



**Kialla West  
Growth  
Corridor  
Ecological  
Assessment**

**April 2022**



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## Executive Summary

DM Ecological was engaged by Greater Shepparton City Council to develop an ecological assessment of the Kialla West Growth Corridor. The Ecological Assessment will be used to inform a future urban structure integrating access, drainage and open space considerations to guide the future development of the land.

In order to provide a context for the study area, information about flora and fauna from within 5 kilometres of the study area was obtained from relevant biodiversity databases, including those maintained by both the Victorian Government Department of Environment, Land, Water and Planning (DELWP) and the Australian Government Department of Agriculture, Water and the Environment (DAWE). Records from the following databases were collated and reviewed:

Flora and fauna assessments were undertaken within the study area where a list of species present was compiled. Particular attention was given to searching for significant species and their habitats. Of priority was identifying native vegetation as identified in the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning – DELWP, 2017) Identifying and mapping the extent of native vegetation assists in ensuring that any development is designed with the avoid, minimise, mitigate principle in mind.

The study area resides within the Victorian Riverina bioregion and modelled as containing Ecological Vegetation Classes (EVC) #803 – Plains Woodland and #56 – Floodplain Riparian Woodland. The desktop assessment returned records for 441 flora species and 353 fauna species within the buffered search area. The majority of the study area has been highly modified by extensive land clearing, cultivation, cropping and grazing. Native vegetation is predominantly limited to the outer extents of the study area, where it includes or adjoins the riparian areas of the Goulburn River and Seven Creeks. There are significant amounts of vegetation contained within road reserves throughout the study area. Some of the highest quality native vegetation was present in these areas. Native vegetation mapping completed in this assessment identified:

- 77.42ha of Floodplain Riparian Wetland;
- 3.64ha of Plains Woodland; and
- 321 Scattered Trees.

10 threatened species were assessed as having at least a medium likelihood of occurring within the study area. These were mainly amphibious, aquatic or hollow-dependant fauna. Although no further assessments are recommended at this point, they likely will be as any planning or designs infer impact on their potential habitat(s). It is worth noting that this report has intended to assess the ecological values of the study area in order to provide a guide to any future development of the area. As yet, there are no specific plans or designs on which to assess potential impacts on biodiversity. The data collected during this assessment and particularly; the mapped extent of native vegetation, should be used to inform planning and design of infrastructure (roads, utilities etc.), residential lots, green space and recreational areas etc to ensure impact is minimised or avoided wherever possible.

# 1 Introduction

## 1.1 Project background

DM Ecological was engaged by Greater Shepparton City Council to develop an ecological assessment of the Kialla West Growth Corridor (Figure 1). The Ecological Assessment will be used to inform a future urban structure integrating access, drainage and open space considerations to guide the future development of the land.

## 1.2 Scope of assessment

The scope of the works will include the following:

- inception meeting with Council officers to be held via video conference;
- undertake a desktop assessment of flora and possible fauna species present;
- undertake a site visit in late spring of 2021 to be accompanied by a Council officer to understand the land, review native roadside vegetation, and to conduct isolated site visits on private property identified as being of significance in the desktop assessment phase;
- prepare a draft plan and report including:
  - species identified during the assessment including their extent, condition, ecological vegetation class, environmental value, significance and bioregional conservation status;
  - recommendations for any further works or investigations, such as targeted species surveys or the like;
  - maps detailing ecological features, significant species habitat or communities, tree protection zones for mature trees, etc; and
- provide recommendations regarding any other relevant ecological considerations for the site.

Council officers will use the results of the Ecological Assessment and other reports to inform the road network structure, open space and stormwater drainage infrastructure within the Kialla West Growth Corridor.

## 1.3 Location of study area

The study area is one of six residential investigation areas which are identified in the Greater Shepparton Planning Scheme via amendment C93 – namely Investigation Area 2. The Shepparton and Mooroopna 2050 Regional City Growth Plan identified Investigation Area 2 as the Kialla West Growth Corridor. It is designated as a medium-term growth corridor to be undertaken in the next 5-10 years as a low-density residential estate. The Growth Corridor will consider standard residential density if flooding, access, bushfire and servicing constraints can be resolved. The study area is located in Kialla West, south of Shepparton in Victoria (Figure 1). It is confined by Bennets Rd to the south, Seven Creeks and Goulburn Valley Highway to the east, largely confined to Raftery Rd in the west and aligns with an existing property boundary to the north. The study area comprises over 40 existing lots and encompasses the following overlays:

- Rural Living Zone (RLZ);
- Schedule to the Rural Living Zone (RLZ);
- Urban Floodway Zone (UFZ);
- Schedule to the Urban Floodway Zone (UFZ);
- Public Use Zone – Service and Utility (PUZ1); and
- Schedule to the Public Use Zone (PUZ).

The land is freehold land that has been historically used for agriculture, as evidenced by vegetation clearing and some laser graded bays and associated irrigation infrastructure. (Figure 1). There appears to be planted vegetation present as well as remnant native vegetation, particularly in and adjacent to the existing road reserves and the Seven Creeks riparian area. There are some scattered paddock trees which are likely remnant vegetation. There are some constructed farm dams scattered throughout the study area. The study area is within:

- Victorian Riverina Bioregion;
- Goulburn River Basin;
- Goulburn Broken Catchment Management Authority (CMA) area; and
- Greater Shepparton City Council.

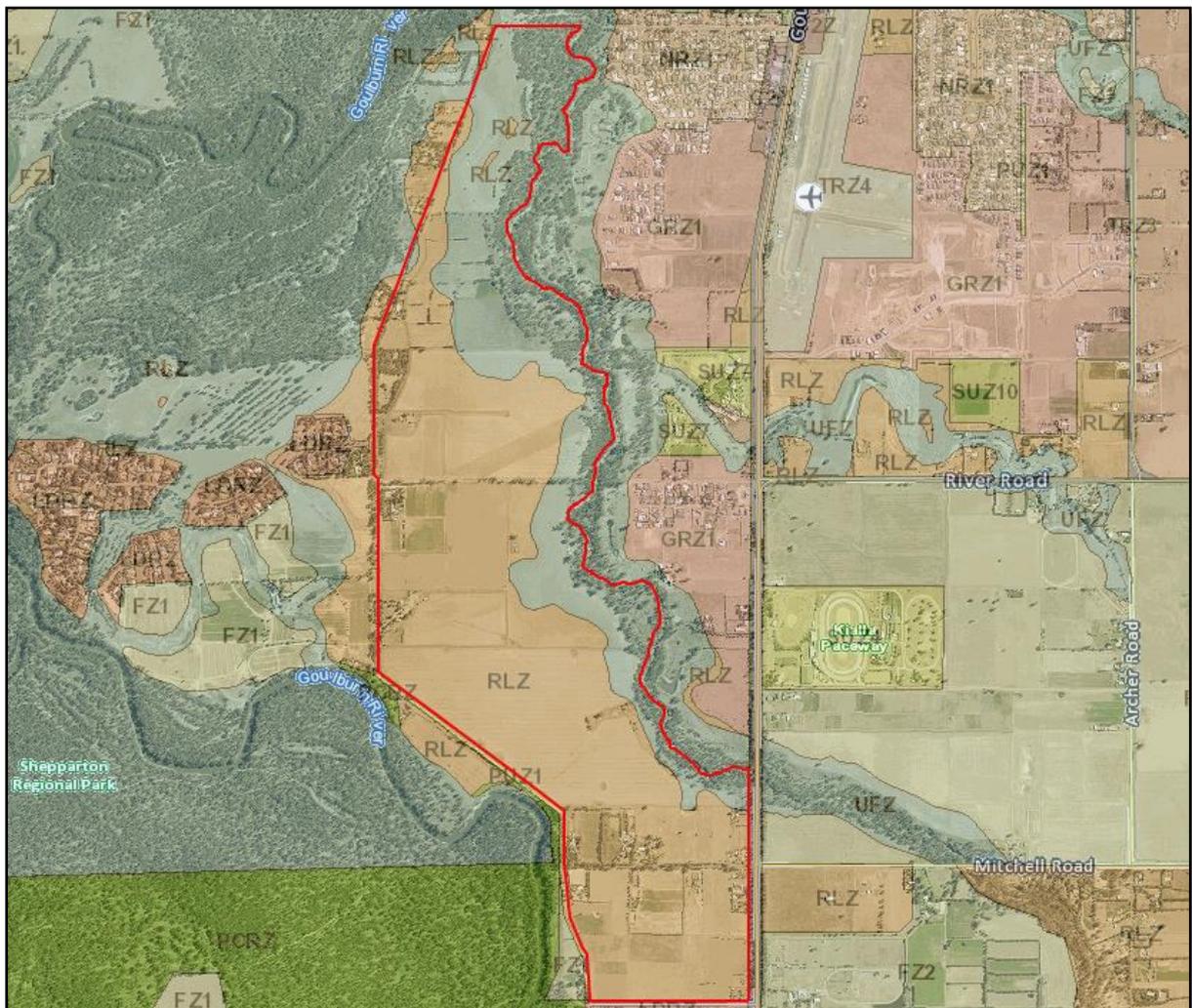


Figure 1: Study area identified by red polygon (VicPlan 2021).

## 2 Methodology

### 2.1 Desktop assessment

In order to provide a context for the study area, information about flora and fauna from within 5 kilometres of the study area was obtained from relevant biodiversity databases, including those maintained by both the Victorian Government Department of Environment, Land, Water and Planning (DELWP) and the Australian Government Department of Agriculture, Water and the Environment (DAWE). Records from the following databases were collated and reviewed:

- DELWP's Victorian Biodiversity Atlas (VBA), including the 'VBA\_FLORA25, FLORA100 & FLORA Restricted' and 'VBA\_FAUNA25, FAUNA100 & FAUNA Restricted' datasets; and
- DAWE's Protected Matters Search Tool for matters protected by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Other sources of biodiversity information were examined including:

- DELWP's NatureKit mapping tool;
- DELWP's Habitat Importance Maps;
- DELWP's Native Vegetation Information Management (NVIM) system; and
- Planning Scheme overlays relevant to biodiversity based on <http://planningschemes.dpcd.vic.gov.au>.

#### 2.1.1 Definitions of significance

The significance of a species or ecological community is determined by its listing status under Commonwealth or State legislation / policy (Table 1).

**Table 1 Criteria for determining significance of species & ecological communities**

Significance	
<b>National</b>	Listed as critically endangered, endangered or vulnerable under the EPBC Act.
<b>State</b>	Listed as critically endangered, endangered or vulnerable in Victoria on a DELWP Advisory List (DSE 2009; DSE 2013; DEPI 2014). Listed as threatened under the FFG Act.

Records of significant species within a 5km buffer of the study area generated from the databases are provided in Table 2 (flora) and Table 3 (fauna) in the results section of this report and the species have been assessed to determine their likelihood of occurrence (Table 7 – results) based on the process outlined below.

#### 2.1.2 Determining likelihood of occurrence of significant species

Likelihood of occurrence indicates the potential for a species or ecological community to occur regularly within the study area. It is based on expert opinion, information in relevant biodiversity databases and reports, and an assessment of the habitats on site. Likelihood of occurrence is ranked as negligible, low, medium, high or recorded. The rationale for the rank assigned is provided. Those species for which there is little or no suitable habitat within the study area, or would only very occasionally occur there, are assigned a likelihood of low or negligible and are not considered further.

Species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered.

### 2.1.3 Determining occurrence of significant ecological communities

The EPBC Act Policy Statement for White Box – Yellow Box – Blakely’s Red Gum grassy woodlands and derived native grasslands (CoA 2006) was used to determine the absence of this threatened ecological community within the study area. Further information can be found within the policy statement: <https://www.environment.gov.au/system/files/resources/be2ff840-7e59-48b0-9eb5-4ad003d01481/files/box-gum.pdf>

A similar process was used to determine absence of Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and derived native grasslands of South Eastern Australia (CoA 2012a). Further information can be found within the document: <https://www.environment.gov.au/system/files/resources/e6041636-388e-40cc-9bd4-8c8b2dbe6419/files/grey-box-booklet.pdf>

For FFG Act listed communities, the descriptions provided by DELWP were reviewed: <https://www.environment.vic.gov.au/conserving-threatened-species?a=50418>

## 2.2 Site Assessment

### 2.2.1 Flora assessment

The flora assessment was undertaken on 26<sup>th</sup>-27<sup>th</sup> November 2021 and 2<sup>nd</sup>-3<sup>rd</sup> February 2022. A list of flora species was collected. Of priority was identifying native vegetation as identified in the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning – DELWP, 2017) herein referred to as ‘the Guidelines’. Identifying and mapping the extent of native vegetation assists in ensuring that any development is designed with the avoid, minimise, mitigate principle in mind. Desktop assessments identified the study area residing within the Victorian Riverina bioregion and modelled as containing Ecological Vegetation Classes (EVC) #803 – Plains Woodland and #56 – Floodplain Riparian Woodland. The EVC Benchmarks (Appendix 4) provide a list of species likely to occur within the study area should they be in an ecologically sound condition. These benchmarks were used to inform the site assessment.

Native vegetation is defined in the Victoria Planning Provisions as ‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses’ (Clause 72). Native vegetation is assessed using two parameters: extant (hectares) and condition (Table 2).

As per the Guideline’s, native vegetation mapped included both patches and scattered trees (small or large according to EVC benchmark diameter at breast height (DBH)). Trees in patches were further classified as small or large patch trees, despite the Guidelines only requiring the accounting of large patch trees. This will give council a better understanding of the extent to which patches are ‘treed’. Large patch trees were not accounted for separately in the areas of EVC#56 Floodplain Riparian Woodland which were found along the riparian corridors of Seven Creeks and Goulburn River. Communication with council on this matter indicated that these

areas were unlikely to be impacted by development and to quantify the number of large trees within them at this stage would not be an effective use of project resources.

**Table 2 Native vegetation determinations.**

Category	Definition	Extent	Condition
<b>Patch</b>	<p>An area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy;</p> <p>OR</p> <p>An area of vegetation where at least 25% of the total perennial understory plant cover is native;</p> <p>OR</p> <p>Any mapped wetland included in the Current Wetland Maps (DELWP, NatureKit, VicPlan, Mapshare etc.)</p>	Measured in hectares (hectare area of the patch).	<p>Vegetation Quality Assessment Manual (DSE 2004).</p> <p>Modelled condition of current wetlands.</p>
<b>Scattered Tree</b>	A native canopy tree that does not form part of a patch.	<p>Measure in hectares. Large trees are attributed 15m radius or 0.071 hectare extent.</p> <p>Small trees are attributed a 10m radius or 0.031 hectare extent.</p>	All scattered trees assigned condition score of 0.2 (where not part of a patch).

### 2.2.2 Fauna assessment

The study area was investigated on 26<sup>th</sup>-27<sup>th</sup> November 2021 and 2<sup>nd</sup>-3<sup>rd</sup> February 2022 to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls.

Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

### 2.2.3 Targeted threatened species surveys

Targeted threatened species surveys have not yet been undertaken, but may be recommended should this initial assessment identify their likely occurrence.

### 2.2.4 Limitations

Ecological surveys provide a sampling of flora and fauna at the given time and season. There are several reasons why a species may not be detected at the site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. If a species is not detected, it doesn't

necessarily mean that it is not present. In most cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The flora and fauna assessments were conducted in early summer, which is a suitable time for ecological surveys in northern Victoria. It coincides with many fauna dispersal movements which presents an opportunity to detect species during, foraging and movement establishing home ranges and territories. Many flora species are still flowering at this time which makes them easier to detect and more readily identifiable.

