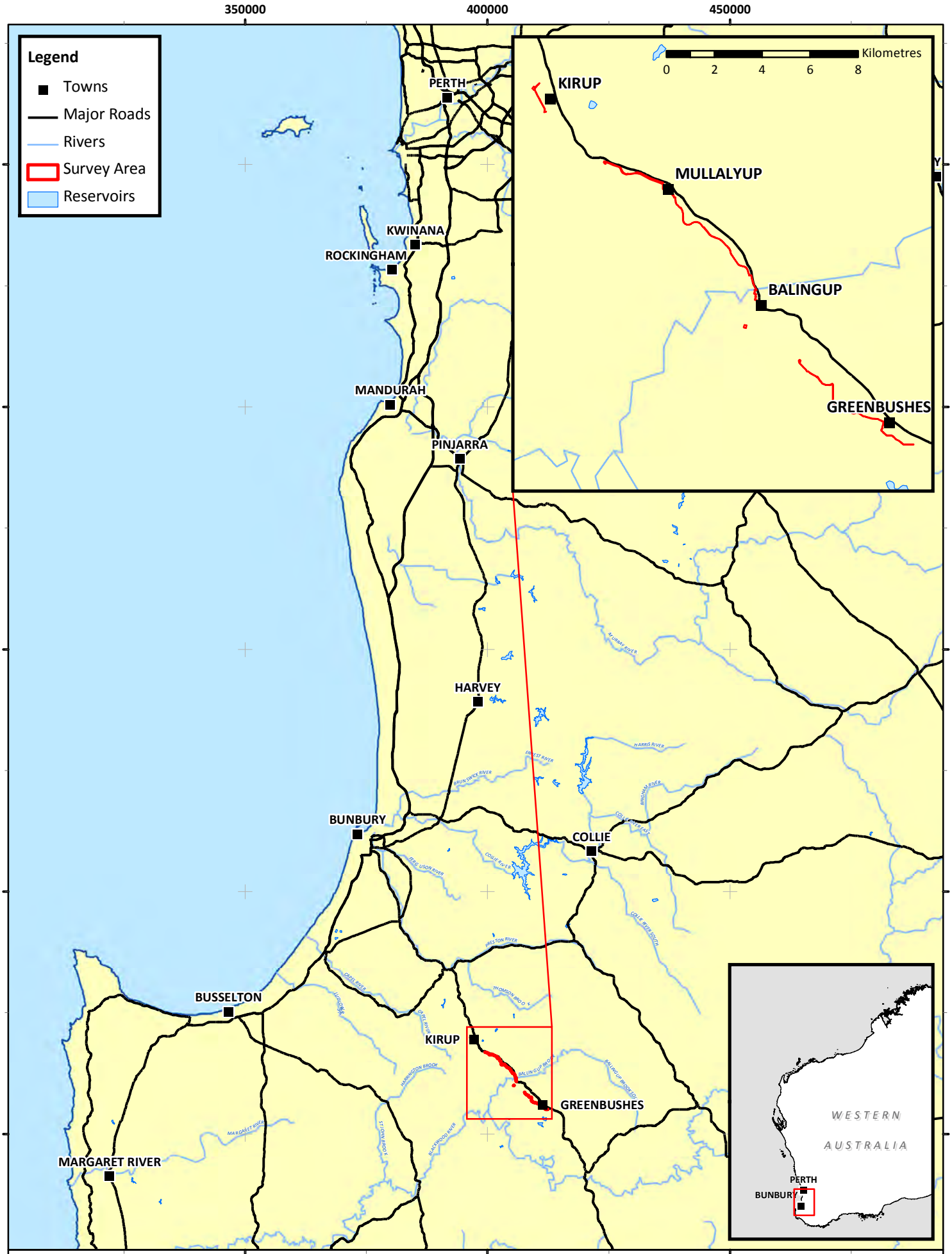
- Level 2 flora and vegetation assessment to be compliant with the Environmental Protection Authority (EPA)'s Position Statement No. 3 (2002) and Guidance Statement 51 (2004).
- Level 1 Fauna assessment to be compliant with the Guidance Statement 56 (EPA 2004b).
- Field survey of trees with hollows suitable for use by black cockatoos and trees with drays likely to be used by ring tailed possums (if any), being Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

More specifically, the requirements of the flora, vegetation and fauna assessment for the route:

- A database and literature search for conservation significant flora, fauna and vegetation (threatened or priority ecological communities (TEC/PECs); locally significant vegetation) that may occur within the survey area.
- A flora and vegetation field survey:
    - identifying and mapping the different vegetation communities on site and their condition
    - recording an inventory of flora species, including weed species
    - recording any threatened or priority flora and ecological communities.
- A fauna field survey:
    - identifying and mapping fauna habitats
    - recording opportunistic fauna sightings

  - assessing the potential of available fauna habitats to provide habitat (foraging, roosting, nesting) for fauna of conservation significance, and evidence of recent utilization of such habitat
  - mapping of habitat for black cockatoos, including locations of actual roost trees (if any) and trees with suitable hollows.

- Assessment of the proposed clearing of the route against the Department of Environment Regulation's (DER) 10 Clearing Principles.
- For any riparian areas, recommendations on the need for offsets as required by the Statewide Clearing Permit assessment and any minor realignments that minimises or avoids the need for offsets.



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure 1: Survey Area Location

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Author: V. Clarke	Date: 28-01-2014
Drawn: H.Thornton	4175_13_GDR_1Rev0_140128_Fig1Locn

Datum: GDA 1994
Projection: MGA Zone 50
0 10 20 30 40 Kilometres
N

1.2 Environmental Context

1.2.1 Climate

The survey area is located in the Southwest region of Western Australia. The climate in this region is described as warm Mediterranean, and is characterised by rainfall ranges of between 600 and 1000 millimetres (mm) annually (Mitchell et al. 2002). Weather data from Bridgetown weather station (9510), the nearest long-term weather station located approximately 23 km south of Balingup, indicate the mean annual rainfall from 1901 to 2012 is 821.1 mm (Bureau of Meteorology (BOM) 2013). Maximum daily temperatures range between 27.5˚C and 29.8˚C in the summer months and between 15.8˚C and 16.7˚C in the winter months (BOM 2013; Figure 2).

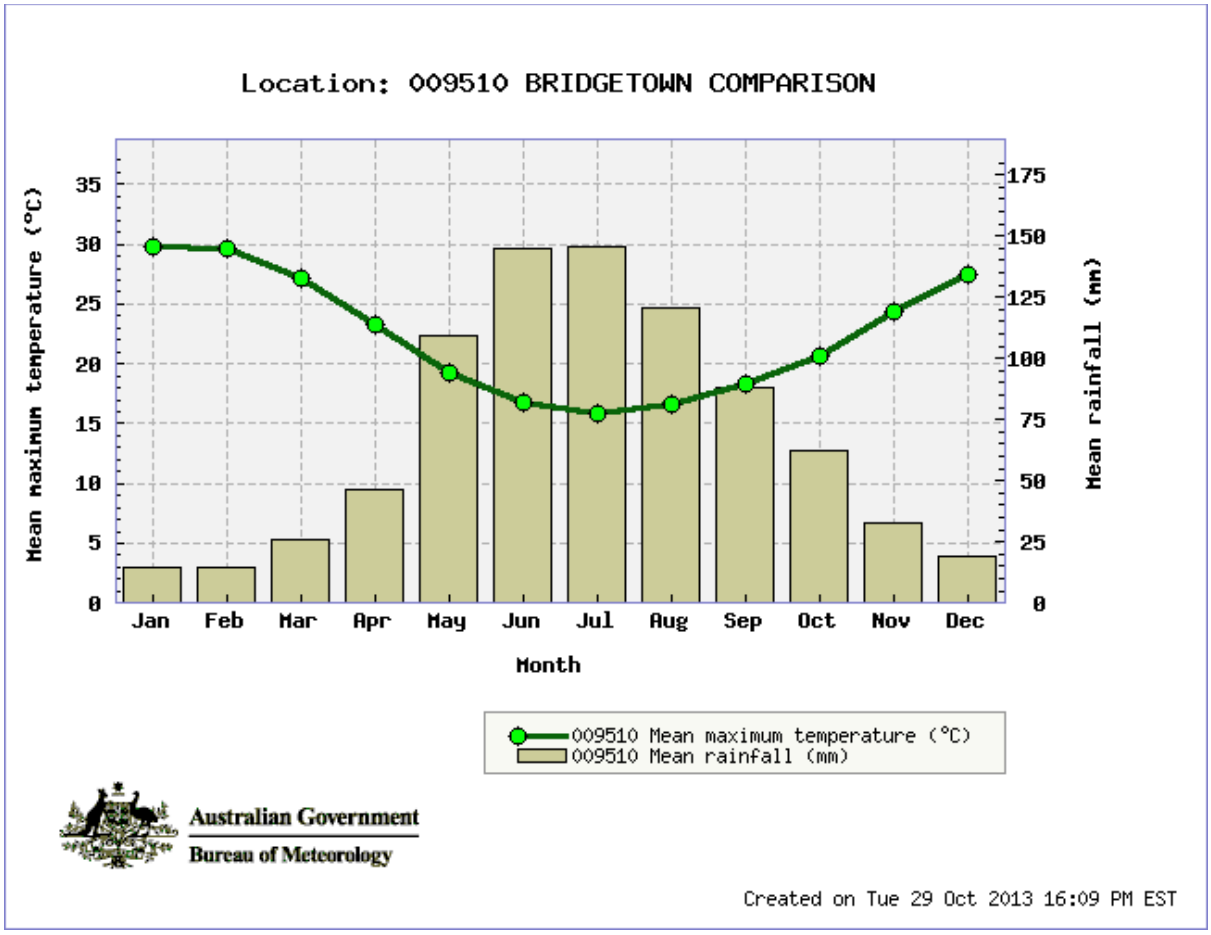

Figure 2: Climate data from Bridgetown weather station (9510) including mean annual rainfall (mm) and mean maximum temperature (°C) (1901-2012) in Western Australia (BOM 2013).

1.2.2 Geology, Landforms and Soils

The survey area is at the border of the southern and northern jarrah forests (Beard 1990), and this subregion occupies the northern portion of the Darling Plateau, east of the Darling Scarp. It overlies Achaean granite and metamorphic rocks and has an average elevation of about 300 m. The plateau is an ancient erosion surface capped by an extensive lateritic duricrust, which has been dissected by later drainage. The plateau is occasionally broken by prominent granite hills of unusual elevation. The dominant soils are lateritic gravels consisting of up to 5 m or more of ironstone gravels in a yellow sandy matrix, and related lateritic podzolic soils with ironstone gravels in a sandy surface horizon overlying mottled yellow-brown clay subsoil. Some granite boulders may protrude through

the laterite mantle and hard-setting loamy soils to deep loams can be found within valleys (Beard 1990).

1.2.2.1 Land Systems

The project alignment traverses approximately 20 km kilometres from Greenbushes to Kirup and crosses 12 land systems, as mapped by the Western Australian Agriculture Department (DAFWA 2013b). These land systems and their areas of occupancy within the alignment are provided in Table 1.

Table 1: Land systems (DAFWA 2013b) mapped within the project alignment.

Name	Code	Area (ha)	Description
Dwellingup subsystem	DpDW	4.03	Divides, lower to upper slopes and hillcrests. Duplex sandy gravels and loamy gravels with minor areas of shallow gravels, deep sandy gravels, yellow deep sands and yellow and pale deep sands, often gravelly.
Hester subsystem	DpHR	1.20	Ridges and hill crests on laterite and gneiss, relief 5-40 metres (m), slopes 5-15%. Soils are sandy gravels, loamy gravels and loamy earths.
Mornington Hill subsystem	DpMH	0.15	Low hills on laterite overlying granite, relief 40-80 m, slopes 5-20%. Soils are sandy and loamy gravels with some deep sands and loamy earths.
Yarragil Upstream Valleys phase	DpYGu	2.73	Relief 5-20 m, slopes 3-10%. Valley floor is broader than downstream phase. Soil parent material is mainly laterite. Soils are gravels and sands.
Balingup Moderate Slopes phase	LvBL4	2.82	Balingup Subsystem, moderate slope phase, slopes 15-35%, relief 60-120 m.
Balingup Footslopes phase	LvBLf	3.32	Balingup Subsystem, footslope phase, slopes 3-10%, relief 5-20 m.
Bridgetown Steep Slopes Phase	LvBT5	0.46	Relief 100-180 m, slopes 15-50%, soils are loamy earths.
Kirup Gentle Slopes Phase	LvKR2	10.55	Footslopes, relief 20-30 m, slopes 2-10%.
Kirup Low Slopes Phase	LvKR3	6.35	Relief 20-60 m, slopes 5-20%.
Kirup Sandy Slopes Phase	LvKRs	2.22	Relief 20 m, slopes 2-15%. Soils are deep sands and sandy earths.
Mumballup Upstream Flats Phase	LvMLu	1.31	Flats 50-250 m wide, prone to waterlogging and flooding.
Queenwood Low Slopes Phase	LvQW3	0.52	Slopes (5-15%), soils are gravels.

1.2.3 Surface Water and Hydrology

The corridor passes through Capel River Catchment – Busselton Coast Basin, and Hardy Estuary /Blackwood River catchment, Blackwood River.

The alignment is intersected two creeks and a few minor drainage lines. In the vicinity of Greenbushes the alignment intersects Dumpling Gully; in Balingup the Balingup Brook is crossed and in Mullalyup the Mullalyup Brook is crossed; towards Kirup the Capel River is crossed.

1.2.4 Vegetation

The Interim Biogeographic Regionalisation for Australia (IBRA version 7) divides the Australian continent into 89 bioregions and 419 subregions (Department of the Environment (DoE) 2013c). IBRA regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna. Specialist ecological knowledge, combined with appropriate regional and continental scale biophysical datasets were interpreted to define and describe these regions (Thackway and Cresswell 1995). Information about each subregion is used to help determine which ecosystems are adequately protected in the conservation estate. The survey area is located within the IBRA Southern Jarrah Forest Subregion (JF2) of the Jarrah Forest Bioregion.

Pre-European vegetation was mapped at a broad scale across Western Australia (Beard 1990) and the survey area is within the Southwest Botanical Province; the alignment is comprised of one singular unit: 3 medium forest (jarrah-marri) (Government of Western Australia 2013).

The forest areas of southwest Western Australia were mapped at a finer scale within '*Vegetation of the Darling System*' (Heddle et al. 1980) and then further refined as part of the Regional Forest Agreement (Mattiske and Havel 1998). The alignment comprises eight vegetation complexes as defined for the forest region (Table 2).

Table 2: Vegetation complexes traversed for the survey alignment (Mattiske and Havel 1998).

Vegetation complex	Vegetation complex code	Area (ha)
Balingup	BL	7.20
Bridgetown	BT	0.46
Catterick	CC1	2.72
Dwellingup	D1	4.19
Hester	HR	1.19
Kirup	KR	17.69
Mumballup	ML	1.31
Queenwood	QW	0.89
Total		**35.66**

2 Methodology

2.1 Desktop Assessment

Database searches were conducted to identify listed conservation significant flora, fauna and ecological communities within or in close proximity to the survey area. The search details are summarised in Table 3.

Table 3: Summary of database searches.

Database name	Search focus	Search area
Protected Matters Search Tool (DoE) 2013)	MNES (including flora, fauna, and communities).	20 km radius from a line defined by the coordinates -33.844436 °S, 116.068749 °E and -33.610867 °S, 115.855889 °E (GDA94).
NatureMap (DPaW 2013a)	Flora and fauna species including those of conservation significance; listed threatened and priority ecological communities (TEC/PECs).	20 km radius from a line defined by the coordinates 33°42' 49'' S, 115°53' 43'' E and 33°50' 49'' S, 116°03' 24'' E (GDA94).
Threatened and Priority Flora Database (TPFL) (Department of Parks and Wildlife (DPaW 2013b)	Threatened (also known as declared rare flora) and priority flora species.	20 km radius from a line defined by the coordinates 33°42' 49'' S, 115°53' 43'' E and 33°50' 49'' S, 116°03' 24'' E (GDA94).
Birdata (BirdLife Australia 2013)	Bird species.	1 degree from a point defined by the coordinates -33.83508 °S and 116.04195 °E (GDA94).

In addition a literature review was conducted of relevant contextual and Water Corporation supplied reports. The most relevant of these included:

- *Roadside vegetation and conservation values in the Shire of Donnybrook-Balingup*. Roadside Conservation Committee (2008)
- *Native vegetation handbook for the Shire of Bridgetown-Greenbushes*. Shaun B. Grein. (1997)
- *Declared rare and poorly known flora in the central forest region, Western Australian Wildlife Management Program No. 33*. Department of Conservation and Land Management (2001)
- *Dieback interpretation report, Bridgetown pipeline route project Section 1 – Mullalyup to Balingup (Railway line), Southampton Road, Padbury Road, and Bridgetown Loop*. Forest Management Branch, Department of Environment and Conservation (2010)
- *Bridgetown RWSS Pipelines Balingup to Kirup Link, Biological Survey*. AECOM (2010)

2.2 Field Survey

The field survey was conducted by two Astron personnel from the 14 to 17 October 2013. The team consisted of Principal Botanist Vanessa Clarke and Senior Zoologist Dr Jessica Oates.

2.2.1 Level 2 Vegetation and Flora Survey

The vegetation and flora field survey was undertaken in accordance with the requirements for a Level 2 assessment outlined in the EPA's *Position Statement 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection* (2002) and *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (2004).

Information acquired during the desktop study assisted in design of the field survey. Pre-survey planning involved the examination of 1: 10,000 scale aerial photography, nearby survey results and regional vegetation community mapping and descriptions. The number and location of sampling sites were determined based on the following criteria:

- the inclusion of at least one, and where possible, a duplicate sample site in each vegetation association, distinguishable on aerial photographs
- sampling in homogenous vegetation and the avoidance of ecotone areas between associations
- the inclusion of target areas that are prospective for conservation significant flora species identified during the desktop study.

Nine quadrats and six relevés (unmarked and unbounded sample areas), were surveyed in representative vegetation associations within the ~20 km corridor (survey area). The following information was collected at each quadrat and relevé:

- **Location** – coordinates measured using a handheld GPS (MGA50, WGS84). One set of coordinates taken from the corner of a quadrat or a central location of each relevé.
- **Recorder and date** –personnel involved in sampling that location and the survey date.
- **Species** – all vascular plant species present including introduced species. Species that could not be identified in the field were collected for later identification at the Astron herbarium or WA Herbarium.
- **Weeds** – the occurrence of any introduced flora.
- **Percent foliar cover** – The percentage cover was estimated for the dominant species in each layer.
- **Vegetation description** – Vegetation was described according to Aplin's (1979) modification of the vegetation classification system of Specht (1970) (Appendix A). At this level, vegetation is described up to three dominant genera for each of the upper, mid and ground strata are categorised based on dominant growth form, cover and height.
- **Vegetation condition** – assessed according to the *Vegetation Condition Classification* (Appendix C) (Trudgen 1996).
- **Habitat** – a broad description of the surrounding landscape based on landform, topography and soil.
- **Disturbances** – records of any obvious disturbances such as fire, tracks or grazing.
- **Photographs** – a photograph was taken of each quadrat and relevé.

A hard copy of colour aerial photography on 20 A3 colour maps at a scale of 1: 10,000 was used to locate the survey area and to assist in navigation as well as delineating vegetation communities and vegetation condition boundaries. Previous mapping units described by AECOM (2010) were referred to try and align vegetation units encountered.

Targeted searches were undertaken for threatened and priority flora potentially occurring in the survey area as determined by the database searches and literature review. The entire survey area was traversed on foot and all species found within the survey area, including introduced species, were listed opportunistically if they did not occur in a quadrat or relevé. For each introduced species recorded in the survey area, it was also noted whether the species was widespread or dominant.

2.2.2 Level 1 Fauna Survey

The fauna survey was undertaken in conjunction with the vegetation and flora survey. In the context of a Level 1 survey, rather than listing the highly anecdotal sightings of fauna seen during a reconnaissance visit, the guidance statement (EPA 2004b) advises field observers to describe the fauna habitats of the survey area, which give a comprehensive indication of fauna that can reasonably be expected to occur.

The survey area was traversed on foot and by vehicle. Major fauna habitat types were described based on the landform and vegetation type. Habitat condition was assessed based on the presence of anthropogenic (human-induced) disturbances, and using the descriptors suggested by Thompson and Thompson (2010) (Appendix C). Habitats likely to support fauna species of conservation significance were photographed and a GPS location recorded. All vertebrate fauna species observed opportunistically were recorded, and any locations of conservation significant fauna were recorded using a GPS.

2.2.2.1 Western Ringtail Possum Assessment

A targeted search was conducted for western ringtail possum habitat, concentrating on areas of peppermint (*Agonis flexuosa*). The site was searched for faecal pellets and dreys and if found a photograph and GPS coordinate was taken.

2.2.2.2 Black Cockatoo Assessment

Targeted searches were also undertaken for black cockatoo feeding and breeding habitat. To determine if the site was foraging habitat for black cockatoos, potential foraging plants were identified and recorded, and the ground was searched for any evidence of black cockatoo foraging, for example chewed fruits of the Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*). To determine the breeding habitat classification of the site in accordance with Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) referral guidelines (2011), a habitat assessment was undertaken. Native trees greater than 50 centimetre (cm) diameter at breast height (DBH) are classified as mature trees with potential for breeding hollows to develop (DSEWPaC 2012). The site was searched systematically and trees greater than 50 cm DBH were recorded, including the species, height of tree, GPS coordinate and number of potential hollows. Photographs were taken of a representative sample of trees. To determine if trees had potential breeding hollows, the following criteria were assessed for each mature tree where possible (based on Gibbons and Lindenmayer 2002):

- height of the potential hollow in the tree
- minimum entrance width of a potential hollow

- diameter of the branch on which the potential hollow occurred
- whether the branch was living, part dead or dead
- whether the tree has multiple potential hollows.

2.3 Specimen Identification and Data Entry

Plant specimens that were not identified in the field were collected, pressed and identified in Perth by Astron Principal Botanist, Vanessa Clarke. Some collections that were difficult to determine were provided to consultant botanist Mr Frank Obbens, who assisted with determining their identification with assistance from WA Herbarium staff. Orchids that were collected or photographed were confirmed by DPaW orchid expert Mr Andrew Brown.

2.4 Limitations of the Survey

Excellent seasonal conditions preceded the survey, which was undertaken in peak spring. A good diversity of annual/ephemeral species was able to be censured and survey timing is not considered a limitations.

Day one of the survey had dry weather conditions and the entire alignment was able to be traversed. Day two had light precipitation in the morning and access was restricted to areas that were not on DPaW managed land (i.e. State forest). Day three had also damp conditions from the previous day, so areas that were not DPaW managed were prioritised. On day four, dry conditions were present and the remaining areas were able to be accessed, so that over the course of the survey, all areas were able to be safely traversed without risk of dieback spread.

There are some limitations associated with assessing the suitability of tree hollows for black cockatoos. It is not always possible to determine if a hollow or tree irregularity is suitable for use or in fact possible to enter. The angle of branch and height from ground limit accurate observations as to width, depth and existing occupancy (e.g. bees). Therefore the term “potential hollow” is used. It must be surmised that a significant number of these potential hollows are in fact not currently suitable for various reasons. It is however possible that many have the potential to develop suitable hollow characteristics over time as natural processes occur.

3 Results

3.1 Seasonal Conditions

The field survey was conducted between 14 and 17 October 2013. In the 12 months preceding the survey 969.2 mm of rainfall was received, 148.1 mm above the average annual rainfall since 1901 (821.1 mm) (BOM 2013). Rain associated with low pressure systems during September 2013 (250 mm) resulted in well above average rainfall for that month (Figure 3).

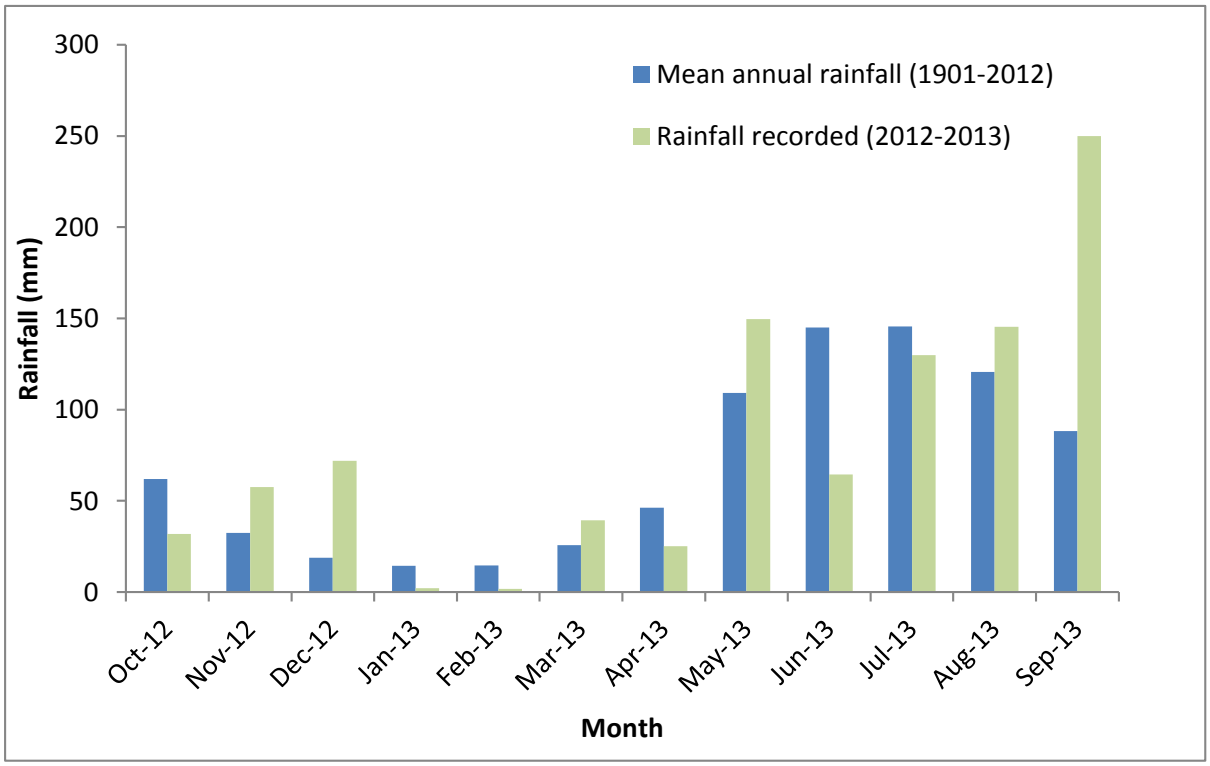

Figure 3: Mean (1901-2012) monthly rainfall (mm) and actual rainfall (mm) preceding the October 2013 survey recorded at Bridgetown (long-term mean) and Bridgetown Comparison (actual) weather station (BOM 2013).

3.2 Desktop Assessment

3.2.1 Vegetation and Flora

No TECs or PECs have previously been recorded within 30 km of the survey area (DPaW 2013b).

The Commonwealth's Protected Matters Search (DoE 2013a) and the State's *NatureMap* (DPaW 2013a) identified 24 threatened flora species within a 20 km radius of the survey area (Table 4). The results of the database searches are provided in full in Appendix B. Conservation categories for flora, fauna and ecological communities are presented in Appendix A.

Table 4: Threatened flora recorded within 20 km of the survey area (DoE 2013; DPaW 2013) listed according to threat.

Taxon	Conservation status	Flowering	Potential to occur in survey area
*Brachyscias verecundus**	Critically Endangered (CR)	Oct-Nov	Medium; habitat present.
*Darwinia foetida**	CR	Sept-Nov	Low; habitat not present.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)*	CR	Oct	Low; habitat not present.
*Andersonia gracilis**	Endangered (EN)		Medium; habitat present.
Banksia nivea subsp. *uliginosa**	EN	Aug to Sep	Low; habitat not present.
*Caladenia hoffmanii**	EN	Aug to Oct	Low; habitat not present.
*Caladenia huegelii**	EN	Sep to Oct	Low-Medium; habitat not ideal.
*Caladenia winfieldii**	EN	Oct to Nov	Very Low; habitat not present.
*Centrolepis caespitosa**	EN; Priority 4	Oct to Dec	Very Low; habitat not present.
*Darwinia whicherensis**	EN	Oct to Dec	Low-Medium; habitat not ideal.
*Diuris purdiei**	EN	After fire; Sep to Oct	Low; habitat not present.
*Drakaea elastica**	EN	Oct to Nov	Very Low; habitat not present.
*Gastrolobium papilio**	EN	Oct	Low-Medium; habitat not ideal.
Lambertia echinata subsp. *occidentalis**	EN	Feb or Apr or Dec	Low; habitat not present.
*Petrophile latericola**	EN	Nov	Low; habitat not present and no previous collections within alignment vicinity.
Rulingia sp. Trigwell Bridge (R.Smith s.n. 20/6/1989); now *Commersonia erythrogyne**	EN	Sept	Medium; only id heavy loam around granite outcrops occurs.
*Sphenotoma drummondii**	EN	Sep to Dec	Low to nil; habitat not present in alignment.
Banksia squarrosa subsp. *argillacea**	Vulnerable (VU)	Jun to Nov	Low; habitat not present.
Caladenia harringtoniae	VU	Oct to Nov	Medium; creeklines present.
Chamelaucium sp. C Coast Plain (R.D.Royce 4872)*	VU	Oct to Dec	Very Low; habitat not present.
Daviesia elongata subsp. *elongata**	VU	Dec or Jan to Feb	Low-Medium; habitat may be present but no collections from alignment vicinity.
*Diuris micrantha**	VU	Sep to Oct	Low-Medium; habitat not ideal.
*Drakaea micrantha**	VU	Sep to Oct.	Low-Medium; habitat not ideal.
*Synaphea stenoloba**	VU	Aug to Oct	Low; heavy soil habitat not present.
Banksia sp. Boyup Brook (L.W. Sage LWS 2366)	Priority (P)1	Oct	Low; unless sandy soils encountered.

Taxon	Conservation status	Flowering	Potential to occur in survey area
Dillwynia sp. Capel (P.A. Jurjevich 1771)	P1	Sept-Oct	Low; habitat not suitable & no collections in alignment vicinity.
Senecio gilbertii	P1	Sep to Nov	Low; habitat not suitable & no collections in alignment vicinity.
Stylidium acuminatum subsp. *acuminatum*	P1	Oct-Nov	Medium; potential for habitat but no collections in vicinity.
Platytheca anasima	P2	Oct-Dec	Low; unless sandy soils are encountered.
Thysanotus unicupensis	P2	Oct-Dec	High; suitable habitat.
Corybas abditus	P3	Oct-Nov	Low; no suitable habitat.
Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3		Low; unless sandy soils are encountered.
Synaphea polypodioides	P3	Sep-Oct	Low-Medium; habitat may be present but no collections from alignment vicinity.
Tetraria sp. Blackwood River (A.R. Annels 3043) PN	P3		Low-Medium; habitat may be present but no collections from alignment vicinity.
Tetratheca parvifolia	P3	Oct	Low-Medium; habitat may be present but no collections from alignment vicinity.
Thysanotus gageoides	P3	Oct-Nov	Low; low potential for suitable habitat.
Acacia semitrullata	P4	Jun-Aug	Low; unless sandy soils are encountered.
Grevillea ripicola	P4	Oct-Nov	Medium; potential habitat may be present

**denotes taxa listed as MNES under the Commonwealth EPBC Act with dual listing under the State WC Act except Centrolepis caespitosa, which is a priority flora taxon only but was previously thought to be rare. Priority flora are not especially listed under either act.*

3.2.2 Vertebrate Fauna

The database searches identified a total of 222 terrestrial vertebrate fauna species recorded within the vicinity of the survey area (Appendix B). This included nine amphibian species, 22 reptile species, 158 bird species (including seven introduced) and 33 mammal species (including nine introduced), of which 28 species are deemed to have conservation significance.

Table 5 lists those species of conservation significance identified by the *NatureMap* (DPaW 2013a) and EPBC Protected Matters (DoE 2013a) database searches. The EPBC Protected Matters Search (DoE 2013a) identified 11 threatened terrestrial fauna species and seven migratory fauna species of national environmental significance within a 20 km radius of the survey area. The *NatureMap* (DPaW 2013a) search identified 10 schedule 1 species, two schedule 3 species, two schedule 4 species, two priority 3 species, five priority 4 species and one priority 5 species. The results of the database searches are in Appendix B.

Marine species have been excluded from the report as they are highly unlikely to occur within the survey area. In addition, a number of records were presented through the results of *NatureMap* that

are clearly not relevant to this assessment and have been deleted accordingly. For example, the greater bilby (*Macrotis lagotis*) and numbat (*Myrmecobius fasciatus*) are locally extinct from the area and have been deleted from the assessment.

Table 5: Conservation significant vertebrate fauna species identified by DPaW *NatureMap* (2013a), DoE (2013a) and Birdlife Australia (2013) database searches.

Species name	Common name	State conservation status (WC Act)	Federal conservation status (EPBC Act)
Reptiles			
Morelia spilota imbricata	Carpet python	Schedule 4	
Ctenotus delli	Darling Range heath ctenotus	Priority 4	
Birds			
Cacatua pastinator pastinator	Muir's corella (southern)	Schedule 4	Vulnerable
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	Schedule 1	Vulnerable
Calyptorhynchus baudinii	Baudin's black cockatoo	Schedule 1	Vulnerable
Calyptorhynchus latirostris	Carnaby's black cockatoo	Schedule 1	Endangered
Leipoa ocellata	Malleefowl	Schedule 1	Vulnerable
Apus pacificus	Fork-tailed swift	Schedule 3	Migratory
Ardea modesta	Eastern great egret	Schedule 3	Migratory
Ardea ibis	Cattle egret	Schedule 3	Migratory
Botaurus pociloptilus	Australasian Bittern	Schedule 1	Endangered
Ixobrychus flavicollis australis	Australian Black Bittern	Priority 3	
Haliaeetus leucogaster	White-bellied sea eagle	Schedule 3	Migratory
Falco peregrinus	Peregrine Falcon	Schedule 4	
Falcunculus frontatus leucogaster	Western Shrike-tit	Priority 4	
Merops ornatus	Rainbow bee-eater	Schedule 3	Migratory
Atrichornis clamosus	Noisy scrub-bird	Schedule 1	Vulnerable
Tyto novaehollandiae novaehollandiae	Masked owl (southern)	Priority 3	
Mammals			
Bettongia pencillata ogilbyi	Woylie	Schedule 1	Endangered
Dasyurus geoffroii	Chuditch	Schedule 1	Vulnerable
Phascogale calura	Red-tailed phascogale	Schedule 1	Endangered
Phascogale tapoatafa tapoatafa	Southern brush-tailed phascogale	Schedule 1	
Pseuodcheirus occidentalis	Western ringtail possum	Schedule 1	Vulnerable

Species name	Common name	State conservation status (WC Act)	Federal conservation status (EPBC Act)
Macropus irma	Western brush wallaby	Priority 4	
Setonix brachyurus	Quokka	Schedule 1	Vulnerable
Hydromys chrysogaster	Water rat	Priority 4	
Isoodon obesulus fusciventer	Quenda	Priority 5	
Falsistrellus mackenziei	Western false pipistrelle	Priority 4	

3.3 Field Survey

3.3.1 Vegetation

The vegetation communities of the project area are typical of those found in the jarrah forest region. The scope of works requested that Astron vegetation units be consistent with previous survey work undertaken in the local area by consultants for the Water Corporation (AECOM 2010 summarised in Table 6). However, the Astron-described units were not able to be reconciled with the AECOM (2010) vegetation units due to inconsistencies in definition of the dominant structural layer (i.e. AECOM defined 'Low Woodland to Low Open Forest of *Eucalyptus marginata* and *Corymbia calophylla*' but did not state which published structural definitions were used. Forest is typically only used for trees in excess of 30 m height; or where tree height is 10 – 30 m but the cover is a minimum of 30 – 70 %. Astron found that the areas traversed had trees generally 10 – 30 m with cover also of 10 – 30 % and therefore could only be described as 'Woodland' or infrequently 'Open Woodland'. Seven vegetation units were described and mapped in the survey area. The codes ascribed and vegetation descriptions are grouped in Table 7 and provided in full in Appendix E.

Table 6: Vegetation communities defined for adjacent survey areas (AECOM 2010).