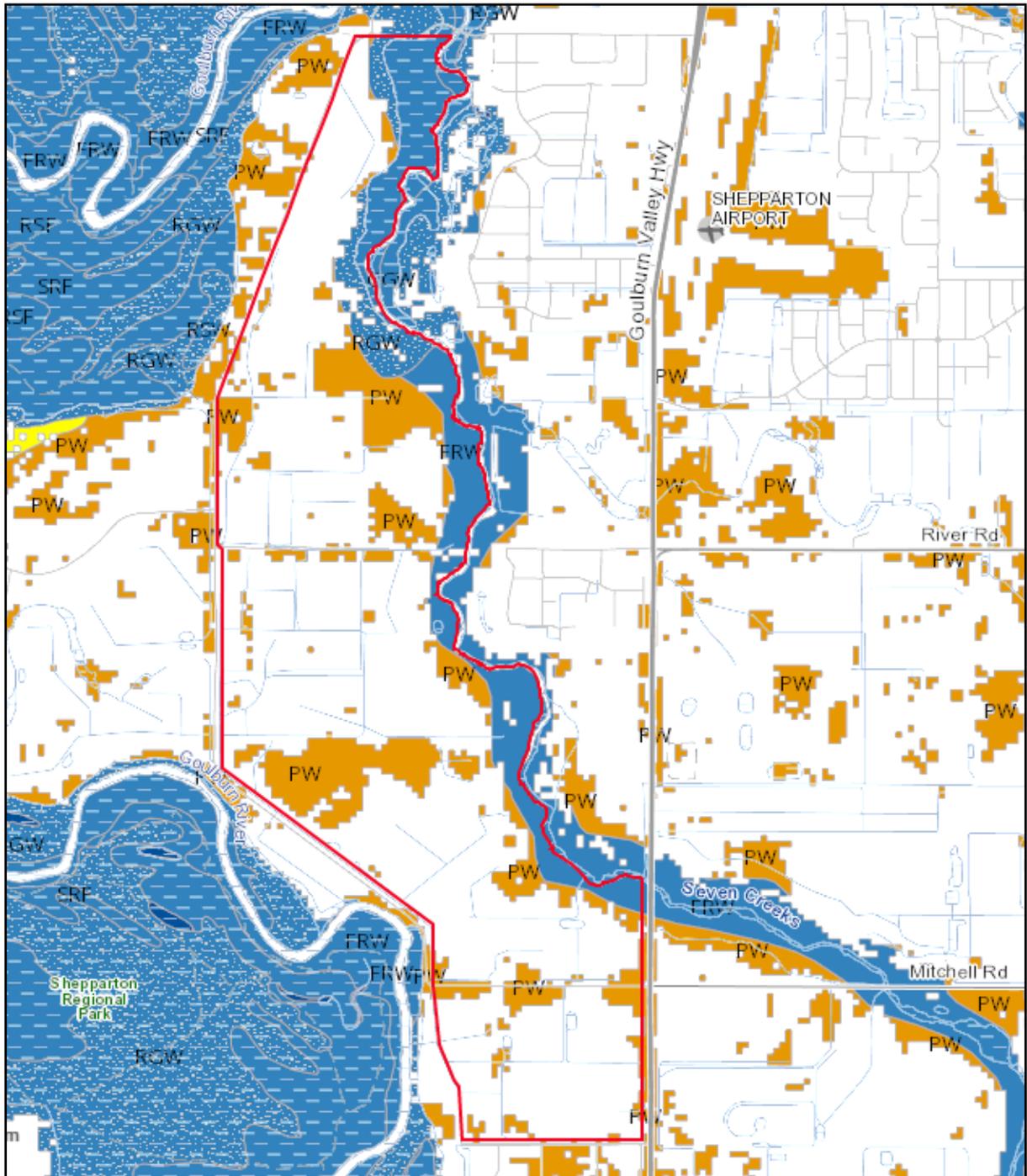


Figure 2: Mapped EVC's #803 Plains Woodland (orange) and #56 Floodplain Riparian Woodland (blue) in the study area. (NatureKit, 2021)

### 2.2.5 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the EPBC Act, associated policy statements, significant impacts guidelines, listing advice and key threatening processes;
- Threatened taxa, communities and threatening processes listed under Section 10 of the FFG Act and associated action statements and listing advice;
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017); and
- Noxious weeds and pest animals listed under the Catchment and Land Protection Act 1994 (CaLP Act).



**Table 3 Listed fauna species recorded within a 5km buffer of the study area**

Scientific Name	Common Name	FFG Act	Conservation Status	EPBC Act	Last Recorded
<i>Bidyanus bidyanus</i>	Silver Perch	Listed	Endangered	Critically Endangered	2020
<i>Spatula rhynchotis</i>	Australasian Shoveler	Listed	Vulnerable		1989
<i>Macquaria australasica</i>	Macquarie Perch	Listed	Endangered	Endangered	1975
<i>Melanotaenia fluviatilis</i>	Murray-Darling Rainbowfish	Listed	Endangered		2018
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	Listed	Vulnerable		2018
<i>Biziura lobata</i>	Musk Duck	Listed	Vulnerable		2018
<i>Stagonopleura guttata</i>	Diamond Firetail	Listed	Vulnerable		2018
<i>Maccullochella peelii</i>	Murray Cod	Listed	Endangered	Vulnerable	2020
<i>Ardea intermedia plumifera</i>	Intermediate Egret	Listed	Critically Endangered		2001
<i>Neophema pulchella</i>	Turquoise Parrot	Listed	Vulnerable		1980
<i>Burhinus grallarius</i>	Bush Stone-curlew	Listed	Critically Endangered		1985
<i>Hieraaetus morphnoides</i>	Little Eagle	Listed	Vulnerable		1981
<i>Ardea alba modesta</i>	Eastern Great Egret	Listed	Vulnerable		2019
<i>Maccullochella macquariensis</i>	Trout Cod	Listed	Endangered	Endangered	2020
<i>Aythya australis</i>	Hardhead	Listed	Vulnerable		2019
<i>Pseudophryne bibronii</i>	Brown Toadlet	Listed	Endangered		2004
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Listed	Endangered		2019
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Listed	Vulnerable		2009
<i>Oxyura australis</i>	Blue-billed Duck	Listed	Vulnerable		2000
<i>Hirundapus caudacutus</i>	White-throated Needletail	Listed	Vulnerable	Vulnerable	1981
<i>Polytelis swainsonii</i>	Superb Parrot	Listed	Endangered	Vulnerable	1977
<i>Petaurus norfolcensis</i>	Squirrel Glider	Listed	Vulnerable		1992
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Listed	Endangered		1980
<i>Emydura macquarii</i>	Murray River Turtle	Listed	Critically Endangered		1982
<i>Grantiella picta</i>	Painted Honeyeater	Listed	Vulnerable	Vulnerable	2013
<i>Lathamus discolor</i>	Swift Parrot	Listed	Critically Endangered	Critically Endangered	1982
<i>Tringa glareola</i>	Wood Sandpiper	Listed	Endangered		1987
<i>Litoria raniformis</i>	Growling Grass Frog	Listed	Vulnerable	Vulnerable	1982
<i>Pluvialis fulva</i>	Pacific Golden Plover	Listed	Vulnerable		1987
<i>Ixobrychus dubius</i>	Australian Little Bittern	Listed	Endangered		1981
<i>Egretta garzetta</i>	Little Egret	Listed	Endangered		2000
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Listed	Critically Endangered	Endangered	1977
<i>Galaxias rostratus</i>	Flat-headed Galaxias	Listed	Vulnerable	Critically Endangered	1990
<i>Falco subniger</i>	Black Falcon	Listed	Critically Endangered		1978
<i>Pyrholaemus sagittatus</i>	Speckled Warbler	Listed	Endangered		1982
<i>Melanodryas cucullata</i>	Hooded Robin	Listed	Vulnerable		1977
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Listed	Vulnerable	Vulnerable	2007
<i>Ornithorhynchus anatinus</i>	Platypus	Listed	Vulnerable		1980
<i>Ninox connivens</i>	Barking Owl	Listed	Critically Endangered		1995

<i>Varanus varius</i>	Lace Monitor	Listed	Endangered		2014
<i>Tandanus tandanus</i>	Freshwater Catfish	Listed	Endangered	Critically Endangered	1992

The protected matters search tool (PMST) report (Appendix 5) identified EPBC Act listed species which have habitat potentially occurring within the search area, but for which there are no actual records. These are listed in Table 4 (below)

**Table 4 EPBC Listed species with potential habitat within 5km buffer of study area but no records**

Scientific Name	Common Name	EPBC Act	PMST Comments
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Foraging, feeding or related behaviour may occur within area
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered	Species or species habitat may occur within area
<i>Falco hypoleucos</i>	Grey Falcon	Vulnerable	Species or species habitat likely to occur within area
<i>Numenius madagascariensis</i>	Eastern Curlew	Critically Endangered	Species or species habitat may occur within area.
<i>Pedionomus torquatus</i>	Plains Wanderer	Critically Endangered	Species or species habitat likely to occur within area
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Species or species habitat likely to occur within area
<i>Crinia sloanei</i>	Sloanes Froglet	Endangered	Species or species habitat may occur within area
<i>Synemon plana</i>	Golden Sun Moth	Critically Endangered	Species or species habitat may occur within area
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	Vulnerable	Species or species habitat may occur within area
<i>Delma impar</i>	Striped Legless Lizard	Vulnerable	Species or species habitat may occur within area
<i>Brachyscome muelleroides</i>	Mueller Daisy	Vulnerable	Species or species habitat may occur within area
<i>Lepidium monoplacoides</i>	Winged Pepper-cress	Endangered	Species or species habitat may occur within area
<i>Glycine latrobeana</i>	Clover Glycine	Vulnerable	Species or species habitat likely to occur within area
<i>Pimelea spinescens subsp. spinescens</i>	Plains Rice-flower	Critically Endangered	Species or species habitat likely to occur within area
<i>Sclerolaena napiformis</i>	Turnip Copperburr	Endangered	Species or species habitat likely to occur within area
<i>Senecio macrocarpus</i>	Large -fruit Fireweed	Vulnerable	Species or species habitat may occur within area
<i>Senecio psilocarpus</i>	Swamp Fireweed	Vulnerable	Species or species habitat may occur within area

The protected matters search tool (PMST) report (Appendix 5) also identified EPBC Act listed threatened ecological communities which may potentially occur within the search area. These are listed in Table 5 (below).

**Table 5 EPBC Listed threatened ecological communities' that may occur within 5km buffer of study area**

Threatened Ecological Community	EPBC Act	PMST Comments
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community known to occur within area
Grey Box ( <i>Eucalyptus microcarpa</i> ) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Community may occur within area

Threatened Ecological Community	EPBC Act	PMST Comments
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

## 3.2 Vegetation and fauna habitat

The majority of the study area has been highly modified by extensive land clearing, cultivation, cropping and grazing. Native vegetation is predominantly limited to the outer extents of the study area, where it includes or adjoins the riparian areas of the Goulburn River and Seven Creeks. There are significant amounts of vegetation contained within road reserves throughout the study area. Some of the highest quality native vegetation was present in these areas.

Some parts of the study area include existing residential lots, containing some native but mostly planted vegetation. They are largely found in the south of the study area along Mitchell Rd and Bennets Rd. The cropped areas comprising the majority of the study area have been significantly modified to support introduced vegetation (crops), which are of limited ecological value. These areas are still actively farmed and the areas which are not cultivated support introduced planted vegetation, pasture grasses and weeds. Some remnant scattered trees remain within these locations. Farm infrastructure including fences, tracks and cattle yards reflect a long farming history.

The vegetation composition and ecological condition changes markedly where it includes Seven Creeks and its associated riparian zones. Vegetation present is mainly remnant native vegetation with River Red Gums (*Eucalyptus camaldulensis*) the dominant species. There are numerous large remnant trees, as well as active recruitment of this species occurring in the area. The area is lacking species diversity through the mid-story with the dominant *E. camaldulensis* recruitment taking place. There are Silver Wattle (*Acacia dealbata*) present in the mid-story. There are native understory species in this area including Common Tussock-grass (*Poa labillardierei*), Common Spike-sedge (*Eleocharis acuta*) and bull rushes (*Juncus sp.*). Wallaby grasses (*Rytidosperma spp.*) are prevalent in this area. Patches of vegetation mapped within the Seven Creeks are representative of EVC#56 (Floodplain Riparian Woodland).

Some patches of vegetation mapped along Mitchell Rd, Raftery Rd and River Rd West were of high quality and representative of EVC#803 Plains Woodland. There were large remnant trees comprised of Grey Box (*Eucalyptus macrocarpa*), River Red Gum (*Eucalyptus camaldulensis*), Yellow Box (*Eucalyptus melliodora*) and one Buloke (*Allocasuarina luehmannii*). There were many large stags and live hollow-bearing trees. Native mid and understory species included: Golden Wattle (*Acacia pycnantha*), Gold-dust Wattle (*Acacia acinacea*), Mallee Wattle (*Acacia montana*), Silver Wattle (*Acacia dealbata*), Sweet Bursaria (*Bursaria spinosa*), Weeping Pittosporum (*Pittosporum augustifolium*) Ruby Saltbush (*Enchylanea tomentosa*), Cotton Fireweed (*Sencio quadridentatus*), Black-anther Flax-lily (*Dianella revoluta*), Common Wallaby Grass (*Austrodanthonia caespitosa*) and Rough Spear Grass (*Austrostipa scabra*).

A number of these patches had few or no large trees, lacked most of the mid and understorey species listed above which combined with presence of high impact weeds including Boxthorn (*Lycium ferocissimum*), Gazania (*Gazania linearis*), Phalaris (*Phalaris aquatica*) and Prickly Pear (*Opuntia spp.*) reduced their quality to moderate or low.

Native vegetation mapping completed in this assessment identified:

- 7.42ha of Floodplain Riparian Wetland;
- 3.64ha of Plains Woodland; and
- 321 Scattered Trees.

The remaining portions of the study area were identified as either existing residential lots, or containing vegetation that is either non-native or exempt from statutory approval prior to removal (e.g. planted).

These features are described further in Table 6 and mapped in Appendix 3. Typical photos of these features including vegetation types and habitat follow Table 6.

**Table 6 Summary of vegetation and habitat types within the study area**

Vegetation or habitat type	Description	Location	Fauna habitat & significant values
<p><b>Floodplain Riparian Woodland EVC 56</b></p> <p>As described in the Victorian Riverina Bioregion EVC Benchmark</p> <p>Figures 4 and 5</p>	<p><b>Structure:</b> An open eucalypt woodland or open forest to 20 m tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. Occurs along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall relatively low and soils are fertile alluviums subject to periodic flooding and inundation.</p> <p><b>Character species:</b> River Red Gum canopy dominance. The area is lacking species diversity through the mid-story with the dominant <i>E. camaldulensis</i> recruitment taking place. There are Silver Wattle (<i>Acacia dealbata</i>) present in the mid-story. with other benchmark species present including Common Tussock-grass (<i>Poa labillardierei</i>), Common Spike-sedge (<i>Eleocharis acuta</i>) and bull rushes (<i>Juncus</i> sp.).</p> <p><b>Weeds:</b> Cover of weeds relatively low with presence of Cape Weed (<i>Arctotheca calendula</i>), Smooth Cat's-ear (<i>Hypochoeris glabra</i>), Dock spp, (Onion Grass (<i>Romulea rosea</i>) and Wimmera Rye Grass (<i>Lolium rigidum</i>).</p> <p><b>Bioregional Conservation Status (BCS):</b> Vulnerable.</p>	<p>The Seven Creeks riparian area and part of the southern east corner of the study area in the Goulburn River riparian zone.</p>	<p>The River Red Gums in these areas offer possible foraging and nesting habitat for a range of bird and arboreal mammals. The large hollow bearing trees provide ideal habitat for the threatened Squirrel Glider (<i>Petaurus norfolcensis</i>).</p> <p>Woody debris and tussocky grasses in the study area presents likely habitat for a range of reptile species and possibly small mammals (i.e., Yellow-footed antechinus – <i>Antechinus flavipes</i>).</p> <p>The significant size of these patches associated with the Seven Creeks riparian zone within the study area provide optimum corridors for movement throughout the landscape for large vertebrate fauna including Eastern Grey Kangaroos and Swamp Wallabies. Importantly the provide direct connectivity to the Goulburn River and Shepparton Regional Park downstream of the study area.</p>

Vegetation or habitat type	Description	Location	Fauna habitat & significant values
<p><b>Plains Woodland EVC 803</b></p> <p>As described in the Victorian Riverina Bioregion EVC Benchmark</p> <p>Figures 6 and 7</p>	<p><b>Structure:</b> An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with &lt;600 mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present.</p> <p><b>Character species:</b> Large remnant trees comprised of Grey Box (<i>Eucalyptus microcarpa</i>), River Red Gum (<i>Eucalyptus camaldulensis</i>), Yellow Box (<i>Eucalyptus melliodora</i>) and one Buloke (<i>Allocasuarina luehmannii</i>). There were many large stags and live hollow-bearing trees. Native mid and understory species included: Golden Wattle (<i>Acacia pycnantha</i>), Gold-dust Wattle (<i>Acacia acinacea</i>), Mallee Wattle (<i>Acacia montana</i>), Silver Wattle (<i>Acacia dealbata</i>), Sweet Bursaria (<i>Bursaria spinosa</i>), Weeping Pittosporum (<i>Pittosporum augustifolium</i>) Ruby Saltbush (<i>Enchylanea tomentosa</i>), Cotton Fireweed (<i>Sencio quadridentatus</i>), Black-anther Flax-lily (<i>Dianella revoluta</i>), Common Wallaby Grass (<i>Austrodanthonia caespitosa</i>) and Rough Spear Grass (<i>Austrostipa scabra</i>).</p> <p><b>Weeds:</b> Cover of weeds relatively low but high impact weeds present including Boxthorn (<i>Lycium ferocissimum</i>) (Figure 11), Gazania (<i>Gazania linearis</i>), Phalaris (<i>Phalaris aquatica</i>) and Prickly Pear (<i>Opuntia</i> spp.)</p> <p><b>Bioregional Conservation Status (BCS):</b> Vulnerable.</p>	<p>Present as patches of varying quality throughout the roadsides within the study area including Mitchell Rd, Raftery Rd and River Rd West.</p>	<p>Patches are typically small (0.057ha on average and 0.81ha maximum) associated with the linear and narrow extent of the road reserves. Because of this, they offer limited permanent habitat opportunities for terrestrial fauna, offering temporary refuge, feeding opportunities and movement pathways for these species.</p> <p>The abundance of large trees, hollow bearing trees (Figure 10) and flowering species present in the canopy provide significant habitat opportunities for a range of arboreal and avian fauna, particularly hollow-dependent species.</p>

Vegetation or habitat type	Description	Location	Fauna habitat & significant values
<b>Predominantly introduced vegetation</b>  Figures 8	The majority of the study area has been cultivated and supports modified paddocks that have been cleared and are currently used for cropping and grazing. The uncultivated edges of cropped areas near fences, tracks and cattle yards are heavily infested with weed species such as Capeweed, Bathurst Burr and Patterson’s Curse.	Majority of the study area that isn’t roadsides, riparian areas or residential lots.	Predominantly introduced vegetation offers limited habitat.
<b>Planted Vegetation</b>  Figure 9	Native but non-indigenous species and non-native species planted in linear formations throughout study area.	Abundant in the northernmost parcel of the study area.	Planted trees and shrubs are unlikely to provide core habitat values for significant flora or fauna species but may provide movement corridors, foraging or nesting opportunities for woodland birds.



*Figure 4: Seven Creeks and adjacent riparian vegetation, Feb 2022*



*Figure 5: Seven Creeks riparian area representing EVC#56 Floodplain Riparian Woodland*



*Figure 6: Grey Box dominated patch with native understory representing EVC#803 Plains Woodland at Mitchell Rd, Feb 2022*



*Figure 7: EVC#803 Plains Woodland patch including mature and recruiting Bulokes at Raftery Rd, Feb 2022*



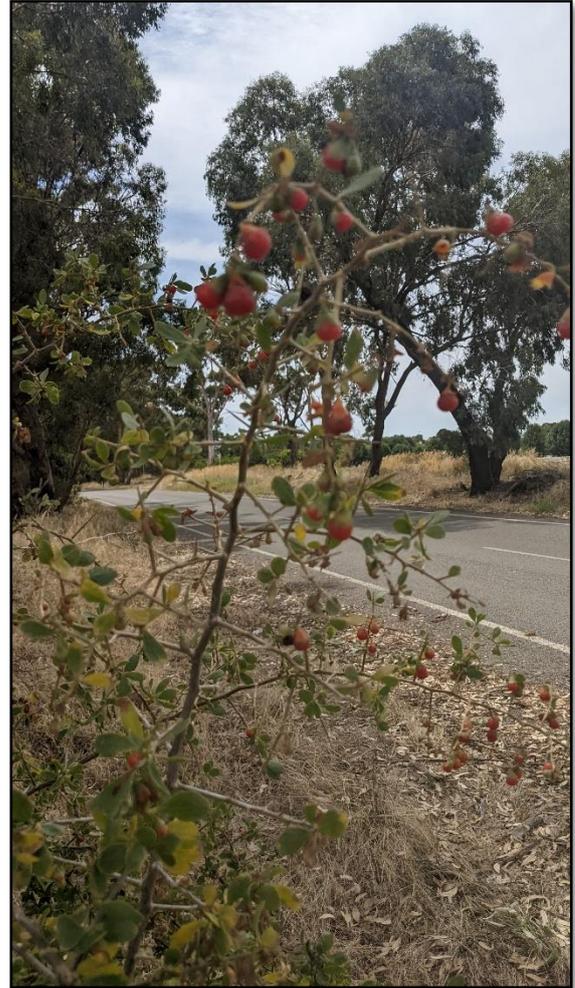
*Figure 8: Land cleared for agricultural purposes representing the majority of the study area, Feb 2022*



*Figure 9: Planted shelterbelts in the north of the study area, Feb 2022*



*Figure 10: Large trees with hollows providing habitat,  
Feb 2022*



*Figure 11: High impact weed Boxthorn present along  
Raftery Rd, Feb 2022*

### 3.3 Landscape Context

The study area and much of the surrounding land has been subject to agricultural land use historically, including clearing of vegetation for grazing and cropping. More recently, land immediately west of the study area (Arcadia Downs) has been developed into a residential subdivision. Likewise to the east of the study area and Seven Creeks, residential developments have been extending south as one of the main growth areas of the Shepparton/ Kialla region. The eastern border of the study area is Seven Creeks. Whilst there is little ecological value throughout the majority of the study area, Seven Creeks and its surrounding riparian vegetation is largely in-tact (though disturbed) and provides suitable habitat for a range of native flora and fauna species. There is a significant abundance of large River Red Gum trees, many of which are hollow-bearing. Woody debris, organic matter coverage and native grasses provide good terrestrial habitat features. Seven Creeks is a priority waterway in the Goulburn Broken Catchment Management Authority (GB CMA) Regional Waterway Strategy.

### 3.4 Fauna Observations

During the ecological assessment, fauna observations were recorded. The species directly observed within the study area are provided in Table 7

**Table 7 Fauna observed within study area**

Common Name	Scientific Name	Conservation Status	
		FFG Act	EPBC Act
Australian Magpie	<i>Cracticus tibicen</i>	Secure	Secure
Australian Raven	<i>Corvus coronoides</i>	Secure	Secure
Australian Wood Duck	<i>Chenonetta jubata</i>	Secure	Secure
Black-faced Cuckoo Shrike	<i>Coracina novaehollandiae</i>	Secure	Secure
Common Blackbird	<i>Turdus merula</i>	Introduced	Introduced
Common Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced
Crested Pigeon	<i>Ocyphaps lophotes</i>	Secure	Secure
Eastern Rosella	<i>Platycercus eximius</i>	Secure	Secure
Galah	<i>Eolophus roseicapillus</i>	Secure	Secure
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	Secure	Secure
Indian Myna	<i>Acridotheres tristis</i>	Introduced	Introduced
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	Secure	Secure
Little Lorikeet	<i>Glossopsitta pusilla</i>	Secure	Secure
Little Raven	<i>Corvus mellori</i>	Secure	Secure
Long-billed Corella	<i>Cacatua tnuirostris</i>	Secure	Secure
Magpie-lark	<i>Grallina cyanoleuca</i>	Secure	Secure
Noisy miner	<i>Manorina melanocephala</i>	Secure	Secure
Pacific Black Duck	<i>Anas superciliosa</i>	Secure	Secure
Rainbow Bee-eater	<i>Merops ornatus</i>	Secure	Marine/Migratory
Red-rumped parrot	<i>Psephotus haematonotus</i>	Secure	Secure
Sacred Kingfisher	<i>Todiramphus sanctus</i>	Secure	Secure
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	Secure	Secure
Sulfur-crested Cockatoo	<i>Cacatua galerita</i>	Secure	Secure
Superb Fairy Wren	<i>Malurus cyaneus</i>	Secure	Secure
Welcome Swallow	<i>Hirundo neoxena</i>	Secure	Secure

Common Name	Scientific Name	Conservation Status	
		FFG Act	EPBC Act
White-faced Heron	<i>Egretta novaehollandiae</i>	Secure	Secure
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	Secure	Secure
Willie Wagtail	<i>Rhipidura leucophrys</i>	Secure	Secure
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	Secure	Secure

### 3.5 Flora Observations

During the ecological assessment, flora observations were recorded. The species directly observed within the study area on are provided in Table 8

**Table 8 Flora observed within study area**

Common Name	Scientific Name	Conservation Status	
		FFG Act	EPBC Act
Bathurst Burr	<i>Xanthium spinosum</i>	Regionally controlled weed	
Black-anther Flax-lily	<i>Dianella revoluta</i>	Not listed	Not listed
Boxthorn	<i>Lycium ferocissimum</i>	Weed of National Significance	
Bullrushes	<i>Juncus spp.</i>	Not listed	Not listed
Buloke	<i>Allocasuarina luehmannii</i>	Vulnerable	Not listed
Capeweed	<i>Arctotheca calendula</i>	Introduced	Introduced
Common Spike Sedge	<i>Eleocharis acuta</i>	Not listed	Not listed
Common Tussock Grass	<i>Poa labillardierei</i>	Not listed	Not listed
Common Wallaby Grass	<i>Austrodanthonia caespitosa</i>	Not listed	Not listed
Cotton Fireweed	<i>Sencio quadridentatus</i>	Not listed	Not listed
Dock	<i>Dock spp.</i>	Introduced	Introduced
Gazania	<i>Gazania linearis</i>	Introduced	Introduced
Golden Wattle	<i>Acacia pycnantha</i>	Not listed	Not listed
Gold Dust Wattle	<i>Acacia acinacea</i>	Not listed	Not listed
Grey Box	<i>Eucalyptus microcarp</i>	Not listed	Not listed
Mallee Wattle	<i>Acacia montana</i>	Not listed	Not listed
Onion Grass	<i>Romulea rosea</i>	Introduced	Introduced
Paterson's Curse	<i>Echium plantagineum</i>	Regionally controlled weed	
Prickly Pear	<i>Opuntia spp.</i>	Restricted Weed	
Red Ironbark	<i>Eucalyptus sideroxylon</i>	Not listed	Not listed
River Red Gum	<i>Eucalyptus camaldulensis</i>	Not listed	Not listed
Rough Spear Grass	<i>Austrostipa scabra</i>	Not listed	Not listed
Ruby Salt Bush	<i>Enchylanea tomentosa</i>	Not listed	Not listed
Silver Wattle	<i>Acacia dealbata</i>	Not listed	Not listed
Smooth Cat's-ear	<i>Hypochoeris glabra</i>	Introduced	Introduced
Sweet Bursaria	<i>Bursaria spinosa</i>	Not listed	Not listed
Toowoomba Canary Grass	<i>Phalaris aquatica</i>	Introduced	Introduced
Weeping Pittosporum	<i>Pittosporum augustifolium</i>	Not listed	Not listed
Wimmera Rye Grass	<i>Lolium rigidum</i>	Introduced	Introduced
Yellow Box	<i>Eucalyptus melliodora</i>	Not listed	Not listed

### 3.6 Significant Species

### 3.6.1 EPBC Act and FFG Act listed species

Lists of EPBC Act and FFG Act listed species recorded or predicted to occur within 5 kilometers of the study area are provided in Tables 2, 3 and 4. An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e., which habitats or features of relevance to the species) is included in Table 9 (next page). Where species have a likelihood of occurrence within the study area of medium or high, they are given further consideration.

**Table 9 Summary of EPBC and FFG Act listed species most likely to occur in the study area**

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
<b>Regent Honeyeater</b> <i>Anthochaera phrygia</i>	Critically Endangered under EPBC Act Listed under FFG Act	A range of dry woodlands and forests dominated by nectar producing tree species.	<b>Low</b>	Likelihood is considered low mainly due to the lack of extensive stands of ironbark, white box or yellow box eucalypts
<b>Curlew Sandpiper</b> <i>Calidris ferruginea</i>	Critically Endangered under EPBC Act Listed under FFG Act	Occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	<b>Negligible</b>	No suitable habitat in study area
<b>Flathead Galaxix</b> <i>Galaxias rostratus</i>	Critically Endangered under EPBC Act Listed under FFG Act	Southern Murray Darling Basin. inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for still or slow flowing waters.	<b>Negligible</b>	No suitable habitat in study area
<b>Swift Parrot</b> <i>Lathamus discolor</i>	Critically Endangered under EPBC Act Listed under FFG Act	A range of forests and woodlands, especially those supporting nectar-producing tree species. Also, well-treed urban areas.	<b>Low</b>	Could utilise study area when in mainland Australia however would expect it to forage in areas with more diversity of flowering species.
<b>Eastern Curlew</b> <i>Numenius madagascariensis</i>	Critically Endangered under EPBC Act Listed under FFG Act	Intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbors and lagoons.	<b>Negligible</b>	No suitable habitat in study area
<b>Plains Rice-flower</b> <i>Pimelea spinescens subsp. spinescens</i>	Critically Endangered under EPBC Act Listed under FFG Act	Grassland or open shrubland on basalt-derived soils, usually comprising black or grey clays (Walsh & Entwisle 1996). Plants from more northerly populations occur on red clay complexes. Vegetation is often	<b>Low</b>	Lack of accompanying vegetation required including Kangaroo Grass

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
		dominated by <i>Themeda triandra</i> , with <i>Austrostipa</i> spp. or <i>Austrodanthonia</i> spp. co-dominant. Associated species include <i>Acaena echinata</i> , <i>Calocephalus citreus</i> , <i>Chrysocephalum apiculatum</i> , <i>Eryngium ovinum</i> , <i>Plantago varia</i> , <i>Ptilotus erubescens</i> , <i>Schoenus apogon</i> and <i>Velleia paradoxa</i> .		
<b>Plains Wanderer</b> <i>Pedionomus torquatus</i>	Critically Endangered under EPBC Act Listed under FFG Act	open, sparse swards and grasslands	<b>Low</b>	No grasslands on site. Only crops and introduced pasture species with herbaceous weeds which is not suitable habitat.
<b>Golden Sun Moth</b> <i>Synemon plana</i>	Critically Endangered under EPBC Act Listed under FFG Act	Native grasslands and grassy woodlands containing wallaby grass ( <i>Austrodanthonia</i> spp.), spear grass ( <i>Austrostipa</i> spp.), and <i>Bothriochloa</i> , as well as in degraded grasslands dominated by the exotic Chilean needlegrass ( <i>Nassella nessiana</i> ),	<b>Medium</b>	Grassy woodlands containing wallaby grasses and spear grasses are present within the study area, particularly near to Seven Creeks.
<b>Australasian Bittern</b> <i>Botaurus poiciloptilus</i>	Endangered under EPBC Act Listed under FFG Act	Lives and forages in wetlands amongst rushes and reeds	<b>Low</b>	Possibly in Seven Creeks waterway but even then, habitat suitability very low.
<b>Sloane's Froglet</b> <i>Crinia sloanei</i>	Endangered under EPBC Act Listed under FFG Act	Temporary and permanent waterbodies including oxbows off creeks and rivers, farm dams, large and small natural wetlands, constructed frog ponds and temporary puddles. It prefers wetlands that contain riparian and aquatic vegetation. Most often it has been found in waterbodies that contain grasses and reeds that are of medium height and have small stem diameters, such as couch, water couch or the common spike rush ( <i>Eleocharis acuta</i> ).	<b>Medium</b>	There is a distinct lack of aquatic vegetation and structural habitat associated with farm dams and GMW channel, however habitat is considered suitable for this species within Seven Creeks.