Vegetation code	Vegetation community description (AECOM 2010)
CcLt	Low Open Woodland of *Corymbia calophylla* over a Closed Herbland dominated by **Lathyrus tingitanus*, **Trifolium dubium* and **Raphanus raphanistrum* on sandy loam.
EmCcLOF	Low Woodland to Low Open Forest of *Eucalyptus marginata* and *Corymbia calophylla* with occasional *Banksia grandis* over a Shrubland to Tall Shrubland dominated by *Acacia pulchella, Acacia extensa, Mirbelia dilatata* and *Xanthorrhoea preissii* with occasional *Pteridium esculentum* and *Macrozamia riedlei* over a Low Shrubland of *Phyllanthus calycinus, Bossiaea ornata* and *Hibbertia hypericoides* with occasional *Acacia pulchella* and infestations of **Plantago lanceolata* on sandy loam.
EmLOW	Low Open Woodland to Open Woodland of *Eucalyptus marginata* and *Corymbia calophylla* with occasional **Pinus radiata* over a Tall Shrubland dominated by *Bossiaea linophylla, Mirbelia dilatata* and *Taxandria parviceps* over a Shrubland of *Pteridium esculentum* with occasional *Xanthorrhoea preissii*, *Acacia saligna* and **Allium triquetrum* over an Open Herbland of **Watsonia meriana* and **Oxalis hirta* over introduced grasses on clayey soils.
ErCcLOW	Low Open Woodland of *Eucalyptus rudis* with occasional *Corymbia calophylla* and *Acacia saligna* over an Open Heath of **Rubus ulmifolius* with occasional *Pteridium esculentum*, **Allium triquetrum* and **Oxalis hirta* on clayey loam in association with drains and low lying areas adjacent to road reserves.
ErMv	Woodland to Low Closed Forest of *Eucalyptus rudis* with occasional *Melaleuca viminea* subsp. *viminea*, *Melaleuca preissiana* and **Acacia decurrens* over a Shrubland of *Pteridium esculentum* and *Kunzea recurva* with scattered *Astartea fascicularis* and **Watsonia meriana* over a Very Open Sedgeland of *Meeboldina roycei* and *Hypolaena exsulca* on sandy loam.
CcLOW	Low Open Woodland of *Corymbia calophylla* with occasional *Eucalyptus marginata* and **Pinus radiata* over a Shrubland to Tall Shrubland dominated by *Pteridium esculentum, Taxandria parviceps, Mirbelia dilatata* and *Trymalium odoratissimum* subsp. *trifidum* with occasional *Bossiaea linophylla* and *Acacia extensa* over a Low Heath of *Hypocalymma robustum, Tetraria capillaris* and **Oxalis hirta* on clayey soils.
P3	Pasture dominated by **Ehrharta longiflora*, **Avena fatua* and *Austrostipa elegantissima* with scattered **Acacia decurrens, Pteridium esculentum, Eucalyptus rudis*, **Eucalyptus globulus, Eucalyptus accedens, Macrozamia riedlei, Melaleuca preissiana* and *Xanthorrhoea preissii* on sands in association with degraded areas.
Cleared	Cleared areas devoid of any native and non-native species.

Table 7: Astron vegetation units described for the survey area.

Landscape position	Structure	Code	Description
Upper to midslope	Woodland	EmCcW	Jarrah-marri (*Eucalyptus marginata, Corymbia calophylla*) woodland with a mid-storey that may range in the following dominant taxa in the upper shrub layer: *Xanthorrhoea preissii, Macrozamia riedlei, Mirbelia dilatata, Hakea amplexicaulis, Acacia extensa, Leucopogon verticillatus.* The following as dominants in the mid-shrub layer: *Bossiaea ornata, B. linophylla, Hibbertia hypericoides, Phyllanthus calycinus, Pteridium esculentum* over sedges including *Tetraria capillaris* and *Patersonia umbrosa* var. *xanthina.*
	Open Woodland	EmCcOW	Jarrah-marri open woodland with a mid-storey that may range in the following dominant taxa in the upper shrub layer: *Pteridium esculentum, Hakea amplexicaulis* with *Bossiaea ornata, Leucopogon nutans* as primary dominants in the lower shrubs; over *Tetraria* species.
Midslope	Woodland	EmCcBgPlW	Jarrah-marri with bull banksia (*Banksia grandis*) and snotty gobble (*Persoonia longifolia*) woodland with a mid-storey that may range in the following dominant taxa in the mid-shrub layer: *Bossiaea ornata, Hibbertia amplexicaulis* over *Tetraria capillaris* and *Desmocladus fascicularis.*
Lower slope	Woodland	CcW	Marri woodland over a mid-shrub layer of *Taxandria parviceps* and *Bossiaea linophylla* over lower shrubs including: *Pteridium esculentum, Hypocalymma angustifolia, Acacia pulchella, Bossiaea linearifolia* over sedges of *Tetraria capillaris, Patersonia occidentalis* and *P. pygmaea*.
Creeks and drainage lines	Woodland	CcEmErW	Marri-jarrah-flooded gum (*Eucalyptus rudis*) woodland over a tall shrubland including *Trymalium odoratissimum* subsp. *trifidum, Agonis linearifolia, Hakea lissocarpha* over smaller shrubs such as *Phyllanthus calycinus, Acacia pulchella* with a dominant sedge layer of *Lepidosperma effusum*.
Various	Cleared	Cl	Area historically cleared of all native vegetation.
Various	Planted	Pl	Area containing planted introduced species that are plantation or orchard.

Vegetation mapping is presented in Figure D.1-19 (Appendix D), and quadrat and relevé data are presented in Appendix E.

No TECs or PECs were recorded within the survey area and none are likely to occur based on the results of database search information (Appendix B) and a comprehensive survey within the survey area.

3.3.2 Vegetation Condition

Vegetation condition in the survey area ranged from 'completely degraded' (Plate 1) to 'excellent' (Plate 2) (Figure D.1-19 of Appendix D), with the majority of the survey area in 'very good' condition, depending on the impact of fire frequency, logging and possibly dieback, which had simplified species diversity at some sites. Areas outside of State Forest had generally been historically cleared and were used for plantations, orchards or other purposes.

Of the four creeklines crossed by the alignment, two remained in very good condition and the other two were completely degraded with little or no remnant vegetation remaining and a high weed occurrence and density:

- Dumpling Gully – good to very good condition
- Spring Creek – very good condition
- Balingup Brook – completely degraded
- Mullalyup Brook (two crossings) – both degraded.

The majority of the forested areas had extremely low weed occurrence. Weeds were associated with historically cleared areas and farms or adjacent to tracks and the rail-line.

Plate 1: Vegetation in completely degraded condition. Photograph adjacent to railway line.

Plate 2: Vegetation in excellent condition. Site is also likely to be dieback free; though recovering from fire.

3.3.3 Flora

Two-hundred and six vascular plant taxa representing 128 genera from 48 families were recorded within the survey area, with 28 taxa being non-native (weeds). Three collections will be lodged by the WA Herbarium due to the atypical characteristics of the collections (*Caladenia ?ferruginea*

(atypical colouring); *Synaphea gracillima* (leaf apex atypical) and *Stylidium scandens* (significant range extension)). A complete species list is presented in Appendix F.

The species recorded are typical of the southern jarrah forest and the diversity recorded is representative of total diversity present.

No threatened or priority flora were recorded in the survey area. Thorough searches particularly in areas of suitable habitat, particularly for *Caladenia harringtoniae* did not locate any threatened flora in the vicinity of the survey area.

Of the 28 weeds species encountered, the most serious are the declared pest plant blackberry (**Rubus ulmifolius*) and the weed of national significance, bridal creeper (**Asparagus asparagoides*).

3.3.4 Fauna Habitat

Three broad fauna habitat types were recorded during the survey and relate to the vegetation types mapped in Figures D1-19 (Appendix D):

- *Jarrah-marri* woodland (Plate 2) – *Eucalyptus marginata* with *Corymbia calophylla* woodlands.
- *Eucalyptus rudis* woodland (Plate 3) – *Eucalyptus rudis* woodland, sometimes with occasional *C. calophylla* and *Melaleuca* species in association with low lying areas and drainage lines.
- *Cleared* – Cleared areas including roads, parks and previous pine plantations.

Fauna habitat condition was considered to range from 'highly degraded' to 'high quality' according to the condition rating scale of Thompson and Thompson (2010). Highly degraded habitat was considered to be the cleared habitat. Some areas of woodland were considered to be high quality, as they retained connectivity with other habitats and are likely to support a natural vertebrate fauna assemblage. The foraging and breeding habitat available for black cockatoos is discussed separately in Section 3.3.5.2.

Plate 3: Jarrah-marri woodland.

Plate 4: Flooded gum (*Eucalyptus rudis*) woodland.

3.3.5 Vertebrate Fauna

Thirty-four fauna species were recorded during the survey through direct observation or indirect evidence (Table 8). During the field survey three amphibian species, 28 bird species (including three conservation significant species) and three mammal species (including one conservation significant

and one introduced species) were identified either by sight or indirect evidence, such as calls and dens (Table 8).

Table 8: Vertebrate fauna species recorded opportunistically during the survey.

Common name	Species name	Observation type
Mammals		
Quenda	*Isoodon obesulus fusciventer*	Diggings
Western grey kangaroo	*Macropus fuliginosus*	Individuals
Fox	*Vulpes vulpes*	Dens
Birds		
Emu	*Dromaius novaehollandiae*	Tracks
Australian shelduck	*Tadorna tadornoides*	Individuals
Pacific black duck	*Anas superciliosa*	Individuals
White-faced heron	*Ardea novaehollandiae*	Individuals
Eastern great egret	*Ardea modesta*	Individuals
Nankeen night-heron	*Nycticorax caledonicus*	Individuals
Purple swamphen	*Porphyrio porphyrio*	Individuals
Common bronzewing	*Phaps chalcoptera*	Individuals
Forest red-tailed black cockatoo	*Calyptorhynchus banksii naso*	Individuals
Baudin's black cockatoo	*Calyptorhynchus baudinii*	Individuals
Galah	*Cacatua roseicapilla*	Individuals
Australian ringneck	*Platycercus zonarius*	Individuals
Laughing kookaburra	*Dacelo novaeguineae*	Individuals
Splendid fairy-wren	*Malurus splendens*	Individuals
Red-browed pardalote	*Pardalotus rubricatus*	Individuals
Weebill	*Smircrornis brevirostris*	Individuals
Singing honeyeater	*Lichenostomous virescens*	Individuals
Western spinebill	*Acanthorhynchus superciliosus*	Individuals
Red wattlebird	*Anthochaera carunculata*	Individuals
Golden whistler	*Pachycephala pectoralis*	Individuals
Rufous whistler	*Pachycephala rufiventris*	Individuals
Grey fantail	*Rhipidura albiscapa*	Individuals
Willie wagtail	*Rhipidura leucophrys*	Individuals
Black-faced cuckoo-shrike	*Coracina novaehollandiae*	Individuals
Magpie-lark	*Grallina cyanoleuca*	Individuals
Scarlet robin	*Petroica boodang*	Individuals
Australian magpie	*Cracticus tibicen*	Individuals
Australian raven	*Corvus coronoides*	Individuals
Amphibians		
Moaning Frog	*Heleioporus eyrei*	Calls
Quacking Frog	*Crinia georgiana*	Calls
Glauert's Froglet	*Crinia glauerti*	Calls

3.3.5.1 Western Ringtail Possum Assessment

No evidence of western ringtail possums was recorded during the survey.

3.3.5.2 Black Cockatoo Assessment

Baudin's black cockatoo and forest red-tailed black cockatoo were both present within the survey area. Both of the species present at the time of survey were observed overflying, foraging and roosting in small flocks and in some cases in pairs. This pairing of forest red-tailed black cockatoos could be indicative of breeding behaviour. Larger flocks were recorded around the golf course and the section of pipeline that follows Cirillo Road.

A total of 209 eucalypt trees (90 jarrah and 119 marri) with a DBH greater than 50 cm were recorded, including those with and without hollows (Figures H1-19; Appendix H). Of the 209 trees recorded, only 10 trees contained potential hollows that may be suitable for black cockatoos. Definitive evidence of past or current breeding activity by black cockatoos is difficult to ascertain; however, it did not appear that any trees were currently utilised by black cockatoos for breeding.

The high number of healthy marri and jarrah trees present within the survey area would provide considerable foraging opportunity and evidence in the form of chewed fruits was observed on numerous occasions. Chewed marri nuts were observed under many trees, characteristic of forest red-tail black cockatoos. Given the homogenous nature of the survey area most parts of the vegetated alignment would be considered suitable black cockatoo foraging habitat, although there were two areas where feeding evidence suggested that the cockatoos preferred to forage; along the golf course and the section of Cirillo Road. Area of quality foraging habitat within survey area for black cockatoos is 10.52 ha (which is the area of intact vegetation rated in good condition or better).

Plate 5: Chewed marri nuts by forest red-tailed black cockatoos.

Plate 6: Freshly chewed marri nuts by red-tailed black cockatoos.

3.3.5.3 Other Species of Conservation Significance

In addition to the two species of black cockatoo recorded during the survey, presence of the quenda (priority 5) was recorded within the survey area by their characteristic diggings (Figures H1-19; Appendix H). The eastern great egret (migratory; S3 at state level) was also recorded during the survey around the dams adjacent to the survey area.

In addition to those species recorded during the survey, Carnaby's black cockatoo (*Calyptorhynchus latirostris*), cattle egret (*Ardea ibis*), peregrine falcon (*Falco peregrinus*), carpet python (*Morelia spilota imbricata*), chuditch (*Dasyurus geoffroii*), southern brush-tailed phascogale (*Phascogale tapaotafa tapaotafa*) and western brush wallaby (*Macropus irma*) have a high likelihood of occurring in the survey area (Table 9).

There is a moderate likelihood of the fork-tailed swift (*Apus pacificus*), western shrike-tit (*Falcunculus frontatus leucogaster*), rainbow bee-eater (*Merops ornatus*), masked owl (*Tyto novaehollandiae novaehollandiae*), woylie (*Bettongia pencillata ogilbyi*), water rat (*Hydromys chrysogaster*) and western false pipistrelle (*Falsistrellus mackenziei*) occurring in the survey area (Table 9).

Darling Range heath ctenotus (*Ctenotus delli*), Muir's corella (*Cacatua pastinator pastinator*), malleefowl (*Leipoa ocellata*), Australasian bittern (*Botaurus pociloptillus*), Australian black bittern (*Ixobrychus flavicollis australis*), white-bellied sea eagle (*Haliaeetus leucogaster*), noisy scrub-bird (*Atrichornis clamosus*), red-tailed phascogale (*Phascogale calura*), western ringtail possum (*Pseudocheirus occidentalis*) are considered to have a low likelihood of being present in the survey area (Table 9). These species have been recorded previously within the region but unsuitable habitat occurs within the survey area.

Table 9: Fauna habitat descriptions and likelihood of occurrence in the survey area.

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
Reptiles							
Morelia spilota imbricata	Carpet python		S4		Recorded in semi-arid coastal and inland habitats consisting of *Banksia* woodland, eucalypt woodlands and grasslands.	Suitable habitat exists throughout the survey area.	High – but not recorded in current survey
Ctentotus delli	Darling Range heath ctenotus			P4	Occurs in Jarrah and Marri woodland with a shrub-dominated understorey on laterite, sand or clay, and occasionally on granite outcrops.	Survey area is outside of the known distribution.	Low
Birds							
Cacatua pastinator pastinator	Muir's corella (southern)	VU	S4		Eucalypt woodlands dominated by wandoo, marrri and jarrah.	Occurs in Lake Muir region and based on known distribution does not occur in the area.	Low
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	S1		Eucalypt forest where it feeds primarily on marri and jarrah fruit.	Suitable foraging habitat exists within the survey area. There are few mature trees able to support potential breeding.	High – individuals sighted within survey area.
Calyptorhynchus baudinii	Baudin's black cockatoo	VU	S1		Eucalypt forest, where it feeds on mainly marri seeds, flowers, nectar and buds. Also feed on seeds of *Eucalyptus, Hakea, Banksia* and pine species.	Suitable foraging habitat exists within the survey area. There are few mature trees able to support potential breeding.	High – individuals sighted within survey area.
Calyptorhynchus latirostris	Carnaby's black cockatoo	EN	S1		Eucalypt woodland, principally wandoo or salmon gum, and shrubland or kwongan heath dominated by *Hakea* and *Banksia* species.	Suitable foraging habitat exists within the survey area. There are few mature trees able to support potential breeding.	High – but not recorded in current survey
Leipoa ocellata	Malleefowl	VU	S1		Largely confined to arid and semi-arid woodland that is dominated by mallee eucalypts on sandy	Suitable habitat does not exist within the survey	Low

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
					soils with less than 430 mm of rainfall annually.	area.	
Apus pacificus	Fork-tailed Swift	Mi	S3		Summer migrant to Australia and occurs in low to very high airspace over varied habitat from rainforest to semi-desert.	Aerial species	Moderate
Ardea modesta	Eastern great egret	Mi	S3		Wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral).	Suitable habitat exists within the survey area and in immediate vicinity.	High – recorded during the survey
Ardea ibis	Cattle egret	Mi	S3		Largely wetland species however can exploit drier open habitats more than other heron species.	Suitable habitat exists within the survey area and in immediate vicinity.	High - but not recorded in current survey
Botaurus pociloptilus	Australasian bittern	EN	S1		Found in beds of tall rush mixed with or near short fine sedge and open pools. Also occurs around swamps, lakes, pools, rivers and channels fringed with lignum, canegrass or other dense vegetation.	Limited suitable habitat exists within the survey area.	Low
Ixobrychus flavicollis australis	Australian black bittern			P3	Freshwater pools, swamps and lagoons, well screened with trees	Limited suitable habitat exists within the survey area.	Low
Haliaeetus leucogaster	White-bellied sea eagle	Mi	S3		Require presence of large areas of open water and have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds.	Suitable habitat does not exist within the survey area.	Low
Falco peregrinus	Peregrine falcon		S4		Found from woodlands to open grasslands and coastal cliffs. Normally nests on cliff edges.	Suitable habitat exists throughout the survey area and is likely to be an occasional visitor.	High - but not recorded in current survey
Falcunculus frontatus leucogaster	Western shrike-tit			P4	Open eucalypt forest and woodland	Suitable habitat exists within the survey area.	Moderate
Merops ornatus	Rainbow bee-eater	Mi	S3		Lightly wooded, preferably sandy, country near water such as drainage channels and creek lines.	Suitable habitat exists within the survey area.	Moderate
Atrichornis clamosus	Noisy scrub-bird	VU	S1		Wetter areas within the distribution of marri and jarrah, in particular the ecotone between forest and swamp vegetation.	Survey area is outside of the known distribution.	Low

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
Tyto novaehollandiae novaehollandiae	Masked owl (southern)			P3	Requires large hollows in old growth eucalypts for nesting and often favours areas with dense understorey, particularly along watercourses and gullies.	There are few mature trees able to support potential breeding.	Moderate
Mammals							
Bettongia pencillata ogilbyi	Woylie	EN	S1		Open forest and woodland with a low understorey of tussock grasses or woody scrub.	Suitable habitat exists within the survey area.	Moderate
Dasyurus geoffroii	Chuditch	VU	S1		Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts.	Suitable habitat is found throughout the survey area.	High – but not recorded in current survey
Phascogale calura	Red-tailed Phascogale	EN	S1		Wandoo and Sheoak woodland associations, with populations most dense in the latter vegetation type.	This species is now restricted to the Wheatbelt and South Coast regions and the survey area is outside of this distribution.	Low
Phascogale tapoatafa tapoatafa	Southern brush-tailed phascogale		S1		Dry sclerophyll forests and open woodlands that contain hollow-bearing trees.	Suitable habitat is found throughout the survey area.	High – but not recorded in current survey
Pseuodcheirus occidentalis	Western ringtail possum	VU	S1		Inhabit coastal peppermint/tuart associations from Bunbury to Albany. On Swan Coastal Plain the highest densities occur in habitats with dense, lush vegetation.	No suitable habitat exists within the survey area.	Low
Macropus irma	Western brush wallaby			P4	Optimum habitat is open forest or woodland, particularly favouring open, seasonally-wet flats with low grasses and open scrubby thickets.	Suitable habitat is found throughout the survey area.	High – but not recorded in current survey
Setonix brachyurus	Quokka	VU	S1		Densely vegetated swamps and sometimes tea-tree thickets on sandy soils along creek systems and dense heath on slopes.	Limited suitable habitat is found in the survey area.	Low
Hydromys chrysogaster	Water rat			P4	Usually found near permanent bodies of fresh or brackish water along river and lake banks. They prefer areas with riparian vegetation and a degree of habitat complexity.	Suitable habitat is found in the survey area and in immediate vicinity.	Moderate

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
Isoodon obesulus fusciventer	Quenda			P5	Scrubby, often swampy, vegetation with dense cover up to 1m high, often feeds in adjacent forest and woodland that is burnt regularly and in areas of pasture and cropland lying close to dense cover.	Suitable habitat is found throughout the survey area.	High – evidence of species recorded during the survey
Falsistrellus mackenziei	Western false pipistrelle			P4	Wet sclerophyll forest dominated by karri and in high rainfall zones of the jarrah and tuart forests.	Suitable habitat exists within the survey area.	Moderate

HIGH	Species recorded within, or in proximity to, the survey area within 20 km; suitable habitat occurs
MODERATE	Species recorded outside survey area, but within 20 km; limited suitable habitat occurs
LOW	Species rarely, or not recorded, within 20 km, and/or suitable habitat does not occur

4 Discussion and Recommendations

4.1 Vegetation and Flora

The flora and vegetation survey did not record the presence of any conservation significant flora or vegetation, despite good seasonal conditions and intensive searches. The vegetation complex mapping of the area (Mattiske & Havel 1998) and the pre-European extent (Department of Agriculture and Food Western Australia 2013) have been assessed as having sufficient percentage remaining that the proposed clearing would not be a significant issue in terms of local or State vegetation complex representation.

The alignment intersects four creeks and a few minor drainage lines. In the vicinity of Greenbushes the alignment intersected Dumpling Gully; in Balingup the Balingup Brook was crossed and in Mullalyup the Mullalyup Brook was crossed; towards Kirup the Capel River was crossed. Of these water courses only two were still vegetated with remnant vegetation (Dumpling Gully – good to very good condition and Spring Creek – very good condition). There may be a small amount of clearing of riparian vegetation within the two vegetated creeklines; however both creeks already have a vehicle track crossing and it may be possible to reduce clearing to an amount that will not have any significant impact. Based on the potential to utilise existing tracks to cross the creeks, and therefore minimise impact, there is little reason to require an offset.

The required clearing within these two creeks will be minimal (if any) and as such may be considered to 'not likely be at variance' to Principle F of the Department of Environmental Regulation's 10 Clearing Principles (viz '*Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland*').

Very few weed species were present in the majority of the forested survey areas but high weed incidence was observed in degraded areas adjacent to the railway line, farms and some plantations. Weed hygiene measures to prevent the incursion of weeds into areas of good or better condition should be implemented and managed during the project implementation process.

4.2 Vertebrate Fauna

The survey area is a narrow corridor that follows existing tracks and cleared areas. Only a portion of the alignment remains vegetated and an even smaller portion is in good or better condition. The vegetated areas are within relatively extensive and contiguous jarrah-marri forest, particularly around Greenbushes and Mullalyup. Dependant on timber harvesting and fire history of the adjoining forest it may be considered that similar quality and quantity of fauna habitat surrounds, and extends from, the proposed alignment. The survey area does not provide a significant corridor for fauna.

The survey recorded conservation significant species and habitat that is likely to support additional conservation significant species. The characteristic diggings of quenda were observed within the survey area and this species is likely to be present through parts of the survey area. The survey area is likely to provide foraging habitat for the three species of black cockatoo and the jarrah, marri and *Banksia* species recorded in the survey area are target species for feeding by all three conservation significant black-cockatoo species. Baudin's black cockatoo and forest red-tailed black cockatoo were recorded within the survey area and there was evidence of foraging within the survey area. All jarrah-marri woodland within the survey area (10.52 ha) would be considered medium to high value foraging habitat for the black cockatoo species due to the presence of food items such as jarrah, marri, banksia and certain *Hakea* species (Cale 2003). Black cockatoo species were regularly observed feeding within the alignment near the golf course and along Cirillo Road. The flooded gum

(*Eucalyptus rudis*) creek habitat (vegetation unit CcEmErW) and the cleared areas (vegetation unit Cl) are considered of low value to black cockatoos for feeding due to the lack of preferred food items.

The survey area provides limited breeding habitat for black cockatoos as there are very few old trees. Of the 209 trees identified, only 10 trees with hollows that would be potentially suitable for cockatoos were identified. Only 185 of these trees including seven trees with hollows (four marri and three jarrah), occur within the proposed alignment. There was no evidence of black cockatoos breeding in these hollows at the time. The hollows were not inspected, however, so the suitability to black cockatoos cannot be assessed. The hollows are also likely to provide habitat for other birds, reptiles and bats. The majority of potential habitat trees were recorded along Cirillo Road near Mullalyup.

The remaining 199 trees were recorded without hollows, of which 178 trees without hollows (110 marri and 68 jarrah) occur within the alignment, are relatively young trees of uniform height and width, measuring just over 50 cm DBH. This is due to the previous logging activities that have removed most of the mature trees. Suitable tree hollows are essential for black cockatoo nesting. A substantial portion of breeding habitat has already been lost through clearing and loss of mature trees by timber harvesting in the jarrah forest. It has been estimated that it takes a minimum of 130 years for jarrah and marri to be of use to hollow dependent fauna (Whitford and Williams 2002). Natural tree recruitment cannot replace large scale loss of mature hollow bearing trees in the short term and significant shortages of hollows have already occurred throughout the forest range of black cockatoos. This is compounded by increased competition for nesting opportunities by other native and introduced species.

As proposed by the Water Corporation, the tree and habitat loss can be reduced by placing the pipeline along already existing tracks and cleared areas and avoiding the trees with hollows where possible. For example, locating the pipeline within the paddock rather than remnant vegetation south of Old Padbury Road and within the blue gum plantation rather than remnant vegetation around the Mullalyup and Cirillo Road sections. In the section along Cirillo Road where the majority of potential habitat trees occur, the alignment is recommended to be located towards the southern edge to avoid clearing trees. In selecting the alignment, the direct (clearing) and indirect (i.e. potential damage to roots) impacts to potential habitat trees needs to be considered. This may mean considering significant trees that are situated just outside the proposed alignment. Recommendations in regards to preferred alignment, to minimise impacts, are illustrated in Appendix H, along with the habitat tree locations.

The proximity of recorded occurrences of the carpet python, peregrine falcon, chuditch, western brush wallaby and southern brush-tailed phascogale, and the suitability of habitat in the survey area suggests they are likely to be present. The western brush wallaby and peregrine falcon are highly mobile species and are therefore considered less likely to be directly affected by clearing vegetation. The carpet python, chuditch and southern brush-tailed phascogale are also likely to occur within the survey area, and these species are more at risk of direct impacts (such as mortality) during vegetation clearing.

Based on the results of the field survey, Astron advises that the project may pose a risk of impact to the black cockatoo species; particularly if clearing of more than one hectare of quality foraging habitat and clearing of breeding habitat (which includes all trees over 50 cm DBH of species known to support breeding) is proposed. Should this be the case, referral to the Minister for the Environment under the EPBC Act is advised. It is likely that the alignment can be managed to avoid and minimise removal of habitat trees and good quality vegetation.

5 The Department of Environment Regulation's 10 Clearing Principles

The proposal to clear vegetation within the Greenbushes to Kirup pipeline route is considered below in terms of the DER's 10 Clearing Principles under Schedule 5 of the *Environmental Protection Act 1986*, which stipulate that native vegetation should not be cleared if:

a) It comprises a high level of biological diversity

The application area covers 35.66 ha (although only half of this area contains remnant vegetation) of which only 10.5 ha remains in good condition or better. The alignment is approximately 20 km in length between Greenbushes and Kirup, Western Australia. It lies within the Southern Jarrah Forest subregion of the Jarrah Forest IBRA region.

A Level 2 flora and vegetation survey of the application area was conducted by Astron in October 2013. Two hundred and six vascular plant taxa representing 128 genera from 48 families were recorded within the survey area, with 28 taxa being non-native (weeds). This level of diversity is representative of a comprehensive survey undertaken during peak spring conditions with a good suite of orchids and other ephemeral taxa recorded.

The vegetation associations within the survey area are typical jarrah forest on laterite soils; no sandy soils or granitic habitats were encountered along the alignment. None of the vegetation associations are considered to be rare or restricted and previous surveys indicate that these communities are present outside of the application area (AECOM 2010).

There are no known TECs or PECs within the application area (DPaW 2013a). The closest known PEC, is more than 70 km to the west of the survey area (DPaW 2013a).

No priority flora was recorded within the application area during the field survey (Astron 2013), despite intensive searches.

Twenty-eight introduced flora species were recorded within the survey area, of particular note is **Rubus ulmifolius* (blackberry), which was noted in some low-lying areas adjacent to the alignment. This species is listed as a declared pest under the *Biosecurity and Agriculture Management Act 2007* by the Department of Agriculture and Food (2013). Some serious environmental weeds were also noted within the alignment including arum lily, bridal creeper, watsonia, woody acacias and freesia.

Three fauna habitat types were recorded in the survey area: jarrah/marri woodland, *E. rudis* woodland and cleared habitat. Highly degraded habitat was considered to be the cleared habitat. Some areas of woodland were considered to be high quality, as they retained connectivity with other habitats and are likely to support a native vertebrate fauna assemblage. The other habitats extend beyond the survey area and are adjacent to the area surveyed. In addition they are considered to be common throughout the bioregion and therefore unlikely to support a greater level of faunal diversity than the surrounding areas.

Based on the information presented above, the survey area does not contain a level of biodiversity that is higher, or restricted to the survey area. In a regional context, the survey area is small and the flora, vegetation and habitats found extend over a significant area regionally.

Therefore, the proposed clearing is not likely to be at variance to this Principle.

b) It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

The survey area includes three broad fauna habitat types: jarrah-marri woodland, creeklines with flooded gum (*E. rudis)* woodland and cleared areas. The cleared areas are considered to be in a highly disturbed (Thompson and Thompson 2010) condition and of little value to fauna. The remaining two habitats are considered to be well represented outside of the survey area and are contiguous to adjacent to the survey area.

Four conservation significant fauna species were recorded during the current survey and an additional seven species have been assessed as having high potential of occurring within the survey area:

Recorded

- *Calyptorhynchus banksia naso* Forest red-tailed black cockatoo (VU, S1)
- *Calyptorhynchus baudinii* Baudin's black cockatoo (VU, S1)
- *Ardea modesta* Eastern reef egret (Mi, S3)
- *Isoodon obesulus fusciventer* Quenda (P5)

Likely to Occur

- *Morelia spilota imbricata* Carpet python (S4)
- *Ardea ibis* Cattle egret (Mi, S3)
- *Falco peregrinus* Peregrine falcon (S4)
- *Calyptorhynchus latirostris* Carnaby's black cockatoo (EN, S1)
- *Dasyurus geoffroii* Chuditch (EN, S1)
- *Phascogale tapaotafa tapaotafa* Southern brush-tailed phascogale (S1)
- *Macropus irma* Western brush wallaby (P4)

While the habitats within the survey area may be utilised by the conservation significant fauna species listed above, mainly as a part of a larger foraging area, the proposed area for clearing is small, linear in nature and is considered unlikely to significantly impact on these species. The majority of the species listed are mobile and are likely to temporarily move away from the area being disturbed.

The survey area provides suitable feeding and breeding habitat for Carnaby's black cockatoo, Baudin's black cockatoo and forest red-tailed black cockatoo. Baudin's Black-cockatoo and forest red-tailed black cockatoos were recorded within the survey area and there was evidence of foraging within the survey area. All jarrah-marri woodland within the survey area of good condition or better (10.52 ha) would be considered medium to high value foraging habitat for the black cockatoo species. Black cockatoo species were regularly observed feeding within the alignment near the golf course and along Cirillo Road.

One hundred and eighty-five trees were recorded within the proposed alignment as potential breeding habitat for black cockatoos; however very few mature trees (seven trees) old enough to have potentially suitable hollows were observed. The majority of potential habitat trees were recorded along Cirillo Road near Mullalyup. It is difficult to assess the suitability of these hollows for breeding black cockatoos without inspecting the hollows; however, there was no evidence at the time of the survey that they were being used by black cockatoos.

Based on the above information, the proposed clearing of the potential feeding and breeding habitat trees within the survey area is at variance to this Principle.

c) It includes, or is necessary for the continued existence of, rare flora

Twenty-four threatened flora species, were listed as occurring within the vicinity of the survey area (DoE & DPaW 2013a); however only two of these were rated as having high potential to occur within the survey area based on habitat (*Brachyscias verecundus* and *Caladenia harringtoniae*). The survey corridor was traversed on foot, targeting potential habitat for both taxa, but neither were located despite intensive searches in areas of potential habitat (creeklines, moss swords). Seasonal conditions and the timing of the survey were optimal for potentially recording these two taxa, however neither was encountered.

Based on a comprehensive survey of the proposed clearing area, the proposed clearing is not likely to be variance to this Principle.

d) It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community

No TECs listed under the EPBC Act have been located within or adjacent (<20 km away) to the survey area (DoE 2013; DPaW 2013b).

Given that no TECs occur within a minimum distance of at least 20 km from the proposed alignment; the proposed clearing is not likely to impact on any TEC/PECs and is therefore not at variance to this Principle.

e) It is significant as a remnant of native vegetation in an area that has been extensively cleared

The survey alignment is approximately 20 km long; the corridor was generally 10 m in width (wider in some areas to accommodate potential variations in alignment) and the total area of survey was 35.66 ha. The vegetated area is ~20 ha of which only 10.5 ha remains in good condition or better. The Water Corporation intends to utilise existing tracks and cleared areas (which exist for the entire alignment) for the pipeline; and seeks to minimise any clearing which may be required to install the infrastructure.

The application area occurs within the Southern Jarrah Forest Subregion (JF2) of the Jarrah Forest IBRA bioregion; the Shire of Bridgetown-Greenbushes and the Shire of Donnybrook-Balingup; the alignment is comprised of one singular pre-European vegetation unit: 3 medium forest (jarrah-marri) (DPaW 2013a). Table 10 shows the pre-European vegetation extents remaining within the bioregions and local government areas. The mapped vegetation has not been cleared to below a critical threshold level and therefore the proposal does not represent a significant amount of clearing at a local and regional scale.

Table 11 has the current extent of forest region vegetation complexes (Mattiske and Havel 1998). Three vegetation complexes (Balingup, Bridgetown and Mumballup) have less than 30% extent remaining. However, the mapped areas of these three complexes do not contain any remnant vegetation within the proposed alignment. Therefore no impact to these complexes is proposed and therefore no offset is required.

Table 10: Extent of region and pre-European vegetation remaining (DEC 2013a).

	Pre-European (ha)	Current extent (ha)	% Remaining	% Remaining in DPaW reserves
IBRA Bioregion				
Jarrah Forest	4,506,660	2,459,298	54.57	39.34
IBRA Subregion				
Southern Jarrah Forest	2,607,879	1,335,801	51.22	37.01
Shire				
Shire of Donnybrook-Balingup	156,003	88,337	56.63	55.72
Shire of Bridgetown-Greenbushes	133,759	72,590	54.27	48.66
Pre-European Vegetation Association Jarrah Forest IBRA bioregion				
3	2,661,405	1,631,110	68.23	57.65
3 within Shire of Donnybrook-Balingup	93,346	61,452	65.83	71.66
3 within Shire of Bridgetown-Greenbushes	121,152	69,307	57.21	52.37

Table 11: Vegetation complexes mapped within the survey alignment (Mattiske and Havel 1998).

Vegetation complex	Vegetation code	Area in survey area(ha)	Extent remaining; area in reservation
Balingup	BL	7.2076	24%; 5.4%*
Bridgetown	BT	0.4558	12%; 1.7%*
Catterick	CC1	2.7210	62%; 6.9%**
Dwellingup	D1	4.1906	88%; 14.7%*
Hester	HR	1.1945	74.3%; 13.7%**
Kirup	KR	17.6884	60.2%; 3.9%**
Mumballup	ML	1.3137	4%; 0.9%*
Queenwood	QW	0.8888	38.9%; 0%**
Total area		**35.66**	

**Havel (2002).*

***WALGA (2014).*

The vegetation described and mapped within the application area by Astron (2013) is considered to be widespread throughout the Southern Jarrah Forest bioregion and all vegetation is contiguous with surrounding forested areas adjacent to the survey area (Astron 2013). Clearing of the relatively small area of native vegetation within the application area will not significantly reduce the known pre-European extents or vegetation complex extents.