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
<b>Trout Cod</b> <i>Maccullochella macquariensis</i>	Endangered under EPBC Act Listed under FFG Act	Cooler upper reaches of streams, usually in flowing pools between falls and rapids where the stream bottom is bed-rock, boulders and sand or gravel substrates. Larger fish are usually found in the deeper holes, smaller fish beneath and amongst boulders.	<b>Medium</b>	Both Seven Creeks and Goulburn River have known Trout Cod populations. The study area is <5km upstream from the Seven Creeks/ Goulburn River confluence so they could be reasonably assumed be present in the study area at times.
<b>Macquarie Perch</b> <i>Macquaria australasica</i>	Endangered under EPBC Act Listed under FFG Act	Naturally a riverine fish, preferring deep holes. Cool, upper reaches of Victorian tributaries of the Murray-Darling system.	<b>Low</b>	There are <10 known populations of this species nationally and although they exist in the Seven Creeks, they are not associated with lower reaches downstream of Euroa.
<b>Australian Painted Snipe</b> <i>Rostratula australis</i>	Endangered under EPBC Act Listed under FFG Act	Different types of shallow, brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins and small, low-lying islands. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and cane grass.	<b>Low</b>	Farm dam and Seven Creeks not considered wetlands according to habitat this species habitat specification.
<b>Turnip Copperburr</b> <i>Sclerolaena napiformis</i>	Endangered under EPBC Act Listed under FFG Act	Remnants of native grassland and grassy woodland on fertile clay loam soils.	<b>Negligible</b>	No remnants of native grasslands or grassy woodlands within study area.
<b>River Swamp Wallaby-grass</b> <i>Amphibromus fluitans</i>	Vulnerable under EPBC Act Listed under FFG Act	Gilgai depressions in seasonally wet Kangaroo Grass ( <i>Themeda triandra</i> ) dominated grassland, a seasonal soak dominated by Common Bog-rush ( <i>Schoenus Apogon</i> ) and in a stand of Sedge <i>Carex sp. aff. bichenoviana</i> .	<b>Low</b>	No seasonally wet depressions or stands of associated species.
<b>Pink-tailed Legless Lizard</b> <i>Aprasia parapulchella</i>	Vulnerable under EPBC Act Listed under FFG Act	Sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass ( <i>Themeda australis</i> ). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found	<b>Low</b>	Lacking slopes, rocky outcrops and Kangaroo Grass.

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
		beneath small, partially-embedded rocks		
<b>Mueller Daisy</b> <i>Brachyscome muelleroides</i>	Vulnerable under EPBC Act Listed under FFG Act	Restricted to the mid-Murray and Murrumbidgee Rivers region in New South Wales South and Victoria. The species occurs in seasonally wet depressions in the landscape, and appears to rely on seasonal inundation to survive.	<b>Negligible</b>	No seasonally wet depressions or seasonal inundations within study area,
<b>Striped Legless Lizard</b> <i>Delma impar</i>	Vulnerable under EPBC Act Listed under FFG Act	Grassy ground cover, often with a mixture of native and exotic perennials and annuals. The species shelters under surface rock, in cracks in the soil, or in tussocks.	<b>Low</b>	Some native grasses including tussocks in Seven Creeks riparian area however density of these grasses is low. No obvious surface rock or cracking clays.
<b>Grey Falcon</b> <i>Falco hypoleucos</i>	Vulnerable under EPBC Act Listed under FFG Act	The species occurs throughout the arid and semiarid zones of Australia, where the mean annual rainfall is less than 500 mm, but rarely in waterless areas. These areas are relatively treeless except along watercourses, and comprise sandy to stony plains, spinifex tussock grassland, low shrubland and acacia scrub.	<b>Low</b>	Although highly unlikely cannot be completely discounted due to the varied habitat usage of the species.
<b>Clover Glycine</b> <i>Glycine latrobeana</i>	Vulnerable under EPBC Act Listed under FFG Act	Grasslands and grassy woodlands	<b>Medium</b>	Grassy woodlands are present in the study area, restricted to roadsides and riparian areas. Roadside grassy woodlands are modified.
<b>Painted Honeyeater</b> <i>Grantiella picta</i>	Vulnerable under EPBC Act Listed under FFG Act	Found in dry open forests and woodlands, and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. It has been seen in urban parks and gardens where large eucalypts are available.	<b>Medium</b>	Suitable habitat and may use study area on occasion particularly when mistletoe is present. Mainly around Seven Creeks riparian zone.

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
<b>White-throated Needletail</b> <i>Hirundapus caudacutus</i>	Vulnerable under EPBC Act Listed under FFG Act	Almost exclusively aerial but will roost in trees on occasion	<b>Low</b>	No records since 1981 but could possibly occupy airspace over study area.
<b>Growling Grass Frog</b> <i>Litoria raniformis</i>	Vulnerable under EPBC Act Listed under FFG Act	Water bodies, including slow flowing streams and rivers, or off-stream wetlands, which contain water at least periodically	<b>Medium</b>	There is a distinct lack of aquatic vegetation and structural habitat associated with farm dams and GMW channel, however habitat is considered suitable for this species within Seven Creeks.
<b>Murray Cod</b> <i>Maccullochella peelii</i>	Vulnerable under EPBC Act Listed under FFG Act	Waterways of the Murray–Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers and billabongs.	<b>Medium</b>	Known in the Goulburn River and likely to move upstream to this extent of Seven Creeks when conditions suit.
<b>Superb Parrot</b> <i>Polytelis swainsonii</i>	Vulnerable under EPBC Act Listed under FFG Act	Timbered waterways and nearby well-watered woodlands, especially in River Red Gums along the Murray and Murrumbidgee Rivers.	<b>Low</b>	Whilst there is suitable habitat on site for nesting, they require Black Box trees for foraging which are not in required proximity to the site.
<b>Swamp Fireweed</b> <i>Senecio psilocarpus</i>	Vulnerable under EPBC Act Listed under FFG Act	Prefers moist soil and is a semi-aquatic plant.	<b>Low</b>	Study area consist of dry soils with the exemption of floods from Seven Creeks which are infrequent.
<b>Intermediate Egret</b> <i>Ardea intermedia</i>	Listed under FFG Act	Prefers freshwater swamps, billabongs, floodplains and wet grasslands with dense aquatic vegetation	<b>Low</b>	No dense aquatic vegetation within study area. Dams/ channel not suitable.
<b>Eastern Great Egret</b> <i>Ardea modesta</i>	Listed under FFG Act	Prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands.	<b>Medium</b>	Seven Creeks and GMW channel may provide foraging habitat in times of low flow.
<b>Bush Stone Curlew</b> <i>Burhinus grallarius</i>	Listed under FFG Act	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	<b>Low</b>	Not impossible and have been known close by historically. Lack of mid and understory makes them particularly vulnerable to predation.

Species name	Listing status	Habitat	Likely occurrence in study area	Rational for likelihood ranking
<b>Little Egret</b> <i>Egretta garzetta nigripes</i>	Listed under FFG Act	Tidal mudflats, saltwater and freshwater wetlands, and mangroves.	<b>Negligible</b>	No suitable habitat within study area
<b>Little Bittern</b> <i>Ixobrychus minutus dubius</i>	Listed under FFG Act	Occurs in diverse freshwater swamp habitats, mainly where tall rushes, reeds, Typha (cumbungi), shrub thickets or other dense cover is inundated by at least 30 cm of water.	<b>Negligible</b>	Highly cryptic species that stays within cover. No suitable habitat within study area.
<b>Murray River Rainbowfish</b> <i>Melanotaenia fluviatilis</i>	Listed under FFG Act	Slow-flowing rivers, wetlands and billabongs.	<b>Low</b>	Farm dams/ channel not suitable and Seven Creeks mostly unreliable for constant flow.
<b>Turquoise Parrot</b> <i>Neophema pulchella</i>	Listed under FFG Act	Open, grassy woodland with dead trees near permanent water	<b>Medium</b>	Study area presents hollows suitable as nest sites within suitable habitat.
<b>Blue-billed Duck</b> <i>Oxyura australis</i>	Listed under FFG Act	Almost wholly aquatic, and is seldom seen on land. Non-breeding flocks, often with several hundred individuals, congregate on large, deep open freshwater dams and lakes in autumn	<b>Low</b>	No suitable bodies of water within study area.
<b>Squirrel Glider</b> <i>Petaurus norfolcensis</i>	Listed under FFG Act	River Red Gum forests, and mixed species dry forests (including 'box-ironbark' forests) and woodlands. Both of these general habitat types typically contain many mature trees and characteristically include a substantial understory of Silver Wattle or Black Wattle.	<b>Medium</b>	Likely presence of suitable habitat, abundance of hollows and connectivity to intact remnant areas.
<b>Brush-tailed Phascogale</b> <i>Phascogale tapoatafa</i>	Listed under FFG Act	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.	<b>Medium</b>	Likely presence of suitable habitat, abundance of hollows and connectivity to intact remnant areas.

#### 3.6.1.1 Golden Sun Moth – *Synemon plana*

Potential habitat for the golden sun moth includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species. The golden sun moth is also known to inhabit degraded grasslands, including those dominated by the exotic Chilean needlegrass (*Nassella neesiana*), a weed of national significance (Australian Government, 2009). Threats to the species include:

- Loss and degradation of habitat;
- Small, isolated and fragmented populations;
- Frequent and/or intense fire and;
- Predation.

The likelihood of occurrence within the study area for this species was assessed as medium due to the Seven Creeks riparian area containing suitable habitat. Unless proposed residential or associated works would have direct impacts on the Seven Creeks riparian area, it is suggested that there are no further requirements at this time. Should the Seven Creeks be impacted by construction or stormwater discharge, further considerations may need to be given to this species occurrence in the creek.

#### 3.6.1.2 Sloane's Froglet – *Crinia sloanei*

Adults are most common in woodlands, floodplains, grasslands, and open and disturbed areas. Within these habitats they shelter under logs and other debris, usually in moist depressions or near water. Eggs and tadpoles are aquatic and can be found in ponds, dams, swamps, flooded grassland, ditches and hollows (Amphibian Research Centre, 2020). Threats to the species include (NSW Office of Environment & Heritage, 2020):

- Fragmentation and degradation of habitat and water quality through clearing;
- Drought and longer-term climate change impacts on the presence, persistence and seasonality of water at breeding sites. This in turn impacts on recruitment and persistence of populations;
- Changes in water availability, flow and flooding regimes in creeks, rivers, floodplains and wetlands;
- The susceptibility of Sloane's Froglet to the amphibian chytrid fungus is not known;
- Loss of habitat via urbanisation and development; and
- Habitat degradation from inappropriate stock grazing (cattle).

The likelihood of occurrence within the study area for this species was assessed as suitable due to the Seven Creeks presence as suitable habitat. The GMW channel and farm dams within the study area did not present as suitable habitat for this species. Unless proposed residential or associated works would have direct impacts on the Seven Creeks riparian area, it is suggested that there are no further requirements at this time. Should the Seven Creeks be impacted by construction or stormwater discharge, further considerations may need to be given to this species occurrence in the creek.

#### 3.6.1.3 Trout Cod - *Maccullochella macquariensis*

Associated with cooler upper reaches of streams, usually in flowing pools between falls and rapids where the stream bottom is bed-rock, boulders and sand or gravel substrates. Larger fish are usually found in the deeper holes, smaller fish beneath and amongst boulders. The only known remaining self-sustaining population of trout cod in Victoria is confined to the Seven Creeks system near Euroa (Victorian Fisheries Authority, 2020). Apart from environmental changes such as those caused by dams, siltation and "river improvement" activities, it is likely, because of similarities in habitat requirements, certain aspects of observed behaviour (such as

establishment of territories), and feeding habits, that introduced trout may have been a factor in the decline in range and abundance of trout cod ((Victorian Fisheries Authority, 2020).

The likelihood of occurrence within the study area for this species was assessed as suitable due to the Seven Creeks presence as suitable habitat. Unless proposed residential or associated works would have direct impacts on the Seven Creeks riparian area, it is suggested that there are no further requirements at this time. Should the Seven Creeks be impacted by construction or stormwater discharge, further considerations may need to be given to this species occurrence in the creek.

#### 3.6.1.4 Painted Honeyeater - *Grantiella picta*

Unlike many species of honeyeaters which will forage at almost any types of flowers, the Painted Honeyeater specialises in foraging at the flowers of the parasitic mistletoes that grow in trees (Birdlife Australia, 2020). Suitable habitat and may use study area on occasion particularly when mistletoe is present. Mainly around Seven Creeks riparian zone where mistletoe is present in the River Red Gums. Woodland birds should readily move into adjacent suitable habitat when disturbed, however any permitted removal of native vegetation requires checking for active nests at time of removal to ensure that no chicks or eggs are disturbed lost during project development. See Section 4.1 – Recommendations.

#### 3.6.1.5 Growling Grass Frog – *Litoria rainformis*

Adults are usually found close to or in water or very wet areas in woodlands, shrublands, and open and disturbed areas. Eggs and tadpoles can be found in permanent lakes, swamps, dams, and lagoons with still water (Amphibian Research Centre, 2020). The species is dependent on a matrix of aquatic and terrestrial habitat for breeding, foraging, shelter and dispersal, and typically occurs in landscapes with both permanent and seasonally flooded water bodies (Australian Government, 2020). Principal threats to the species include:

- Habitat loss, degradation and modification;
- Fragmentation and isolation of populations; and
- Introduced predators and disease.

The likelihood of occurrence within the study area for this species was assessed as suitable due to the Seven Creeks presence as suitable habitat. The GMW channel and farm dams within the study area did not present as suitable habitat for this species. Unless proposed residential or associated works would have direct impacts on the Seven Creeks riparian area, it is suggested that there are no further requirements at this time. Should the Seven Creeks be impacted by construction or stormwater discharge, further considerations may need to be given to this species occurrence in the creek.