The survey area is not within a highly-cleared landscape and is not a critical corridor for fauna dispersal.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

f) It is growing in, or in association with, an environment associated with a watercourse or wetland

There are no regionally significant wetlands or watercourses with permanent water within the application area.

The alignment intersects four creeks and a few minor drainage lines. In the vicinity of Greenbushes the alignment intersected Dumpling Gully; in Balingup the Balingup Brook was crossed and in Mullalyup the Mullalyup Brook was crossed; towards Kirup the Capel River was crossed.

Of these water courses only two were still vegetated with native vegetation (Dumpling Gully – good to very good condition and Spring Creek – very good condition). There may be a small amount of clearing of riparian vegetation within the two vegetated creeklines; however both creeks already have a vehicle track crossing and it may be possible to reduce clearing to an amount that will not have any significant impact. Based on the potential to utilise existing tracks to cross the creek and therefore minimise impact, there is little reason to require an offset.

The proposed clearing may be at variance to this Principle.

g) The clearing of the vegetation is likely to cause appreciable land degradation

The application area has been mapped as intersecting 12 land systems (see Section 1.3.2). The survey alignment is approximately 20 km in length and follows existing tracks, roads and cleared areas. The clearing requirement for low gauge water pipe is minimal and the topography of the alignment is generally low relief with minimal slopes.

The minor clearing associated with this project is not likely to cause appreciable land degradation either from wind erosion, changes to soil properties or chemistry; nor likely to impact on adjacent vegetation.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

h) The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

The application area is not located within or adjacent to any conservation reserves. However, some of the alignment is within Greenbushes State Forest 20 and 21 (DPaW 2013b). State Forest is managed for timber extraction but also has important ecological values. The clearing associated with this project is minor and will occur adjacent to or within previously cleared tracks/areas. Therefore no significant impacts to environmental values are expected.

The proposed clearing is therefore not likely to be at variance to this Principle.

i) The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

The corridor passes through Capel River Catchment – Busselton Coast Basin, and Hardy Estuary /Blackwood River catchment, Blackwood River. The alignment is intersected by two creeks and a few minor drainage lines. In the vicinity of Greenbushes the alignment is intersected Dumpling Gully; in Balingup the Balingup Brook is crossed and in Mullalyup the Mullalyup Brook is crossed; towards Kirup the Capel River is crossed.

The alignment passes through the Greenbushes Catchment Area and Padbury Reservoir Catchment Area, which are both Public Drinking Water Supply Areas but neither are assigned a priority level. It also passes close to the Kirup Dam Catchment Area (P1 and P2 Areas) and Mullalyup Water Reserve (no assigned priority level). However, due to the limited amount of clearing (along pre-existing cleared areas or tracks and roads) it is considered unlikely that the proposed clearing will impact the quality of either water source.

The limited clearing is unlikely to have a significant impact on the quality of surface or underground water. The proposed clearing is not likely to be at variance to this Principle.

j) The clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding

The proposed clearing follows pre-existing tracks, roads and previously cleared land. Along the alignment some low-lying areas are present but the minimal amount of clearing for the project would have no significant impact on the natural surface and groundwater processes. The proposal is not likely to cause, or exacerbate, the incidence or intensity of flooding.

Therefore, the proposed clearing is not at variance to this Principle.

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Appendix A: Definitions, Categories and Criteria for Conservation Significant Vegetation, Flora and Fauna

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Table A.1: Categories of threatened ecological communities (DEC 2010).

PD: Presumed Destroyed
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant **and either** of the following applies (A or B): A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats **or** B) All occurrences recorded within the last 50 years have since been destroyed.
CR : Critically Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as **Critically Endangered** when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting **any one or more of** the following criteria (A, B or C): A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% **and either or both** of the following apply (i or ii): i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B) Current distribution is limited, **and one or more** of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

En: Endangered
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as **Endangered** when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting **any one or more** of the following criteria (A, B, or C): A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement **and either or both** of the following apply (i or ii): i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B) Current distribution is limited, **and one or more** of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
VU: Vulnerable
An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as **Vulnerable** when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting **any one or more of** the following criteria (A, B or C): A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated. B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations. C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

Table A.2: Definitions and criteria for priority ecological communities (DEC 2010).

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

P1: Priority One – Poorly-known ecological communities
Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two – Poorly-Known ecological communities
Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three – Poorly-Known ecological communities
(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four
Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5: Priority Five – Conservation dependent ecological communities
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Table A.3: Definitions and Criteria for Threatened Ecological communities (DoE 2013b).

Three categories exist for listing threatened ecological communities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). An ecological community may be categorised:

Categories of ecological communities	
Critically endangered	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.

Table A.4: Conservation codes for Western Australian flora and fauna (DPaW 15 May 2013).

Code	Conservation category	Definition
X	Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice and Wildlife Conservation (Rare Flora) Notice under the *Wildlife Conservation Act 1950*. • **Presumed Extinct Fauna** • **Presumed Extinct Flora (Declared Rare Flora – Extinct)**	Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
T	Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice and Wildlife Conservation (Rare Flora) Notice under the *Wildlife Conservation Act 1950*. • **Threatened Fauna (Fauna that is rare or is likely to become extinct)** • **Threatened Flora (Declared Rare Flora - Extant)**	Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
IA	Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice under the *Wildlife Conservation Act 1950*. • **Birds protected under an international agreement**	Birds that are subject to an agreement between governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction.
S	Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice under the *Wildlife Conservation Act 1950.* • **Other specially protected fauna**	Fauna that is in need of special protection, otherwise than for the reasons mentioned in the above schedules.
Threatened fauna and flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria: • **CR: Critically Endangered -** considered to be facing an extremely high risk of extinction in the wild. • **EN: Endangered -** considered to be facing a very high risk of extinction in the wild. • **VU: Vulnerable -** considered to be facing a high risk of extinction in the wild.		

Table A.5: Priority species under Western Australian *Wildlife Conservation Act 1950*.

Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora and Priority Fauna Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These taxa require regular monitoring. Conservation Dependent species are placed in Priority 5.

P1: Priority One – Poorly known taxa
Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2: Priority Two – Poorly known taxa
Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3: Priority Three – Poorly known taxa
Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4: Priority Four: Rare, near threatened and other taxa in need of monitoring
(a) Rare. Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. (b) Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5: Priority Five: Conservation dependent taxa
Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxa becoming threatened within five years.

Table A.6: Categories and definitions for *EPBC Act* listed flora and fauna species (DEWSPaC 2013).

Conservation category	Definition
Extinct	Taxa not definitely located in the wild during the past 50 years.
Extinct in the wild	Taxa known to survive only in captivity.
Critically endangered (CR)	Taxa facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (E)	Taxa facing a very high risk of extinction in the wild in the near future.
Vulnerable (V)	Taxa facing a high risk of extinction in the wild in the medium term.
Near threatened (NT)	Taxa that risk becoming Vulnerable in the wild.
Conservation dependant (CD)	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened.
Data deficient (insufficiently known) (DD)	Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.
Least concern (LC)	Taxa that are not considered threatened.

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Appendix B: Database Search Results

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Australian Government

Department of Sustainability, Environment, Water, Population and Communities

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: 23/09/13 16:37:44

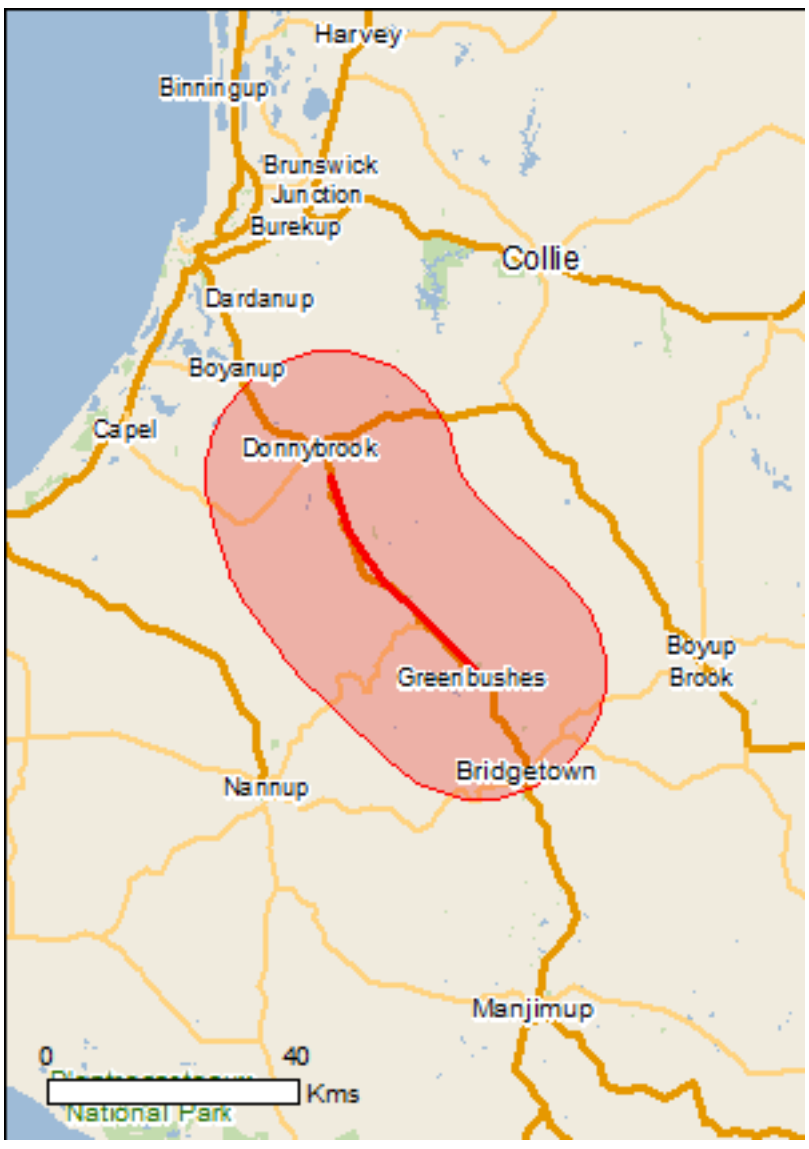
Summary

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 (Geoscience Australia), ©PSMA 2010

Coordinates

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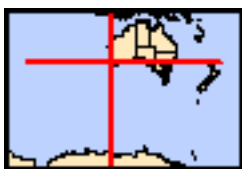

Summary

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 Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	33
Listed Migratory Species:	7

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 and the heritage values of a place on the Register of the National Estate.

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.

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	6
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.

Place on the RNE:	28
State and Territory Reserves:	13
Regional Forest Agreements:	1
Invasive Species:	29
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (RAMSAR)	[Resource Information]
Name	Proximity
Vasse-wonnerup system	Upstream from Ramsar

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Cacatua pastinator pastinator Muir's Corella (southern), Western Long-billed Corella (southern) [25981]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum [25911]	Vulnerable	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat known to occur within area
Brachyscias verecundus Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat may occur within area
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat known to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Caladenia winfieldii Majestic Spider-orchid [64504]	Endangered	Species or species habitat likely to occur within area
Centrolepis caespitosa [6393]	Endangered	Species or species habitat likely to occur within area
Chamelaucium sp. C Coast Plain (R.D.Royce 4872) Royce's Waxflower [82023]	Vulnerable	Species or species habitat may occur within area
Darwinia foetida Muchea Bell [83190]	Critically Endangered	Species or species habitat may occur within area
Darwinia whicherensis Abba Bell [83193]	Endangered	Species or species habitat may occur within area
Daviesia elongata subsp. elongata Long-leaved Daviesia [64883]	Vulnerable	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 may occur within area
Drakaea elastica Glossy-leafed Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area
Petrophile latericola Laterite Petrophile [64532]	Endangered	Species or species habitat may occur within area
Rulingia sp. Trigwell Bridge (R.Smith s.n. 20/6/1989) Trigwell's Rulingia [64541]	Endangered	Species or species habitat may occur within area
Sphenotoma drummondii [21160]	Endangered	Species or species habitat may occur within area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area
Synaphea stenoloba Dwellingup Synaphea [66311]	Endangered	Species or species habitat may 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		
Cacatua pastinator pastinator Muir's Corella (southern), Western Long-billed Corella (southern) [25981]	Vulnerable	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
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

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 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
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Dalgarup Management Priority Area	WA	Indicative Place
Dardanup Management Priority Area	WA	Indicative Place
Greenbushes Management Priority Area	WA	Indicative Place
Mullalyup Management Priority Area	WA	Indicative Place
Preston - Noggerup Management Priority Area	WA	Indicative Place
Powlalup Nature Reserve (1977 boundary)	WA	Registered
Historic		
Blue Atlas Cedar	WA	Indicative Place
Bridgedale	WA	Indicative Place
Brookview Farm Homestead	WA	Indicative Place
Careydale Farm Homestead	WA	Indicative Place
Hawterville Farmhouse and Garden	WA	Indicative Place
Marri	WA	Indicative Place
Old Brookhampton Farm Group	WA	Indicative Place
Old Brookhampton Hall	WA	Indicative Place

Name	State	Status
St Peters Anglican Church	WA	Indicative Place
St Thomas Anglican Church	WA	Indicative Place
Torridon Farm Homestead	WA	Indicative Place
Trotts Cottage	WA	Indicative Place
Yabberup Hall	WA	Indicative Place
All Saints Anglican Church	WA	Registered
Anchor and Hope Inn (former)	WA	Registered
Blackwood Inn and former Barns	WA	Registered
Brooklands Farm Homestead (former)	WA	Registered
Crendon Farm Homestead	WA	Registered
Golden Valley Farm Homestead, Outbuildings and Garden	WA	Registered
Paynedale Farm Homestead	WA	Registered
Soldiers Memorial Hall	WA	Registered
Southampton Farm Homestead	WA	Registered

State and Territory Reserves

[Resource Information]

Name	State
Dalgarup	WA
Dardanup	WA
Greater Preston	WA
Greenbushes	WA
Hester	WA
Kerr	WA
Powlalup	WA
Unnamed WA20751	WA
Unnamed WA26238	WA
Unnamed WA3412	WA
Unnamed WA43031	WA
Wellington	WA
Wellington Discovery Forest	WA

Regional Forest Agreements

[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		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

Name	Status	Type of Presence
Sturnus vulgaris Common Starling [389]		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
Capra hircus Goat [2]		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
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		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 rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		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		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		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
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

Name	Status	Type of Presence
		area
[Lycium ferocissimum](#) African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
[Olea europaea](#) Olive, Common Olive [9160]		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
[Rubus fruticosus aggregate](#) Blackberry, European Blackberry [68406]		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

Coordinates

-33.844436 116.068749,-33.77369 115.980172,-33.737153 115.932107,-33.678319 115.881982,-33.622304 115.860009,-33.610867 115.855889

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 Heritage and Register of National Estate properties, Wetlands of International 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.

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:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA 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
-State Forests of 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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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 29/10/2013

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Line'
Group By Family

Family	Species	Records
Alliaceae	1	4
Amaranthaceae	3	11
Amaryllidaceae	3	3
Anarthriaceae	4	6
Apiaceae	14	44
Apocynaceae	1	1
Apodanthaceae	1	2
Araceae	1	1
Araliaceae	2	2
Asparagaceae	23	64
Asteraceae	39	103
Boraginaceae	2	2
Boryaceae	2	2
Brassicaceae	9	14
Bryaceae	5	9
Campanulaceae	4	9
Caprifoliaceae	3	4
Caryophyllaceae	2	2
Casuarinaceae	2	4
Celastraceae	2	6
Centrolepidaceae	2	6
Chenopodiaceae	4	5
Colchicaceae	5	11
Commelinaceae	1	1
Convolvulaceae	2	2
Cucurbitaceae	1	1
Cupressaceae	1	1
Cyperaceae	37	68
Dasypogonaceae	2	7
Dennstaedtiaceae	1	3
Dicranaceae	3	25
Dilleniaceae	14	53
Ditrichaceae	2	5
Droseraceae	11	21
Elaeocarpaceae	8	38
Ericaceae	25	86
Euphorbiaceae	3	7
Fabaceae	105	292
Fissidentaceae	1	1
Gentianaceae	2	5
Geraniaceae	2	4
Goodeniaceae	13	60
Haemodoraceae	13	34
Haloragaceae	4	6
Hemerocallidaceae	8	15
Hydrocharitaceae	1	1
Hypericaceae	2	5
Hypoxidaceae	3	6
Iridaceae	25	72
Juncaceae	10	23
Juncaginaceae	3	4
Lamiaceae	9	17
Lauraceae	2	3
Lentibulariaceae	2	2
Linaceae	2	3
Lindsaeaceae	1	5
Loganiaceae	3	10
Loranthaceae	2	4
Lythraceae	1	2
Malvaceae	7	16
Menyanthaceae	1	1
Moraceae	1	1
Myrtaceae	39	98
Olacaceae	1	2
Oleaceae	1	1
Onagraceae	5	5
Orchidaceae	46	94
Orobanchaceae	3	5
Orthodontiaceae	1	1
Oxalidaceae	4	9
Papaveraceae	4	4
Passifloraceae	1	1
Phyllanthaceae	3	9
Pinaceae	1	1
Pittosporaceae	6	18
Plantaginaceae	6	12
Poaceae	42	86
Podocarpaceae	1	15
Polygalaceae	3	3

Polygonaceae	6	16
Potamogetonaceae	3	4
Pottiaceae	2	10
Primulaceae	2	5
Proteaceae	49	108
Pteridaceae	1	4
Racopilaceae	1	3
Ranunculaceae	4	11
Restionaceae	19	48
Rhamnaceae	1	2
Rosaceae	10	22
Rubiaceae	6	13
Rutaceae	7	14
Salviniaceae	1	1
Santalaceae	4	13
Sapindaceae	2	5
Scrophulariaceae	1	1
Selaginellaceae	1	1
Sematophyllaceae	1	8
Solanaceae	2	2
Stylidiaceae	18	35
Thymelaeaceae	9	12
Tropaeolaceae	1	1
Urticaceae	1	1
Verbenaceae	1	1
Violaceae	3	5
Xanthorrhoeaceae	2	8
Xyridaceae	3	3
Zamiaceae	1	9
Zygophyllaceae	1	1
TOTAL	**798**	**1956**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Alliaceae					
1.	1378	*Allium triquetrum (Three-cornered Garlic)*	Y		
Amaranthaceae					
2.	2656	*Amaranthus caudatus (Love Lies Bleeding)*	Y		
3.	2718	*Ptilotus drummondii (Narrowleaf Mulla Mulla)*			
4.	2742	*Ptilotus manglesii (Pom Poms, Mulamula)*			
Amaryllidaceae					
5.	1489	*Amaryllis belladonna (Belladonna Lily)*	Y		
6.	1493	*Leucojum aestivum (Snowflake)*	Y		
7.	1494	*Narcissus pseudonarcissus*	Y		
Anarthriaceae					
8.	1062	*Anarthria prolifera*			
9.	1063	*Anarthria scabra*			
10.	1097	*Lyginia barbata*			
11.	18049	*Lyginia imberbis*			
Apiaceae					
12.	6203	*Actinotus glomeratus*			
13.	8595	*Apium graveolens (Wild Celery)*	Y		
14.	12040	*Apium prostratum var. prostratum (Sea Celery)*			
15.	6218	*Daucus glochidiatus (Australian Carrot)*			
16.	6219	*Eryngium pinnatifidum (Blue Devils)*			
17.	6222	*Homalosciadium homalocarpum*			
18.	6245	*Pentapeltis peltigera*			
19.	6246	*Pentapeltis silvatica (Southern Pentapeltis)*			
20.	6253	*Platysace filiformis*			
21.	6259	*Platysace tenuissima*			
22.	6283	*Xanthosia atkinsoniana*			
23.	6284	*Xanthosia candida*			
24.	6285	*Xanthosia ciliata*			
25.	6289	*Xanthosia huegelii*			
Apocynaceae					
26.	6575	*Vinca major (Blue Periwinkle)*	Y		
Apodanthaceae					
27.	2408	*Pilostyles hamiltonii*			
Araceae					
28.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
Araliaceae					
29.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
30.	6280	*Trachymene pilosa (Native Parsnip)*			
Asparagaceae					
31.	8779	*Asparagus asparagoides (Bridal Creeper)*	Y		
32.	1201	*Asparagus officinalis (Asparagus)*	Y		
33.	1280	*Chamaescilla corymbosa (Blue Squill)*			
34.	11299	*Chamaescilla corymbosa var. corymbosa*			
35.	1308	*Laxmannia sessiliflora (Nodding Lily)*			
36.	11464	*Laxmannia sessiliflora subsp. australis*			
37.	1309	*Laxmannia squarrosa*			
38.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
39.	1225	*Lomandra drummondii*			
40.	1228	*Lomandra hermaphrodita*			
41.	1229	*Lomandra integra*			
42.	1234	*Lomandra nigricans*			
43.	1236	*Lomandra odora (Tiered Matrush)*			
44.	1238	*Lomandra pauciflora*			
45.	1239	*Lomandra preissii*			
46.	1243	*Lomandra sericea (Silky Mat Rush)*			
47.	1244	*Lomandra sonderi*			
48.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
49.	1330	*Thysanotus fastigiatus*			
50.	1338	*Thysanotus manglesianus (Fringed Lily)*			
51.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
52.	1351	*Thysanotus sparteus*			
53.	35519	*Thysanotus unicupensis*		P2	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Asteraceae					
54.	7838	*Arctotheca calendula (Cape Weed)*	Y		
55.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
56.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
57.	7910	*Carduus tenuiflorus (Sheep Thistle)*	Y		
58.	7911	*Carthamus lanatus (Saffron Thistle)*	Y		
59.	7935	*Cichorium intybus (Chicory)*	Y		
60.	7937	*Cirsium vulgare (Spear Thistle)*	Y		
61.	7941	*Conyza parva*	Y		
62.	20074	*Conyza sumatrensis*	Y		
63.	13354	*Craspedia variabilis*			
64.	29054	*Crepis foetida subsp. foetida*	Y		
65.	19893	*Cynara cardunculus subsp. flavescens*	Y		
66.	7968	*Erigeron karvinskianus*	Y		
67.	19088	*Euchiton collinus*			
68.	12741	*Hyalosperma cotula*			
69.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
70.	8096	*Lactuca serriola (Prickly Lettuce)*	Y		
71.	18585	*Lagenophora huegelii*			
72.	8106	*Millotia tenuifolia (Soft Millotia)*			
73.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
74.	18352	*Pithocarpa pulchella var. melanostigma*			
75.	8175	*Podolepis gracilis (Slender Podolepis)*			
76.	8177	*Podolepis lessonii*			
77.	8195	*Quinetia urvillei*			
78.	8203	*Senecio diaschides*	Y		
79.	20719	*Senecio glomeratus subsp. glomeratus*			
80.	8208	*Senecio hispidulus (Hispid Fireweed)*			
81.	8215	*Senecio minimus (Toothed Fireweed)*			
82.	20663	*Senecio multicaulis subsp. multicaulis*			
83.	8223	*Sigesbeckia orientalis (Indian Weed)*	Y		
84.	14583	*Siloxerus multiflorus*			
85.	8227	*Silybum marianum (Variegated Thistle)*	Y		
86.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
87.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
88.	8248	*Tolpis barbata (Yellow Hawkweed)*	Y		
89.	29048	*Tolpis virgata*	Y		
90.	8250	*Tragopogon porrifolius (Salsify)*	Y		
91.	8251	*Trichocline spathulata (Native Gerbera)*			
92.	8257	*Vellereophyton dealbatum (White Cudweed)*	Y		
Boraginaceae					
93.	6674	*Borago officinalis (Borage)*	Y		
94.	6722	*Myosotis australis (Southern Forget-me-not)*			
Boryaceae					
95.	1272	*Borya scirpoidea*			
96.	1273	*Borya sphaerocephala (Pincushions)*			
Brassicaceae					
97.	2995	*Brassica napus*	Y		
98.	3000	*Brassica tournefortii (Mediterranean Turnip)*	Y		
99.	3018	*Lepidium africanum (Rubble Peppercress)*	Y		
100.	19989	*Lepidium didymum*	Y		
101.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
102.	3063	*Rapistrum rugosum (Turnip Weed)*	Y		
103.	3066	*Rorippa nasturtium-aquaticum (Watercress)*	Y		
104.	3071	*Sisymbrium officinale (Hedge Mustard)*	Y		
105.	3072	*Sisymbrium orientale (Indian Hedge Mustard)*	Y		
Bryaceae					
106.	32417	*Ptychostomum angustifolium*			
107.	32424	*Rosulabryum albolimbatum*			
108.	32426	*Rosulabryum campylothecium*			
109.	32427	*Rosulabryum capillare*			
110.	32429	*Rosulabryum torquescens*			
Campanulaceae					
111.	9289	*Lobelia anceps (Angled Lobelia)*			
112.	7385	*Wahlenbergia communis (Native Bluebell)*			
113.	7388	*Wahlenbergia multicaulis*			
114.	7392	*Wahlenbergia stricta (Austral Bluebell)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Caprifoliaceae					
115.	35322	*Centranthus ruber subsp. ruber*	Y		
116.	7365	*Lonicera japonica (Japanese Honeysuckle)*	Y		
117.	7368	*Scabiosa atropurpurea (Purple Pincushion)*	Y		
Caryophyllaceae					
118.	2891	*Corrigiola litoralis (Strapwort)*	Y		
119.	11803	*Silene gallica var. quinquevulnera*	Y		
Casuarinaceae					
120.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
121.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
Celastraceae					
122.	4733	*Stackhousia monogyna*			
123.	4737	*Tripterococcus brunonis (Winged Stackhousia)*			
Centrolepidaceae					
124.	1117	*Aphelia cyperoides*			
125.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
Chenopodiaceae					
126.	2490	*Chenopodium glaucum (Glaucous Goosefoot)*	Y		
127.	11368	*Dysphania glomulifera subsp. glomulifera*			
128.	33480	*Dysphania pumilio (Clammy Goosefoot)*			
129.	30434	*Salsola australis*			
Colchicaceae					
130.	1382	*Baeometra uniflora*	Y		
131.	12770	*Burchardia congesta*			
132.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
133.	1394	*Wurmbea dioica (Early Nancy)*			
134.	1402	*Wurmbea sinora*			
Commelinaceae					
135.	1162	*Cartonema philydroides*			
Convolvulaceae					
136.	41761	*Calystegia silvatica*	Y		Y
137.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
Cucurbitaceae					
138.	7372	*Cucumis myriocarpus (Prickly Paddy Melon)*	Y		
Cupressaceae					
139.	93	*Callitris drummondii (Drummond's Cypress Pine)*			
Cyperaceae					
140.	743	*Baumea juncea (Bare Twigrush)*			
141.	747	*Baumea rubiginosa*			
142.	749	*Bolboschoenus caldwellii (Marsh Club-rush)*			
143.	754	*Carex divisa (Divided Sedge)*	Y		
144.	756	*Carex inversa (Knob Sedge)*			
145.	759	*Carex tereticaulis*		P1	
146.	13766	*Caustis sp. Boyanup (G.S. McCutcheon 1706)*		P3	
147.	763	*Chorizandra enodis (Black Bristlerush)*			
148.	768	*Cyathochaeta avenacea*			
149.	17618	*Cyathochaeta equitans*			
150.	20216	*Ficinia nodosa (Knotted Club Rush)*			
151.	900	*Gahnia aristata*			
152.	902	*Gahnia decomposita*			
153.	20200	*Isolepis cernua var. setiformis*			
154.	20198	*Isolepis fluitans var. fluitans*			
155.	914	*Isolepis hookeriana (Bristle Club Rush)*			
156.	42741	*Lepidosperma apricola*			
157.	930	*Lepidosperma costale*			
158.	932	*Lepidosperma effusum (Spreading Sword-sedge)*			
159.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
160.	936	*Lepidosperma leptostachyum*			
161.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
162.	944	*Lepidosperma scabrum*			
163.	29150	*Lepidosperma sp. Margaret River (B.J. Lepschi 1841)*			
164.	945	*Lepidosperma squamatum*			
165.	948	*Lepidosperma tetraquetrum*			
166.	953	*Mesomelaena graciliceps*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
167.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
168.	969	*Schoenoplectus validus (Lake Club-rush)*			
169.	976	*Schoenus breviculmis*			
170.	984	*Schoenus curvifolius*			
171.	985	*Schoenus discifer*			
172.	999	*Schoenus loliaceus*		P2	
173.	1002	*Schoenus nanus (Tiny Bog Rush)*			
174.	1036	*Tetraria octandra*			
175.	35578	*Tetraria sp. Blackwood River (A.R. Annels 3043)*		P3	
176.	35579	*Tetraria sp. Jarrah Forest (R. Davis 7391)*			
Dasypogonaceae					
177.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
178.	1219	*Dasypogon hookeri (Pineapple Bush)*			
Dennstaedtiaceae					
179.	41651	*Pteridium esculentum subsp. esculentum*			
Dicranaceae					
180.	32334	*Campylopus australis*			
181.	32338	*Campylopus introflexus*	Y		
182.	32344	*Dicranoloma diaphanoneuron*			
Dilleniaceae					
183.	5109	*Hibbertia amplexicaulis*			
184.	5114	*Hibbertia commutata*			
185.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
186.	20051	*Hibbertia diamesogenos*			
187.	5125	*Hibbertia ferruginea*			
188.	19778	*Hibbertia glomerata subsp. darlingensis*			
189.	20059	*Hibbertia hemignosta*			
190.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
191.	5137	*Hibbertia inconspicua*			
192.	5157	*Hibbertia polystachya*			
193.	5159	*Hibbertia pulchra*			
194.	20032	*Hibbertia pulchra var. pulchra*			
195.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
196.	5176	*Hibbertia vaginata*			
Ditrichaceae					
197.	32462	*Ceratodon purpureus subsp. convolutus*			
198.	32351	*Eccremidium pulchellum*			
Droseraceae					
199.	3092	*Drosera bulbosa (Red-leaved Sundew)*			
200.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
201.	13217	*Drosera erythrorhiza subsp. erythrorhiza*			
202.	15453	*Drosera gigantea subsp. gigantea*			
203.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
204.	3108	*Drosera marchantii*			
205.	13209	*Drosera marchantii subsp. marchantii*			
206.	3109	*Drosera menziesii (Pink Rainbow)*			
207.	3118	*Drosera pallida (Pale Rainbow)*			
208.	3131	*Drosera stolonifera (Leafy Sundew)*			
209.	13205	*Drosera tubaestylis*			
Elaeocarpaceae					
210.	4524	*Platytheca galioides*			
211.	4526	*Tetratheca affinis*			
212.	4535	*Tetratheca hirsuta (Black Eyed Susan)*			
213.	4538	*Tetratheca parvifolia*		P3	
214.	4544	*Tetratheca setigera*			
215.	4546	*Tetratheca virgata*			
216.	4547	*Tremandra diffusa*			
217.	4548	*Tremandra stelligera*			
Ericaceae					
218.	6306	*Andersonia caerulea (Foxtails)*			
219.	6312	*Andersonia involucrata*			
220.	6314	*Andersonia lehmanniana*			
221.	6323	*Astroloma ciliatum (Candle Cranberry)*			
222.	6325	*Astroloma drummondii*			
223.	6334	*Astroloma pallidum (Kick Bush)*			
224.	14504	*Astroloma sp. Nannup (R.D. Royce 3978)*		P4	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
225.	6348	*Conostephium pendulum (Pearl Flower)*			
226.	6360	*Leucopogon australis (Spiked Beard-heath)*			
227.	6367	*Leucopogon capitellatus*			
228.	6374	*Leucopogon conostephioides*			
229.	6396	*Leucopogon glabellus*			
230.	41260	*Leucopogon microcarpus*			
231.	40941	*Leucopogon obovatus subsp. revolutus*			
232.	6425	*Leucopogon oxycedrus*			
233.	6428	*Leucopogon pendulus*			
234.	6436	*Leucopogon propinquus*			
235.	6441	*Leucopogon reflexus (Heart-leaf Beard-heath)*			
236.	18098	*Leucopogon sp. Darradup (R.D. Royce 2998)*			
237.	19662	*Leucopogon sp. Margaret River (J. Scott 207)*			
238.	6454	*Leucopogon verticillatus (Tassel Flower)*			
239.	34736	*Lysinema pentapetalum*			
240.	31931	*Sphenotoma capitata*			
241.	31952	*Sphenotoma gracilis (Swamp Paper-heath)*			
242.	6476	*Styphelia tenuiflora (Common Pinheath)*			
Euphorbiaceae					
243.	13101	*Amperea simulans*			
244.	34160	*Euphorbia lathyris (Caper Spurge)*	Y		
245.	4666	*Monotaxis occidentalis*			
Fabaceae					
246.	15429	*Acacia alata var. alata*			
247.	15466	*Acacia applanata*			
248.	18285	*Acacia baileyana*	Y		
249.	11731	*Acacia browniana var. browniana*			
250.	11377	*Acacia browniana var. obscura*			
251.	17858	*Acacia dealbata*	Y		
252.	19920	*Acacia dealbata subsp. dealbata*	Y		
253.	3294	*Acacia dentifera*			
254.	3307	*Acacia divergens*			
255.	18287	*Acacia elata*	Y		
256.	3331	*Acacia extensa (Wiry Wattle)*			
257.	3339	*Acacia flagelliformis*		P4	
258.	18286	*Acacia floribunda*	Y		
259.	3374	*Acacia huegelii*			
260.	16165	*Acacia insolita subsp. insolita*			
261.	18217	*Acacia iteaphylla*	Y		
262.	3410	*Acacia lateriticola*			
263.	17464	*Acacia longifolia subsp. longifolia*	Y		
264.	17958	*Acacia mearnsii*	Y		
265.	10955	*Acacia melanoxylon*	Y		
266.	3448	*Acacia mooreana*			
267.	3453	*Acacia myrtifolia*			
268.	3454	*Acacia nervosa (Rib Wattle)*			
269.	3464	*Acacia obovata*			
270.	3496	*Acacia preissiana*			
271.	3502	*Acacia pulchella (Prickly Moses)*			
272.	15481	*Acacia pulchella var. glaberrima*			
273.	15483	*Acacia pulchella var. pulchella*			
274.	3504	*Acacia pycnantha (Golden Wattle)*	Y		
275.	30034	*Acacia saligna subsp. pruinescens*			
276.	30032	*Acacia saligna subsp. saligna*			
277.	30036	*Acacia saligna subsp. stolonifera*			
278.	3537	*Acacia semitrullata*		P4	
279.	3591	*Acacia urophylla*			
280.	15487	*Acacia varia var. varia*			
281.	3686	*Aotus cordifolia*			
282.	14396	*Bossiaea aquifolium subsp. aquifolium*			
283.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
284.	3713	*Bossiaea linophylla*			
285.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
286.	18497	*Bossiaea sp. Waroona (B.J. Keighery & N. Gibson 229)*			
287.	10861	*Callistachys lanceolata (Wonnich)*			
288.	18156	*Chamaecytisus palmensis (Tagasaste)*	Y		
289.	8971	*Chorizema cordatum*			
290.	3757	*Chorizema glycinifolium*			
291.	13107	*Chorizema retrorsum*			