#### 3.6.1.6 Murray Cod - *Maccullochella peelii*

Occurs most frequently in sluggish, turbid waters, usually in deep holes, where logs and stumps afford cover and provide spawning sites. Will live and breed in lakes if water conditions and habitat are suitable. Occurs naturally in upper reaches of the Murray-Darling system where the water is relatively clear and there is little fallen timber (Victorian Fisheries Authority, 2020).

The likelihood of occurrence within the study area for this species was assessed as suitable due to the Seven Creeks presence as suitable habitat. Unless proposed residential or associated works would have direct impacts on the Seven Creeks riparian area, it is suggested that there are no further requirements at this time. Should the Seven Creeks be impacted by construction or stormwater discharge, further considerations may need to be given to this species occurrence in the creek.

### 3.6.1.7 Eastern Great Egret - *Ardea modesta*

The Eastern Great Egret has been reported in a wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). These include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs (Kushlan & Hancock 2005; Marchant & Higgins 1990; Martínez-Vilalta & Motis 1992). The species usually frequents shallow waters.

There is potentially suitable habitat within the study area for *A. modesta* based on seasonal conditions. The species prefers shallow waters as a wading specialist, and these occur with the Seven Creeks, primarily during summer and autumn. There is also an opportunity for foraging habitat during the winter months, when typically GMW channels are drawn down during the closed irrigation season. The potential habitat identified within the study area presents as foraging habitat rather than breeding. The Seven Creeks habitat is unlikely to be impacted by any proposed development as such no further surveys are proposed at this time.

### 3.6.1.8 Turquoise Parrot - *Neophema pulchella*

The Turquoise Parrot favours open, grassy woodland with dead trees near permanent water. It also inhabits coastal heaths and pastures with exotic grasses and weeds, along roadsides and in orchards (Birdlife Australia, 2020). The Turquoise Parrot main breeding season is from August to January (August to November in North-east Victoria). Turquoise Parrots nest in hollow-bearing trees, either dead or alive also, in hollows in tree-stumps (dead, ringbarked, burnt or coppicing), fallen logs and fence posts (Chaffer and Miller 1946; Barker 1953; Jarman 1973; Quin 1990). Preferred breeding habitat is an ecotone between farmland and forests. Open grassy forests and woodlands; in gullies and on low slopes of foothills that are moist and seasonally waterlogged are used; occasionally they breed on ridges (Quin 1990; Quin and Baker-Gabb 1993). Hollows tend to be small diameter but deep and located 1.5-3 m above ground (State Wide Integrated Flora and Fauna Teams, 2020).

There is suitable habitat for this species present within the study area from the existing farm dam through to and including the Seven Creeks riparian area. The area presents hollow bearing trees suitable for nesting sites within proximity to semi-permanent (Seven Creeks) and permanent (farm dam/ proposed wetland complex) which is the species preferred habitat.

Works in this area, particularly native vegetation removal should be avoided during the species nominated breeding season (August – November). Native vegetation removal should avoid the removal of hollow bearing trees wherever possible. See Section 4.1 – Recommendations.

### 3.6.1.9 Squirrel Glider – *Petaurus norfolcensis*

Squirrel Gliders in Victoria occur in River Red Gum (*Eucalyptus camaldulensis*) forests, and mixed species dry forests (including 'box-ironbark' forests) and woodlands. These sites typically carry uneven-aged stands, sometimes with other associated eucalypts, such as Grey Box (*Eucalyptus macrocarpa*), Black Box (*Eucalyptus largiflorens*) and Yellow Box (*Eucalyptus melliodora*) (Rowley 1997) Tree-hollows are essential to Squirrel Gliders for den and breeding sites and in areas where hollows are scarce, gliders may shelter in sub-optimal hollows in the rotting bases of coppice stumps (Traill & Lill 1997). (Department of Sustainability and Environment, 2003).

Given the presence of suitable habitat, abundance of hollows and connectivity to intact remnant areas, Squirrel Glider presence in the study area is possible, if not likely.) Much of the remnant vegetation present within the

study area could contain preferred habitat for the Squirrel Glider, by way of hollow-bearing trees and flowering species presence. With breeding habitat likely present, care should be taken to minimize hollow bearing tree removal wherever possible. Where this cannot be achieved, pre clearing hollow surveys should be undertaken to by an ecologist to identify any active nesting sites. Where hollows are to be removed, this should be done under the direct direction and supervision of an experienced wildlife ecologist. See Section 4.1 – Recommendations.

#### 3.6.1.9.1 Brush-tailed Phascogale (*Phascogale tapoatafa*)

Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.

Given the presence of suitable habitat, abundance of hollows and connectivity to intact remnant areas, species presence in the study area is possible. With breeding habitat likely present, designs should avoid or at least care should be taken to minimize hollow bearing tree removal wherever possible. Where this cannot be achieved, hollow surveys should be undertaken by an ecologist to identify any active nesting sites prior to the permitted removal of any native vegetation. Where hollows are to be removed, this should be done under the direct direction and supervision of an experienced wildlife ecologist. See Section 4.1 – Recommendations

## 4. Discussion and Recommendations

The Kialla West Growth Corridor sits on floodplain between the Goulburn River and Seven Creeks, with less than 1km separating the two waterways at some locations within the study area. Historically, floodplains have provided productive agricultural land and this is evidenced within the study area by the extent of land clearing, presence of an irrigation network and large areas still being actively cropped. Due to the extent of historical land clearing within the study area, native vegetation is largely restricted to roadsides and the riparian areas associated with Seven Creek sand in the south of the study area, the Goulburn River.

Pre-170 EVC modelling shows the area largely comprised EVC#56 Floodplain Riparian Woodland around the Seven Creeks and Goulburn River, and EVC#803 Plains Woodland throughout the floodplain. Most of the Plains Woodland extent has been cleared historically, but it does still persist in small patches along the various roadsides including: Raftery Road, River Road West and Mitchell Road. Some of these patches are considered high quality (Appendix 2), however most have been significantly disturbed or modified. The Floodplain Riparian Woodland EVC is largely still present within its modelled extent to a medium – to high quality (Appendix 2). Invasive weeds and anthropogenic disturbances (grazing, creation of vehicle tracks, litter etc) have reduced its quality to some extent in patches.

Away from the roadsides and natural waterways, native vegetation is present in the form of scattered trees throughout the various properties, some being very large. They are largely isolated but still provide habitat and dispersal opportunities for avian species. There are a number of existing residential and/or rural living properties within the study area that contain treed vegetation. These are in the form of shelterbelts and gardens. Although they provide some opportunity for native faunal species, they are not considered native under the Guidelines due to their origin (outside Victoria) or status (planted) and would not require planning approvals prior to removal. Consideration may be given to their possible value towards habitat, connectivity or green space in planning any future development.

The roadside and riparian vegetation present within the study area is of significant ecological value. These provide a reasonable diversity of native flora species and act as wildlife corridors by linking significant patches of habitat. The multitude of large remnant trees (many of which are hollow bearing) provide habitat opportunities for a number of threatened fauna species. The Seven Creeks riparian area contains mostly native vegetation in the form of a River Red Gum (*Eucalyptus camaldulensis*) forest with native ground covers, some of which is representative of Ecological Vegetation Class #56, Riparian Floodplain Woodland. There are both mature and hollow bearing trees in this location as well as active recruitment of *E. camaldulensis*. Seven Creeks itself is a priority waterway as listed in the GB CMA Regional Waterway Strategy and is one of the few known breeding areas for the threatened Macquarie Perch (*Macquaria australasica*) and Trout Cod (*Maccullochella macquariensis*). It has also been identified as the most likely location within the study area to support suitable habitat for other threatened species including Murray Cod (*Maccullochella peelii*), Growling Grass Frog (*Litoria rainformis*) and Sloane's Froglet (*Crinia sloanei*). Vegetation surrounding the creek and extending west to the farm dam supports suitable habitat for threatened species including: Painted Honeyeater (*Grantiella picta*), Turquoise Parrot (*Neophema pulchella*) Squirrel Glider (*Petaurus norfolcensis*) and Brush-tailed Phascogale (*Phascogale toapatafa*).

It is worth noting that this report has intended to assess the ecological values of the study area in order to provide a guide to any future development of the area. As yet, there are no specific plans or designs on which to assess potential impacts on biodiversity. The data collected during this assessment and particularly; the mapped extent of native vegetation, should be used to inform planning and design of infrastructure (roads, utilities etc.), residential lots, green space and recreational areas etc, to ensure impact is minimised wherever possible.

The data collected does not contain the detail required to quantify any native vegetation offset requirements for proposed removal. Any future proposed vegetation removal will need to be assessed separately to satisfy the requirements of the Guidelines.

The likely presence of threatened species and their habitat in the area has largely aligned with the extent of high-quality native vegetation (i.e. roadside and riparian areas). Any future impacts in these areas need to consider the implications of threatened species. In some instances, targeted species surveys may be required to determine the extent of any proposed impacts on the species, particularly amphibious, aquatic or hollow dependant fauna.

Where impacts to threatened species are identified, they should be assessed against referral criteria under the Australian Governments Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and the Victorian Environmental Effects (EE) Act 1978 to determine the significance of the proposed impact and any further requirements.

#### 4.1 Summary of recommendations

- Presence of native vegetation in the study area should be considered in planning for any future development, particularly in roadside reserves along Raftery Road, Mitchell Road and River Road West, and along the Seven Creeks Riparian Corridor;
- Native vegetation should be prioritised for retention, particularly where patches are identified as medium to high quality and large scattered trees are present;
- Where habitat trees (i.e. hollow bearing, containing nests etc.) could be impacted, they must be inspected by an ecologist immediately prior to removal and any occupying fauna relocated with the appropriate permissions from DELWP under the Wildlife Act 1975 or Flora and Fauna Guarantee Act 1988.
- Non-native vegetation (e.g. planted shelterbelts) should also be considered for retention where possible;
- Where future development designs indicate removal of native vegetation is required, or impacts to waterways are possible (i.e. stormwater and sediment pond discharge points), further assessment including targeted threatened species surveys must be undertaken; and
- Future development should consider assessment against the referral guidelines under the EPBC Act 1999 and EE Act 1978.
- A Fauna Management Plan (FMP) should be required as a condition of any planning permit issued to develop the site which identifies priority areas, patches of vegetation or individual trees of habitat significance and the appropriate management measures to ensure impact on fauna is avoided as a priority or minimised wherever possible.

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## Appendix 1 – Tree Data

Tree ID	Size Class	Scattered/Patch	Species	Notes
1	Large	Scattered	Grey Box	Hollows
2	Large	Scattered	Grey Box	Hollows
3	Large	Scattered	Grey Box	
4	Small	Scattered	Grey Box	
10	Small	Scattered	Stag	
11	Small	Scattered	Grey Box	
12	Small	Scattered	Grey Box	
13	Large	Scattered	Grey Box	
14	Small	Scattered	Grey Box	
15	Small	Scattered	Grey Box	
16	Large	Scattered	Grey Box	
17	Small	Scattered	Grey Box	
18	Small	Scattered	Grey Box	
30	Large	Scattered	Grey Box	
51	Large	Scattered	Stag	
52	Large	Scattered	Stag	
53	Small	Scattered	Grey Box	
54	Small	Scattered	Grey Box	
55	Large	Scattered	Grey Box	
59	Small	Scattered	Grey Box	
60	Small	Scattered	Stag	
61	Small	Scattered	Stag	
69	Large	Scattered	Yellow Box	
70	Large	Scattered	Grey Box	
71	Small	Scattered	Grey Box	
72	Large	Scattered	Grey Box	
73	Small	Scattered	Grey Box	
74	Small	Scattered	Grey Box	
75	Small	Scattered	Grey Box	
76	Small	Scattered	Grey Box	
77	Small	Scattered	Stag	
78	Large	Scattered	Stag	
94	Large	Scattered	Grey Box	
104	Small	Scattered	Grey Box	
182	Large	Scattered	Grey Box	
183	Small	Scattered	Grey Box	
184	Small	Scattered	Grey Box	
185	Small	Scattered	Grey Box	
186	Large	Scattered	Grey Box	
187	Small	Scattered	Grey Box	
188	Small	Scattered	Grey Box	
189	Small	Scattered	Stag	

Tree ID	Size Class	Scattered/Patch	Species	Notes
190	Large	Scattered	Grey Box	
191	Large	Scattered	Grey Box	
192	Large	Scattered	Grey Box	
193	Large	Scattered	Grey Box	
194	Large	Scattered	Grey Box	
195	Small	Scattered	Grey Box	
196	Small	Scattered	Grey Box	
197	Small	Scattered	Grey Box	
198	Small	Scattered	Grey Box	
199	Small	Scattered	Grey Box	
200	Large	Scattered	Grey Box	
201	Small	Scattered	Grey Box	
203	Large	Scattered	Grey Box	
211	Large	Scattered	Grey Box	
212	Large	Scattered	Grey Box	
213	Large	Scattered	Stag	
214	Small	Scattered	Grey Box	Hollows
215	Small	Scattered	Grey Box	Hollows
216	Small	Scattered	Grey Box	Hollows
217	Small	Scattered	Grey Box	
218	Small	Scattered	Grey Box	
219	Large	Scattered	Grey Box	
225	Large	Scattered	Grey Box	
226	Large	Scattered	Grey Box	
243	Small	Scattered	Grey Box	Hollows
244	Small	Scattered	River Red Gum	Hollows
245	Small	Scattered	River Red Gum	Hollows
246	Small	Scattered	River Red Gum	Hollows
247	Small	Scattered	River Red Gum	
248	Small	Scattered	River Red Gum	
249	Large	Scattered	Grey Box	Weeping pittosporum
250	Small	Scattered	Grey Box	Hollows
251	Small	Scattered	River Red Gum	
252	Small	Scattered	River Red Gum	
253	Small	Scattered	River Red Gum	Hollows
254	Small	Scattered	River Red Gum	
255	Small	Scattered	River Red Gum	Weeping pittosporum
256	Large	Scattered	Grey Box	
257	Small	Scattered	River Red Gum	Hollows
258	Small	Scattered	River Red Gum	Hollows
259	Small	Scattered	River Red Gum	
286	Small	Scattered	River Red Gum	
310	Small	Scattered	River Red Gum	Red ironbark

Tree ID	Size Class	Scattered/Patch	Species	Notes
311	Large	Scattered	River Red Gum	
312	Large	Scattered	River Red Gum	
313	Small	Scattered	Grey Box	
314	Small	Scattered	River Red Gum	
315	Small	Scattered	River Red Gum	
316	Large	Scattered	River Red Gum	
317	Large	Scattered	Grey Box	
318	Large	Scattered	Grey Box	
319	Small	Scattered	Grey Box	
320	Small	Scattered	River Red Gum	
333	Large	Scattered	Grey Box	
334	Large	Scattered	Grey Box	
335	Small	Scattered	Grey Box	
336	Small	Scattered	Grey Box	
337	Large	Scattered	River Red Gum	
338	Small	Scattered	Grey Box	
339	Small	Scattered	Grey Box	
400	Large	Scattered	Stag	
401	Small	Scattered	Grey Box	
402	Small	Scattered	Stag	
403	Small	Scattered	Grey Box	
404	Small	Scattered	Grey Box	
405	Small	Scattered	Grey Box	
406	Small	Scattered	Stag	
407	Small	Scattered	Stag	
408	Large	Scattered	Grey Box	
409	Small	Scattered	River Red Gum	
410	Small	Scattered	River Red Gum	
411	Small	Scattered	River Red Gum	
412	Small	Scattered	River Red Gum	
413	Small	Scattered	River Red Gum	
414	Small	Scattered	River Red Gum	
415	Small	Scattered	River Red Gum	
416	Small	Scattered	River Red Gum	
417	Large	Scattered	Grey Box	
418	Large	Scattered	Grey Box	
419	Small	Scattered	River Red Gum	
420	Small	Scattered	River Red Gum	
421	Large	Scattered	River Red Gum	
422	Small	Scattered	River Red Gum	
423	Small	Scattered	River Red Gum	
424	Small	Scattered	River Red Gum	
428	Large	Scattered	Grey Box	

Tree ID	Size Class	Scattered/Patch	Species	Notes
429	Small	Scattered	Stag	
430	Small	Scattered	Grey Box	
431	Large	Scattered	Grey Box	
432	Small	Scattered	Grey Box	
433	Small	Scattered	Grey Box	
445	Small	Scattered	Grey Box	
446	Small	Scattered	Grey Box	
458	Large	Scattered	Grey Box	
459	Large	Scattered	Grey Box	
460	Small	Scattered	Stag	
461	Large	Scattered	Stag	
463	Small	Scattered	Grey Box	
464	Small	Scattered	Grey Box	
465	Small	Scattered	Grey Box	
466	Small	Scattered	Grey Box	
467	Small	Scattered	Grey Box	
468	Small	Scattered	Stag	
492	Large	Scattered	Stag	
493	Large	Scattered	Other	
494	Small	Scattered	Stag	
495	Small	Scattered	Stag	
496	Small	Scattered	Grey Box	
503	Small	Scattered	Grey Box	
510	Small	Scattered	Grey Box	
544	Small	Scattered	River Red Gum	
551	Small	Scattered	River Red Gum	
552	Small	Scattered	River Red Gum	
553	Small	Scattered	Stag	
554	Small	Scattered	River Red Gum	
555	Large	Scattered	Grey Box	
556	Small	Scattered	Grey Box	
557	Small	Scattered	River Red Gum	
558	Large	Scattered	Grey Box	
559	Large	Scattered	Grey Box	
560	Small	Scattered	Grey Box	
561	Small	Scattered	Other	
562	Small	Scattered	Stag	
575	Large	Scattered	Grey Box	
576	Large	Scattered	Grey Box	
577	Small	Scattered	Stag	
581	Small	Scattered	Grey Box	
582	Large	Scattered	Grey Box	
587	Small	Scattered	Grey Box	

Tree ID	Size Class	Scattered/Patch	Species	Notes
588	Large	Scattered	Grey Box	
618	Large	Scattered	Grey Box	
619	Large	Scattered	Grey Box	
620	Large	Scattered	Grey Box	
624	Large	Scattered	Grey Box	
625	Small	Scattered	Grey Box	
626	Small	Scattered	Stag	
627	Small	Scattered	Grey Box	
628	Small	Scattered	Grey Box	
629	Large	Scattered	Grey Box	
630	Small	Scattered	Grey Box	
631	Large	Scattered	Stag	
642	Large	Scattered	Grey Box	
664	Small	Scattered	Stag	
665	Large	Scattered	Grey Box	
666	Small	Scattered	Grey Box	
667	Small	Scattered	Grey Box	
668	Large	Scattered	Grey Box	
669	Small	Scattered	Grey Box	
670	Large	Scattered	Grey Box	
671	Small	Scattered	Grey Box	
672	Large	Scattered	Grey Box	
673	Small	Scattered	Grey Box	
686	Large	Scattered	Grey Box	
687	Large	Scattered	Grey Box	
688	Small	Scattered	Grey Box	
689	Large	Scattered	Grey Box	
690	Small	Scattered	Grey Box	
691	Small	Scattered	Grey Box	
692	Large	Scattered	River Red Gum	
693	Large	Scattered	River Red Gum	
694	Large	Scattered	River Red Gum	
695	Small	Scattered	River Red Gum	
696	Small	Scattered	Stag	
697	Small	Scattered	Stag	
698	Small	Scattered	River Red Gum	
699	Small	Scattered	River Red Gum	
700	Small	Scattered	River Red Gum	
701	Large	Scattered	Grey Box	
702	Small	Scattered	Grey Box	
703	Small	Scattered	Grey Box	
704	Small	Scattered	Grey Box	
705	Large	Scattered	Grey Box	

Tree ID	Size Class	Scattered/Patch	Species	Notes
706	Large	Scattered	Grey Box	
707	Large	Scattered	Grey Box	
708	Small	Scattered	Grey Box	
709	Small	Scattered	Grey Box	
717	Small	Scattered	Grey Box	
718	Small	Scattered	Grey Box	
719	Small	Scattered	Grey Box	
720	Small	Scattered	Grey Box	
721	Small	Scattered	Grey Box	
722	Small	Scattered	Grey Box	
723	Small	Scattered	Grey Box	
724	Small	Scattered	Grey Box	
725	Large	Scattered	Grey Box	
726	Small	Scattered	Grey Box	
727	Small	Scattered	Grey Box	
728	Small	Scattered	Grey Box	
729	Small	Scattered	Grey Box	
737	Large	Scattered	Grey Box	
739	Large	Scattered	Grey Box	
740	Small	Scattered	Grey Box	
741	Small	Scattered	Grey Box	
742	Large	Scattered	Stag	
743	Small	Scattered	Grey Box	
744	Small	Scattered	Grey Box	
750	Large	Scattered	Stag	
751	Small	Scattered	Grey Box	
752	Large	Scattered	Grey Box	
753	Large	Scattered	Grey Box	
754	Large	Scattered	Stag	
755	Large	Scattered	Stag	
756	Large	Scattered	Grey Box	
757	Large	Scattered	Stag	
758	Small	Scattered	Grey Box	
759	Small	Scattered	Grey Box	
760	Small	Scattered	Other	
761	Large	Scattered	Grey Box	
762	Large	Scattered	Grey Box	
763	Large	Scattered	Grey Box	
764	Large	Scattered	Grey Box	
765	Large	Scattered	Grey Box	
766	Small	Scattered	Other	
767	Small	Scattered	Grey Box	
768	Large	Scattered	Grey Box	

Tree ID	Size Class	Scattered/Patch	Species	Notes
769	Large	Scattered	Grey Box	
770	Small	Scattered	Stag	
771	Large	Scattered	Stag	
772	Small	Scattered	Stag	
778	Small	Scattered	Grey Box	
779	Small	Scattered	Grey Box	
780	Small	Scattered	Stag	
781	Large	Scattered	Stag	
782	Large	Scattered	Grey Box	
783	Small	Scattered	Stag	
784	Small	Scattered	Stag	
803	Small	Scattered	Grey Box	
804	Small	Scattered	Grey Box	
805	Small	Scattered	Grey Box	
806	Large	Scattered	Grey Box	
807	Small	Scattered	Grey Box	
808	Large	Scattered	Grey Box	
809	Small	Scattered	Grey Box	
810	Large	Scattered	Grey Box	
811	Small	Scattered	Grey Box	
812	Small	Scattered	Stag	
813	Small	Scattered	Grey Box	
814	Large	Scattered	Grey Box	
815	Small	Scattered	River Red Gum	
816	Small	Scattered	Yellow Box	
817	Small	Scattered	Grey Box	
818	Small	Scattered	Grey Box	
819	Large	Scattered	River Red Gum	
820	Small	Scattered	Grey Box	
821	Large	Scattered	Grey Box	
848	Small	Scattered	Grey Box	
869	Large	Scattered	Stag	
870	Large	Scattered	Grey Box	
871	Large	Scattered	Grey Box	
872	Large	Scattered	Grey Box	
873	Large	Scattered	Grey Box	
950	Large	Scattered	Grey Box	
951	Large	Scattered	River Red Gum	
952	Large	Scattered	Yellow Box	
953	Large	Scattered	River Red Gum	
969	Large	Scattered	Grey Box	
982	Large	Scattered	River Red Gum	
983	Large	Scattered	River Red Gum	

Tree ID	Size Class	Scattered/Patch	Species	Notes
984	Large	Scattered	River Red Gum	
985	Small	Scattered	River Red Gum	
986	Small	Scattered	River Red Gum	
1019	Large	Scattered	Other	
1020	Large	Scattered	Other	
1021	Large	Scattered	Other	
1022	Small	Scattered	River Red Gum	
1023	Small	Scattered	River Red Gum	
1024	Small	Scattered	River Red Gum	
1025	Large	Scattered	Other	
1026	Large	Scattered	Grey Box	
1027	Large	Scattered	Grey Box	
1028	Large	Scattered	Grey Box	
1029	Large	Scattered	Grey Box	
1030	Large	Scattered	Grey Box	
1031	Large	Scattered	Grey Box	
1038	Large	Scattered	Grey Box	
1039	Large	Scattered	River Red Gum	
1040	Large	Scattered	River Red Gum	
1041	Large	Scattered	River Red Gum	
1042	Small	Scattered	River Red Gum	

## Appendix 2 – Patch Data

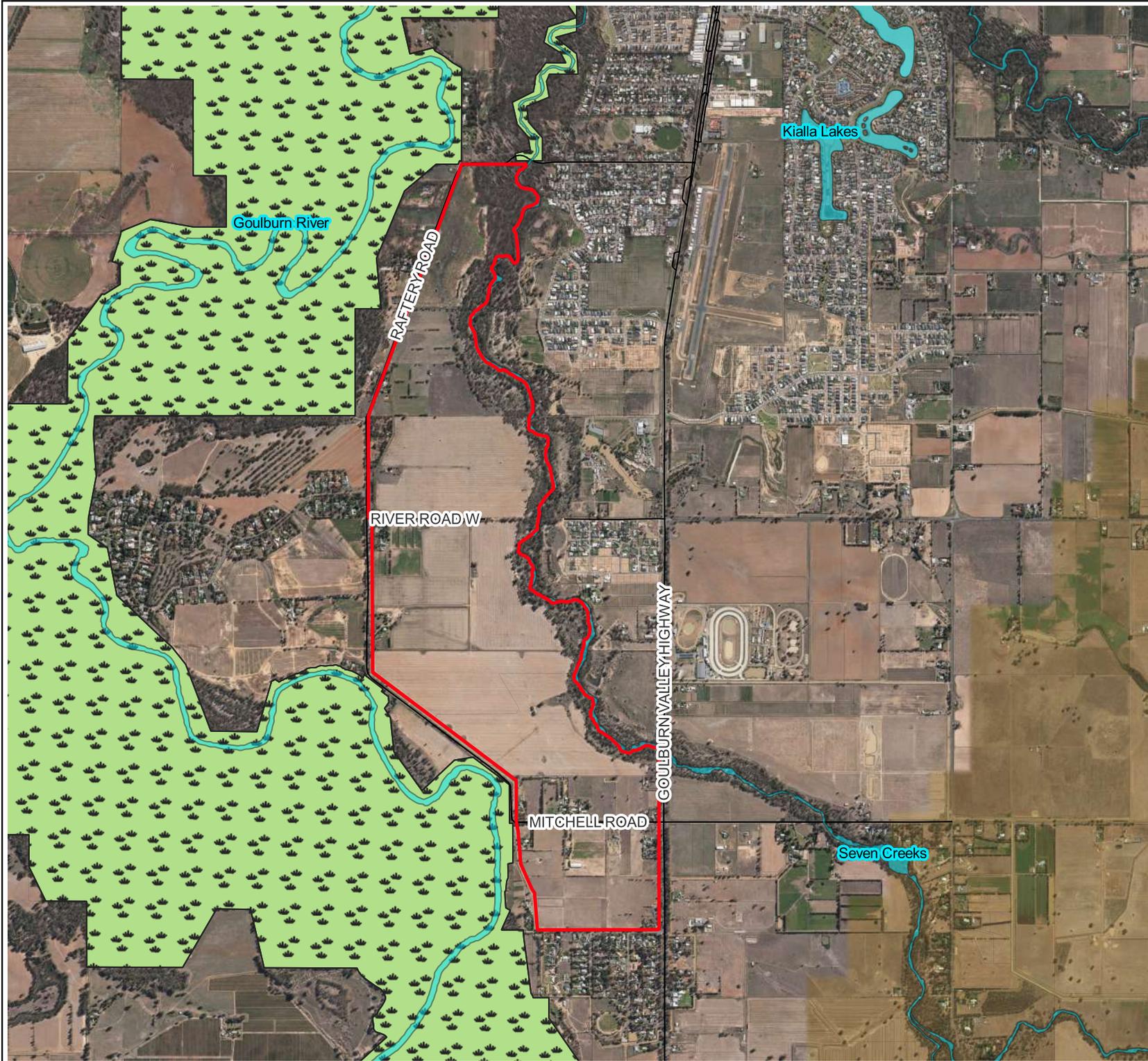
Patch ID	EVC	Quality	Patch Size (ha)	Notes
1	Plains Woodland	Moderate	0.0396	Prickly pear, olive trees
2	Plains Woodland	Low	0.0049	Small trees dead, ash tree
3	Plains Woodland	Low	0.0137	Mix of live and dead small grey box
4	Plains Woodland	Low	0.0178	Small grey box trees, no shrub layer, dominated by annual grasses
5	Plains Woodland	Low	0.0138	Small grey box trees, ash trees, no shrub layer, dominated by annual grasses
6	Plains Woodland	High	0.0892	Contains large trees, native shrub layer, evidence of recruitment
7	Plains Woodland	Moderate	0.0111	Large trees, no understory, annual grasses
8	Plains Woodland	Moderate	0.0297	Mostly small trees, some recruitment
9	Plains Woodland	Moderate	0.0852	Large trees prominent, no shrub layer, annual grasses
10	Plains Woodland	Moderate	0.0513	Some large trees, some recruitment
11	Plains Woodland	High	0.1715	Some large trees, some recruitment
12	Plains Woodland	Moderate	0.0295	Some large trees, some recruitment
13	Plains Woodland	Moderate	0.0376	Large trees, some recruitment, annual grasses
14	Plains Woodland	Moderate	0.0251	Some large trees, some recruitment, ash trees and annual grasses prevalent
15	Plains Woodland	Moderate	0.0184	Some large trees, some recruitment
16	Plains Woodland	Moderate	0.0427	Some large trees, some recruitment, annual grasses
17	Plains Woodland	Low	0.054	No large trees, no shrub layer, euc recruitment, annual grasses
18	Plains Woodland	High	0.0929	Large trees prevalent, native shrub layer, eucalyptus and acacia recruitment, wallaby and poa grasses
19	Plains Woodland	High	0.0779	Many large trees, native shrub layer (Cassinia), eucalyptus and acacia recruitment, wallaby grass prevalent, cotton fireweed
20	Plains Woodland	Moderate	0.0603	Large trees, some recruitment, native and annual grasses
21	Plains Woodland	Moderate	0.0532	Large trees, some recruitment, annual and native grasses
22	Plains Woodland	Low	0.0214	No large trees, no shrub layer, some recruitment, annual grasses
23	Plains Woodland	Low	0.0163	No large trees, no shrub layer, limited recruitment, annual grasses
24	Plains Woodland	Low	0.0284	No large trees, no shrub layer, limited recruitment, annual grasses
25	Plains Woodland	Moderate	0.0459	No large trees, active eucalyptus recruitment, wallaby grass and juncus sp prevalent
26	Plains Woodland	Low	0.0259	No large trees, some recruitment, annual grasses