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292.	3761	*Chorizema rhombeum*			
293.	3799	*Daviesia cordata (Bookleaf)*			
294.	3800	*Daviesia costata*			
295.	3807	*Daviesia divaricata (Marno)*			
296.	3808	*Daviesia elongata*			
297.	14529	*Daviesia elongata subsp. elongata*		T	
298.	15505	*Daviesia incrassata subsp. incrassata*			
299.	3817	*Daviesia inflata*			
300.	3832	*Daviesia physodes*			
301.	3835	*Daviesia preissii*			
302.	3866	*Dillwynia uncinata (Silky Parrot Pea)*			
303.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
304.	3891	*Gastrolobium bilobum (Heart Leaf Poison)*			
305.	14202	*Gastrolobium glabratum*			
306.	19733	*Gastrolobium retusum*			
307.	3924	*Gastrolobium spinosum (Prickly Poison)*			
308.	20474	*Gastrolobium whicherense*		P2	
309.	3936	*Genista linifolia (Flaxleaf Broom)*	Y		
310.	18143	*Genista monspessulana*	Y		
311.	3948	*Gompholobium capitatum*			
312.	10909	*Gompholobium confertum*			
313.	3950	*Gompholobium knightianum*			
314.	3951	*Gompholobium marginatum*			
315.	3953	*Gompholobium ovatum*			
316.	3954	*Gompholobium polymorphum*			
317.	3955	*Gompholobium preissii*			
318.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
319.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
320.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
321.	3965	*Hovea elliptica (Tree Hovea)*			
322.	3968	*Hovea trisperma (Common Hovea)*			
323.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
324.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
325.	4017	*Jacksonia horrida*			
326.	4036	*Kennedia carinata*			
327.	4037	*Kennedia coccinea (Coral Vine)*			
328.	4044	*Kennedia prostrata (Scarlet Runner)*			
329.	4045	*Kennedia stirlingii (Bushy Kennedia)*			
330.	3669	*Labichea punctata (Lance-leaved Cassia)*			
331.	4047	*Lathyrus tingitanus (Tangier Pea)*	Y		
332.	8564	*Lotus subbiflorus*	Y		
333.	4063	*Lotus uliginosus (Greater Lotus)*	Y		
334.	4065	*Lupinus angustifolius (Narrowleaf Lupin)*	Y		
335.	4067	*Lupinus luteus (Yellow Lupin)*	Y		
336.	4090	*Mirbelia dilatata (Holly-leaved Mirbelia)*			
337.	3618	*Paraserianthes lophantha (Albizia)*			
338.	17114	*Paraserianthes lophantha subsp. lophantha*			
339.	17016	*Podalyria sericea*	Y		
340.	4177	*Pultenaea ochreata*			
341.	4181	*Pultenaea reticulata*			
342.	4187	*Pultenaea verruculosa*			
343.	17020	*Robinia pseudoacacia*	Y		
344.	17551	*Sphaerolobium drummondii*			
345.	4207	*Sphaerolobium medium*			
346.	4208	*Sphaerolobium nudiflorum*			
347.	4313	*Trifolium subterraneum (Subterranean Clover)*	Y		
348.	4317	*Ulex europaeus (Gorse)*	Y		
349.	4320	*Vicia hirsuta (Hairy Vetch)*	Y		
350.	12070	*Vicia sativa subsp. sativa*	Y		
Fissidentaceae					
351.	32369	*Fissidens tenellus*			
Gentianaceae					
352.	6539	*Centaurium erythraea (Common Centaury)*	Y		
353.	6543	*Cicendia filiformis (Slender Cicendia)*	Y		
Geraniaceae					
354.	4340	*Geranium retrorsum*			
355.	4341	*Geranium solanderi (Native Geranium)*			
Goodeniaceae					

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356.	7420	*Dampiera alata (Winged-stem Dampiera)*			
357.	7444	*Dampiera hederacea (Karri Dampiera)*			
358.	7446	*Dampiera heteroptera*		P3	
359.	7454	*Dampiera linearis (Common Dampiera)*			
360.	29362	*Goodenia coerulea*			
361.	7505	*Goodenia eatoniana*			
362.	19285	*Goodenia pulchella subsp. Wheatbelt (L.W. Sage & F. Hort 795)*			
363.	13165	*Goodenia pusilla*			
364.	7568	*Lechenaultia biloba (Blue Leschenaultia)*			
365.	7575	*Lechenaultia formosa (Red Leschenaultia)*			
366.	7602	*Scaevola calliptera*			
367.	7613	*Scaevola glandulifera (Viscid Hand-flower)*			
368.	7665	*Velleia trinervis*			
Haemodoraceae					
369.	1406	*Anigozanthos bicolor (Little Kangaroo Paw)*			
370.	11931	*Anigozanthos bicolor subsp. decrescens*			
371.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
372.	11261	*Anigozanthos manglesii subsp. manglesii*			
373.	1418	*Conostylis aculeata (Prickly Conostylis)*			
374.	11826	*Conostylis aculeata subsp. aculeata*			
375.	1447	*Conostylis pusilla*			
376.	1453	*Conostylis serrulata*			
377.	1454	*Conostylis setigera (Bristly Cottonhead)*			
378.	11597	*Conostylis setigera subsp. setigera*			
379.	1465	*Haemodorum discolor*			
380.	1468	*Haemodorum laxum*			
381.	1478	*Phlebocarya ciliata*			
Haloragaceae					
382.	6143	*Glischrocaryon aureum (Common Popflower)*			
383.	6144	*Glischrocaryon flavescens*			
384.	6146	*Gonocarpus benthamii*			
385.	6189	*Myriophyllum crispatum*			
Hemerocallidaceae					
386.	23474	*Agrostocrinum hirsutum*			
387.	1276	*Caesia micrantha (Pale Grass Lily)*			
388.	1259	*Dianella revoluta (Blueberry Lily)*			
389.	1295	*Johnsonia acaulis*			
390.	1296	*Johnsonia inconspicua*		P3	
391.	1297	*Johnsonia lupulina (Hooded Lily)*			
392.	1260	*Stypandra glauca (Blind Grass)*			
393.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
Hydrocharitaceae					
394.	168	*Ottelia ovalifolia (Swamp Lily)*			
Hypericaceae					
395.	20043	*Hypericum canariense*	Y		
396.	5182	*Hypericum perforatum (St John's Wort)*	Y		
Hypoxidaceae					
397.	1500	*Hypoxis glabella (Tiny Star)*			
398.	1503	*Hypoxis occidentalis*			
399.	11845	*Hypoxis occidentalis var. quadriloba*			
Iridaceae					
400.	18279	*Babiana angustifolia*	Y		
401.	18392	*Freesia alba x leichtlinii*	Y		
402.	1519	*Gladiolus cardinalis*	Y		
403.	1523	*Gladiolus tristis (Largeflower Gladiolus)*	Y		
404.	1524	*Gladiolus undulatus (Wild Gladiolus)*	Y		
405.	1532	*Ixia maculata (Yellow Ixia)*	Y		
406.	1533	*Ixia paniculata*	Y		
407.	1534	*Ixia polystachya (Variable Ixia)*	Y		
408.	19179	*Moraea flaccida (One-leaf Cape Tulip)*	Y		
409.	11749	*Orthrosanthus laxus var. laxus (Morning Iris)*			
410.	1542	*Patersonia babianoides*			
411.	1546	*Patersonia juncea (Rush Leaved Patersonia)*			
412.	30472	*Patersonia occidentalis var. occidentalis*			
413.	1551	*Patersonia pygmaea (Pygmy Patersonia)*			
414.	1553	*Patersonia umbrosa (Yellow Flags)*			
415.	11550	*Patersonia umbrosa var. xanthina (Yellow Flags)*			

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416.	11544	*Romulea rosea var. australis (Guildford Grass)*	Y		
417.	1558	*Sparaxis bulbifera*	Y		
418.	1560	*Sparaxis pillansii (Harlequin Flower)*	Y		
419.	1561	*Tritonia crocata*	Y		
420.	38401	*Tritonia gladiolaris (Lined Tritonia)*	Y		
421.	13103	*Watsonia borbonica*	Y		
422.	1566	*Watsonia marginata*	Y		
423.	18108	*Watsonia meriana var. bulbillifera*	Y		
424.	18118	*Watsonia meriana var. meriana*	Y		
Juncaceae					
425.	20454	*Juncus acutus subsp. acutus*	Y		
426.	8328	*Juncus amabilis*			
427.	1178	*Juncus bufonius (Toad Rush)*	Y		
428.	1179	*Juncus caespiticius (Grassy Rush)*			
429.	1180	*Juncus capitatus (Capitate Rush)*	Y		
430.	1184	*Juncus holoschoenus (Jointleaf Rush)*			
431.	11922	*Juncus kraussii subsp. australiensis*			
432.	1188	*Juncus pallidus (Pale Rush)*			
433.	1195	*Juncus subsecundus (Finger Rush)*			
434.	1198	*Luzula meridionalis (Field Woodrush)*			
Juncaginaceae					
435.	40660	*Cycnogeton huegelii*			
436.	40661	*Cycnogeton lineare*			
437.	151	*Triglochin striata*			
Lamiaceae					
438.	6839	*Hemiandra pungens (Snakebush)*			
439.	6855	*Hemigenia humilis*			
440.	6856	*Hemigenia incana (Silky Hemigenia)*			
441.	6866	*Hemigenia pritzelii*			
442.	38323	*Lavandula stoechas subsp. stoechas*	Y		
443.	6881	*Marrubium vulgare (Horehound)*	Y		
444.	15994	*Mentha x piperita var. citrata*	Y		
445.	6906	*Moluccella laevis (Molucca Balm)*	Y		
446.	6930	*Stachys arvensis (Staggerweed)*	Y		
Lauraceae					
447.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
448.	2957	*Cassytha racemosa (Dodder Laurel)*			
Lentibulariaceae					
449.	7126	*Utricularia benthamii*			
450.	7157	*Utricularia violacea (Violet Bladderwort)*			
Linaceae					
451.	4362	*Linum marginale (Wild Flax)*			
452.	4363	*Linum trigynum (French Flax)*	Y		
Lindsaeaceae					
453.	59	*Lindsaea linearis (Screw Fern)*			
Loganiaceae					
454.	6506	*Logania campanulata (Bell-flowered Logania)*			
455.	13128	*Logania serpyllifolia subsp. angustifolia*			
456.	14551	*Logania serpyllifolia subsp. serpyllifolia*			
Loranthaceae					
457.	2380	*Amyema miquelii (Stalked Mistletoe)*			
458.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
Lythraceae					
459.	5281	*Lythrum hyssopifolia (Lesser Loosestrife)*	Y		
Malvaceae					
460.	4903	*Abutilon theophrasti*	Y		Y
461.	5033	*Lasiopetalum floribundum (Free Flowering Lasiopetalum)*			
462.	5083	*Thomasia glutinosa (Sticky Thomasia)*			
463.	5084	*Thomasia grandiflora (Large Flowered Thomasia)*			
464.	5086	*Thomasia macrocalyx*			
465.	5092	*Thomasia pauciflora (Few Flowered Thomasia)*			
466.	5094	*Thomasia purpurea*			
Menyanthaceae					
467.	36181	*Ornduffia parnassifolia*			

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Moraceae					
468.	1747	*Ficus carica (Common Fig)*	Y		
Myrtaceae					
469.	20249	*Astartea leptophylla*			
470.	36441	*Babingtonia camphorosmae (Camphor Myrtle)*			
471.	5429	*Calothamnus sanguineus (Silky-leaved Blood flower, Pindak)*			
472.	5458	*Calytrix flavescens (Summer Starflower)*			
473.	5465	*Calytrix leschenaultii*			
474.	5485	*Calytrix variabilis*			
475.	17104	*Corymbia calophylla (Marri)*			
476.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
477.	13534	*Eucalyptus aspersa*			
478.	5615	*Eucalyptus decipiens (Limestone Marlock, Moit)*			
479.	13538	*Eucalyptus decipiens subsp. chalara*			
480.	13536	*Eucalyptus decipiens subsp. decipiens*			
481.	5628	*Eucalyptus drummondii (Drummond's Gum)*			
482.	12697	*Eucalyptus latens (Narrow-leaved Red Mallee)*			
483.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
484.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
485.	5739	*Eucalyptus patens (Swan River Blackbutt, Dwuda)*			
486.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
487.	18085	*Eucalyptus utilis*			
488.	36445	*Harmogia parviflora*			
489.	5817	*Hypocalymma angustifolium (White Myrtle, Kudjid)*			
490.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
491.	5841	*Kunzea recurva*			
492.	14775	*Kunzea spathulata*			
493.	5847	*Leptospermum erubescens (Roadside Teatree)*			
494.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		
495.	13273	*Melaleuca incana subsp. incana*			
496.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			
497.	5952	*Melaleuca preissiana (Moonah)*			
498.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
499.	5980	*Melaleuca thymoides*			
500.	5987	*Melaleuca viminea (Mohan)*			
501.	13280	*Melaleuca viminea subsp. viminea*			
502.	16477	*Pericalymma ellipticum var. ellipticum*			
503.	15501	*Pericalymma spongiocaule*			
504.	20135	*Taxandria linearifolia*			
505.	20133	*Taxandria parviceps*			
506.	6065	*Thryptomene saxicola (Rock Thryptomene)*			
507.	15618	*Verticordia plumosa var. plumosa*			
Olacaceae					
508.	2365	*Olax benthamiana*			
Oleaceae					
509.	40242	*Fraxinus angustifolia subsp. angustifolia*	Y		Y
Onagraceae					
510.	11570	*Epilobium billardiereanum subsp. billardiereanum (Smooth Willow Herb)*			
511.	11756	*Epilobium billardiereanum subsp. cinereum (Variable Willow Herb)*			
512.	6132	*Epilobium ciliatum*	Y		
513.	6133	*Epilobium hirtigerum (Hairy Willow Herb)*			
514.	6139	*Oenothera glazioviana (Evening Primrose)*	Y		
Orchidaceae					
515.	13853	*Caladenia arrecta*			
516.	15332	*Caladenia attingens subsp. attingens*			
517.	15335	*Caladenia brownii*			
518.	1580	*Caladenia cairnsiana (Zebra Orchid)*			
519.	1590	*Caladenia ferruginea (Rusty Spider Orchid)*			
520.	1592	*Caladenia flava (Cowslip Orchid)*			
521.	15348	*Caladenia flava subsp. flava*			
522.	13621	*Caladenia harringtoniae*		T	
523.	1597	*Caladenia infundibularis*			
524.	1603	*Caladenia longiclavata (Clubbed Spider Orchid)*			
525.	1604	*Caladenia macrostylis (Leaping Spider Orchid)*			
526.	15371	*Caladenia nana subsp. nana*			
527.	15372	*Caladenia nana subsp. unita*			
528.	15377	*Caladenia reptans subsp. reptans*			

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529.	15380	*Caladenia splendens*			
530.	15382	*Caladenia uliginosa subsp. candicans*			
531.	15383	*Caladenia uliginosa subsp. uliginosa*			
532.	18019	*Caladenia vulgata*			
533.	12935	*Corybas abditus*		P3	
534.	12945	*Corybas recurvus*			
535.	1627	*Cryptostylis ovata (Slipper Orchid)*			
536.	15404	*Cyanicula sericea*			
537.	10916	*Cyrtostylis huegelii*			
538.	10964	*Cyrtostylis robusta*			
539.	10942	*Cyrtostylis tenuissima*			
540.	19649	*Disa bracteata*	Y		
541.	11049	*Diuris corymbosa*			
542.	1632	*Diuris emarginata (Tall Donkey Orchid)*			
543.	11156	*Drakaea livida*			
544.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			
545.	1644	*Elythranthera emarginata (Pink Enamel Orchid)*			
546.	15411	*Eriochilus dilatatus subsp. magnus*			
547.	15412	*Eriochilus dilatatus subsp. multiflorus*			
548.	12932	*Gastrodia lacista*			
549.	1653	*Leporella fimbriata (Hare Orchid)*			
550.	15418	*Leptoceras menziesii*			
551.	1656	*Lyperanthus serratus (Rattle Beak Orchid)*			
552.	15424	*Praecoxanthus aphyllus*			
553.	1686	*Pterostylis barbata (Bird Orchid)*			
554.	11118	*Pterostylis pyramidalis (Snail Orchid)*			
555.	1693	*Pterostylis recurva (Jug Orchid)*			
556.	18655	*Pterostylis sp. crinkled leaf (G.J. Keighery 13426)*			
557.	1698	*Pterostylis vittata (Banded Greenhood)*			
558.	16367	*Pyrorchis nigricans (Red beaks, Elephants ears)*			
559.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
560.	11053	*Thelymitra macrophylla*			
Orobanchaceae					
561.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
562.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
563.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
Orthodontiaceae					
564.	32406	*Orthodontium lineare*			
Oxalidaceae					
565.	30375	*Oxalis exilis*			
566.	4351	*Oxalis flava (Pinkbulb Soursob)*	Y		
567.	4354	*Oxalis incarnata*	Y		
568.	4356	*Oxalis pes-caprae (Soursob)*	Y		
Papaveraceae					
569.	8365	*Fumaria bastardii*	Y		
570.	2969	*Fumaria capreolata (Whiteflower Fumitory)*	Y		
571.	31532	*Fumaria muralis subsp. muralis*	Y		
572.	2968	*Romneya trichocalyx*	Y		Y
Passifloraceae					
573.	5225	*Passiflora filamentosa*	Y		
Phyllanthaceae					
574.	4675	*Phyllanthus calycinus (False Boronia)*			
575.	4690	*Poranthera huegelii*			
576.	4691	*Poranthera microphylla (Small Poranthera)*			
Pinaceae					
577.	88	*Pinus radiata (Radiata Pine)*	Y		
Pittosporaceae					
578.	3157	*Billardiera floribunda (White-flowered Billardiera)*			
579.	25788	*Billardiera fraseri (Elegant Pronaya)*			
580.	25798	*Billardiera fusiformis (Australian Bluebell)*			
581.	3165	*Billardiera variifolia*			
582.	28290	*Cheiranthera parviflora*			
583.	17630	*Marianthus tenuis*			
Plantaginaceae					
584.	12008	*Kickxia elatine subsp. crinita*	Y		
585.	7068	*Kickxia spuria (Roundleaf Toadflax)*			

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			Y		
586.	11785	*Plantago coronopus subsp. commutata*	Y		
587.	7301	*Plantago exilis*			
588.	7108	*Veronica arvensis (Wall Speedwell)*	Y		
589.	7109	*Veronica calycina (Cup Speedwell)*			
Poaceae					
590.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
591.	13380	*Amphibromus nervosus*			
592.	194	*Amphipogon amphipogonoides*			
593.	197	*Amphipogon debilis*			
594.	200	*Amphipogon turbinatus*			
595.	17233	*Austrostipa campylachne*			
596.	17240	*Austrostipa flavescens*			
597.	17253	*Austrostipa semibarbata*			
598.	233	*Avena barbata (Bearded Oat)*	Y		
599.	244	*Briza maxima (Blowfly Grass)*	Y		
600.	245	*Briza minor (Shivery Grass)*	Y		
601.	249	*Bromus diandrus (Great Brome)*	Y		
602.	250	*Bromus hordeaceus (Soft Brome)*	Y		
603.	252	*Bromus madritensis (Madrid Brome)*	Y		
604.	41566	*Cenchrus longisetus (Feathertop)*	Y		
605.	277	*Cortaderia selloana (Pampas Grass)*	Y		
606.	283	*Cynodon dactylon (Couch)*	Y		
607.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
608.	306	*Dichelachne crinita (Longhair Plumegrass)*			
609.	340	*Echinopogon ovatus (Hedgehog Grass)*			
610.	348	*Ehrharta erecta (Panic Veldt Grass)*	Y		
611.	373	*Eragrostis brownii (Brown's Lovegrass)*			
612.	379	*Eragrostis elongata (Clustered Lovegrass)*			
613.	437	*Glyceria maxima (Water Meadowgrass)*	Y		
614.	439	*Hemarthria uncinata (Matgrass)*			
615.	11451	*Hemarthria uncinata var. uncinata*			
616.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
617.	10957	*Lolium perenne x rigidum*	Y		
618.	485	*Microlaena stipoides (Weeping Grass)*			
619.	492	*Neurachne alopecuroidea (Foxtail Mulga Grass)*			
620.	528	*Paspalum distichum (Water Couch)*	Y		
621.	533	*Paspalum vaginatum (Salt Water Couch)*	Y		
622.	548	*Phalaris aquatica (Phalaris)*	Y		
623.	557	*Piptatherum miliaceum (Rice Millet)*	Y		
624.	578	*Poa porphyroclados*			
625.	40431	*Rytidosperma acerosum*			
626.	40430	*Rytidosperma pilosum*			
627.	40427	*Rytidosperma setaceum*			
628.	617	*Sorghum halepense (Johnson Grass)*	Y		
629.	635	*Sporobolus virginicus (Marine Couch)*			
630.	667	*Tetrarrhena laevis (Forrest Ricegrass)*			
631.	673	*Themeda triandra*			
Podocarpaceae					
632.	86	*Podocarpus drouynianus (Wild Plum, Kula)*			
Polygalaceae					
633.	4551	*Comesperma ciliatum*			
634.	4553	*Comesperma drummondii (Drummond's Milkwort)*			
635.	4564	*Comesperma virgatum (Milkwort)*			
Polygonaceae					
636.	17774	*Acetosella vulgaris*	Y		
637.	13911	*Persicaria decipiens*			
638.	16983	*Persicaria maculosa*	Y		
639.	11052	*Persicaria prostrata*			
640.	2432	*Rumex conglomeratus (Clustered Dock)*	Y		
641.	2433	*Rumex crispus (Curled Dock)*	Y		
Potamogetonaceae					
642.	110	*Potamogeton drummondii*			
643.	111	*Potamogeton ochreatus (Blunt Pondweed)*			
644.	112	*Potamogeton pectinatus (Fennel Pondweed)*			
Pottiaceae					
645.	32315	*Barbula calycina*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
646.	32445	*Tortula muralis*			
Primulaceae					
647.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
648.	6483	*Samolus junceus*			
Proteaceae					
649.	1790	*Adenanthos meisneri*			
650.	1791	*Adenanthos obovatus (Basket Flower)*			
651.	28281	*Adenanthos sp. Whicher Range (G.J. Keighery 9736)*			
652.	32576	*Banksia dallanneyi (Couch Honeypot)*			
653.	32616	*Banksia dallanneyi subsp. sylvestris*			
654.	32580	*Banksia dallanneyi var. dallanneyi*			
655.	32577	*Banksia dallanneyi var. mellicula*			
656.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
657.	1848	*Banksia seminuda (River Banksia)*			
658.	32080	*Banksia sessilis var. sessilis*			
659.	1851	*Banksia sphaerocarpa (Round-fruit Banksia)*			
660.	12111	*Banksia sphaerocarpa var. sphaerocarpa (Fox Banksia)*			
661.	32046	*Banksia squarrosa subsp. argillacea*		T	
662.	1863	*Conospermum capitatum*			
663.	16853	*Conospermum capitatum subsp. glabratum*			
664.	16850	*Conospermum flexuosum subsp. laevigatum*			
665.	1945	*Franklandia triaristata (Lanoline Bush)*		P4	
666.	13085	*Grevillea centristigma*			
667.	2066	*Grevillea pilulifera (Woolly-flowered Grevillea)*			
668.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
669.	2082	*Grevillea ripicola (Collie Grevillea)*		P4	
670.	2112	*Grevillea trifida*			
671.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
672.	2137	*Hakea ceratophylla (Horned Leaf Hakea)*			
673.	2174	*Hakea linearis*			
674.	2175	*Hakea lissocarpha (Honey Bush)*			
675.	2191	*Hakea oleifolia (Dungyn)*			
676.	2197	*Hakea prostrata (Harsh Hakea)*			
677.	2203	*Hakea ruscifolia (Candle Hakea)*			
678.	2206	*Hakea stenocarpa (Narrow-fruited Hakea)*			
679.	2215	*Hakea undulata (Wavy-leaved Hakea)*			
680.	2216	*Hakea varia (Variable-leaved Hakea)*			
681.	2225	*Isopogon buxifolius*			
682.	2237	*Isopogon sphaerocephalus (Drumstick Isopogon)*			
683.	2264	*Persoonia graminea*			
684.	2267	*Persoonia longifolia (Snottygobble)*			
685.	2273	*Persoonia saccata (Snottygobble)*			
686.	2299	*Petrophile linearis (Pixie Mops)*			
687.	16874	*Petrophile recurva*			
688.	2316	*Stirlingia latifolia (Blueboy)*			
689.	2317	*Stirlingia simplex*			
690.	2323	*Synaphea gracillima*			
691.	16769	*Synaphea hians*		P3	
692.	2324	*Synaphea petiolaris (Synaphea)*			
693.	16863	*Synaphea petiolaris subsp. triloba*			
694.	31767	*Synaphea polypodioides*		P3	
695.	19055	*Synaphea sp. Pinjarra (R. Davis 6578)*		T	
696.	16749	*Synaphea stenoloba*		T	
697.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
Pteridaceae					
698.	25	*Adiantum aethiopicum (Common Maidenhair)*			
Racopilaceae					
699.	32480	*Racopilum cuspidigerum var. convolutaceum*			
Ranunculaceae					
700.	2929	*Clematis pubescens (Common Clematis)*			
701.	10911	*Ranunculus amphitrichus*			
702.	2932	*Ranunculus colonorum (Common Buttercup)*			
703.	2933	*Ranunculus muricatus (Sharp Buttercup)*	Y		
Restionaceae					
704.	17689	*Chordifex laxus*			
705.	17692	*Cytogonidium leptocarpoides*			
706.	17663	*Desmocladus asper*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
707.	17691	*Desmocladus fasciculatus*			
708.	16595	*Desmocladus flexuosus*			
709.	1070	*Hypolaena exsulca*			
710.	1071	*Hypolaena fastigiata*			
711.	15556	*Leptocarpus elegans*			
712.	1082	*Leptocarpus tenax (Slender Twine Rush)*			
713.	1085	*Lepyrodia glauca*			
714.	1090	*Lepyrodia muirii*			
715.	1092	*Loxocarya cinerea*			
716.	13779	*Loxocarya magna*		P3	
717.	17679	*Meeboldina coangustata*			
718.	17976	*Meeboldina decipiens subsp. decipiens*		P3	
719.	17678	*Meeboldina kraussii*			
720.	17677	*Meeboldina roycei*			
721.	17694	*Meeboldina scariosa*			
722.	17681	*Platychorda applanata*			
Rhamnaceae					
723.	33438	*Trymalium odoratissimum subsp. trifidum*			
Rosaceae					
724.	3184	*Acaena echinata (Sheep's Burr)*			
725.	3185	*Acaena novae-zelandiae*	Y		
726.	18320	*Cotoneaster pannosus*	Y		
727.	17211	*Prunus cerasifera*	Y		
728.	10764	*Rosa chinensis x multiflora*	Y		
729.	3187	*Rosa rubiginosa (Sweet Briar)*	Y		
730.	20506	*Rubus anglocandicans*	Y		
731.	20496	*Rubus laudatus*	Y		
732.	23990	*Rubus ulmifolius var. ulmifolius*	Y		
733.	3192	*Sanguisorba minor (Sheep's Burnet)*	Y		
Rubiaceae					
734.	7321	*Galium divaricatum*	Y		
735.	18254	*Opercularia apiciflora*			
736.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
737.	7350	*Opercularia rubioides*		P3	
738.	18255	*Opercularia vaginata (Dog Weed)*			
739.	17273	*Richardia brasiliensis*	Y		
Rutaceae					
740.	17653	*Boronia crenulata subsp. pubescens*			
741.	4417	*Boronia dichotoma*			
742.	4420	*Boronia fastigiata (Bushy Boronia)*			
743.	16618	*Boronia humifusa*		P1	
744.	4428	*Boronia megastigma (Scented Boronia)*			
745.	11381	*Boronia ramosa subsp. anethifolia*			
746.	18529	*Philotheca spicata (Pepper and Salt)*			
Salviniaceae					
747.	17737	*Azolla pinnata*			
Santalaceae					
748.	2335	*Choretrum lateriflorum (Dwarf Sour Bush)*			
749.	2342	*Leptomeria cunninghamii*			
750.	17703	*Leptomeria ellytes*			
751.	2355	*Leptomeria squarrulosa*			
Sapindaceae					
752.	4757	*Dodonaea ceratocarpa*			
753.	11247	*Dodonaea viscosa subsp. angustissima*			
Scrophulariaceae					
754.	7107	*Verbascum virgatum (Twiggy Mullein)*	Y		
Selaginellaceae					
755.	6	*Selaginella gracillima (Tiny Clubmoss)*			
Sematophyllaceae					
756.	32433	*Sematophyllum homomallum*			
Solanaceae					
757.	6964	*Datura stramonium (Common Thornapple)*	Y		
758.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
Stylidiaceae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
759.	7674	*Levenhookia preissii (Preiss's Stylewort)*			
760.	7676	*Levenhookia pusilla (Midget Stylewort)*			
761.	7677	*Levenhookia stipitata (Common Stylewort)*			
762.	7678	*Stylidium adnatum (Common Beaked Triggerplant)*			
763.	7681	*Stylidium affine (Queen Triggerplant)*			
764.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
765.	30278	*Stylidium androsaceum*			
766.	7688	*Stylidium barleei (Tooth-leaved Triggerplant)*			
767.	7702	*Stylidium ciliatum (Golden Triggerplant)*			
768.	7708	*Stylidium crassifolium (Thick-leaved Triggerplant)*			
769.	7718	*Stylidium diversifolium (Touch-me-not)*			
770.	7734	*Stylidium guttatum (Dotted Triggerplant)*			
771.	7745	*Stylidium junceum (Reed Triggerplant)*			
772.	7773	*Stylidium petiolare (Horn Triggerplant)*			
773.	7796	*Stylidium scandens (Climbing Triggerplant)*			
774.	7798	*Stylidium schoenoides (Cow Kicks)*			
775.	7799	*Stylidium spathulatum (Creamy Triggerplant)*			
776.	25845	*Stylidium tenue*			
Thymelaeaceae					
777.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
778.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
779.	11928	*Pimelea ciliata subsp. ciliata*			
780.	11533	*Pimelea imbricata var. imbricata*			
781.	11402	*Pimelea imbricata var. piligera*			
782.	11182	*Pimelea lehmanniana subsp. nervosa*			
783.	5259	*Pimelea preissii*			
784.	5264	*Pimelea spectabilis (Bunjong)*			
785.	5269	*Pimelea sylvestris*			
Tropaeolaceae					
786.	4360	*Tropaeolum majus (Garden Nasturtium)*	Y		
Urticaceae					
787.	1767	*Urtica urens (Small Nettle)*	Y		
Verbenaceae					
788.	36096	*Verbena incompta (Purple-top Verbena)*	Y		
Violaceae					
789.	5216	*Hybanthus calycinus (Wild Violet)*			
790.	5218	*Hybanthus debilissimus*			
791.	12007	*Hybanthus floribundus subsp. floribundus*			
Xanthorrhoeaceae					
792.	1253	*Xanthorrhoea gracilis (Graceful Grass Tree, Mimidi)*			
793.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
Xyridaceae					
794.	1149	*Xyris lacera*			
795.	1150	*Xyris lanata*			
796.	1151	*Xyris laxiflora*			
Zamiaceae					
797.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
Zygophyllaceae					
798.	4383	*Tribulus terrestris (Caltrop)*	Y		

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 wholely 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.

Taxon	Status	Rank	IUCNCriteria	EPBC	DECRegion	DECDistrict	Distribution	FloweringPeriod	RecoveryPlan
Acacia flagelliformis	4				SWST	BLACKWOOD,WELLINGTON	Harvey, Eaton, Bunbury, Capel, Busselton, Donnybrook	Jul-Sep	
Acacia semitrullata	4				SWST	BLACKWOOD,WELLINGTON	Yallingup, Donnybrook, Harvey, Yarloop, Collie	Jun-Aug	
Banksia sp. Boyup Brook (L.W. Sage LWS 2366)	1				SWST	BLACKWOOD	Wilga S.F.		
Calothamnus rupestris	4				SWAN,SWST,WHTB	PERTH HILLS,BLACKWOOD,WELLINGTON,GREAT SOUTHERN	Red Hill, Gosnells, St Ronans N.R., Boyagin Rock, Collie, Wilga	Aug-Oct	
Caustis sp. Boyanup (G.S. McCutcheon 1706)	3				SCST,SWST,WARR,WHTB	BLACKWOOD,WELLINGTON,DONNELLY,ALBANY,GREAT SOUTHERN	Boyanup State Forest, Boscabel, Kojonup, Whicher NR, Vasse, S of Stirling Ranges, Donnybrook, tutanning NR, Blackwood River NP, Shannon NP	-	
Corybas abditus	3				SCST,SWST,WARR	BLACKWOOD,FRANKLAND,ALBANY	Donnybrook, Walpole, Manypeaks	Oct-Nov	
Dillwynia sp. Capel (P.A. Jurjevich 1771)	1				SWST,WARR	BLACKWOOD,DONNELLY	Whicher Range, Nannup, Donnybrook, Pemberton	Sept-Oct	
Grevillea ripicola	4				SWST	BLACKWOOD,WELLINGTON	Collie, Kirup	Oct-Nov	
Platytheca anasima	2				SWST	BLACKWOOD	Capel, Donnybrook	Oct-Dec	
Senecio gilbertii	1				SWAN,SWST	PERTH HILLS,BLACKWOOD	Bindoon, York, Wooroloo, Wilga, Gooseberry Hill	Sep-Nov	
Stylidium acuminatum subsp. acuminatum	1				SWST	BLACKWOOD,WELLINGTON	Collie, Donnybrook	Oct-Nov	
Synaphea polypodioides	3				SWST	BLACKWOOD,WELLINGTON	Dardanup, Boyanup, Donnybrook	Sep-Oct	
Tetraria sp. Blackwood River (A.R. Annels 3043) PN	3				SCST,SWST,WARR	BLACKWOOD,DONNELLY,FRANKLAND,ALBANY	Denmark, Witchcliffe, Green Range,Manjimup, Mullalyup		
Tetratheca parvifolia	3				SWST	BLACKWOOD	Capel, East of Donnybrook, Collie	Oct	
Thysanotus gageoides	3				SCST,SWST,WHTB	BLACKWOOD,ALBANY,GREAT SOUTHERN	Cranbrook, Cape Riche, Stirling Range, Borden, Ongerup, Mullalyup, Corackerup, Boxwood Hill	Oct-Nov	
Thysanotus unicupensis	2				SWST,WARR	BLACKWOOD,WELLINGTON,DONNELLY	Boyup Brook, Collie, Unicup, Kingston, Mullalyup	Oct-Dec	

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 29/10/2013

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Line'
Group By Family

Family	Species	Records
Acanthizidae	6	443
Accipitridae	9	86
Actinopodidae	3	4
Aegothelidae	2	6
Agamidae	1	1
Anatidae	11	380
Araneidae	8	9
Ardeidae	5	15
Artamidae	2	35
Boidae	1	1
Bothriuridae	1	1
Bovidae	1	1
Burhinidae	1	3
Burramyidae	1	4
Callionymidae	1	2
Campephagidae	3	70
Canidae	1	1
Casuariidae	2	32
Cervidae	1	1
Cheluidae	1	1
Climacteridae	1	24
Columbidae	3	76
Corvidae	2	177
Cracticidae	4	198
Cuculidae	5	33
Dasyuridae	6	102
Dicaeidae	1	3
Dicruridae	5	164
Elapidae	3	22
Estrilidae	1	44
Falconidae	7	39
Felidae	1	1
Galaxiidae	2	10
Garypidae	1	1
Gekkonidae	1	3
Geotriidae	1	1
Halcyonidae	4	131
Hirundinidae	2	65
Hylidae	2	6
Idiopidae	2	2
Lamponidae	2	2
Laridae	1	1
Lepidogalaxiidae	1	2
Leporidae	1	8
Limnodynastidae	2	6
Lycosidae	2	3
Macropodidae	3	32
Maluridae	3	201
Megapodiidae	1	1
Meliphagidae	8	476
Meropidae	1	30
Molossidae	2	2
Motacillidae	1	2
Muridae	4	31
Myobatrachidae	5	62
Myrmecobiidae	1	4
Nannopercidae	1	9
Nemesiidae	1	2
Neosittidae	2	36
Otididae	1	1
Pachycephalidae	7	258
Pardalotidae	4	120
Pelecanidae	1	2
Peramelidae	1	21
Percichthyidae	1	5
Percidae	1	4
Petroicidae	6	103
Phalacrocoracidae	5	32
Phalangeridae	1	15
Podargidae	2	18
Podicipedidae	4	76
Potoroidae	1	3
Procellariidae	1	1
Pseudocheiridae	1	8
Psittacidae	14	474
Pygopodidae	1	2
Rallidae	7	93
Salticidae	1	1
Scincidae	13	92

Strigidae	1	18
Sturnidae	1	2
Suidae	1	1
Sylviidae	2	5
Tachyglossidae	1	3
Tetragnathidae	2	2
Tettigoniidae	1	1
Threskiornithidae	3	71
Thylacomyidae	1	2
Turnicidae	2	2
Typhlopidae	1	6
Tytonidae	3	30
Urodacidae	1	6
Varanidae	1	4
Vespertilionidae	5	12
Zosteropidae	2	192
paradoxosomatidae	1	4
TOTAL	**259**	**4798**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25530	*Gerygone fusca (Western Gerygone)*			
5.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
6.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
7.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
8.	25536	*Accipiter fasciatus (Brown Goshawk)*			
9.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
10.	24285	*Aquila audax (Wedge-tailed Eagle)*			
11.	24288	*Circus approximans (Swamp Harrier)*			
12.	24289	*Circus assimilis (Spotted Harrier)*			
13.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
14.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*		IA	
15.	24295	*Haliastur sphenurus (Whistling Kite)*			
Actinopodidae					
16.	-13329	*Missulena granulosa subsp. granulosa*			
17.	-12846	*Missulena granulosa subsp. hoggi*			
18.	-12829	*Missulena occatoria*			
Aegothelidae					
19.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
20.	24301	*Aegotheles cristatus subsp. cristatus (Australian Owlet-nightjar)*			
Agamidae					
21.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
Anatidae					
22.	24312	*Anas gracilis (Grey Teal)*			
23.	24313	*Anas platyrhynchos (Mallard)*			
24.	24315	*Anas rhynchotis (Australasian Shoveler)*			
25.	24316	*Anas superciliosa (Pacific Black Duck)*			
26.	24318	*Aythya australis (Hardhead)*			
27.	24319	*Biziura lobata (Musk Duck)*			
28.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
29.	24322	*Cygnus atratus (Black Swan)*			
30.	24328	*Oxyura australis (Blue-billed Duck)*			
31.	24329	*Stictonetta naevosa (Freckled Duck)*			
32.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Araneidae					
33.	-13382	*Araneus cyphoxis*			
34.	-12899	*Araneus senicaudatus*			
35.	-1751	*Argiope protensa*			
36.	-13324	*Argiope trifasciata*			
37.	-11836	*Austracantha minax*			
38.	-11681	*Celaenia excavata*			
39.	-13332	*Cyclosa trilobata*			
40.	-12692	*Heurodes turritus*			
Ardeidae					
41.	41324	*Ardea modesta (Eastern Great Egret)*		IA	
42.	24341	*Ardea pacifica (White-necked Heron)*			
43.	24347	*Ixobrychus flavicollis subsp. australis (Australian Black Bittern)*		P3	
44.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
45.	24350	*Nycticorax caledonicus subsp. hilli (Rufous Night Heron)*			
Artamidae					
46.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
47.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
Boidae					
48.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*		S	
Bothriuridae					
49.	-12810	*Cercophonius sulcatus*			
Bovidae					
50.	24251	*Bos taurus (European Cattle)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Burhinidae					
51.	24359	*Burhinus grallarius (Bush Stone-curlew)*		P4	
Burramyidae					
52.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
Callionymidae					
53.	-13853	*? ?*			
Campephagidae					
54.	24361	*Coracina maxima (Ground Cuckoo-shrike)*			
55.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
56.	24362	*Coracina novaehollandiae subsp. novaehollandiae (Black-faced Cuckoo-shrike)*			
Canidae					
57.	24040	*Vulpes vulpes (Red Fox)*	Y		
Casuariidae					
58.	-13506	*Dromaius ater*			Y
59.	24470	*Dromaius novaehollandiae (Emu)*			
Cervidae					
60.	24256	*Dama dama (Fallow Deer)*	Y		
Cheluidae					
61.	25337	*Chelodina oblonga (Oblong Turtle)*			
Climacteridae					
62.	24396	*Climacteris rufa (Rufous Treecreeper)*			
Columbidae					
63.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
64.	24409	*Phaps chalcoptera (Common Bronzewing)*			
65.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
Corvidae					
66.	25592	*Corvus coronoides (Australian Raven)*			
67.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
Cracticidae					
68.	25595	*Cracticus tibicen (Australian Magpie)*			
69.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
70.	25596	*Cracticus torquatus (Grey Butcherbird)*			
71.	25597	*Strepera versicolor (Grey Currawong)*			
Cuculidae					
72.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
73.	24427	*Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*			
74.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
75.	25601	*Chrysococcyx lucidus (Shining Bronze Cuckoo)*			
76.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
Dasyuridae					
77.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
78.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
79.	24098	*Phascogale calura (Red-tailed Phascogale, Kenngoor)*		T	
80.	24099	*Phascogale tapoatafa subsp. tapoatafa (Southern Brush-tailed Phascogale, Wambenger)*		T	
81.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
82.	-17953	*Sminthopsis murina*			
Dicaeidae					
83.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
Dicruridae					
84.	24443	*Grallina cyanoleuca (Magpie-lark)*			
85.	25610	*Myiagra inquieta (Restless Flycatcher)*			
86.	25613	*Rhipidura fuliginosa (Grey Fantail)*			
87.	24452	*Rhipidura fuliginosa subsp. preissi (Grey Fantail)*			
88.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Elapidae					
89.	25252	*Notechis scutatus (Tiger Snake)*			
90.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
91.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
Estrilidae					
92.	24645	*Stagonopleura oculata (Red-eared Firetail)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Falconidae					
93.	25621	*Falco berigora (Brown Falcon)*			
94.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
95.	25622	*Falco cenchroides (Australian Kestrel)*			
96.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel)*			
97.	25623	*Falco longipennis (Australian Hobby)*			
98.	24474	*Falco longipennis subsp. longipennis (Australian Hobby)*			
99.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
Felidae					
100.	24041	*Felis catus (Cat)*	Y		
Galaxiidae					
101.	34028	*Galaxias occidentalis (Western Minnow)*			
102.	34027	*Galaxiella nigrostriata (Black-stripe Minnow)*		P3	
Garypidae					
103.	-12635	*Synsphyronus magnus*			
Gekkonidae					
104.	24980	*Christinus marmoratus (Marbled Gecko)*			
Geotriidae					
105.	34030	*Geotria australis (Pouched Lamprey)*		P1	
Halcyonidae					
106.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
107.	30902	*Dacelo novaeguineae subsp. novaeguineae (Laughing Kookaburra)*	Y		
108.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
109.	24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
Hirundinidae					
110.	24491	*Hirundo neoxena (Welcome Swallow)*			
111.	25629	*Hirundo nigricans (Tree Martin)*			
Hylidae					
112.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
113.	25388	*Litoria moorei (Motorbike Frog)*			
Idiopidae					
114.	-13271	*Euoplos festivus*			Y
115.	-12117	*Idiosoma sigillatum*			
Lamponidae					
116.	-11816	*Lampona brevipes*			
117.	-1712	*Lampona cylindrata*			
Laridae					
118.	24529	*Sterna leucoptera (White-winged Black Tern)*		IA	
Lepidogalaxiidae					
119.	-16271	*Lepidogalaxias salamandroides*			
Leporidae					
120.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
Limnodynastidae					
121.	25410	*Heleioporus eyrei (Moaning Frog)*			
122.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
Lycosidae					
123.	-11630	*Artoria flavimana*			
124.	-13279	*Tasmanicosa leuckartii*			
Macropodidae					
125.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
126.	24133	*Macropus irma (Western Brush Wallaby)*		P4	
127.	24145	*Setonix brachyurus (Quokka)*		T	
Maluridae					
128.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
129.	25654	*Malurus splendens (Splendid Fairy-wren)*			
130.	24552	*Malurus splendens subsp. splendens (Splendid Fairy-wren)*			
Megapodiidae					
131.	24557	*Leipoa ocellata (Malleefowl)*		T	
Meliphagidae					
132.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
133.	24561	*Anthochaera carunculata (Red Wattlebird)*			
134.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
135.	24567	*Epthianura albifrons (White-fronted Chat)*			
136.	25661	*Lichmera indistincta (Brown Honeyeater)*			
137.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
138.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
139.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
Meropidae					
140.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
Molossidae					
141.	24184	*Mormopterus planiceps (Southern Freetail-bat)*			
142.	24185	*Tadarida australis (White-striped Freetail-bat)*			
Motacillidae					
143.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
Muridae					
144.	24215	*Hydromys chrysogaster (Water-rat)*		P4	
145.	24223	*Mus musculus (House Mouse)*	Y		
146.	24243	*Rattus fuscipes (Western Bush Rat)*			
147.	24245	*Rattus rattus (Black Rat)*	Y		
Myobatrachidae					
148.	25398	*Crinia georgiana (Quacking Frog)*			
149.	25399	*Crinia glauerti (Clicking Frog)*			
150.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
151.	25404	*Geocrinia leai (Ticking Frog)*			
152.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Myrmecobiidae					
153.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
Nannopercidae					
154.	-14551	*Edelia vittata*			
Nemesiidae					
155.	-12196	*Aname mainae*			
Neosittidae					
156.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
157.	24606	*Daphoenositta chrysoptera subsp. pileata (Varied Sittella, Black-capped Sitella)*			
Otididae					
158.	24610	*Ardeotis australis (Australian Bustard)*		P4	
Pachycephalidae					
159.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
160.	24613	*Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*			
161.	24616	*Falcunculus frontatus subsp. leucogaster (Western Shrike-tit, Crested Shrike-tit)*		P4	
162.	25679	*Pachycephala pectoralis (Golden Whistler)*			
163.	24623	*Pachycephala pectoralis subsp. fuliginosa (Golden Whistler)*			
164.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
165.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
Pardalotidae					
166.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
167.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
168.	25682	*Pardalotus striatus (Striated Pardalote)*			
169.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
Pelecanidae					
170.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Peramelidae					
171.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P5	
Percichthyidae					
172.	-15786	*Bostockia porosa*			
Percidae					
173.	-14927	*Perca fluviatilis*			
Petroicidae					
174.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
175.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
176.	24658	*Petroica cucullata (Hooded Robin)*			
177.	24659	*Petroica goodenovii (Red-capped Robin)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
178.	25695	*Petroica multicolor (Scarlet Robin)*			
179.	24660	*Petroica multicolor subsp. campbelli (Scarlet Robin)*			
Phalacrocoracidae					
180.	25697	*Phalacrocorax carbo (Great Cormorant)*			
181.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
182.	24666	*Phalacrocorax melanoleucos subsp. melanoleucos (Little Pied Cormorant)*			
183.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
184.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
185.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Podargidae					
186.	25703	*Podargus strigoides (Tawny Frogmouth)*			
187.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
Podicipedidae					
188.	25704	*Podiceps cristatus (Great Crested Grebe)*			
189.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
190.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
191.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Potoroidae					
192.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
Procellariidae					
193.	24693	*Pachyptila desolata (Antarctic Prion)*			
Pseudocheiridae					
194.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum)*		T	
Psittacidae					
195.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
196.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)*		T	
197.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)*		T	
198.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)*		T	
199.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
200.	24738	*Neophema elegans (Elegant Parrot)*			
201.	25720	*Platycercus icterotis (Western Rosella)*			
202.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
203.	24747	*Platycercus spurius (Red-capped Parrot)*			
204.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
205.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
206.	24751	*Platycercus zonarius subsp. zonarius (Port Lincoln Parrot)*			
207.	25722	*Polytelis anthopeplus (Regent Parrot)*			
208.	30854	*Polytelis anthopeplus subsp. westralis (Regent Parrot)*			
Pygopodidae					
209.	24990	*Aprasia pulchella*			
Rallidae					
210.	25727	*Fulica atra (Eurasian Coot)*			
211.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
212.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
213.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
214.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
215.	24771	*Porzana tabuensis (Spotless Crake)*			
216.	24773	*Rallus pectoralis subsp. clelandi (Lewin's Rail)*		X	Y
Salticidae					
217.	-1668	*Ocrisiona leucocomis*			
Scincidae					
218.	25035	*Ctenotus delli (Darling Range Heath Ctenotus, skink)*		P4	
219.	25049	*Ctenotus labillardieri*			
220.	25100	*Egernia napoleonis*			
221.	25115	*Hemiergis initialis subsp. initialis*			
222.	25475	*Hemiergis peronii*			
223.	25117	*Hemiergis peronii subsp. peronii*			
224.	25118	*Hemiergis peronii subsp. tridactyla*			
225.	25131	*Lerista distinguenda*			
226.	25184	*Menetia greyii*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
227.	25191	*Morethia lineoocellata*			
228.	25192	*Morethia obscura*			
229.	25206	*Tiliqua rugosa subsp. palarra*			
230.	25207	*Tiliqua rugosa subsp. rugosa*			
Strigidae					
231.	25748	*Ninox novaeseelandiae (Boobook Owl)*			
Sturnidae					
232.	25752	*Sturnus vulgaris (Common Starling)*	Y		
Suidae					
233.	24259	*Sus scrofa (Pig)*	Y		
Sylviidae					
234.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
235.	24834	*Cincloramphus mathewsi (Rufous Songlark)*			
Tachyglossidae					
236.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
Tetragnathidae					
237.	-13100	*Nanometa gentilis*			
238.	-11711	*Tetragnatha nitens*			
Tettigoniidae					
239.	33989	*Pachysaga strobila (cricket)*		P1	
Threskiornithidae					
240.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
241.	24844	*Threskiornis molucca (Australian White Ibis)*			
242.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Thylacomyidae					
243.	24168	*Macrotis lagotis (Bilby, Dalgyte)*		T	
Turnicidae					
244.	24849	*Turnix varia subsp. varia (Painted Button-quail)*			
245.	24851	*Turnix velox (Little Button-quail)*			
Typhlopidae					
246.	25271	*Ramphotyphlops australis*			
Tytonidae					
247.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
248.	25764	*Tyto novaehollandiae (Masked Owl)*			
249.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southern subsp))*		P3	
Urodacidae					
250.	-12778	*Urodacus novaehollandiae*			
Varanidae					
251.	25225	*Varanus rosenbergi (Heath Monitor)*			
Vespertilionidae					
252.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
253.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
254.	24189	*Falsistrellus mackenziei (Western False Pipistrelle)*		P4	
255.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
256.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Zosteropidae					
257.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
258.	24856	*Zosterops lateralis subsp. gouldi (Grey-breasted White-eye)*			
paradoxosomatidae					
259.	-12082	*Akamptogonus novarae*			

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 wholely 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.

NatureMap
Mapping Western Australia's biodiversity

TEC/PECs Within Project Area Vicinity

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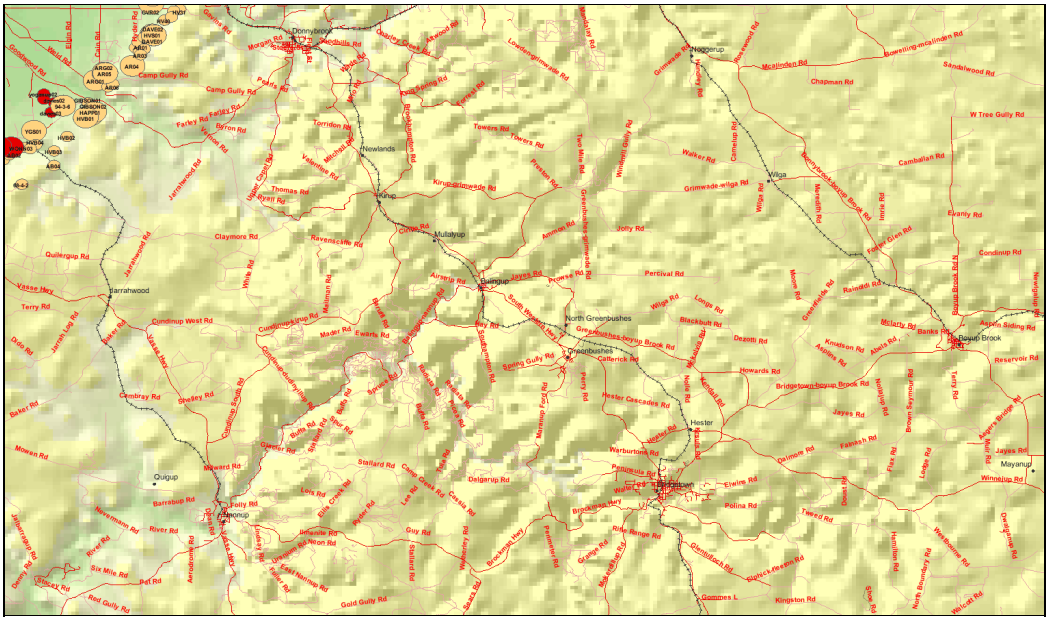
Query details :



Taxon	Status	Rank	IUCNCriteria	EPBC	DECRegion	DECDistrict	Distribution	FloweringPeriod	RecoveryPlan
Acacia flagelliformis	4				SWST	BLACKWOOD,WELLINGTON	Harvey, Eaton, Bunbury, Capel, Busselton, Donnybrook	Jul-Sep	
Acacia semitrullata	4				SWST	BLACKWOOD,WELLINGTON	Yallingup, Donnybrook, Harvey, Yarloop, Collie	Jun-Aug	
Banksia sp. Boyup Brook (L.W. Sage LWS 2366)	1				SWST	BLACKWOOD	Wilga S.F.		
Calothamnus rupestris	4				SWAN,SWST,WHTB	PERTH HILLS,BLACKWOOD,WELLINGTON,GREAT SOUTHERN	Red Hill, Gosnells, St Ronans N.R., Boyagin Rock, Collie, Wilga	Aug-Oct	
Caustis sp. Boyanup (G.S. McCutcheon 1706)	3				SCST,SWST,WARR,WHTB	BLACKWOOD,WELLINGTON,DONNELLY,ALBANY,GREAT SOUTHERN	Boyanup State Forest, Boscabel, Kojonup, Whicher NR, Vasse, S of Stirling Ranges, Donnybrook, tutanning NR, Blackwood River NP, Shannon NP	-	
Corybas abditus	3				SCST,SWST,WARR	BLACKWOOD,FRANKLAND,ALBANY	Donnybrook, Walpole, Manypeaks	Oct-Nov	
Dillwynia sp. Capel (P.A. Jurjevich 1771)	1				SWST,WARR	BLACKWOOD,DONNELLY	Whicher Range, Nannup, Donnybrook, Pemberton	Sept-Oct	
Grevillea ripicola	4				SWST	BLACKWOOD,WELLINGTON	Collie, Kirup	Oct-Nov	
Platytheca anasima	2				SWST	BLACKWOOD	Capel, Donnybrook	Oct-Dec	
Senecio gilbertii	1				SWAN,SWST	PERTH HILLS,BLACKWOOD	Bindoon, York, Wooroloo, Wilga, Gooseberry Hill	Sep-Nov	
Stylidium acuminatum subsp. acuminatum	1				SWST	BLACKWOOD,WELLINGTON	Collie, Donnybrook	Oct-Nov	
Synaphea polypodioides	3				SWST	BLACKWOOD,WELLINGTON	Dardanup, Boyanup, Donnybrook	Sep-Oct	
Tetraria sp. Blackwood River (A.R. Annels 3043) PN	3				SCST,SWST,WARR	BLACKWOOD,DONNELLY,FRANKLAND,ALBANY	Denmark, Witchcliffe, Green Range,Manjimup, Mullalyup		
Tetratheca parvifolia	3				SWST	BLACKWOOD	Capel, East of Donnybrook, Collie	Oct	
Thysanotus gageoides	3				SCST,SWST,WHTB	BLACKWOOD,ALBANY,GREAT SOUTHERN	Cranbrook, Cape Riche, Stirling Range, Borden, Ongerup, Mullalyup, Corackerup, Boxwood Hill	Oct-Nov	
Thysanotus unicupensis	2				SWST,WARR	BLACKWOOD,WELLINGTON,DONNELLY	Boyup Brook, Collie, Unicup, Kingston, Mullalyup	Oct-Dec	

Appendix C: Vegetation Classification and Condition Scales, and Fauna Habitat Condition Scales

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Table C.1: Vegetation Classification System Specht (1970) as modified by Aplin (1979).

Stratum	70-100% cover	30-70% cover	10-30% cover	2-10% cover	<2% cover
Trees > 30 m	Tall closed forest	Tall open Forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees < 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Shrubs > 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs < 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Grasses, sedges, herbs	Closed tussock grassland/ sedgeland/ herbland	Tussock grassland/ sedgeland/ herbland	Open tussock grassland/ sedgeland/ herbland	Very open tussock grassland/ sedgeland/ herbland	Scattered tussock grasses / sedges / herbs

Table C.2: Summary of adapted Vegetation condition scale as adapted from Keighery (1994).

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

Table C.3: Fauna habitat condition scale (Thompson and Thompson 2010).

Habitat condition	Condition description
High Quality Fauna Habitat	These areas closely approximate the vegetation mix and quality that would have been in the area prior to any human induced disturbance. The habitat has connectivity with other habitats and is likely to support the most natural vertebrate fauna assemblage.
Very Good Fauna Habitat	These areas show minimal signs of human induced disturbance (e.g. grazing, clearing, fragmentation, weeds) and retain almost all of the characteristics of the habitat had it not been disturbed. The habitat has connectivity with other habitats, and fauna assemblages in these areas are likely to be minimally effected by disturbance.
Good Fauna Habitat	These areas show signs of human induced disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat had it not been disturbed. The habitat still retains some connectivity with other habitats but fauna assemblages in these areas are likely to be affected by disturbance. Fauna assemblages in these areas are likely to be similar to what might be expected in this habitat.
Disturbed Fauna Habitat	These areas show signs of human induced significant disturbance (e.g. mining, clearing, tracks and roads). Many of the trees, shrubs and undergrowth have died or have been cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain an abundance of weeds or have been damaged by vehicles or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.
Highly Degraded Fauna Habitat	These areas often have a significant human induced loss of vegetation, and / or a large number of vehicle tracks and / or have been completely cleared, and / or areas have been heavily grazed or farmed. There is limited or no fauna habitat connectivity. Fauna assemblages in these areas are likely to differ significantly from what existed prior to the disturbance, and are often depleted compared to what existed prior to the disturbance.

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Appendix D: Vegetation Association, Fauna Habitat and Condition Mapping

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Vegetation Condition Scale (Bush Forever Volume 2, Government of Western Australia 1994)

P - Pristine - Pristine or nearly so, no obvious signs of disturbance

E - Excellent - Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species

VG - Very Good - Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing

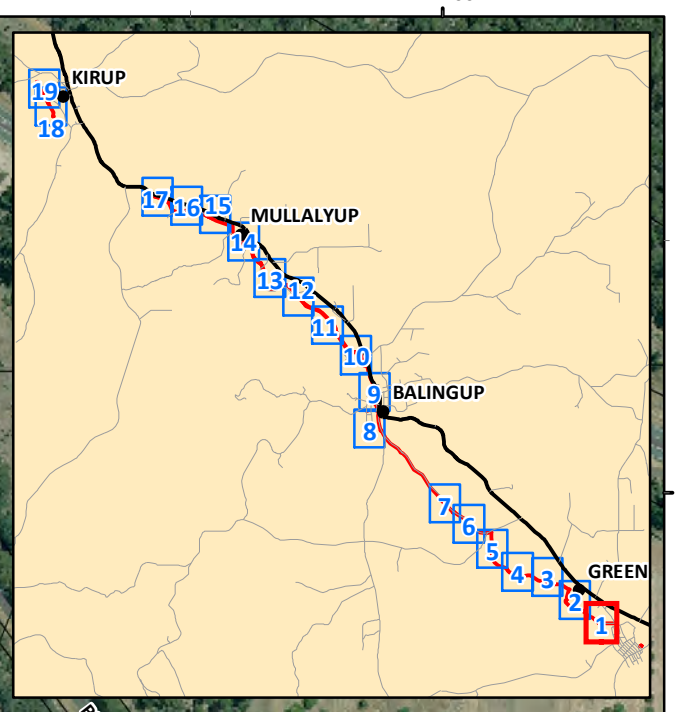
G - Good - Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing

D - Degraded - Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing

CD - Completely Degraded - The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs

411800 412000 412200 412400

6255400 6255200 6255000 6254800 6254600



ION RD

BLACKWOOD RD

G - VG

2

VG
EmCcW
CHARNLEY RD
G
D
CD
1

LANE 5 GR

TEL

Legend

Survey Corridor
Quadrats
River/Creek
Roads
Railway Corridor
Cadastre

Vegetation Units

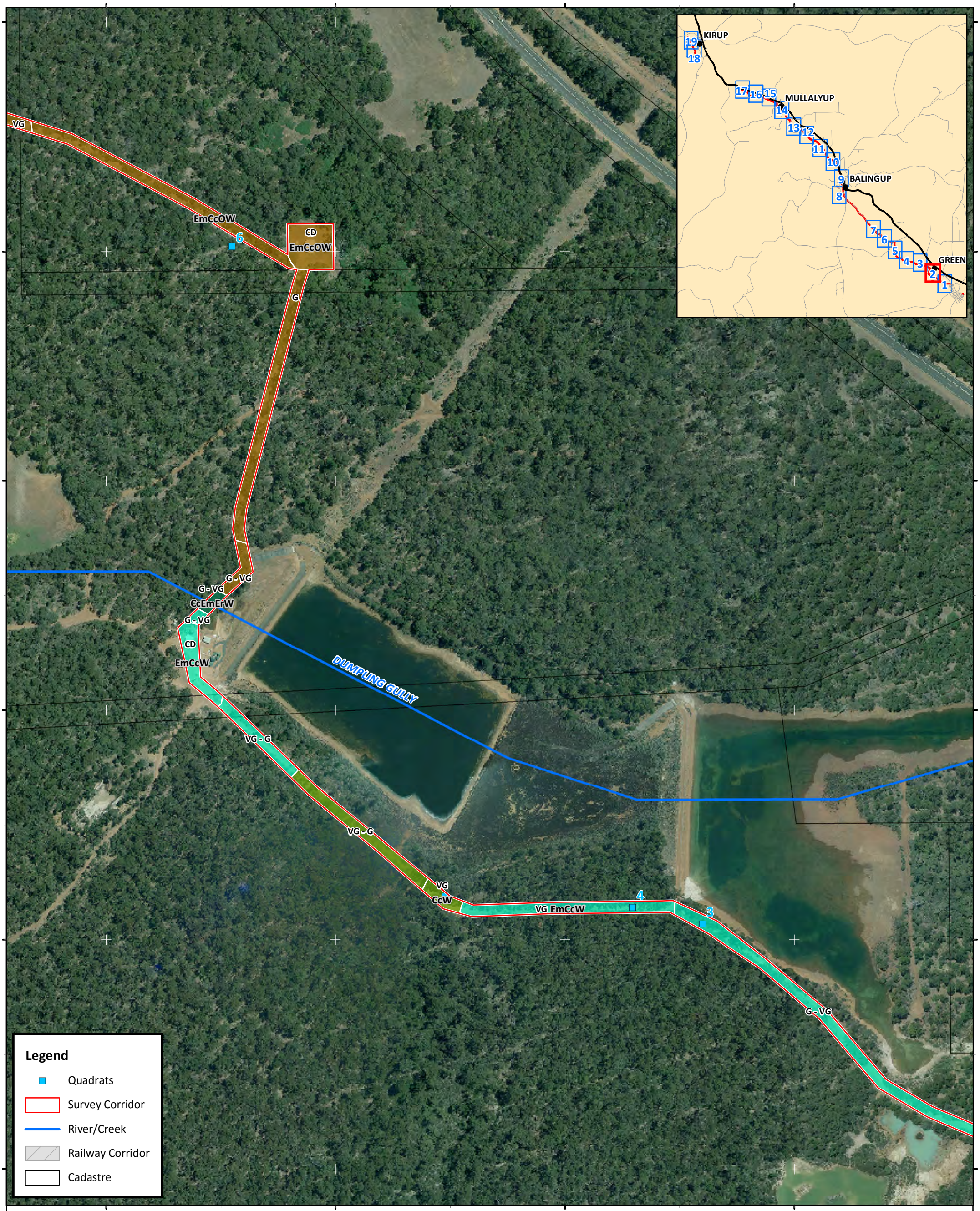
EmCcW	Jarrah-marri woodland with a mid-storey that may range in the following dominant taxa in the upper shrub layer: *Xanthorrhoea preissii, Macrozamia riedlei, Mirbelia dilatata, Hakea amplexicaulis, Acacia extensa, Leucopogon verticillatus. The following as dominants in the mid-shrub layer: Bossiaea ornata, B. linophylla, Hibbertia hypericoides, Phyllanthus calycinus, Pteridium esculentum. Over sedges including Tetraria capillaris and Patersonia umbrosa var. xanthina.*
EmCcOW	Jarrah-marri open woodland with a mid-storey that may range in the following dominant taxa in the upper shrub layer: *Pteridium esculentum, Hakea amplexicaulis* with *Bossiaea ornata, Leucopogon nutans* as primary dominants in the lower shrubs; over *Tetraria* species.
EmCcBgPlW	Jarrah-marri with bull banksia (*Banksia grandis*)and snotty gobble (*Persoonia longifolia*) woodland with a mid-storey that may range in the following dominant taxa in the mid-shrub layer: *Bossiaea ornata, Hibbertia amplexicaulis* over *Tetraria capillaris* and *Desmocladus fascicularis.*
CcW	Marri woodland over a mid-shrub layer of *Taxandria parviceps* and *Bossiaea linophylla* over lower shrubs including: *Pteridium esculentum, Hypocalymma angustifolia, Acacia pulchella, Bossiaea linearifolia* over sedges of *Tetraria capillaris, Patersonia occidentalis* and *P. pygmaea* .
CcEmErW	Marri-jarrah-flooded gum (*Eucalyptus rudis*) woodland over a tall shrubland including *Trymalium odoratissimum* subsp. *trifidum* , *Agonis linearifolia* , *Hakea lissocarpha* over smaller shrubs such as *Phyllanthus calycinus, Acacia pulchella* with a dominant sedge layer of *Lepidosperma effusum* .
Cl	Area historically cleared of all native vegetation.
Pl	Area containing planted introduced species that are plantation or orchard.

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D1: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD01	0 25 50 100 150 200 Metres N



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D2: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD02	0 25 50 100 150 200 Metres N

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Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

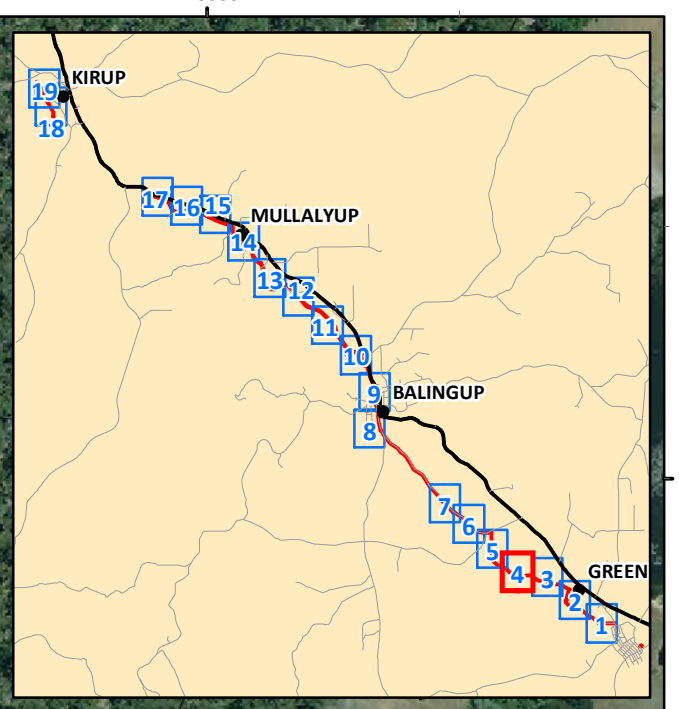
Figure D3: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD03

Datum: GDA 1994
Projection: MGA Zone 50
Metres
0 25 50 100 150 200
N

409400 409600 409800 410000

6256800 6256600 6256400 6256200 6256000



EmCcW
G
G
CcEmErW
9
SPRING CREEK
VG
EmCcW
8
VG
EmCcBgPlW

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

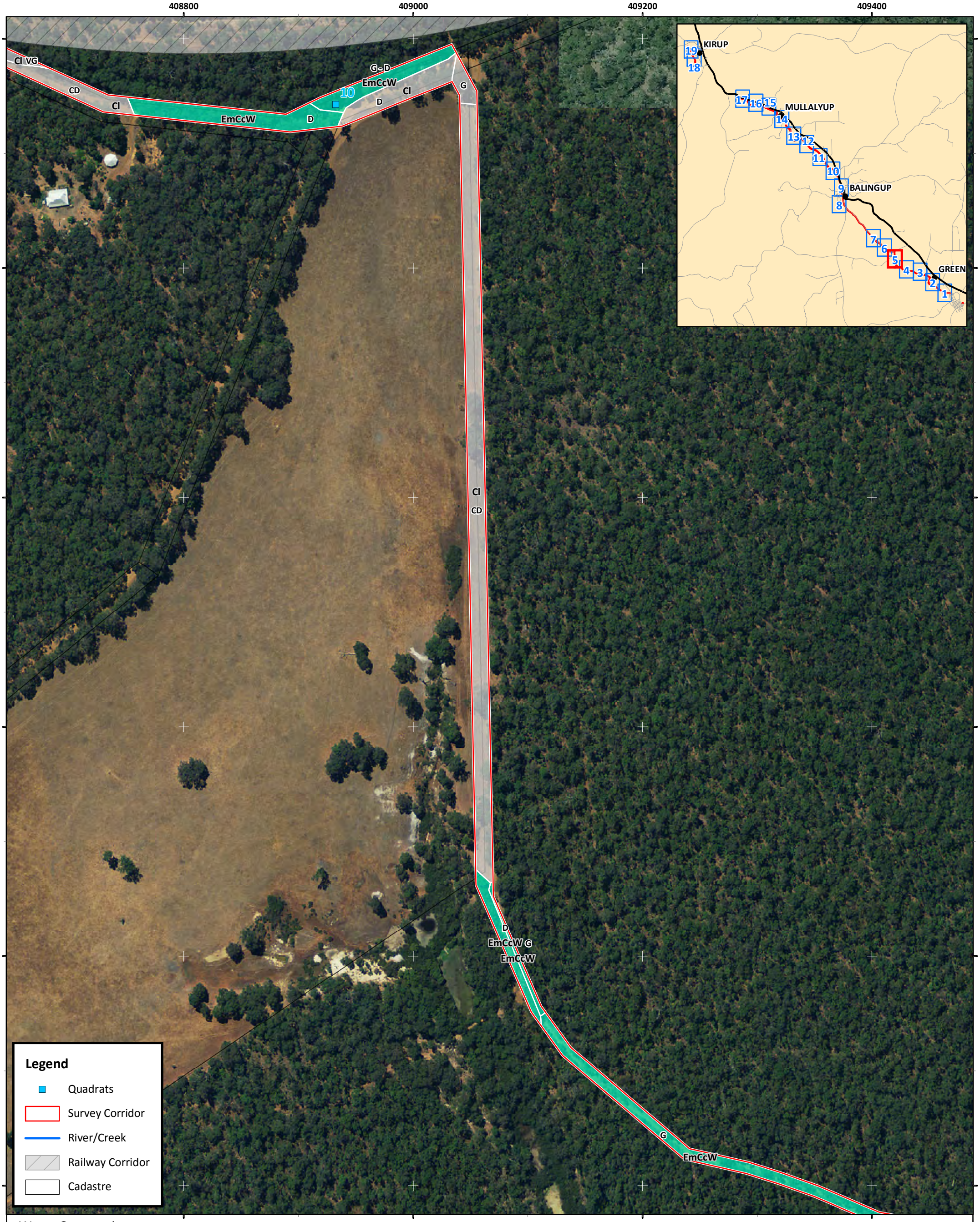
Figure D4: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD04

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

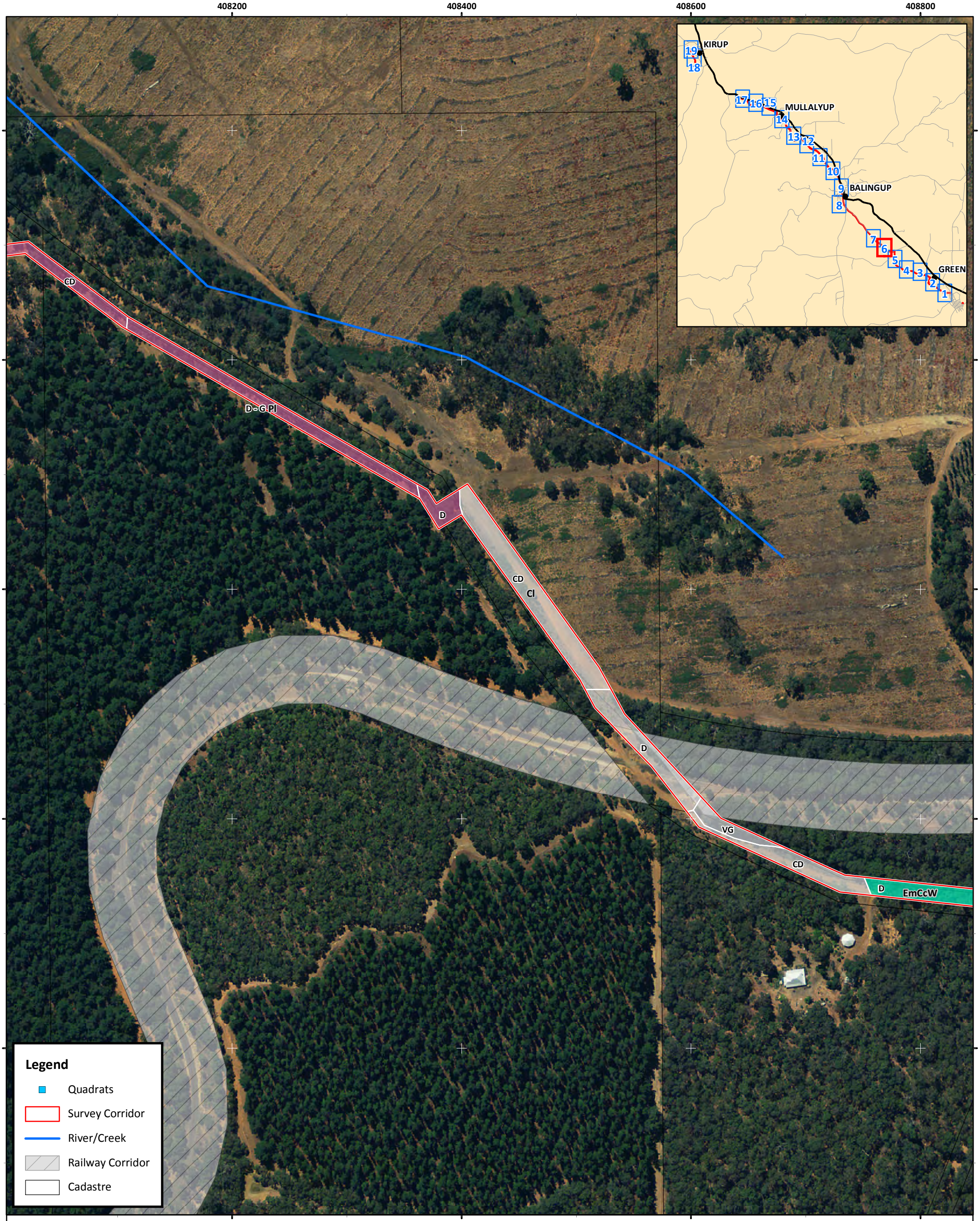


Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D5: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD05	0 25 50 100 150 200 Metres N