Patch ID	EVC	Quality	Patch Size (ha)	Notes
27	Plains Woodland	Low	0.0225	Wattle regrowth and annual grasses
28	Plains Woodland	Low	0.0104	No large trees, limited recruitment, annual grasses
29	Plains Woodland	Low	0.0292	No large trees, no recruitment, annual grasses
30	Plains Woodland	Low	0.0401	Predominately small trees, no recruitment, no shrub layer, annual grasses
31	Plains Woodland	Moderate	0.0867	Large trees, actively recruiting, some native shrub and ground cover species
32	Plains Woodland	Moderate	0.0206	Large trees, some recruitment, native shrub layer present
33	Plains Woodland	Moderate	0.0297	Large hollow bearing trees, no shrub layer, no recruitment, annual grasses
34	Plains Woodland	Moderate	0.0285	Large tree, native shrub layer, some recruitment
35	Plains Woodland	Moderate	0.1716	Large trees, some recruitment, native shrub layer, annual and native ground cover
36	Plains Woodland	Low	0.0444	No large trees, no shrub layer, dominated by annual grasses
37	Plains Woodland	Moderate	0.1507	Large trees including Buloke, recruiting bulokes, box thorn and prickly pear present, annual grasses dominant
38	Plains Woodland	Low	0.0152	No shrub layer, no recruitment, dominated by annual grasses
39	Plains Woodland	Moderate	0.0419	Large trees, no shrub layer, recruiting acacias, dominated by annual grasses
40	Plains Woodland	Moderate	0.0522	Large hollow bearing trees, some recruitment, acacia shrub layer, annual grasses
41	Plains Woodland	Low	0.0157	No shrub layer, no recruitment, no ground layer
42	Plains Woodland	Low	0.0438	Small grey box trees, limited recruitment, limited native ground cover (decommissioned GMW channel)
43	Plains Woodland	High	0.0299	Large hollow bearing trees, some recruitment, no shrub layer or native ground cover
44	Plains Woodland	Moderate	0.073	Large trees, no shrub layer, no recruitment, no native ground cover
45	Plains Woodland	Low	0.0165	No shrub layer, no recruitment, no native ground cover
46	Plains Woodland	Moderate	0.0209	Large trees, eucalyptus and acacia recruitment, annual grasses dominate
47	Plains Woodland	High	0.1008	Large hollow bearing trees, some recruitment, wallaby grass and salt bush prevalent
48	Plains Woodland	High	0.0285	Large hollow bearing trees, no recruitment, no shrub layer, wallaby grass, spear grass and salt bush prevalent

Patch ID	EVC	Quality	Patch Size (ha)	Notes
49	Plains Woodland	Moderate	0.0577	Large hollow bearing trees, no shrub layer, no recruitment, mix of native and exotic ground cover
50	Plains Woodland	Moderate	0.0668	Large trees dominate, no shrub layer or recruitment, mix of native and exotic ground cover
51	Plains Woodland	Low	0.0133	Few trees, no shrub layer, some eucalyptus recruits, some native ground cover
52	Plains Woodland	Low	0.0384	Large trees limited, shrub layer limited, no recruitment, mix of native and exotic grasses
53	Plains Woodland	Low	0.0269	Limited large trees, limited recruitment and shrub layer, mix of native and exotic ground cover
54	Plains Woodland	Moderate	0.0449	Large trees, some recruitment, no shrub layer, mix of native and exotic ground cover
55	Plains Woodland	Low	0.0083	No large trees, recruitment or shrub layer. Exotic ground cover
56	Plains Woodland	Low	0.0162	No large trees, shrub layer or recruitment. Annual grasses
57	Plains Woodland	Low	0.021	No shrub layer, recruitment or native ground cover
58	Plains Woodland	Moderate	0.0087	Large trees, saltbush and wallaby grass
59	Plains Woodland	Moderate	0.8134	Large trees limited, eucalyptus actively recruiting throughout, wallaby grass dominant
60	Plains Woodland	Moderate	0.0254	Large trees, limited shrub layer, native ground cover present
61	Plains Woodland	Moderate	0.039	Large trees, native shrub layer, mix of native and exotic ground cover
62	Floodplain Riparian Woodland	High	0.2511	Large trees, dense shrub layer comprised of multiple acacia and melaleuca species, wallaby grass
63	Plains Woodland	Moderate	0.1338	Large trees limited, some recruitment, some native shrub layer, wallaby grass
72	Plains Woodland	Low	0.0913	Some remnant trees, mostly planted Red Gums, mix of native and annual grasses
80	Floodplain Riparian Woodland	Moderate	0.4023	Small and recruiting river red gums, no shrub layer, wallaby grasses and juncus present in ground cover
81	Floodplain Riparian Woodland	High	21.2639	Remnant, largely intact FRW. Many large hollow bearing trees, recruitment, native ground cover species present
82	Floodplain Riparian Woodland	Moderate	1.649	FRW, large trees, some recruitment, mix of native and annual grasses
83	Floodplain Riparian Woodland	High	24.3762	Remnant FRW. Many large trees. Recruiting eucalyptus. Shrub layer limited. Wallaby and spear grasses prevalent. Juncus throughout

Patch ID	EVC	Quality	Patch Size (ha)	Notes
84	Plains Woodland	Low	0.0385	No recruitment, no shrub layer, annual grasses
85	Floodplain Riparian Woodland	Low	0.0362	No recruitment, no shrub layer, annual grasses
86	Floodplain Riparian Woodland	High	0.9707	Large hollow bearing trees, some native shrub layer, ground layer mowed/ grazed
87	Floodplain Riparian Woodland	High	22.26	Remnant FRW. Many large trees. Recruiting eucalyptus. Shrub layer limited. Wallaby and spear grasses prevalent. Juncus throughout
88	Floodplain Riparian Woodland	Moderate	6.21	FRW, large trees, some recruitment, mix of native and annual grasses.

## Appendix 3– Study Area Maps

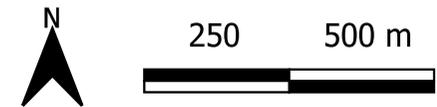


### Legend

- Study Area
- Roads
- Waterways
- Shepparton Regional Park
- Crown Land



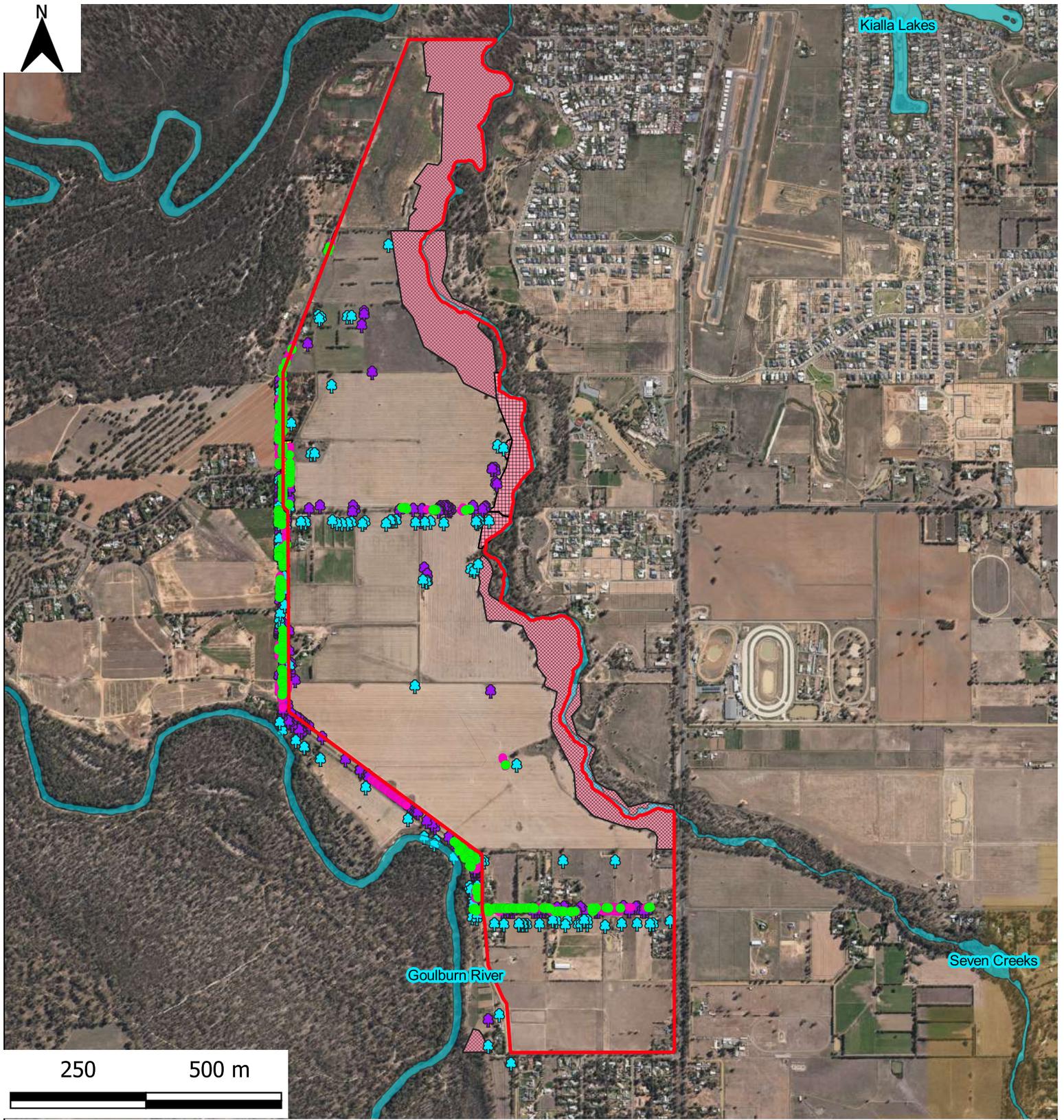
**Figure 1**  
**Location of the study area**  
*Kialla West Growth Corridor*  
*Ecological Assessment*



Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55



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**Figure 2**  
**Native Vegetation Overview**  
*Kialla West Growth Corridor*  
*Ecological Assessment*

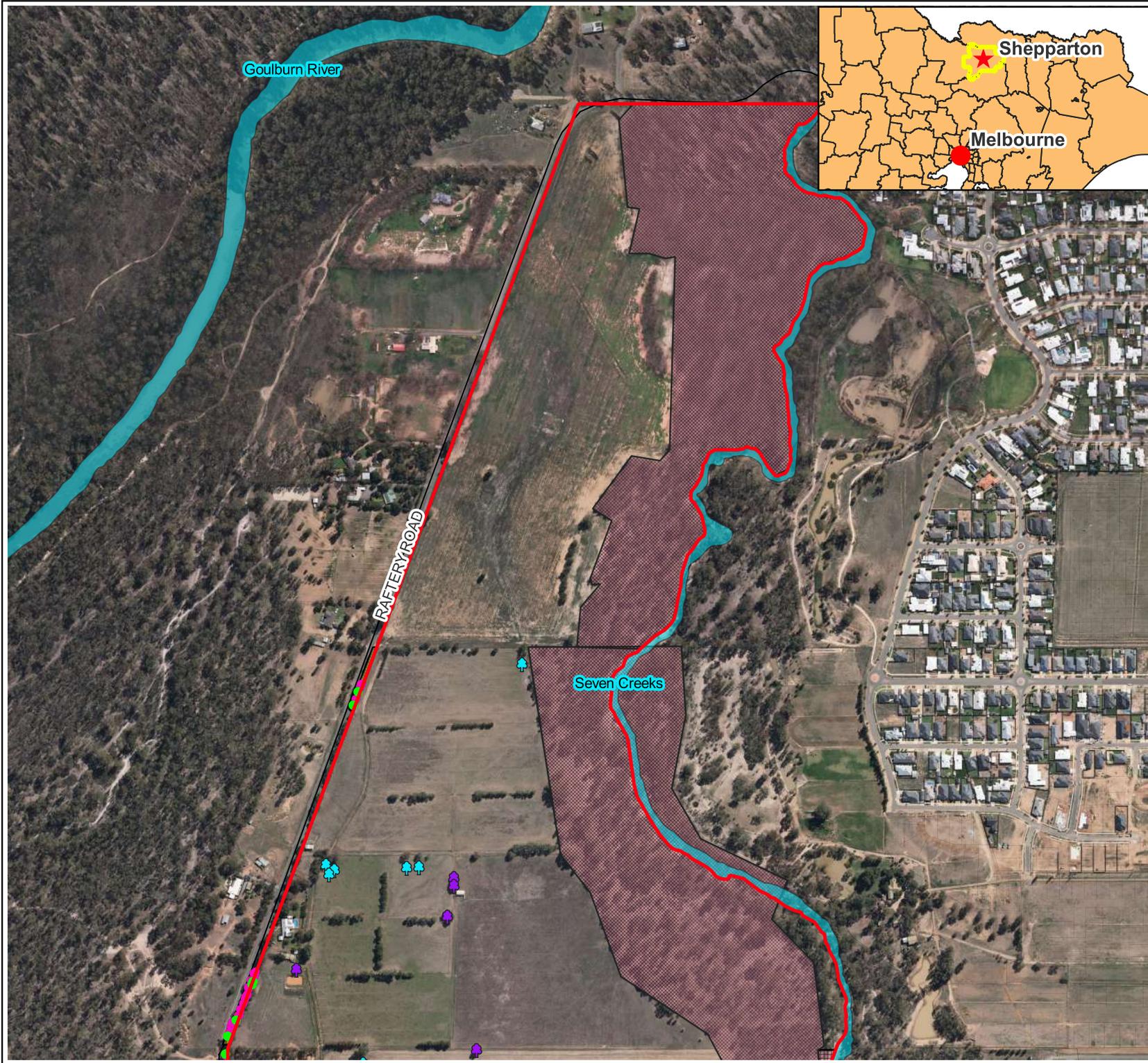


**Legend**

- Study Area
- Waterways
- 🌳 Large Scattered Trees
- 🌳 Small Scattered Trees
- 🌳 Large Patch Trees
- 🌳 Small Patch Trees
- Floodplain Riparian Woodland
- Plains Woodland
- High Quality
- Moderate Quality
- Low Quality

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Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55



## Legend

- Study Area
- Roads
- Waterways
- Large Patch Trees
- Small Patch Trees
- 🌳 Large Scattered Trees
- 🌳 Small Scattered Trees
- Floodplain Riparian Woodland
- Plains Woodland
- High Quality
- Moderate Quality
- Low Quality