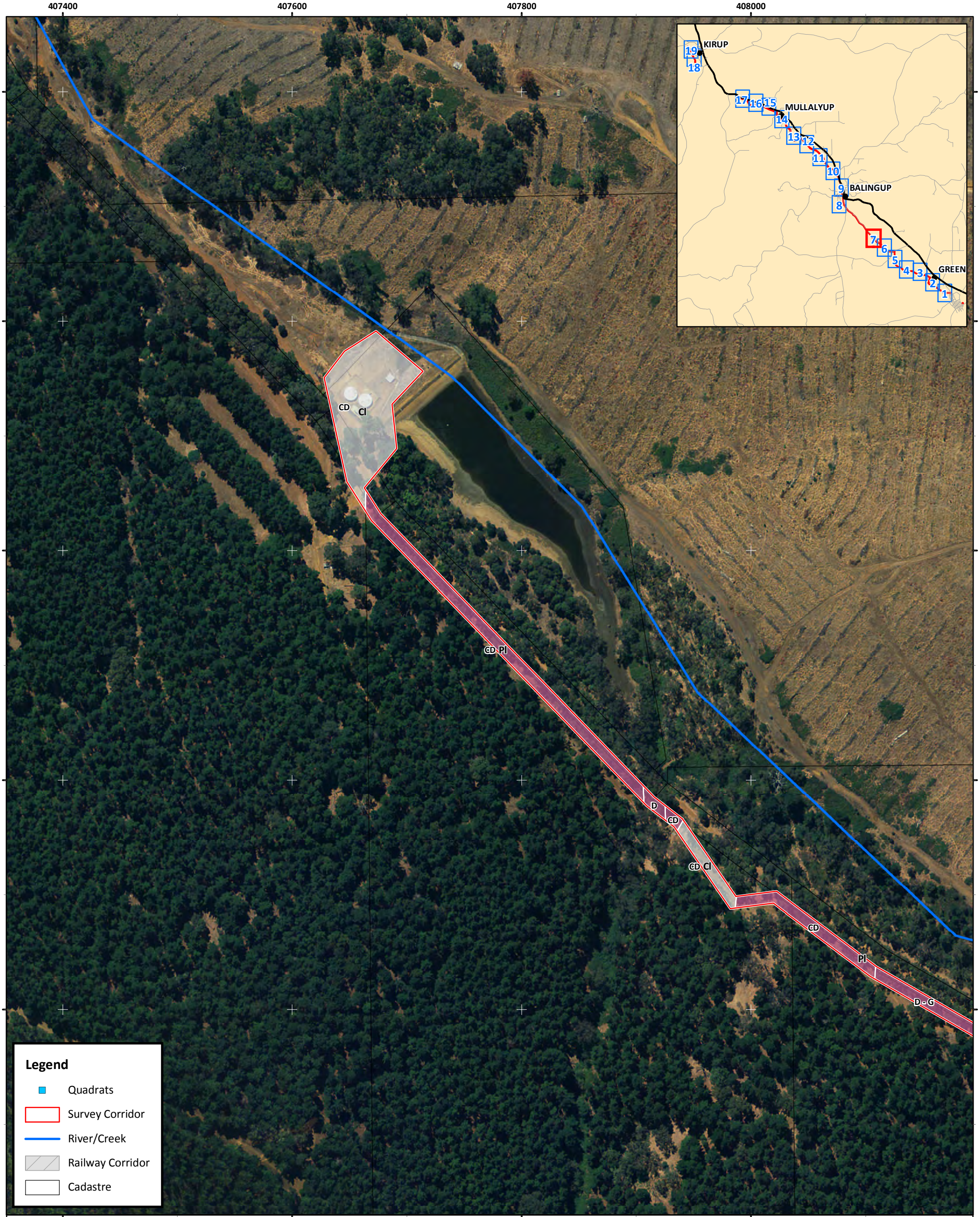


Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D6: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD06	0 25 50 100 150 200 Metres N



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D7: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD07

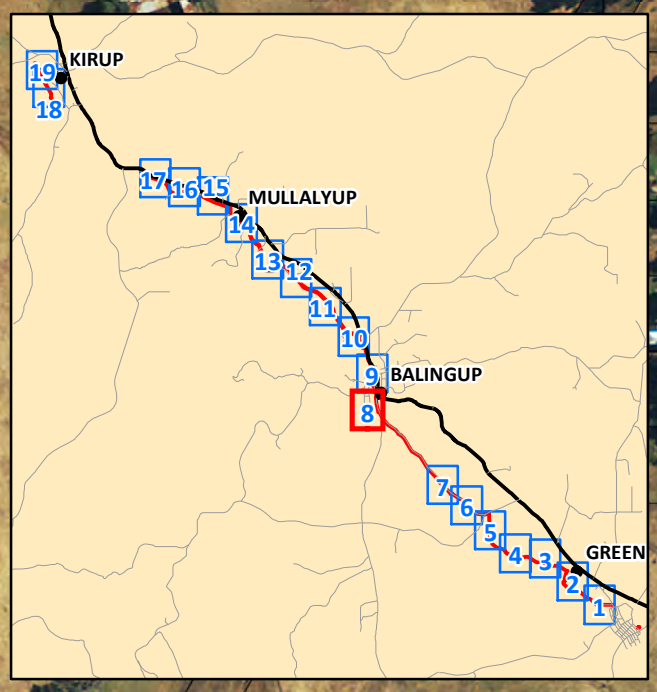
Datum: GDA 1994
Projection: MGA Zone 50
0 25 50 100 150 200 Metres
N

405400 405600 405800 406000

6260800 6260600 6260400 6260200 6260000

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre



Cl CD

Cl CD

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D8: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD08	0 25 50 100 150 200 Metres N

405600 405800 406000 406200

6261800 6261600 6261400 6261200 6261000

CD CcEmErW CD Cl

Cl CD

CD CcEmErW

BALINGUP BROOK

CD Cl

KIRUP
MULLALYUP
BALINGUP
GREEN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D9: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD09

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

405000 405200 405400 405600

6262800 6262600 6262400 6262200 6262000

KIRUP
MULLALYUP
BALINGUP
GREEN

CD
CI
CD

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D10: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD10

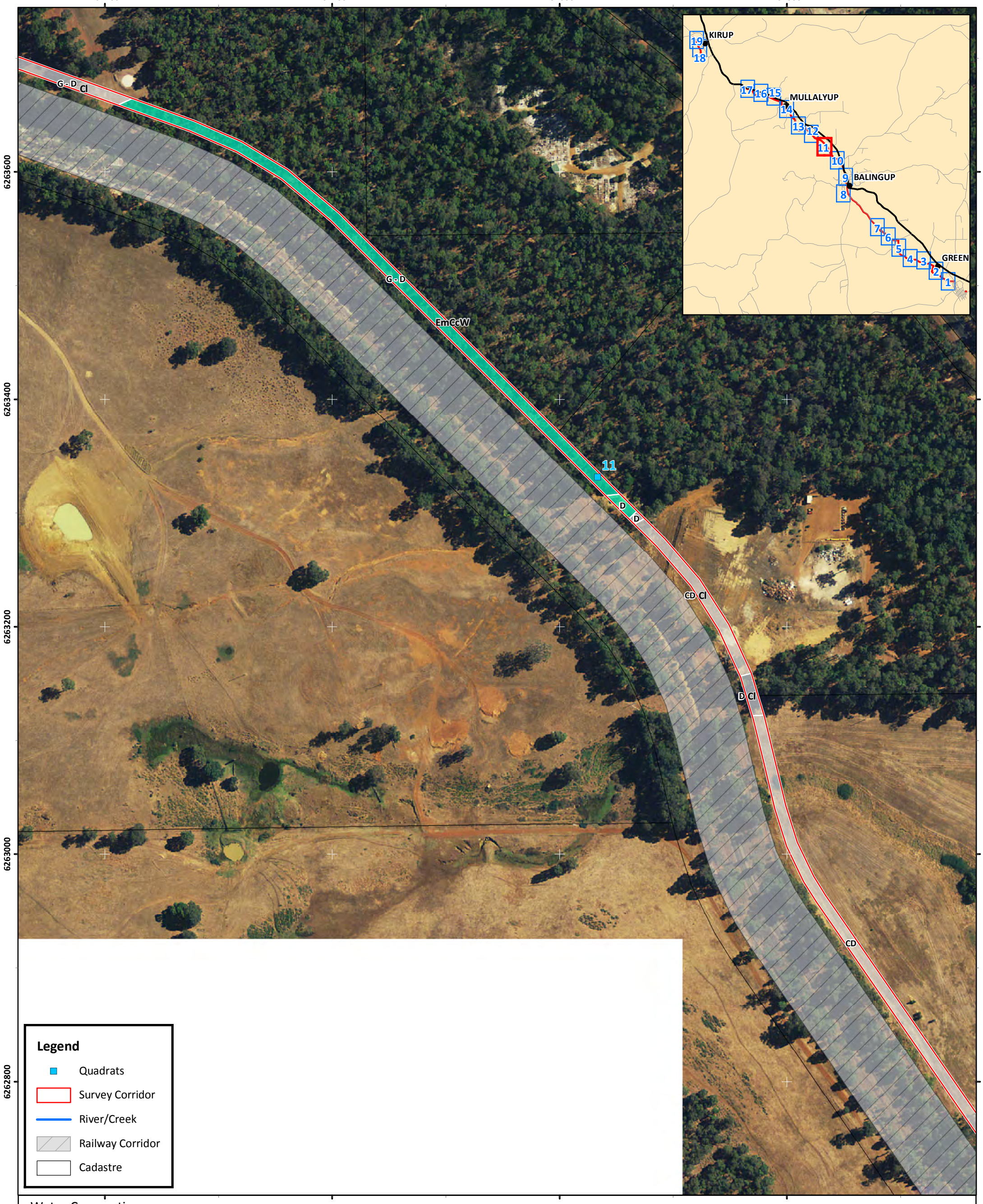
Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

404200 404400 404600 404800

6263600 6263400 6263200 6263000 6262800



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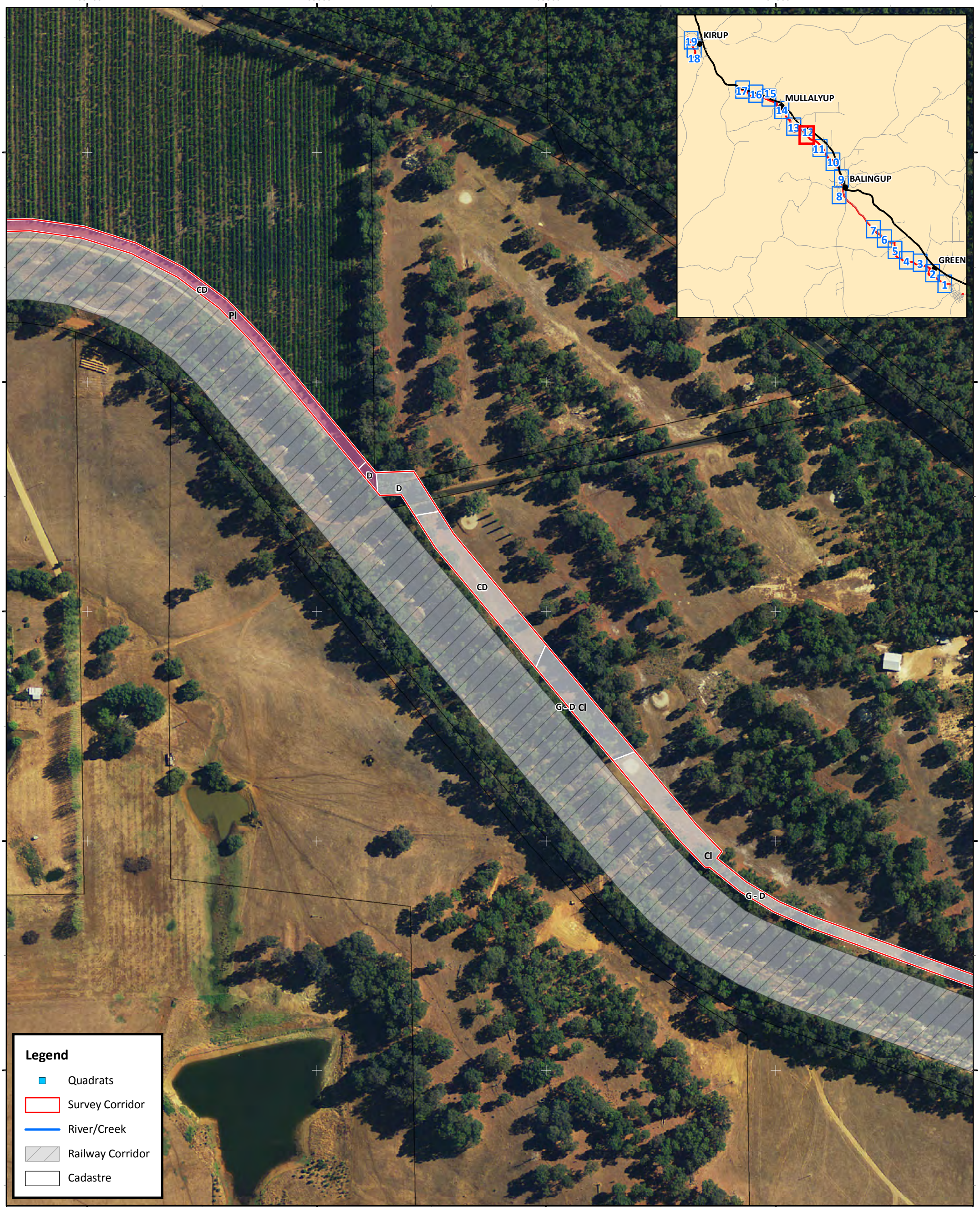
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D11: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD11	0 25 50 100 150 200 Metres N

403400 403600 403800 404000

6264400 6264200 6264000 6263800 6263600



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D12: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD12	0 25 50 100 150 200 Metres N

402600 402800 403000 403200

6265000 6264800 6264600 6264400 6264200 6264000

CI CD

PI

CD

KIRUP MULLALYUP BALINGUP GREEN

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

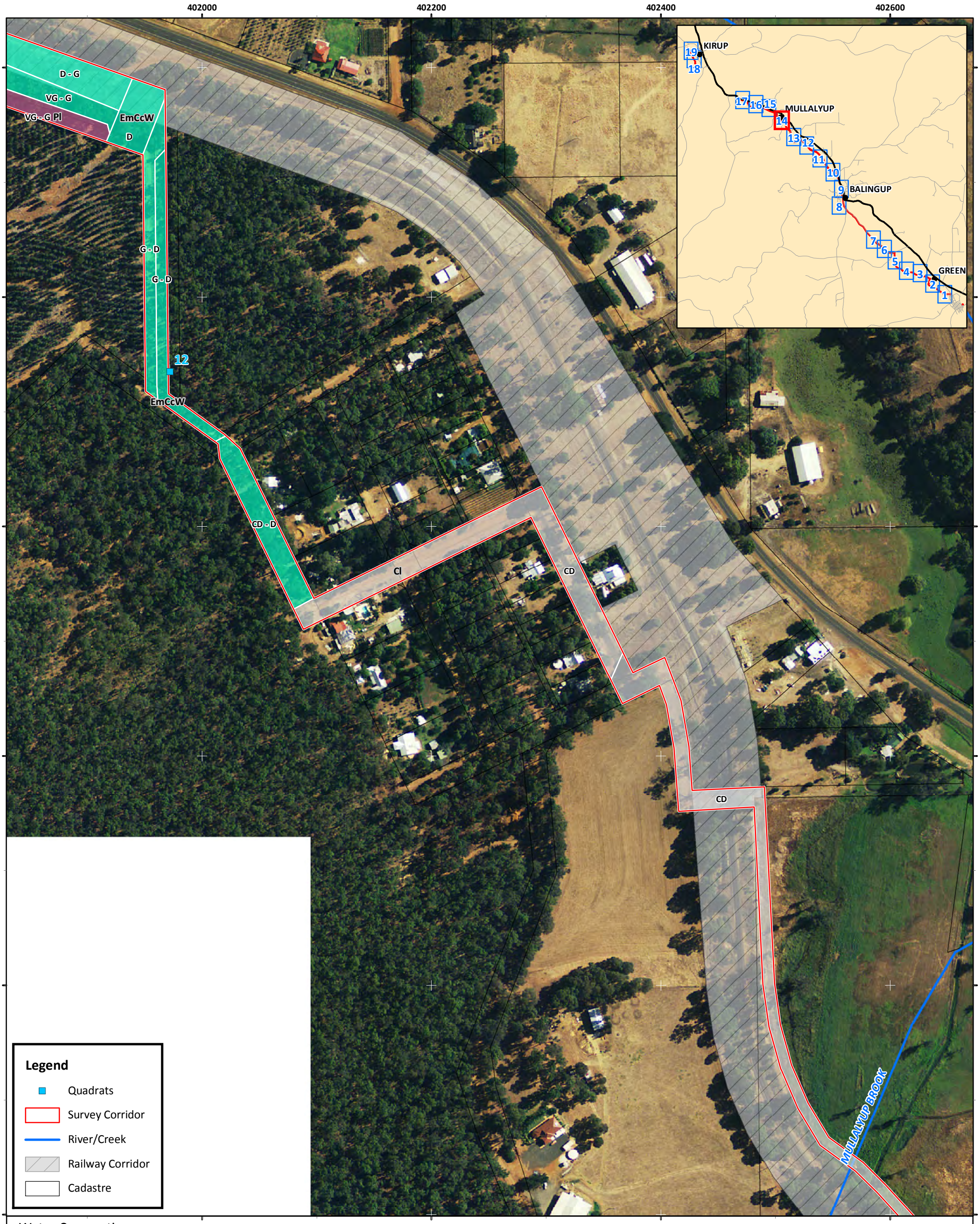
Figure D13: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD13

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N



Water Corporation

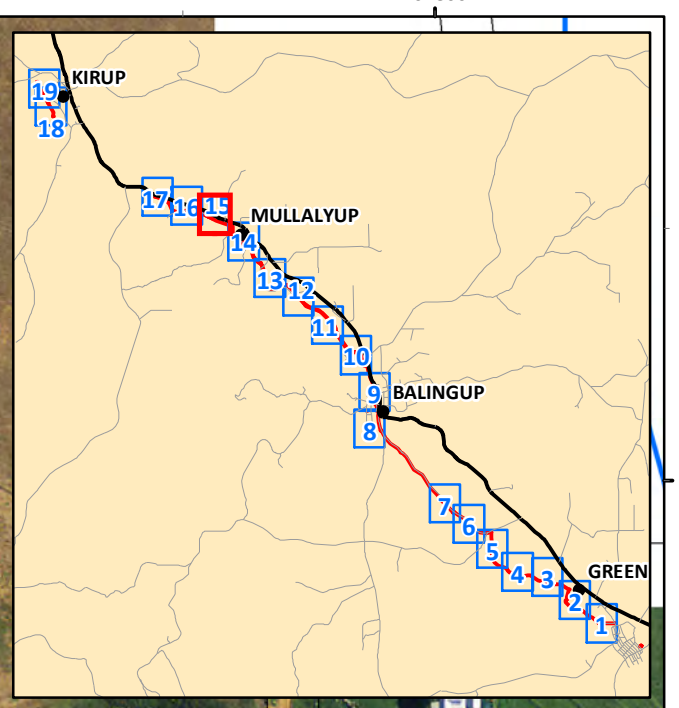
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D14: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD14	0 25 50 100 150 200 Metres N

401200 401400 401600 401800

6266600 6266400 6266200 6266000 6265800



CD
D - CD
EmCcW
CD
CD
D
CD
CD
CcEmErW
CD
VG - G
EmCcW
D - G
VG - G
Pl

Legend

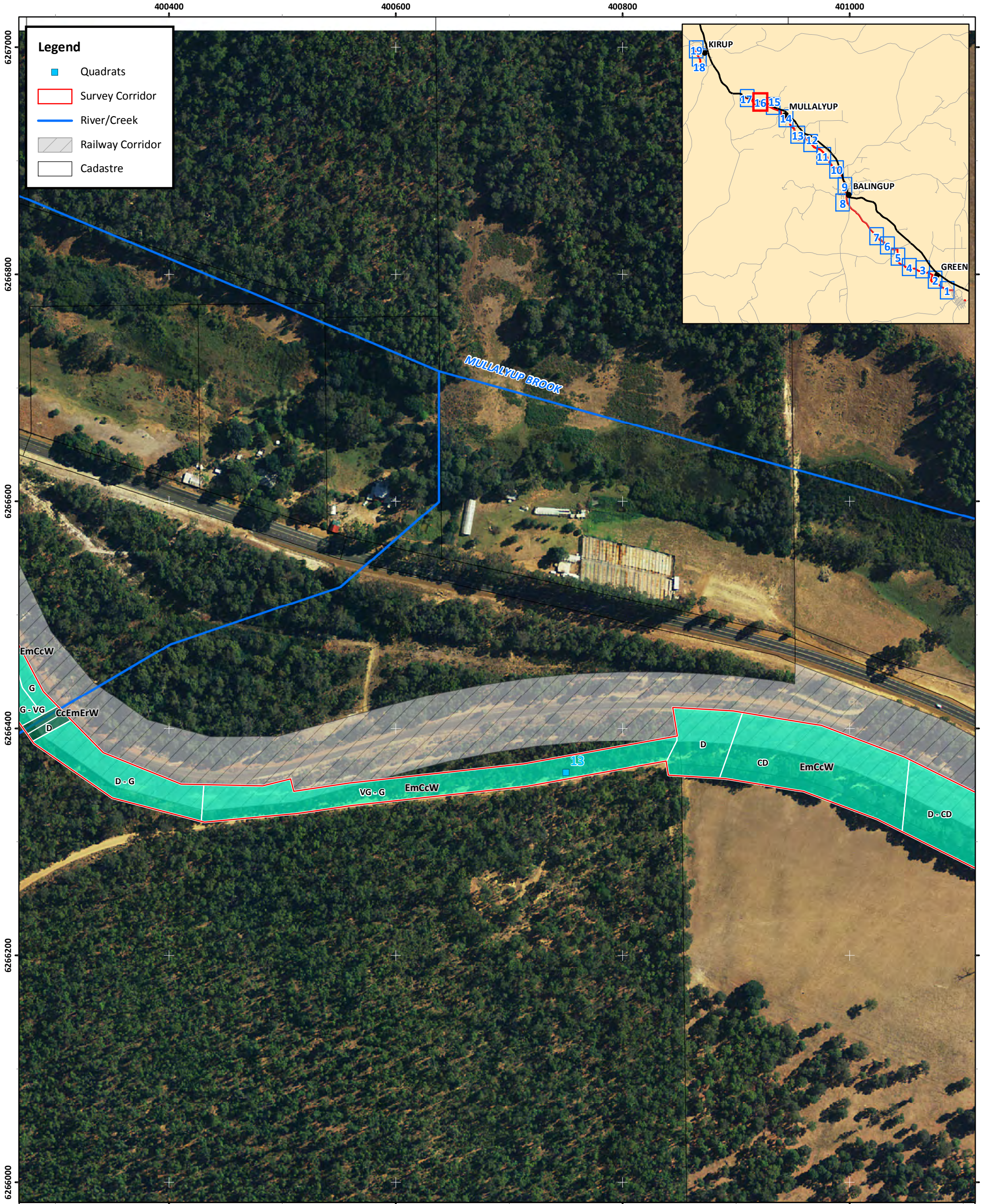
- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D15: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD15	0 25 50 100 150 200 Metres N



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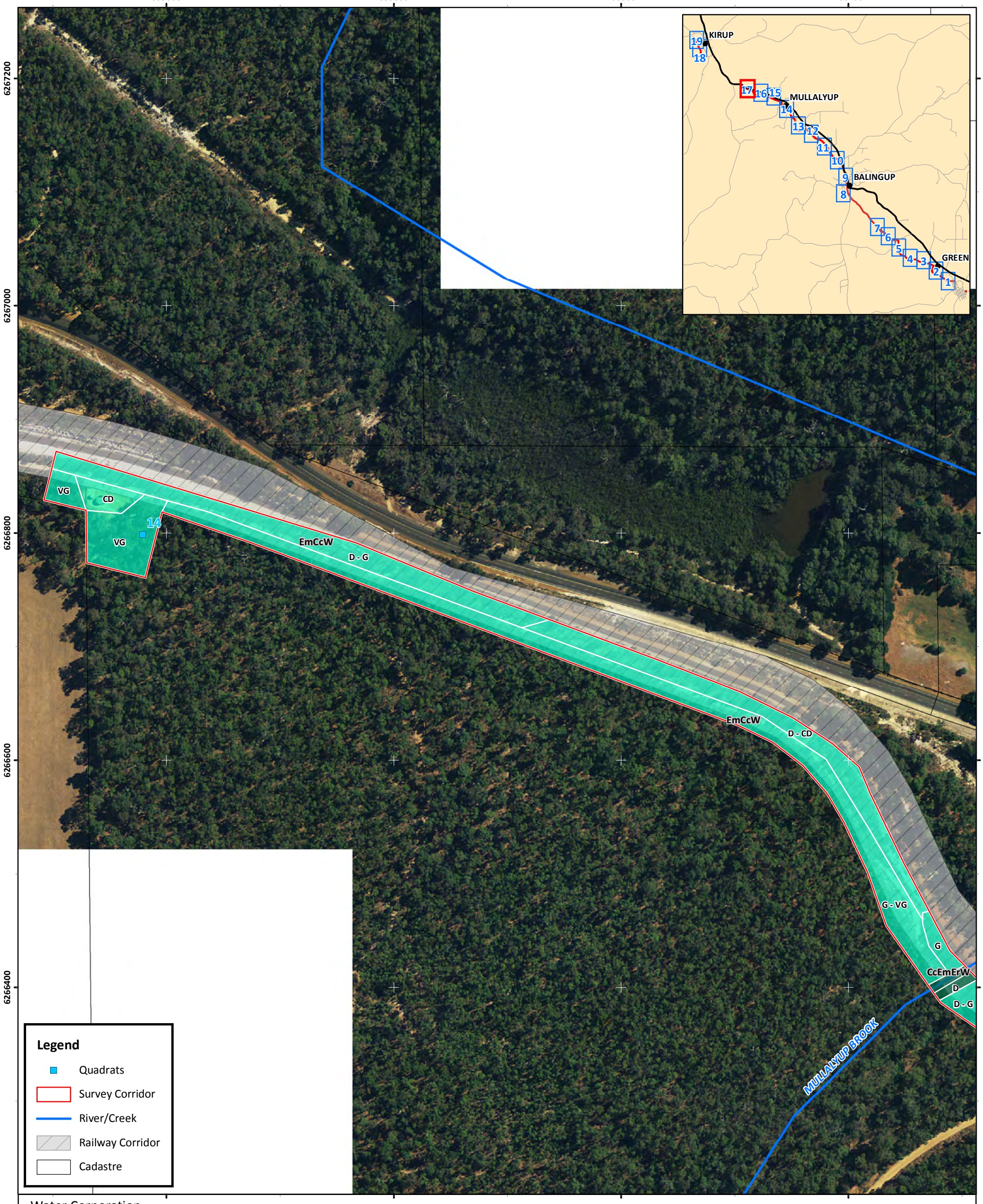
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D16: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50 0 25 50 100 150 200 Metres N
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD16	

399600 399800 400000 400200

6267200 6267000 6266800 6266600 6266400



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Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D17: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD17	0 25 50 100 150 200 Metres N

396600 396800 397000 397200

6269600 6269400 6269200 6269000 6268800

KIRUP
MULLALYUP
BALINGUP
GREEN

E~ VG
EmCcW
MULLALYUP BROOK
D D CD CI

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D18: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD18

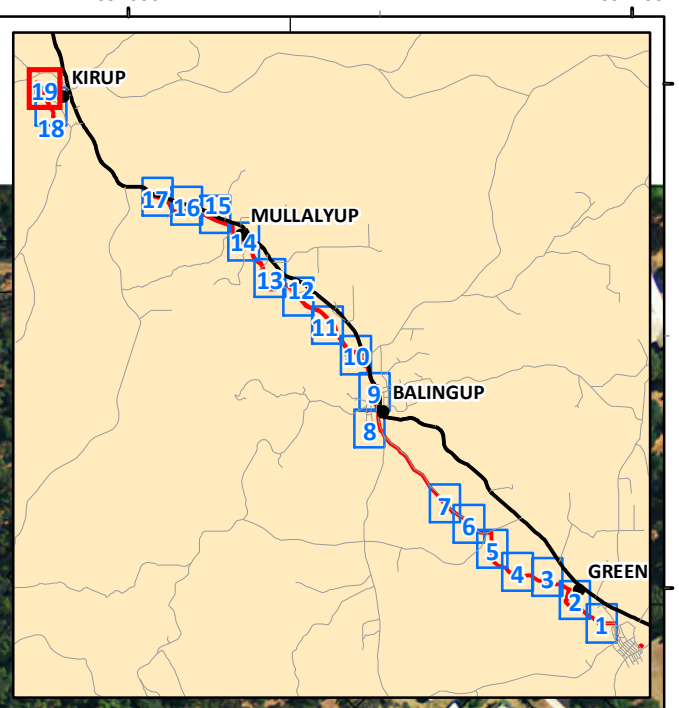
Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

396400 396600 396800 397000 397200

6270200 6270000 6269800 6269600 6269400 6269200



CD

VG - G

15

EmCcW

CD

Cl

E - VG

Legend

- Quadrats
- Survey Corridor
- River/Creek
- Railway Corridor
- Cadastre

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure D19: Vegetation complexes, fauna habitat and condition mapping.

Author: V. Clarke	Date: 28-01-2014
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128_FigD19

Datum: GDA 1994

Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

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Appendix E: Quadrat and Relevé Data

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Site WC01

Location: Charnley Road Greenbushes **Type:** Relevé
Date: 14/10/2013 **Described by:** VC **Seasonal Conditions:** Very good
MGA Zone: 50 **Easting:** 412394 mE **Northing:** 6255052 mN
Habitat: Upper slope; negligible slope and aspect.
Soil: Sandy laterite.
Vegetation: Completely degraded edge of State forest and road reserve with *Pinus* sp. and *Eucalyptus marginata* subsp. *marginata* Woodland over an Open Low Woodland of **Leptospermum laevigatum*, **Acacia baileyana* and *A. podalyriifolia* over an Open Low Shrubland of **Lavandula stoechas* over an Open Herb/Grassland of weed species including **Briza maxima* and **Sparaxis pillansii*.
Vegetation Complex: Mapped as Dwellingup D1.
Veg Condition: Completely degraded.
Fire Age: +10 years.

WC01 Relevé.

WC01 Species List

Name	% Cover	Height (m)
**Pinus* sp.	10	>10
Eucalyptus marginata subsp. *marginata*	10-30	10-30
**Leptospermum laevigatum*	2-10	>10
**Acacia baileyana*	30-70	0.2
**Acacia podalyriifolia*	30-70	0.2
**Lavandula stoechas*	10-30	0.3
**Hypochaeris glabra*	10-30	0.1
**Briza maxima*	10-30	0.4
**Briza minor*	+	0.2
**Freesia* sp. (sterile)	+	0.1

Comments:
Start of Charnley Road is a highly modified area of Completely Degraded jarrah forest with many introduced woody and grassy weeds.

Opportunistic Species:

**Acacia saligna*
**Avena fatua*
**Freesia* sp.
**Podocarpus drouynianus*
**Romulea rosea*
**Trifolium hirtum*
Acacia applanata
Acacia pulchella
Astroloma pallida
Bossiaea ornata
Caesia micrantha
Clematis pubescens
Conostylis aculeata subsp. *aculeata*
Dampiera alata
Daviesia decurrens
Dianella revoluta
Gompholobium marginatum
Hibbertia hypericoides
Hibbertia pilosa
Hovea chorizemifolia
Hypolaena exsulca
Lepidosperma sp. (sterile)
Leucopogon nutans
Leucopogon verticillatus
Lomandra preissii
Lomandra sericea
Macrozamia riedlei
Opercularia hispidula
Patersonia occidentalis
Pericalymma ellipticum
Persoonia longifolia
Phyllanthus calycinus
**Rubus ulmifolius*
Scaevola calliptera
Stylidium piluliferum
Tetrahaena laevis
Tetratheca setigera
Thelymitra sp. (immature)
**Watsonia* sp. (sterile)
Xanthorrhoea preissii

Site WC02

Location: Charnley Road **Type:** Quadrat
Date: 14/10/2013 **Described by:** VC **Seasonal Conditions:** Very good
MGA Zone: 50 **Easting:** 411915 mE **Northing:** 6255126 mN
Habitat: Upperslope; negligible slope and aspect.
Soil: Lateritic sandy loam.
Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over a *Xanthorrhoea preissii* Open Shrubland over an Open Low Heath of *Bossiaea ornata* and *Hibbertia hypericoides* over *Tetraria capillaris* Very Open Sedgeland on lateritic sandy loam.
Vegetation Complex:. Mapped as Dwellingup D1.
Veg Condition: Excellent.
Fire Age: ~10 years.

WC02- Quadrat

WN02 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	30-70	10-30
Corymbia calophylla	30-70	10-30
Persoonia longifolia	2-10	1.5
Xanthorrhoea preissii	10	0.9
Hakea amplexicaulis	1	1.10
Bossiaea ornata	30-70	0.6
Hibbertia hypericoides	30-70	0.5
Tetrahena laevis	+	0.6
Tetraria capillaris	2-10	0.5
Philotheca spicata	+	0.4
Acacia extensa	+	1.5
Scaevola calliptera	+	0.1
Lomandra ?sonderi (sterile)	+	0.7
Hibbertia pilosa	+	
Hovea chorizemifolia	+	
Hibbertia amplexicaulis	+	
Grevillea sp. (sterile)	+	
Chamaescilla corymbosa var. *corymbosa*	+	
Leucopogon ? capitellatus	+	
Dampiera linearis	+	
Pentapeltis peltigera	+	

Drosera pallida	+
Tetratheca setigera	+
Macrozamia riedlei	+
Desmocladus fascicularis	+
Lagenophora huegelii	+
Lepidosperma ? pubisquameum	+
Opercularia echinocephala	+
Daviesia decurrens	+
Pterostylis recurva	+
Lomandra nigricans	+
Leucopogon verticillatus	+
Conostylis setigera	+
Leschenaultia biloba	+
Billardiera variifolia	+
Patersonia babianoides	+

Opportunistic records:
Stylidium amoenum
Trachymene pilosa
Levenhookia pusilla
Drosera glanduligera
Daucus glochidiatus
Agrostocrinum stypandroides
Stylidium calcaratum
Comesperma ciliatum
Austrostipa campylachne
Thomasia grandiflora
Gompholobium ovatum
Neurachne alopecuroidea
Lyperanthus serratus
Lobelia heterophylla
Tripterococcus brunonis
Conostylis aculeata
Astroloma pallida
Astartea sp . (sterile)

Comments:

Quadrat placed to capture maximum diversity and best condition vegetation. Vegetation condition along Charnley Road can vary from ‘excellent’ to ‘good’.

Site WC03

Location: Charnley Road; between road and dam. **Type:** Relevé

Date: 14/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 411520 mE **Northing:** 6255413 mN

Habitat: Upper slope; negligible slope and aspect.

Soil: Brown loam.

Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over **Acacia podalyriifolia* Low Open Woodland over *Bossiaea ornata, Hibbertia hypericoides* Open Low Heath over Tetraria capillaris Very Open Sedgeland on brown loam.

Vegetation Complex: Mapped as Catterick CC1.

Veg Condition: Good.

Fire Age: +10 years.

WC03- Relevé

WC03 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Corymbia calophylla	10-30	10-30
**Acacia podalyriifolia*	>10	0.1
Bossiaea ornata	>70	0.01
Acacia pulchella	>10	0.6
Hibbertia hypericoides	10-30	0.4
Tetraria capillaris	10-30	0.35
Caesia micrantha	+	
**Hypochaeris glabra*	+	
Dampiera linearis	+	
Lomandra purpurea	+	
Tripterococcus brunonis	+	
Thysanotus sp. (climber/sterile)	+	
Tetrahena laevis	+	
Gompholobium marginatum	+	
Scaevola calliptera	+	
Hemigenia incana	+	
Drosera sp. (climber/sterile)	+	
Pentapeltis peltigera	+	
Hypocalymma angustifolia	+	

Desmocladus fascicularis	+
Austrostipa campylachne	+
Kennedia prostrata	+
Burchardia congesta	+
Hakea lissocarpha	+
**Watsonia* sp. (sterile)	+
Tetratheca setigera	+
Jacksonia alata	+
Synaphea gracillima	+
Comesperma conferta	+
Thysanotus multiflorus	+
Xanthosia candida	+
Bossiaea linophylla	+
Logania serpyllifolia subsp. *serpyllifolia*	+

Comments: Area is very small and linear; previously degraded but remains relatively diverse.

Site WC04

Location: Charnely Road, Greenbushes; between two dams **Type:** Quadrat
Date: 14/10/2013 **Described by:** VC **Seasonal Conditions:** Very good
MGA Zone: 50 **Easting:** 411459 mE **Northing:** 6255428 mN
Habitat: Midslope; negligible slope and aspect.
Soil: Brown loam with occasional laterite.
Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over *Bossiaea ornata*, *Hibbertia hypericoides*, *Leucopogon nutans* Low Shrubland over *Tetraria capillaris* Very Open Sedgeland.
Vegetation Complex: Mapped as Catterick CC1.
Veg Condition: Very good to Excellent.
Fire Age: 5-10 years.

WC04- Quadrat

WC04 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Corymbia calophylla	10-30	10-30
Bossiaea ornata	2-10	0.4
Hibbertia hypericoides	10-30	0.25
Leucopogon nutans	2-10	0.15
Tetraria capillaris	2-10	0.3
Xanthorrhoea preissii	2-10	2.0
Clematis pubescens	+	cl
Burchardia congesta	+	
Xanthosia candida	+	
Caladenia latifolia	+	
Tetrahena laevis	+	
Lagenophora huegelii	+	
**Briza maxima*	+	
Opercularia echinocephala	+	
Lomandra purpurea	+	
Caesia micrantha	+	
Macrozamia riedlei	+	
Cassytha glabella	+	
Dampiera linearis	+	

Scaevola calliptera	+
Lomandra sericea	+
Hibbertia amplexicaulis	+
Stylidium amoenum	+
Waitzia acuminata	+
**Hypochaeris glabra*	+
Hemigenia incana	+
Gompholobium marginatum	+
Levenhookia pusilla	+
Desmocladus fascicularis	+
Persoonia longifolia	+

Opportunistic collections from vicinity:
Logania serpyllifolia subsp. *angustifolia*
Hybanthus calycinus
Tetraria octandra
Senecio multicaulis subsp. *multicaulis*

Comments: Nil.

Site WN05

Location: Charnley Road, Greenbushes; adjacent to second dam **Type:** Relevé

Date: 14/10/2013 **Described by:** VC **Seasonal Conditions:** Very Good

MGA Zone: 50 **Easting:** 411295 mE **Northing:** 6255437 mN

Habitat: Midslope; gentle gradient towards dam.

Soil: Brown loam with laterite.

Vegetation: *Corymbia calophylla* Woodland over *Taxandria linearifolia* Very Open Tall Shrubland over an Open Shrubland of *Pteridium esculentum, Bossiaea linophylla* and *Acacia pulchella* over an Open Low Shrubland of *Hypocalymma angustifolia* over a *Tetraria capillaris* Very Open Sedgeland on brown loam.

Vegetation Complex: Mapped as Catterick CC1.

Veg Condition: Good – Very Good.

Fire Age: +10 years.

WN05 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Taxandria linearifolia	2-10	2.0
Pteridium esculentum	2-10	1.2
Bossiaea linearifolia	2-10	1.0
Acacia pulchella	2-10	1.0
Hypocalymma angustifolia	2-10	0.6
Tetraria capillaris	<1	0.5
Xanthorrhoea preissii	+	
Acacia extensa	+	
Hibbertia pilosa	+	
Bossiaea ornata	+	
Hemigenia incana	+	
Philotheca spicatus	+	
Hibbertia hypericoides	+	
Tremandra stelligera	+	
Neurachne alopecuroidea	+	
**Hypochaeris glabra*	+	
Thysanotus sp. (climber/sterile)	+	
Caesia micrantha	+	
Conostylis aculeata.	+	
Lagenophora huegelii	+	
**Oxalis purpurea*	+	

Patersonia occidentalis	+
Drosera ?erythrorhiza	+
Patersonia pygmaea	+
Desmocladus fascicularis	+
Lomandra purpurea	+
Meeboldina scariosa	+

Comments: Signs of previous disturbance and overstorey trees are regrowth.

Site WC06

Location: Tank track from Charnley Road, North Greenbushes **Type:** Quadrat

Date: 15/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 411109 mE **Northing:** 6256004 mN

Habitat: Upperslope.

Soil: Lateritic loam with extruding laterite boulders (common).

Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Open Woodland over a Shrubland of *Pteridium esculentum* and *Hakea amplexicaulis* over an Low Shrubland of *Bossiaea ornata, Leucopogon nutans* over a very open **Briza maxima* grassland on lateritic loam.

Vegetation Complex: Mapped as Catterick CC1.

Veg Condition: Degraded.

Fire Age: ?5-10 years.

WC06- Quadrat

WN06 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	2-10	10-30
Corymbia calophylla	2-10	10-30
Pteridium esculentum	10-30	1.0
Bossiaea ornata	2-10	0.5
Hakea amplexicaulis	2-10	1.2
**Hypochaeris glabra*	<1	0.4
Leucopogon nutans	2-10	0.6
**Briza maxima*	10-30	0.5
Hibbertia amplexicaulis	2-10	0.5
Clematis pubescens	+	
**Asparagus asparagoides*	+	
Hardenbergia comptoniana	+	
Hibbertia pilosa	+	
**Watsonia* sp. (sterile)	+	
Haemodorum sp. (sterile)	+	
Persoonia longifolia	+	

Opportunistic collections:

Sowerbaea laxiflora

Banksia grandis
Allocasuarina fraseriana
Acacia pulchella
**Briza minor*
Thelymitra sp. (immature)
Hovea chorizemifolia
Scaevola calliptera
Caladenia sp. (immature)
Caladenia flava subsp. *flava*
Tripterococcus brunonis
Banksia nivea
Stylidium calcaratum
**Acacia podalyriifolia*

Comments: Degraded through logging and frequent fire; diversity is low in understorey and weed proliferation is high..

Site WC07

Location: Track leading from water tank; south of Hay Road, North Greenbushes **Type:** Quadrat

Date: 15/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 410635 mE **Northing:** 6256146 mN

Habitat: Midslope.

Soil: Lateritic loam.

Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over *Banksia grandis, Persoonia longifolia* Open Low Woodland over *Bossiaea ornata* Open Low Shrubland on lateritic loam.

Vegetation Complex: Mapped as Dwellingup D1.

Veg Condition: Excellent.

Fire Age: ~10 years.

WC07- Quadrat

WN07 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Corymbia calophylla	10-30	10-30
Banksia grandis	2-10	8
Persoonia longifolia	2-10	4
Bossiaea ornata	30-70	0.6
Opercularia hispidula	+	
Logania serpyllifolia subsp. *angustifolia*	+	
Xanthorrhoea gracilis	+	
Stylidium amoenum	+	
Leucopogon nutans	+	
Pterostylis pyramidalis	+	
Acacia pulchella	+	
Hovea chorizemifolia	+	
Scaevola calliptera	+	
Tetrahena laevis	+	
Tetraria capillaris	+	
Desmocladus fascicularis	+	
Lagenophora huegelii	+	
Hibbertia amplexicaulis	+	
Drosera sp. (climbing/sterile)	+	

Hypocalymma angustifolia	+
Acacia extensa	+
Hakea lissocarpha	+
Tetratheca affinis	+
Banksia nivea	+
Conostylis setigera	+
Philotheca spicata	+
Hibbertia pilosa	+
Lomandra sp. (sterile)	+
Tetratheca setigera	+
Orchidaceae sp. (sterile)	+
Dampiera linearis	+
Daviesia decurrens	+
Caladenia sp. (sterile)	+
Patersonia pygmaea	+
Pterostylis recurva	+
Hibbertia sp. (sterile)	+

Opportunistic species:
Labichea punctata
Elythranthera brunonis
Macrozamia riedlei
Acacia urophylla

Comments: Very low weeds and a diverse understorey; regrowth overstorey post-logging.

Site WC08

Location: Track leading from water tank; south of Hay Road, North Greenbushes **Type:** Relevé

Date: 15/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 409936 mE **Northing:** 6256341 mN

Habitat: Midslope.

Soil: Lateritic loamy-sand.

Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over *Xanthorrhoea preissii and Hakea lissocarpha* Shrubland over *Phyllanthus calycinus* Open Low Shrubland over a Very Open *Desmocladus fascicularis* Sedgeland on lateritic loamy-sand.

Vegetation Complex: Mapped as Catterick CC1.

Veg Condition: Very good.

Fire Age: ~5-10 years.

WN08- Releve

WN08 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Corymbia calophylla	10-30	10-30
Xanthorrhoea preissii	2-10	1.5
Hakea lissocarpha	2-10	1.1
Phyllanthus calycinus	30-70	0.6
Logania serpyllifolia subsp. *angustifolia*	2-10	0.4
Bossiaea ornata	2-10	0.5
Astroloma pallida	2-10	0.3
Desmocladus fascicularis	2-10	0.15
Banksia nivea	+	
Elythranthera brunonis	+	
Caladenia flava subsp. *flava*	+	
Lagenophora huegelii	+	
Acacia extensa	+	
Opercularia echinocephala	+	
Thysanotus sp. (climbing/sterile)	+	
Austrostipa campylachne	+	
Pimelea ciliata subsp. *ciliata*	+	

Stylidium calcaratum	+

Comments: Nil.

Site WC09

Location: Track leading from water tank; south of Hay Road, North Greenbushes **Type:** Relevé

Date: 15/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 409503 mE **Northing:** 6256485 mN

Habitat: Drainage line/ephemeral creek.

Soil: Brown sandy loam.

Vegetation: *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* Woodland over *Trymalium odoratissimum and Hakea lissocarpha* Shrubland over *Phyllanthus calycinus* Open Low Shrubland over A Very Open *Desmocladus fascicularis* Sedgeland on lateritic loamy-sand.

Vegetation Complex: Mapped as Catterick CC1.

Veg Condition: Very good.

Fire Age: +10 years.

WC09 Releve

WC09 Species List

Name	% Cover	Height (m)
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Corymbia calophylla	10-30	10-30
Eucalyptus rudis	2-10	10-30
Trymalium odoratissimum	2-10	1.5
Acacia saligna	2-10	1.5
**Acacia podalyriifolia*	2-10	1.5
Lepidosperma effusum	2-10	0.4
Acacia pulchella	2-10	0.5
Agonis linearifolia	2-10	1.2
Anigozanthos sp. (sterile)	+	+
Chorizema ilicifolia	+	
Hovea chorizemifolia	+	
Lagenophora huegelii	+	
Phyllanthus calycinus	+	
Stylidium amoenum	+	
Hypocalymma cordifolium	+	
Thysanotus sp. (climbing/sterile)	+	
Opportunistic:		
Caladenia ?ferruginea		

Grevillea quercifolia

Site WC10

Location: Corner of Hay & Old Padbury Roads, North Greenbushes **Type:** Quadrat

Date: 15/10/2013 **Described by:** VC **Seasonal Conditions:** Very good

MGA Zone: 50 **Easting:** 408932 mE **Northing:** 6257542 mN

Habitat: Midslope; negligible slope and aspect.

Soil: Brown sandy, lateritic loam.

Vegetation: *Corymbia calophylla*, *Eucalyptus marginata* subsp. *marginata* Woodland over *Bossiaea linophylla* Open Tall Shrubland over an Open Shrubland of *Macrozamia riedlei, Pteridium esculentum* and *Leucopogon verticillatus* over a *Bossiaea ornata* Open Low Shrubland over a **Briza maxima* Very Open Grassland on brown sandy, lateritic loam.

Vegetation Complex: Mapped as Dwellingup D1.

Veg Condition: Good to Very Good.

Fire Age: +10 years.

WC10 Quadrat

WC10 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Bossiaea linophylla	2-10	2.1
Macrozamia riedlei	2-10	1.5
Pteridium esculentum	2-10	0.9
Leucopogon verticillatus	2-10	0.8
Bossiaea ornata	2-10	0.5
**Briza maxima*	2-10	0.5
**Pinus* sp.	+	
Persoonia longifolia	+	
Leucopogon capitellatus	+	
Tetrahena laevis	+	
Austrostipa campylachne	+	
**Plantago lanceolata*	+	
**Hypochaeris glabra*	+	
Burchardia congesta	+	
Scaevola calliptera	+	
Liliaceae sp. (sterile)	+	

Hardenbergia comptoniana	+
Caesia micrantha	+
**Oxalis purpurea*	+
Opercularia hispidula	+
Clematis pubescens	+
Tetraria capillaris	+
Lomandra purpurea	+

Opportunistic:
Kennedia prostrata

Comments:

Very weedy along the road edge but core areas intact.

Site WC11

Location: Hawterville Road, Balingup **Type:** Quadrat
Date: 16/10/2013 **Described by:** VC **Seasonal Conditions:** Very good
MGA Zone: 50 **Easting:** 404633 mE **Northing:** 6263331 mN
Habitat: Midlsope; negligible slope and aspect.
Soil: Pale brown lateritic loam.
Vegetation: *Corymbia calophylla*, *Eucalyptus marginata* subsp. *marginata* Woodland over *Bossiaea linophylla* Open Tall Shrubland over an Open Shrubland of *Pteridium esculentum* over **Briza maxima* Very Open Grassland on brown sandy, lateritic loam.
Vegetation Complex: Mapped as Kirup KR.
Veg Condition: Good to Very Good.
Fire Age: ~5-10 years.

WC11 Quadrat.

WC11 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata subsp. *marginata*	10-30	10-30
Bossiaea linophylla	2-10	2.1
Pteridium esculentum	2-10	0.9
**Briza maxima*	2-10	0.5
Persoonia longifolia	+	
Tetraria octandra	+	
Austrostipa campylachne	+	
Hardenbergia comptoniana	+	
**Hypochaeris glabra*	+	
**Oxalis purpurea*	+	
Scaevola calliptera	+	
**Orobanche minor*	+	
Opercularia hispidula	+	
Thysanotus sp. (climbing/sterile)	+	
**Plantago lanceolata*	+	
Clematis pubescens	+	
Caesia micrantha	+	
Lomandra ?sericea	+	

Comments:
Previously degraded or cleared with many grassy weeds and loss of diversity in the understorey.

Site WC12

Location: Cirillo Road; adjacent to blue gum plantation, Mullalyup **Type:** Relevé

Date: 16/10/2013 **Described by:** VC **Seasonal Conditions:** Very Good

MGA Zone: 50 **Easting:** 401972 mE **Northing:** 6265734 mN

Habitat: Midslope; negligible slope and aspect.

Soil: Pale brown lateritic loam.

Vegetation: *Corymbia calophylla* and *Eucalyptus marginata subsp. marginata* Woodland over a *Xanthorrhoea preissii* Open Shrubland over *a Phyllanthus calycinus* Open Low Shrubland over a **Briza maxima* Very Open Grassland on pale brown lateritic loam.

Vegetation Complex: Mapped as Kirup KR.

Veg Condition: Good to Degraded.

Fire Age: <5 years.

WC12 Quadrat

WC12 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata	10-30	10-30
Phyllanthus calycinus	2-10	>1
Xanthorrhoea preissii	2-10	>1
**Briza maxima*	2-10	0.4
Banksia dallanneyi	+	
Kennedia prostrata	+	
Trichocline spathulata	+	
Hypocalymma angustifolia	+	
Macrozamia riedlei	+	
Hibbertia amplexicaulis	+	
Acacia pulchella	+	
Labichea punctata	+	
Hakea amplexicaulis	+	
**Briza minor*	+	
**Ehrharta calycina*	+	
Lagenophora huegelii	+	
**Hypochaeris glabra*	+	

Scaevola calliptera	+
Chamaescilla corymbosa var. *corymbosa*	+
Dampiera linearis	+
**Watsonia* sp. (sterile)	+
Desmocladus fascicularis	+

Comments:
Frequently burnt; resultant loss in understorey diversity. Weeds are increasing, particularly grassy weeds. Regrowth/regenerating marri.

Site WC13

Location: Cirillo Rd Mullalyup **Type:** Quadrat
Date: 16/10/2013 **Described by:** VC **Seasonal Conditions:** Very Good
MGA Zone: 50 **Easting:** 400750mE **Northing:** 6266361 mN
Habitat: Midslope; negligible slope and aspect.
Soil: Pale brown lateritic loam.
Vegetation: *Corymbia calophylla* and *Eucalyptus marginata subsp. marginata* Woodland over a **Acacia ?pycnantha* Low Open Woodland over *a Mirbelia dilatata* and *Podocarpus drouynianus* Open Low Shrubland over a *Pteridium esculentum* Open Shrubland over a *Patersonia umbrosa* var. *xanthina* and *Hibbertia hypericoides* Open Low Shrubland on pale brown lateritic loam.
Vegetation Complex: Mapped as Kirup KR.
Veg Condition: Good to Very Good.
Fire Age: ~10 years.

WC13 Quadrat

WC13 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata subsp. *marginata*	10-30	10-30
**Acacia pycnantha*	2-10	>10
Mirbelia dilatata	2-10	>2
Podocarpus drouynianus	2-10	>2
Pteridium esculentum	2-10	1-2
Patersonia umbrosa var. *xanthina*	2-10	>1
Hibbertia hypericoides	2-10	>1
Hovea trisperma	+	
Xanthorrhoea gracilis	+	
Acacia extensa	+	
Hypocalymma angustifolia	+	
Mirbelia dilatata	+	
Hakea lissocarpha	+	
Leschenaultia biloba	+	
Hovea chorizemifolia	+	
Leucopogon verticillatus	+	

Hovea chorizemifolia	+
Leucopogon sp. (sterile)	+
Boronia fastigiata	+
**Briza maxima*	+
**Aira caryophyllea*	+
Tetrahena laevis	+
Austrostipa campylachne	+
**Hypochaeris glabra*	+
Scaevola calliptera	+
Dampiera linearis	+
Burchardia congesta	+
Lagenophora huegelii	+
Trichocline spathulata	+
Lomandra ?sericea	+
Lomandra preissii	+
Tetraria octandra	+
Lomandra hermaphrodita	+
Lomandra purpurea	+

Comments:
Previous logging and fire has reduced diversity; weeds are encroaching from tracks.

Site WC14

Location: Adjacent to tank site on track from Cirillo Road towards Cundinup Road, Kirup **Type:** Quadrat

Date: 17/10/2013 **Described by:** VC **Seasonal Conditions:** Very Good

MGA Zone: 50 **Easting:** 399579mE **Northing:** 6266798 mN

Habitat: Upperslope; negligible slope and aspect.

Soil: Pale brown loam.

Vegetation: *Corymbia calophylla* and *Eucalyptus marginata subsp. marginata* Woodland over an *Acacia extensa* and Agonis parviceps Open Shrubland over *a Xanthorrhoea gracilis, Patersonia umbrosa var. xanthina and Hibbertia hypericoides* Low Shrubland over a *Pteridium esculentum* Open Shrubland over a *Patersonia umbrosa* var. *xanthina* and *Hibbertia hypericoides* Open Low Shrubland on pale brown loam.

Vegetation Complex: Mapped as Kirup KR.

Veg Condition: Good.

Fire Age: <10 years.

WC14 Quadrat

WC14 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata subsp. *marginata*	2-10	10-30
Acacia extensa	2-10	>2
Agonis parviceps	2-10	>2
Xanthorrhoea gracilis	2-10	1-2
Patersonia umbrosa var. *xanthina*	10-30	>1
Hibbertia hypericoides	2-10	>1
Banksia dallanneyi	2-10	>1
Burchardia congesta	+	
Acacia pulchella	+	
Lagenophora huegelii	+	
Opercularia echinocephala	+	
Tetraria octandra	+	
Leschenaultia biloba	+	
Desmocladus fascicularis	+	
Hibbertia pilosa	+	

Hakea amplexicaulis	+
Logania serpyllifolia	+
?Amphipogon turbinatus	+
Orchidaceae sp. (sterile)	+
Stylidium schoenoides	+
Caladenia flava subsp. flava	+
Hypocalymma robustum	+
Stylidium sp.	+
Macrozamia riedlei	+
Lomandra ?sericea	+
Leucopogon nutans	+
Labichea punctata	+
Comesperma confertum	+
Drosera erythrorhiza	+
Scaevola calliptera	+
Platysace compressa	+

Opportunistic collections in vicinity:
Podocarpus drouynianus
Johnsonia lupulina
Hovea trisperma

Comments:
Appears that frequent fires have reduced diversity of flora. Overstorey still regenerating.

Site WC15

Location: Tank site; track from Castle Street towards Kirup Dam, Kirup **Type:** Quadrat

Date: 17/10/2013 **Described by:** VC **Seasonal Conditions:** Very Good

MGA Zone: 50 **Easting:** 396609mE **Northing:** 6269911 mN

Habitat: Upperslope; negligible slope and aspect.

Soil: Pale brown lateritic loam.

Vegetation: *Corymbia calophylla* and *Eucalyptus marginata subsp. marginata* Woodland over a *Hakea amplexicaulis* Open Tall Shrubland over *a Bossiaea linophylla* Open Shrubland over a *Hibbertia hypericoides and Podocarpus drouynianus* Open Low Heath over a *Patersonia umbrosa* var. *xanthina* Very Open Herbland on pale brown lateritic loam.

Vegetation Complex: Mapped as Hester HR.

Veg Condition: Good to Very Good.

Fire Age: ~10 years.

WC15 Quadrat

WC15 Species List

Name	% Cover	Height (m)
Corymbia calophylla	10-30	10-30
Eucalyptus marginata subsp. marginata	10-30	10-30
Hakea amplexicaulis	2-10	>2
Bossiaea linophylla	2-10	1-2
Hibbertia hypericoides	30-70	>1
Podocarpus drouynianus	30-70	>1
Patersonia umbrosa var. *xanthina*	2-10	>1
Acacia pulchella	+	
Bossiaea ornata	+	
Hakea lissocarpha	+	
Hovea chorizemifolia	+	
Phyllanthus calycinus	+	
Leucopogon propinquus	+	
Labichea punctata	+	
Xanthorrhoea gracilis	+	
Macrozamia riedlei	+	
Tetrahaena laevis	+	
Platysace compressa	+	

Pterostylis recurva	+
Pteridium esculentum	+
Drosera erythrorhiza	+
Lagenophora huegelii	+
Cassytha glabella	+
Opercularia echinocephala	+
Burchardia congesta	+
Scaevola calliptera	+
Thelymitra sp. (immature)	+
Stylidium schoenoides	+
Clematis pubescens	+
Sollya heterophylla	+
Tetraria capillaris	+
Lomandra hermaphrodita	+
Desmocladus fascicularis	+
Lomandra purpurea	+
Lomandra nigricans	+

Opportunistic collections in vicinity:
Acacia alata
Tremandra stelligera

Comments:
Evidence of logging and frequent fire; resultant loss of understorey diversity; low weeds.

Appendix F: Vascular Flora Species List

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Plant family	Species
Apiaceae	*Daucus glochidiatus*
	Pentapeltis peltigera
	Platysace compressa
	Trachymene pilosa
	Xanthosia candida
Asparagaceae	**Asparagus asparagoides*
	Chamaescilla corymbosa var. *corymbosa*
	Laxmannia squarrosa
	Lomandra ?sericea
	Lomandra hermaphrodita
	Lomandra nigricans
	Lomandra preissii
	Lomandra purpurea
	Lomandra sericea
	Lomandra sp. (sterile)
	Sowerbaea laxiflora
	Thysanotus manglesianus
	Thysanotus multiflorus
	Thysanotus sp. (climbing/sterile)
Asteraceae	**Hypochaeris glabra*
	**Ursinia anthemioides*
	Craspedia variabilis
	Hyalosperma cotula
	Lagenophora huegelii
	Senecio multicaulis subsp. *multicaulis*
	Trichocline spathulata
	Waitzia acuminata
Campanulaceae	*Lobelia heterophylla*
Casuarinaceae	*Allocasuarina fraseriana*
Celastraceae	*Tripterococcus brunonis*
Colchidaceae	*Burchardia congesta*
Cyperaceae	*Chorizanda enodis*
	Gahnia aristata
	Lepidopserma ?*pubisquameum*
	Lepidosperma sp.
	Lepidosperma sp. (sterile)
	Tetraria ?sp. Jarrah Forest (R. Davis 7391) (sterile)
	Tetraria capillaris
	Tetraria octandra
Dennstaedtiaceae	*Pteridium esculentum*
Dillenaceae	*Hibbertia amplexicaulis*
	Hibbertia hypericoides
	Hibbertia pilosa
	Hibbertia sp. (sterile)

Droseraceae	*Drosera ?erythrorhiza*
	Drosera erythrorhiza
	Drosera glanduligera
	Drosera pallida
	Drosera sp. (climber/sterile)
Elaeocarpaceae	*Platytheca gallioides*
	Tetratheca affinis
	Tetratheca setigera
	Tremandra stelligera
Ericaceae	*Andersonia caerulea*
	Astroloma pallida
	Leucopogon ?capitellatus
	Leucopogon capitellatus
	Leucopogon nutans
	Leucopogon propinquus
	Leucopogon sp. (sterile)
	Leucopogon verticellatus
Euphorbiaceae	*Monotaxis occidentalis*
Fabaceae	**Acacia baileyana*
	**Acacia longifolia* subsp. *longifolia*
	**Acacia podalyriifolia*
	**Acacia pycnantha*
	**Acacia saligna*
	**Trifolium hirtum*
	Acacia alata
	Acacia applanata
	Acacia extensa
	Acacia pulchella
	Acacia urophylla
	Acacia varia var. *varia*
	Bossiaea eriocarpa
	Bossiaea linearifolia
	Bossiaea linophylla
	Bossiaea ornata
	Comesperma ciliatum
	Comesperma confertum
	Daviesia decurrens
	Gastrolbium bilobum
	Gompholobium marginatum
	Gompholobium ovatum
	Hardenbergia comptoniana
	Hovea chorizemifolia
	Hovea trisperma
	Jacksonia alata
	Kennedia prostrata
	Labichea punctata
	Mirbelia diltata
	Sphaerolobium medium
Goodeniaceae	*Dampiera alata*
	Dampiera linearis
	Leschenaulita biloba

	Scaevola calliptera
Haemodoraceae	*Anigozanthos manglesii*
	Conostylis aculeata subsp. *aculeata*
	Conostylis setigera
	Haemodorum simplex
	Haemodorum sp. (sterile)
Hemerocallidaceae	*Agrostocrinum stypandroides*
	Caesia micrantha
	Dianella revoluta
	Johnsonia lupalina
Iridaceae	**Freesia* sp.
	**Romulea rosea*
	**Sparaxis pillansii*
	**Watsonia marginata*
	**Watsonia* sp. (sterile)
	Patersonia babianoides
	Patersonia occidentalis
	Patersonia pygmaea
	Patersonia umbrosa var. *xanthina*
Lamiaceae	*Hemigenia incana*
Lauraceae	*Cassytha glabella*
Loganiaceae	*Logania serpyllifolia* subsp. *angustifolia*
	Logania serpyllifolia subsp. *serpyllifolia*
Malvaceae	*Thomasia grandiflora*
Myrtaceae	*Agonis parviceps*
	Astartea sp . (sterile)
	Corymbia calophylla
	Eucalyptus marginata subsp. *marginata*
	Eucalyptus patens
	Eucalyptus rudis
	Hypocalymma angustifolia
	Hypocalymma robustum
	Melaleuca preissiana
	Pericalymma ellipticum
	Taxandria linearifolia
Orchidaceae	**Disa bracteata*
	Caladenia ?ferruginea (atypical colouring)
	Caladenia attingens subsp. *attingens*
	Caladenia flava subsp. *flava*
	Caladenia latifolia
	Caladenia macrostylis
	Caladenia sp. (immature)
	Caladenia sp. (sterile)
	Diuris longifolia
	Elythranthreya brunonis
	Lyperanthus serratus
	Orchidaceae sp. (sterile)
	Pterostylis pyramidalis

	Pterostylis recurva
	Pyrorchis nigricans
	Thelymitra ?canaliculata
	Thelymitra flexuosa
	Thelymitra sp (immature)
Orobanchaceae	**Orobanche minor*
Oxalidaceae	**Oxalis purpurea*
Phyllanthaceae	*Phyllanthus calycinus*
Phyllanthaceae	*Poranthera huegelii*
Pinaceae	**Pinus pinaster/radiata*
Pittosporaceae	*Billardiera variifolia*
Pittosporaceae	*Sollya heterophylla*
Plantaginaceae	**Plantago lanceolata*
Poaceae	**Aira caryophyllea*
	**Avena fatua*
	**Briza maxima*
	**Briza minor*
	**Cenchrus clandestinus*
	**Ehrharta calycina*
	Amphipogon amphipogonoides
	Austrostipa campylachne
	Neurachne alopecuroidea
	Tetrahaena laevis
Podocarpaceae	*Podocarpus drouynianus*
Portulacaceae	*Rubus ulmifolius*
Primulaceae	**Anagalis arvensis*
Proteaceae	*Banksia dallanneyi*
	Banksia grandis
	Banksia nivea
	Banksia nivea
	Grevillea manglesii subsp. *manglesii*
	Grevillea quercifolia
	Grevillea sp. (sterile)
	Hakea amplexicaulis
	Hakea lissocarpha
	Persoonia longifolia
	Synaphea gracillima (leaf apex atipical)
	Xylomelum occidentalis
Ranunculaceae	*Clematis pubescens*
Restionaceae	*Desmocladus fasicularis*
	Hypolaena exsulca
	Meeboldina scariosa

Rhamnaceae	*Trymalium odoratissimum* subsp. *trifidum*
Rubiaceae	**Rubus ulmifolius* *Opercularia echinocephala* *Opercularia hispidula*
Rutaceae	*Boronia fastigiata* *Philotheca spicatus*
Salicaceae	**Salix babylonica*
Stylidiaceae	*Levenhookia pusilla* *Stylidium amoenum* *Stylidium calcaratum* *Stylidium junceum* *Stylidium piluliferum* *Stylidium scandens* (range extension) *Stylidium schoenioides* *Stylidium* sp.
Thymeliaceae	*Pimelea ciliata* subsp. *ciliata* *Pimelea suaveolens* subsp. *suaveolens*
Violaceae	*Hybanthus calycinus*
Xanthorrhoeaceae	*Xanthorrhoea gracilis* *Xanthorrhoea preissii*
Zamiaceae	*Macrozamia riedlei*

** denotes weed taxa*

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Appendix G: Vertebrate Fauna List

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Table G.1: Vertebrate fauna species recorded in the region and during the current survey.

Amphibians

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected Matters Search	Recorded During Current Survey
			EPBC Act	WC Act	DPaW			
Hylidae								
Litoria adelaidensis	Slender Tree Frog					x		
Litoria moorei	Motorbike Frog					x		
Limnodynastidae								
Heleioporus eyrei	Moaning Frog					x		x
Limnodynastes dorsalis	Western Banjo Frog					x		
Myobatrachidae								
Crinia georgiana	Quacking Frog					x		x
Crinia glauerti	Clicking Frog					x		x
Crinia pseudinsignifera	Bleating Froglet					x		
Geocrinia leai	Ticking Frog					x		
Pseudophryne guentheri	Crawling Toadlet					x		

Reptiles

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected Matters Search	Recorded During Current Survey
			EPBC Act	WC Act	DPaW			
Cheluidae								
Chelodina oblonga	Oblong Turtle					x		
Agamidae								
Pogona minor minor	Dwarf Bearded Dragon					x		
Gekkonidae								
Christinus marmoratus	Marbled Gecko					x		
Pygopodidae								
Aprasia pulchella						x		
Scincidae								
Ctenotus delli					P4	x		
Ctenotus labillardieri						x		
Egernia napoleonis						x		
Hemiergis initialis initialis						x		
Hemiergis peronii peronii						x		
Hemiergis peronii tridactyla						x		
Lerista distinguenda						x		
Menetia greyii						x		
Morethia lineoocellata						x		
Morethia obscura						x		
Tiliqua rugosa palarra						x		
Tiliqua rugosa rugosa						x		
Varanidae								
Varanus rosenbergi	Heath Monitor					x		
Typhlopidae								
Ramphotyphlops australis						x		
Boidae								

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Recorded
Morelia spilota imbricata	Carpet Python			S4		x		
Elapidae								
Notechis scutatus	Tiger Snake					x		
Pseudonaja affinis	Dugite					x		
Simoselaps bertholdi	Jan's Banded Snake					x		

Birds

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected Matters Search	Birdata	Recorded During Current Survey
			EPBC Act	WC Act	DPaW				
Casuariidae									
Dromaius novaehollandiae	Emu					x		x	x
Megapodiidae									
Leipoa ocellata	Malleefowl		VU	S1			x		
Phasianidae									
Coturnix pectoralis	Stubble Quail							x	
Anatidae									
Biziura lobata	Musk Duck					x		x	
Stictonetta naevosa	Freckled Duck					x			
Cygnus atratus	Black Swan					x		x	
Tadorna tadornoides	Australian Shelduck					x		x	x
Chenonetta jubata	Australian Wood Duck					x		x	
Malacorhynchus membranaceus	Pink-eared Duck							x	
Anas rhynchotis	Australasian Shoveler					x		x	
Anas gracilis	Grey Teal					x		x	
Anas castanea	Chestnut Teal							x	
Anas platyrhynchos	Northern Mallard	x				x	x	x	
Anas superciliosa	Pacific Black Duck					x		x	x
Aythya australis	Hardhead					x		x	
Oxyura australis	Blue-billed Duck					x		x	
Podicipedidae									
Tachybaptus novaehollandiae	Australasian Grebe					x		x	
Poliocephalus poliocephalus	Hoary-headed Grebe					x		x	
Podiceps cristatus	Great Crested Grebe					x		x	
Columbidae									
Columba livia	Rock Dove	x					x		
Streptopelia senegalensis	Laughing Dove	x				x	x	x	

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Streptopelia chinensis	Spotted Dove	x					x		
Phaps chalcoptera	Common Bronzewing					x		x	x
Phaps elegans	Brush Bronzewing							x	
Ocyphaps lophotes	Crested Pigeon					x		x	
Podargidae									
Podargus strigoides	Tawny Frogmouth					x		x	
Aegothelidae									
Aegotheles cristatus	Australian Owlet-nightjar					x		x	
Apodidae									
Apus pacificus	Fork-tailed Swift		Mi	S3			x		
Anhingidae									
Anhinga novaehollandiae	Australasian Darter							x	
Phalacrocoracidae									
Microcarbo melanoleucos	Little Pied Cormorant					x		x	
Phalacrocorax carbo	Great Cormorant					x		x	
Phalacrocorax sulcirostris	Little Black Cormorant					x		x	
Phalacrocorax varius	Pied Cormorant					x		x	
Pelecanidae									
Pelecanus conspicillatus	Australian Pelican					x		x	
Ardeidae									
Botaurus poiciloptilus	Australasian Bittern		EN	S1				x	
Ixobrychus flavicollis australis	Australian Black Bittern				P3	x			
Ardea pacifica	White-necked Heron					x		x	
Ardea modesta	Great Egret		Mi	S3			x	x	x
Ardea ibis	Cattle Egret		Mi	S3			x		
Egretta novaehollandiae	White-faced Heron							x	x
Nycticorax caledonicus	Nankeen Night-Heron							x	x
Threskiornithidae									
Threskiornis molucca	Australian White Ibis					x		x	
Threskiornis spinicollis	Straw-necked Ibis					x		x	
Platalea regia	Royal Spoonbill							x	

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Platalea flavipes	Yellow-billed Spoonbill					x		x	
Accipitridae									
Elanus axillaris	Black-shouldered Kite					x		x	
Haliaeetus leucogaster	White-bellied Sea-Eagle		Mi	S3		x	x		
Haliastur sphenurus	Whistling Kite					x		x	
Accipiter fasciatus	Brown Goshawk					x		x	
Accipiter cirrocephalus	Collared Sparrowhawk					x		x	
Circus assimilis	Spotted Harrier					x			
Circus approximans	Swamp Harrier					x		x	
Aquila audax	Wedge-tailed Eagle					x		x	
Hieraaetus morphnoides	Little Eagle							x	
Falconidae									
Falco cenchroides	Nankeen Kestrel					x		x	
Falco berigora	Brown Falcon					x		x	
Falco longipennis	Australian Hobby					x		x	
Falco peregrinus	Peregrine Falcon			S4		x		x	
Rallidae									
Porphyrio porphyrio	Purple Swamphen					x		x	x
Lewinia pectoralis	Lewin's Rail					x			
Gallirallus philippensis	Buff-banded Rail					x			
Porzana tabuensis	Spotless Crake					x		x	
Tribonyx ventralis	Black-tailed Native-hen							x	
Gallinula tenebrosa	Dusky Moorhen					x		x	
Fulica atra	Eurasian Coot					x		x	
Turnicidae									
Turnix varius	Painted Button-quail					x		x	
Turnix velox	Little Button-quail					x		x	
Cacatuidae									
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo		VU	S1		x	x	x	x
Calyptorhynchus latirostris	Carnaby's Black-Cockatoo		EN	S1		x	x	x	

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Calyptorhynchus baudinii	Baudin's Black-Cockatoo		VU	S1		x	x	x	x
Eolophus roseicapillus	Galah							x	x
Cacatua pastinator	Western Corella							x	
Cacatua pastinator pastinator	Muir's Corella (southern)		VU	S1			x		
Psittacidae									
Glossopsitta porphyrocephala	Purple-crowned Lorikeet					x		x	
Polytelis anthopeplus	Regent Parrot					x		x	
Platycercus icterotis	Western Rosella					x		x	
Barnardius zonarius	Australian Ringneck					x		x	x
Purpureicephalus spurius	Red-capped Parrot					x		x	
Psephotus varius	Mulga Parrot							x	
Neophema elegans	Elegant Parrot					x		x	
Cuculidae									
Chalcites basalis	Horsfield's Bronze-Cuckoo							x	
Chalcites lucidus	Shining Bronze-Cuckoo					x		x	
Cacomantis pallidus	Pallid Cuckoo					x		x	
Cacomantis flabelliformis	Fan-tailed Cuckoo					x		x	
Strigidae									
Ninox novaeseelandiae	Southern Boobook					x		x	
Tytonidae									
Tyto novaehollandiae novaehollandiae	Masked Owl (southern)				P3	x		x	
Tyto javanica	Eastern Barn Owl					x		x	
Halcyonidae									
Dacelo novaeguineae	Laughing Kookaburra					x		x	x
Todiramphus sanctus	Sacred Kingfisher					x		x	
Meropidae									
Merops ornatus	Rainbow Bee-eater		Mi	S3			x	x	
Atrichornithidae									
Atrichornis clamosus	Noisy Scrub-bird		VU	S1				x	
Climacteridae									

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Climacteris rufa	Rufous Treecreeper							x	
Maluridae									
Malurus splendens	Splendid Fairy-wren					x		x	x
Malurus leucopterus	White-winged Fairy-wren							x	
Malurus elegans	Red-winged Fairy-wren					x		x	
Acanthizidae									
Sericornis frontalis	White-browed Scrubwren					x		x	
Calamanthus campestris	Rufous Fieldwren							x	
Smicrornis brevirostris	Weebill					x		x	x
Gerygone fusca	Western Gerygone					x		x	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill					x		x	
Acanthiza uropygialis	Chestnut-rumped Thornbill							x	
Acanthiza inornata	Western Thornbill					x		x	
Acanthiza apicalis	Inland Thornbill					x		x	
Pardalotidae									
Pardalotus punctatus	Spotted Pardalote					x		x	
Pardalotus striatus	Striated Pardalote					x		x	
Pardalotus rubricatus	Red-browed Pardalote								x
Meliphagidae									
Acanthorhynchus superciliosus	Western Spinebill					x		x	x
Lichenostomus virescens	Singing Honeyeater							x	x
Lichenostomus leucotis	White-eared Honeyeater							x	
Lichenostomus ornatus	Yellow-plumed Honeyeater							x	
Manorina flavigula	Yellow-throated Miner							x	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater							x	
Anthochaera lunulata	Western Wattlebird					x		x	
Anthochaera carunculata	Red Wattlebird					x		x	x
Epthianura albifrons	White-fronted Chat					x		x	
Glyciphila melanops	Tawny-crowned Honeyeater							x	

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Lichmera indistincta	Brown Honeyeater					x			
Phylidonyris novaehollandiae	New Holland Honeyeater							x	
Phylidonyris niger	White-cheeked Honeyeater							x	
Melithreptus brevirostris	Brown-headed Honeyeater					x		x	
Melithreptus lunatus	White-naped Honeyeater					x		x	
Pomatostomidae									
Pomatostomus superciliosus	White-browed Babbler							x	
Neosittidae									
Daphoenositta chrysoptera	Varied Sittella					x		x	
Campephagidae									
Coracina maxima	Ground Cuckoo-shrike					x			
Coracina novaehollandiae	Black-faced Cuckoo-shrike					x		x	x
Lalage sueurii	White-winged Triller							x	
Pachycephalidae									
Falcunculus frontatus	Crested Shrike-tit							x	
Falcunculus frontatus leucogaster	Crested Shrike-tit (western)				P4	x			
Pachycephala pectoralis	Golden Whistler					x		x	x
Pachycephala rufiventris	Rufous Whistler					x		x	x
Colluricincla harmonica	Grey Shrike-thrush					x		x	
Artamidae									
Artamus cinereus	Black-faced Woodswallow					x		x	
Artamus cyanopterus	Dusky Woodswallow					x		x	
Cracticus torquatus	Grey Butcherbird					x		x	
Cracticus nigrogularis	Pied Butcherbird							x	
Cracticus tibicen	Australian Magpie					x		x	x
Strepera versicolor	Grey Currawong					x		x	
Rhipiduridae									
Rhipidura albiscapa	Grey Fantail					x		x	x

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Rhipidura leucophrys	Willie Wagtail					x		x	x
Corvidae									
Corvus coronoides	Australian Raven					x		x	x
Monarchidae									
Myiagra inquieta	Restless Flycatcher					x		x	
Grallina cyanoleuca	Magpie-lark					x		x	x
Petroicidae									
Microeca fascinans	Jacky Winter							x	
Petroica boodang	Scarlet Robin					x		x	x
Petroica goodenovii	Red-capped Robin					x		x	
Melanodryas cucullata	Hooded Robin					x		x	
Eopsaltria griseogularis	Western Yellow Robin							x	
Eopsaltria georgiana	White-breasted Robin					x		x	
Acrocephalidae									
Acrocephalus australis	Australian Reed-Warbler					x		x	
Megaluridae									
Megalurus gramineus	Little Grassbird							x	
Cincloramphus mathewsi	Rufous Songlark					x		x	
Cincloramphus cruralis	Brown Songlark							x	
Timaliidae									
Zosterops lateralis	Silvereye					x		x	
Hirundinidae									
Hirundo neoxena	Welcome Swallow					x		x	
Petrochelidon nigricans	Tree Martin					x		x	
Sturnidae									
Sturnus vulgaris	Common Starling	x					x		
Nectariniidae									
Dicaeum hirundinaceum	Mistletoebird							x	
Estrildidae									
Stagonopleura oculata	Red-eared Firetail					x		x	

Scientific Name	Common Name	Introduced	Conservation Codes			*NatureMap*	Protected	Birdata	Recorded
Passeridae									
Passer domesticus	House Sparrow	x					x		
Passer montanus	EurasianTree Sparrow	x					x		
Motacillidae									
Anthus novaeseelandiae	Australasian Pipit					x		x	

Mammals

Scientific Name	Common Name	Introduced	Conservation Codes			NatureMap	Protected Matters Search	Recorded During Current Survey
			EPBC Act	**WC Act**	**DPaW**			
Tachyglossidae								
Tachyglossus aculeatus	Short-beaked Echidna					x		
Dasyuridae								
Antechinus flavipes	Yellow-footed Antechinus					x		
Dasyurus geoffroii	Western Quoll, Chuditch		VU		S1	x	x	
Phascogale calura	Red-tailed Phascogale		EN		S1	x		
Phascogale tapoatafa tapoatafa	Southern Brush-tailed Phascogale, Wambenger				S1	x		
Sminthopsis gilberti	Gilbert's Dunnart					x		
Peramelidae								
Isoodon obesulus fusciventer	Southern Brown Bandicoot, Quenda				P5	x		x
Potoroidae								
Bettongia penicillata ogilbyi	Brush-tailed Bettong, Woylie		EN	S1		x	x	
Macropodidae								
Macropus fuliginosus	Western Grey Kangaroo					x		x
Macropus irma	Western Brush Wallaby				P4	x		
Setonix brachyurus	Quokka		VU	S1		x	x	
Phalangeridae								
Trichosurus vulpecula vulpecula	Common Brushtail Possum					x		
Pseudocheiridae								
Pseudocheirus occidentalis	Western Ringtail Possum		VU	S1		x	x	
Burramyidae								
Cercartetus concinnus	Western Pygmy-possum, Mundarda					x		
Vespertilionidae								
Chalinolobus gouldii	Gould's Wattled Bat					x		

Scientific Name	Common Name	Introduced	Conservation Codes			NatureMap	Protected	Recorded
Chalinolobus morio	Chocolate Wattled Bat					x		
Falsistrellus mackenziei	Western False Pipistrelle				P4	x		
Nyctophilus geoffroyi	Lesser Long-eared Bat					x		
Vespadelus regulus	Southern Forest Bat					x		
Molossidae								
Mormopterus planiceps	Southern Freetail-bat					x		
Tadarida australis	White-striped Freetail-bat					x		
Muridae								
Hydromys chrysogaster	Water-rat				P4	x		
Mus musculus	House Mouse	x				x	x	
Rattus fuscipes	Western Bush Rat					x		
Rattus rattus	Black Rat					x	x	
Leporidae								
Oryctolagus cuniculus	Rabbit	x				x	x	
Canidae								
Canis lupus familiaris	Dog	x					x	
Vulpes vulpes	Red Fox	x				x	x	x
Felidae								
Felis catus	Cat	x				x	x	
Suidae								
Sus scrofa	Pig	x				x	x	
Bovidae								
Bos taurus	European Cattle	x				x	x	
Capra hircus	Goat	x					x	
Cervidae								
Dama dama	Fallow Deer	x				x	x	

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Appendix H: Potential Habitat Trees and Significant Fauna Locations

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411800 412000 412200 412400

6255400 6255200 6255000 6254800 6254600

DUMPLING GULLY

KIRUP MULLALYUP BALINGUP GREEN

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

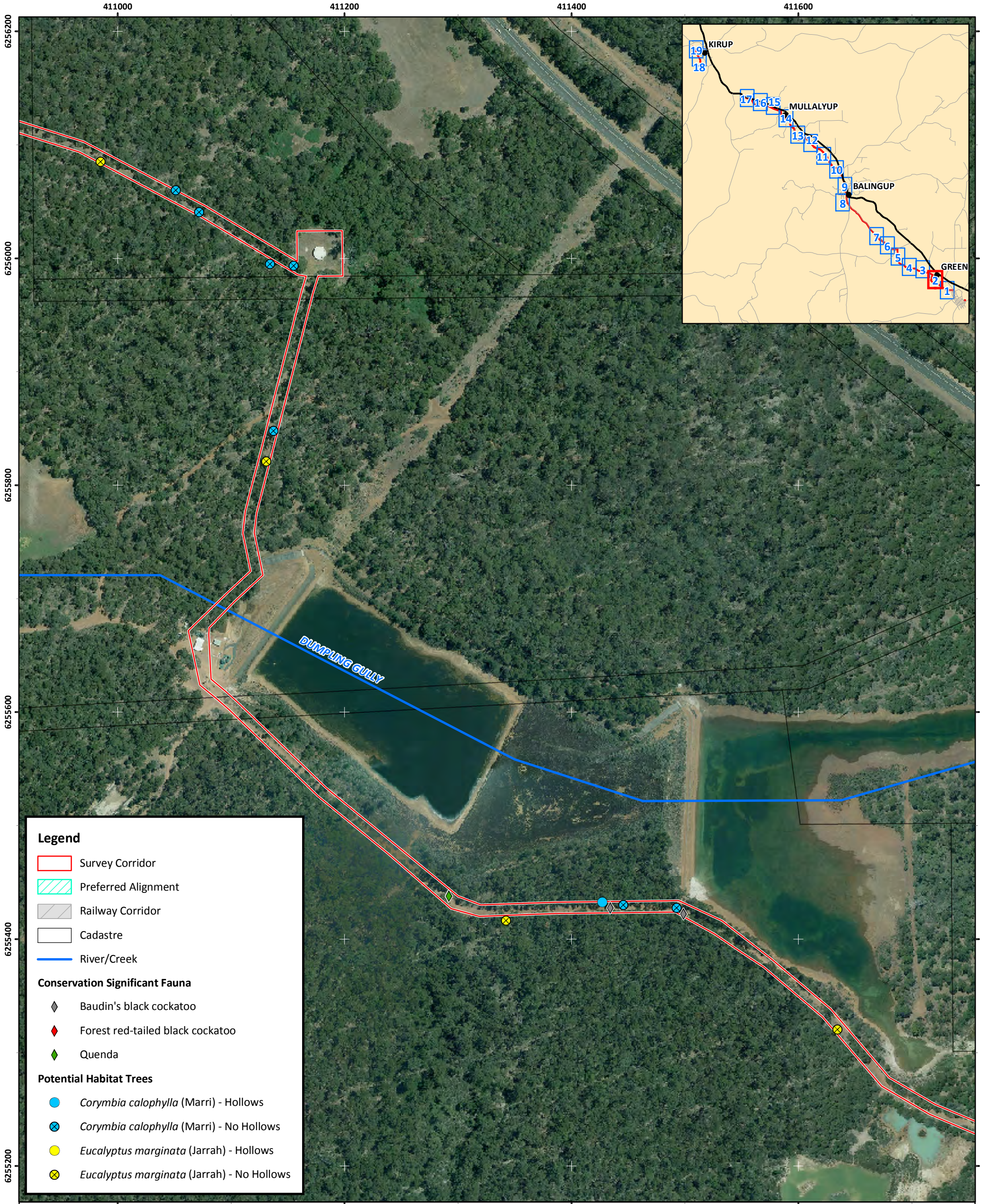
- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H1: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH01	0 25 50 100 150 200 Metres N



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H2: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH02	0 25 50 100 150 200 Metres N

410200 410400 410600 410800

6256800 6256600 6256400 6256200 6256000 6255800

SPRING CREEK

KIRUP MULLALYUP BALINGUP GREEN

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H3: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH03

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

409400 409600 409800 410000

6256800 6256600 6256400 6256200 6256000

KIRUP
MULLALYUP
BALINGUP
GREEN

SPRING CREEK

Legend

- Survey Corridor
- Preferred Alignment
- Cadastre
- Railway Corridor
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

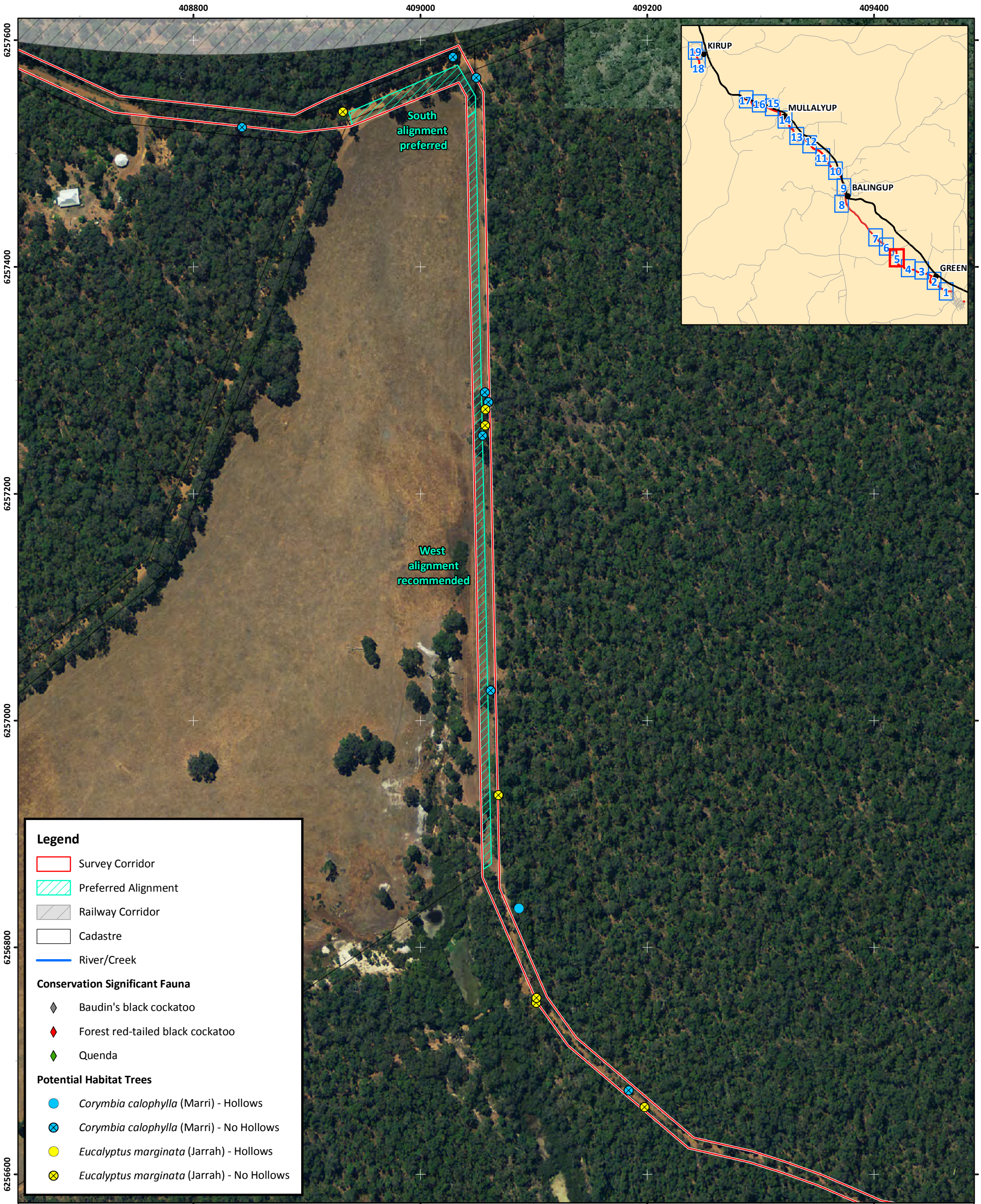
- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H4: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH04	0 25 50 100 150 200 Metres N



Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H5: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: H. Thornton	4175-13_GDR_1Rev0_140128 _FigH05	0 25 50 100 150 200 Metres N

408200 408400 408600 408800

6258200 6258000 6257800 6257600 6257400

KIRUP
MULLALYUP
BALINGUP
GREEN

North-east alignment preferred

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

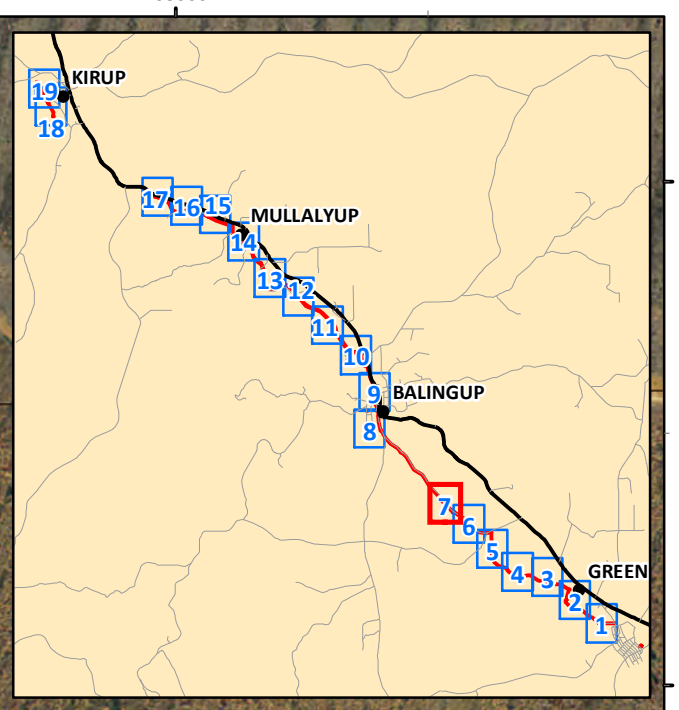
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H6: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH06	0 25 50 100 150 200 Metres N

407400 407600 407800 408000

6258800 6258600 6258400 6258200 6258000



Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H7: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH07

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N

405400 405600 405800 406000

6260800 6260600 6260400 6260200 6260000

KIRUP MULLALYUP BALINGUP GREEN

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H8: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_40128 _FigH08	0 25 50 100 150 200 Metres N

405600 405800 406000 406200

6261800 6261600 6261400 6261200 6261000

BALINGUP BROOK

No preferred alignment

Align east

KIRUP
MULLALYUP
BALINGUP
GREEN

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

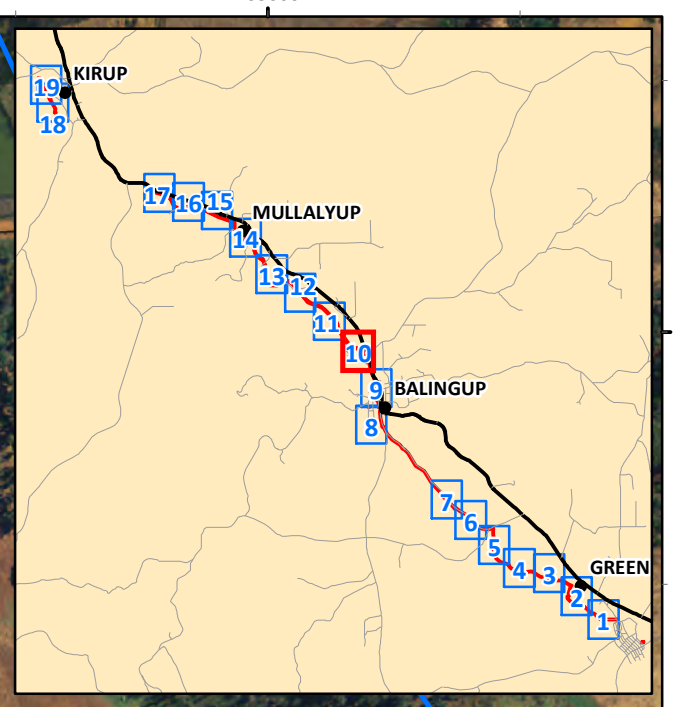
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H9: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH09	0 25 50 100 150 200 Metres N

405000 405200 405400 405600

6262800 6262600 6262400 6262200 6262000



Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

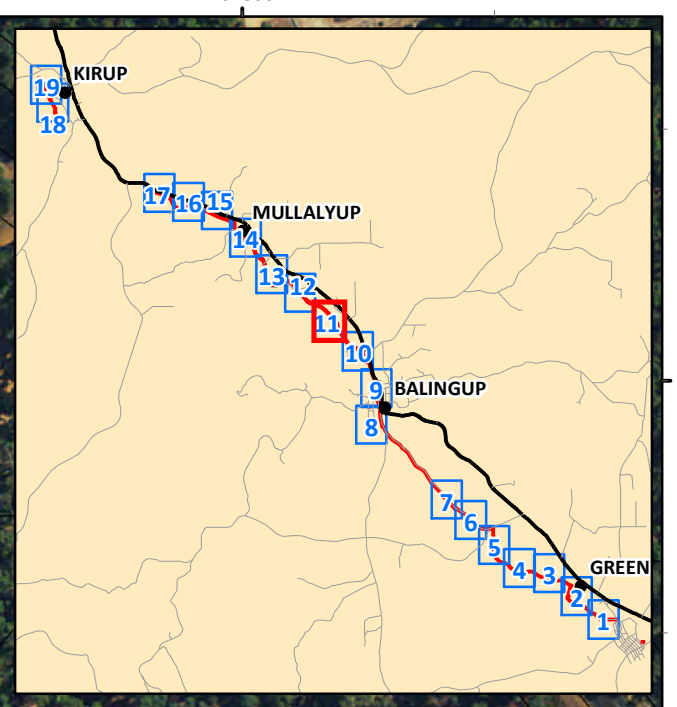
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H10: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH10	0 25 50 100 150 200 Metres N

404200 404400 404600 404800

6263600 6263400 6263200 6263000 6262800



Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H11: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH11	0 25 50 100 150 200 Metres N

403400 403600 403800 404000

6264400 6264200 6264000 6263800 6263600

KIRUP
MULLALYUP
BALINGUP
GREEN
19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Align south-west

Align north-east

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H12: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH12	0 25 50 100 150 200 Metres N

402600 402800 403000 403200

6265000 6264800 6264600 6264400 6264200 6264000

Align
north-east

KIRUP
MULLALYUP
BALINGUP
GREEN

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H13: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH13	0 25 50 100 150 200 Metres N

401800 402000 402200 402400 402600

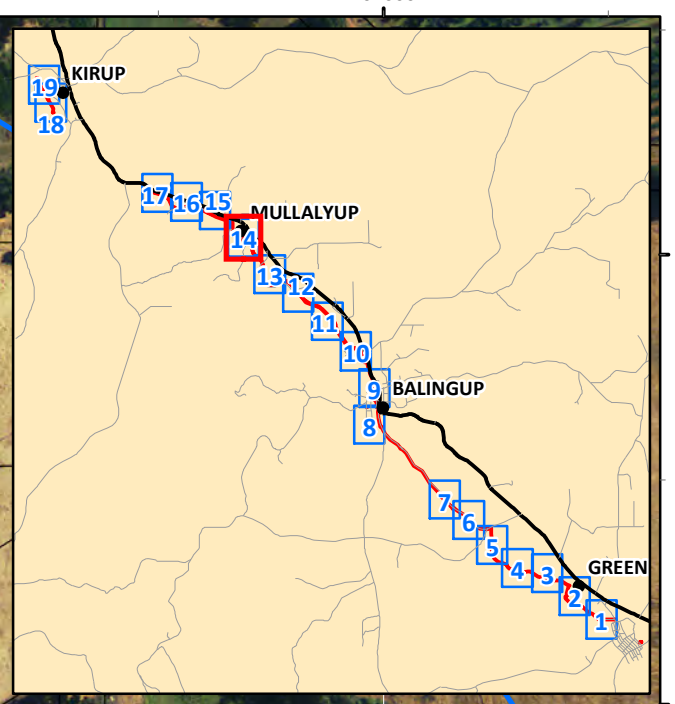
6266000 6265800 6265600 6265400 6265200 6265000

Southern alignment recommended

Align west

Align east

MULLALYUP BROOK



Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H14: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH14	0 25 50 100 150 200 Metres N

401200
401400
401600
401800
6266600
6266400
6266200
6266000
6265800
KIRUP
MULLALYUP
BALINGUP
GREEN
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
Southern alignment recommended
Legend
Survey Corridor
Preferred Alignment
Railway Corridor
Cadastre
River/Creek
Conservation Significant Fauna
Baudin's black cockatoo
Forest red-tailed black cockatoo
Quenda
Potential Habitat Trees
Corymbia calophylla (Marri) - Hollows
Corymbia calophylla (Marri) - No Hollows
Eucalyptus marginata (Jarrah) - Hollows
Eucalyptus marginata (Jarrah) - No Hollows

Water Corporation
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H15: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH15

Datum: GDA 1994
Projection: MGA Zone 50
0 25 50 100 150 200 Metres
N

400400 400600 400800 401000

6267000 6266800 6266600 6266400 6266200 6266000

Legend

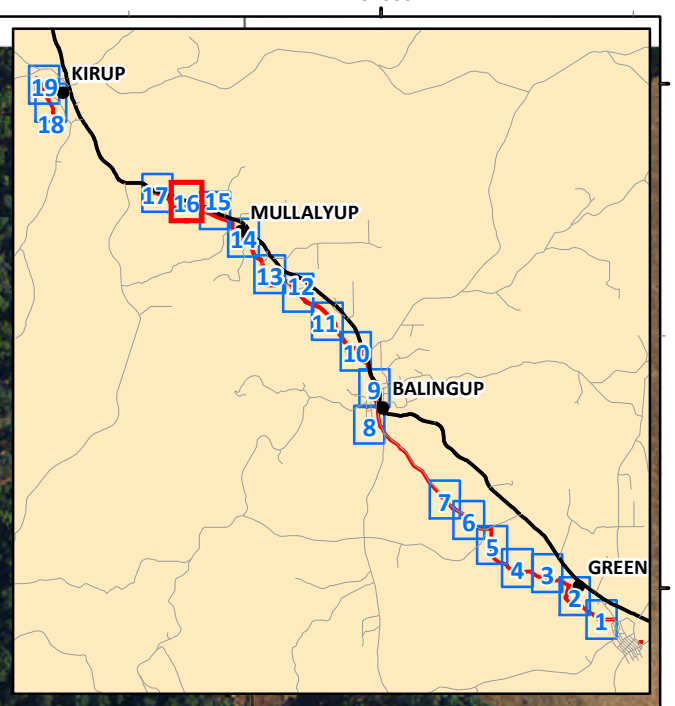
- Survey Corridor
- Preferred Alignment
- River/Creek
- Railway Corridor
- Cadastre

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows



MULLALYUP BROOK

Align north

Southern alignment recommended

Water Corporation

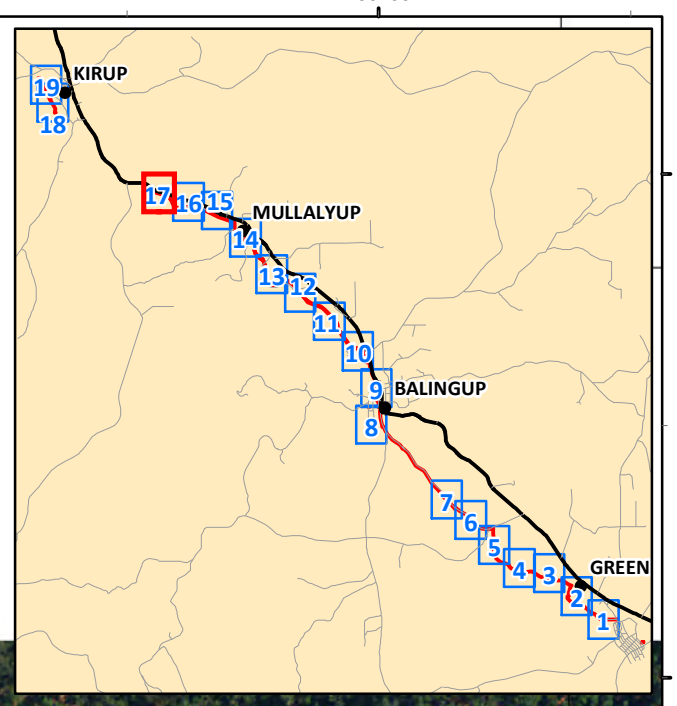
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H16: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128_FigH16	0 25 50 100 150 200 Metres N

399600 399800 400000 400200

6267200 6267000 6266800 6266600 6266400



Align north

MULLALYUP BROOK

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

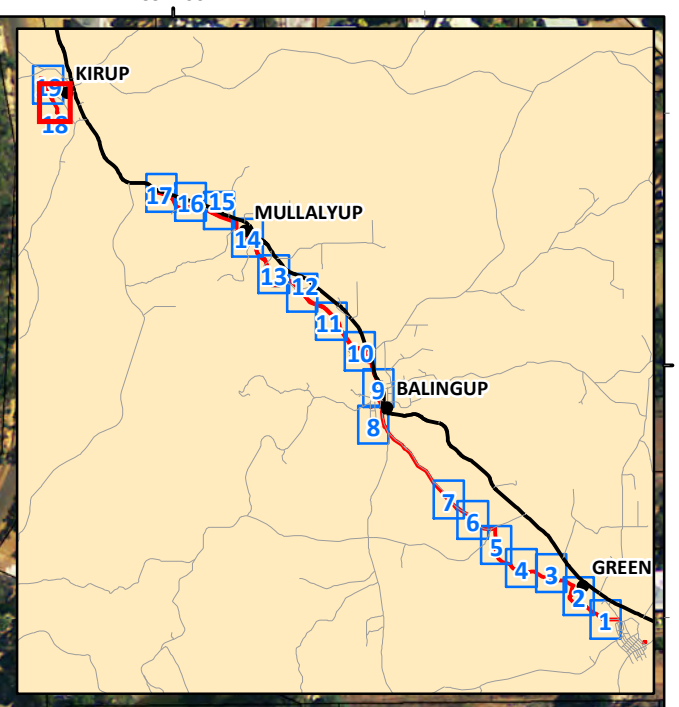
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H17: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH17	0 25 50 100 150 200 Metres N

396600 396800 397000 397200

6269600 6269400 6269200 6269000 6268800



MULLALYUP BROOK

Align south

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

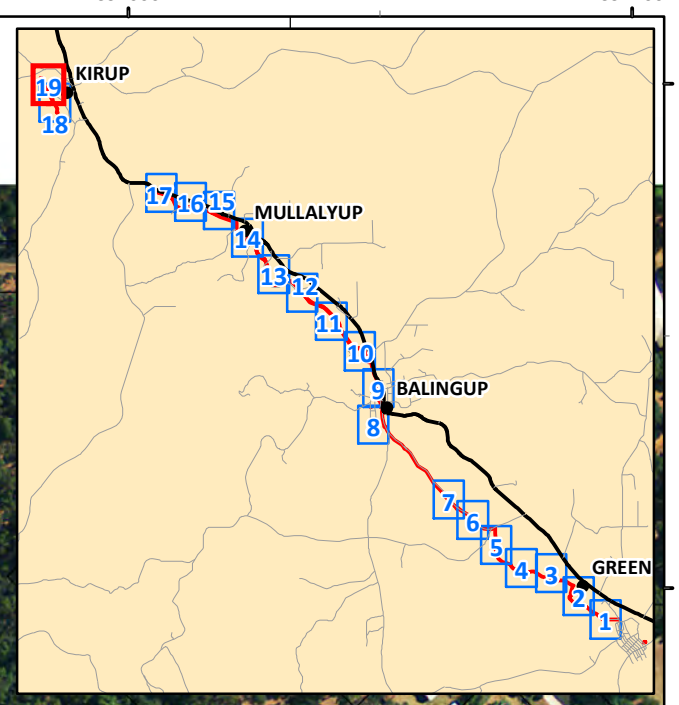
Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H18: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014	Datum: GDA 1994 Projection: MGA Zone 50
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH18	0 25 50 100 150 200 Metres N

396400 396600 396800 397000 397200

6270200 6270000 6269800 6269600 6269400 6269200



Align south-west

Legend

- Survey Corridor
- Preferred Alignment
- Railway Corridor
- Cadastre
- River/Creek

Conservation Significant Fauna

- Baudin's black cockatoo
- Forest red-tailed black cockatoo
- Quenda

Potential Habitat Trees

- *Corymbia calophylla* (Marri) - Hollows
- *Corymbia calophylla* (Marri) - No Hollows
- *Eucalyptus marginata* (Jarrah) - Hollows
- *Eucalyptus marginata* (Jarrah) - No Hollows

Water Corporation

Greenbushes to Kirup Pipeline Route – Vegetation, Flora and Fauna Assessment

Figure H19: Potential habitat trees and significant fauna locations with preferred alignment options

Author: V. Clarke	Date: 28-01-2014
Drawn: C. Smith	4175-13_GDR_1Rev0_140128 _FigH19

Datum: GDA 1994
Projection: MGA Zone 50

0 25 50 100 150 200 Metres

N