## Figure 2a

### Native vegetation detail *Kialla West Growth Corridor Ecological Assessment*



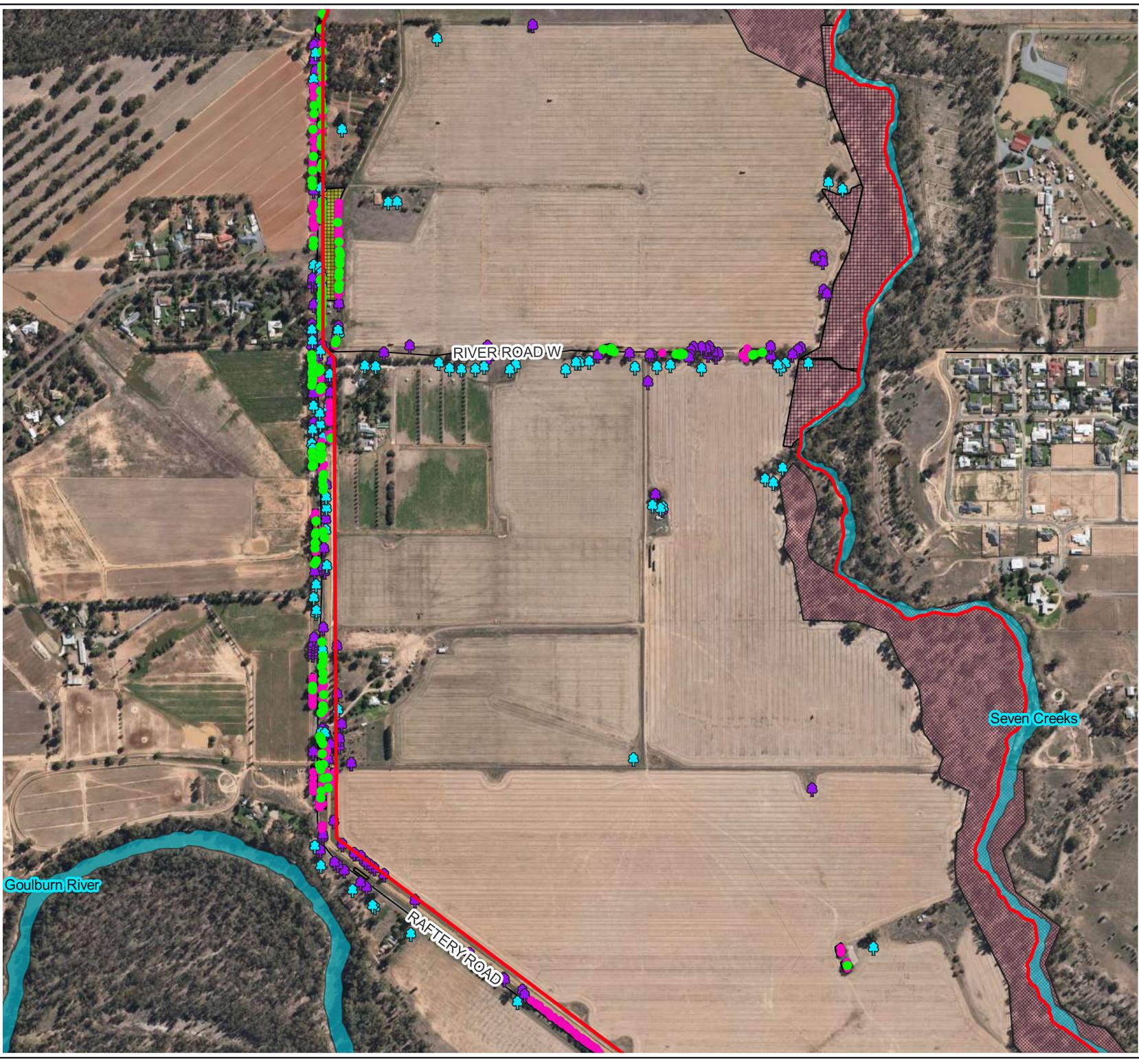
Map Scale: 1:90,000 @ A4  
Coordinate System: GDA94 MGA Zone 55



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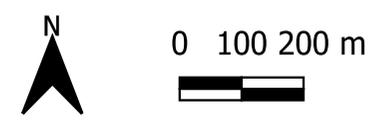
Dylan McWhinney



### Legend

- Study Area
- Roads
- Waterways
- Large Patch Trees
- Small Patch Trees
- Large Scattered Trees
- Small Scattered Trees
- Floodplain Riparian Woodland
- Plains Woodland
- High Quality
- Moderate Quality
- Low Quality

**Figure 2b**  
**Native vegetation detail**  
*Kialla West Growth Corridor*  
*Ecological Assessment*

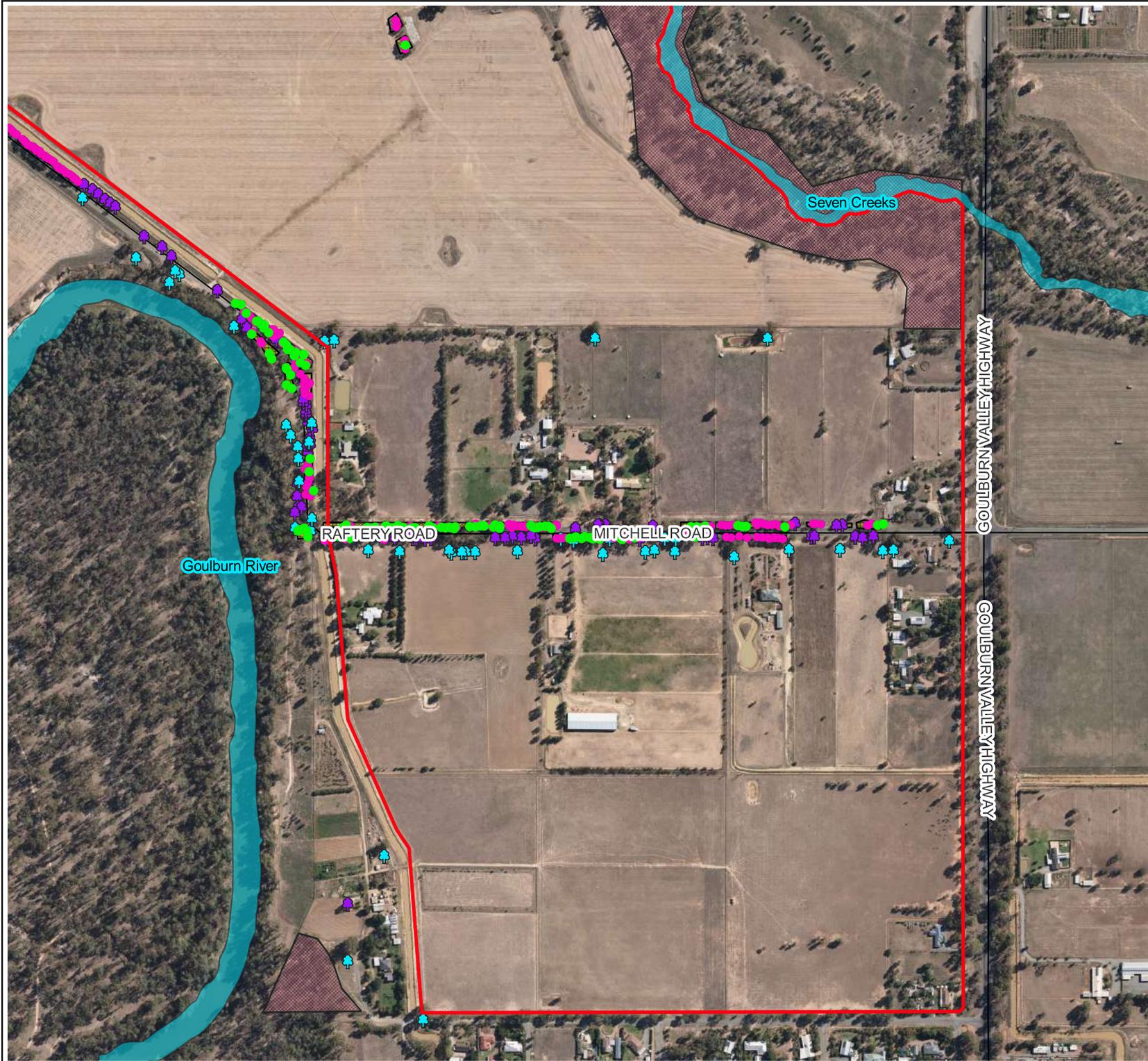


Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55



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14/04/2022 Dylan McWhinney



### Legend

- Study Area
- Roads
- Waterways
- Large Patch Trees
- Small Patch Trees
- Large Scattered Trees
- Small Scattered Trees
- Floodplain Riparian Woodland
- Plains Woodland
- High Quality
- Moderate Quality
- Low Quality

**Figure 2c**

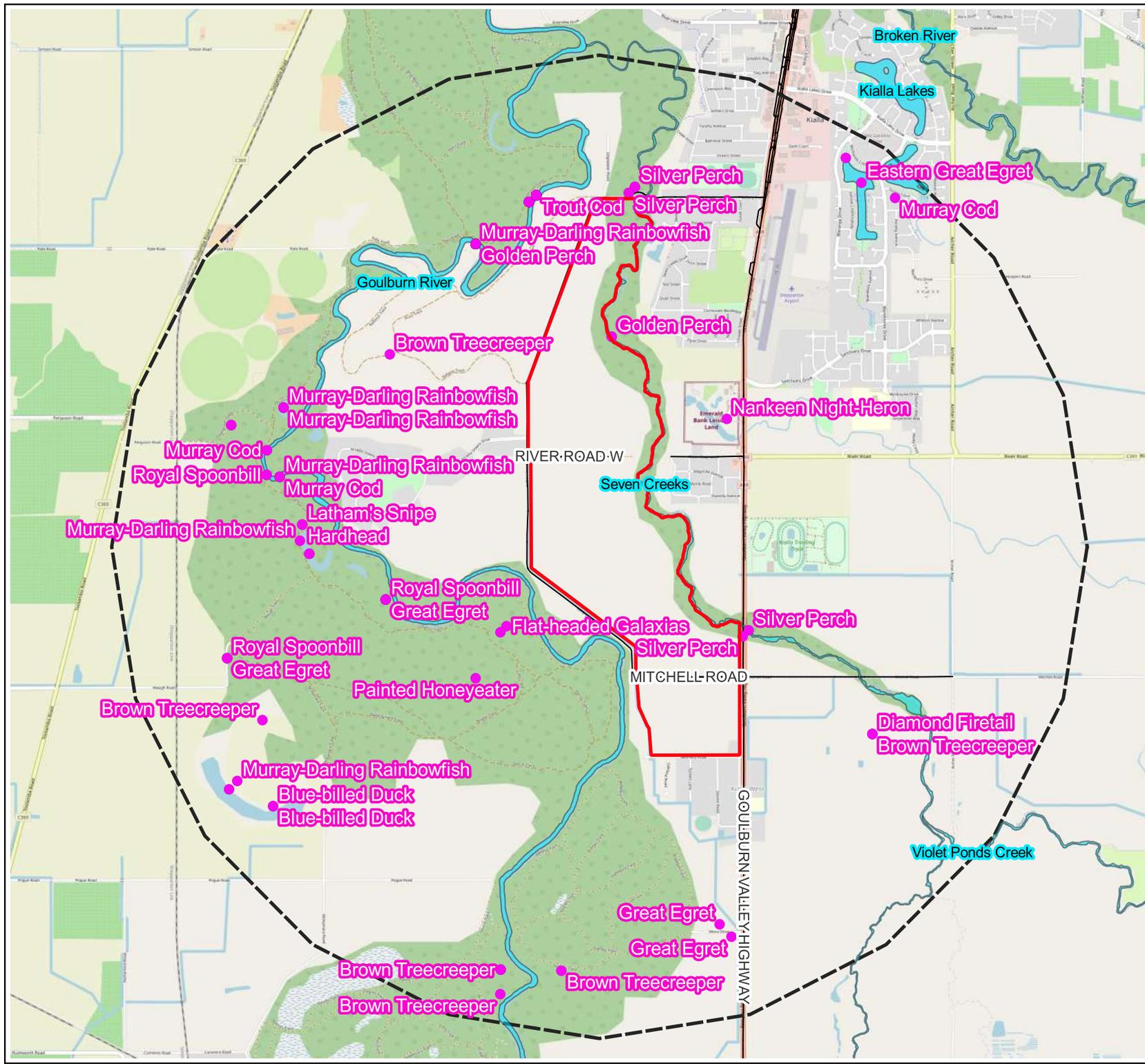
**Native vegetation detail**  
*Kialla West Growth Corridor*  
*Ecological Assessment*



Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55



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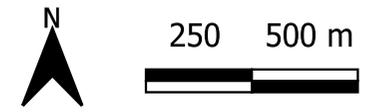


### Legend

- Study Area
- Roads
- Waterways
- 5km search buffer
- VBA Significant Fauna Records



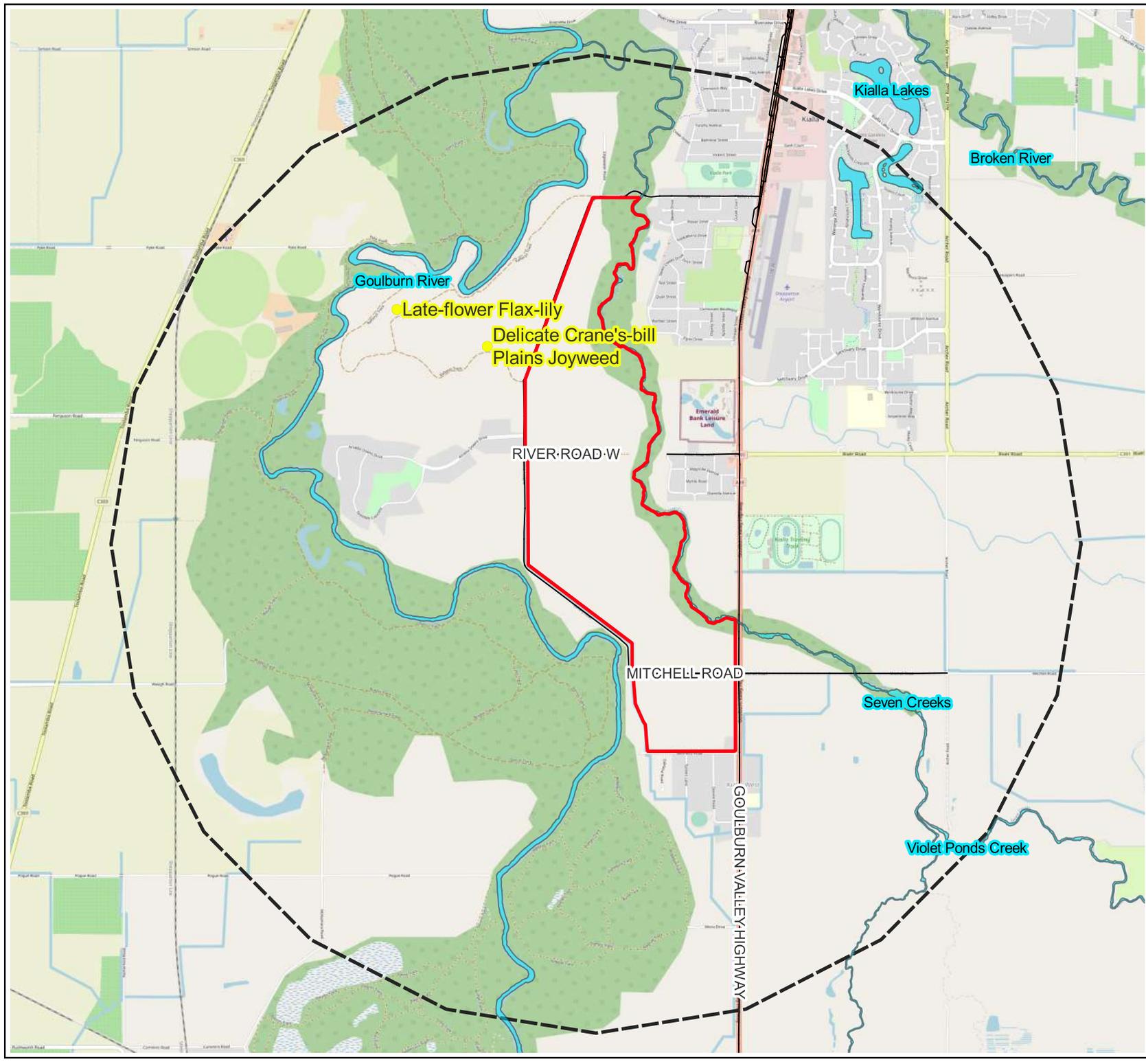
**Figure 3a**  
**Threatened fauna within 5km of study area**  
*Kialla West Growth Corridor Ecological Assessment*



Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55



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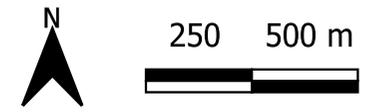


### Legend

- Study Area
- Roads
- Waterways
- VBA Significant Flora Records
- 5km search buffer



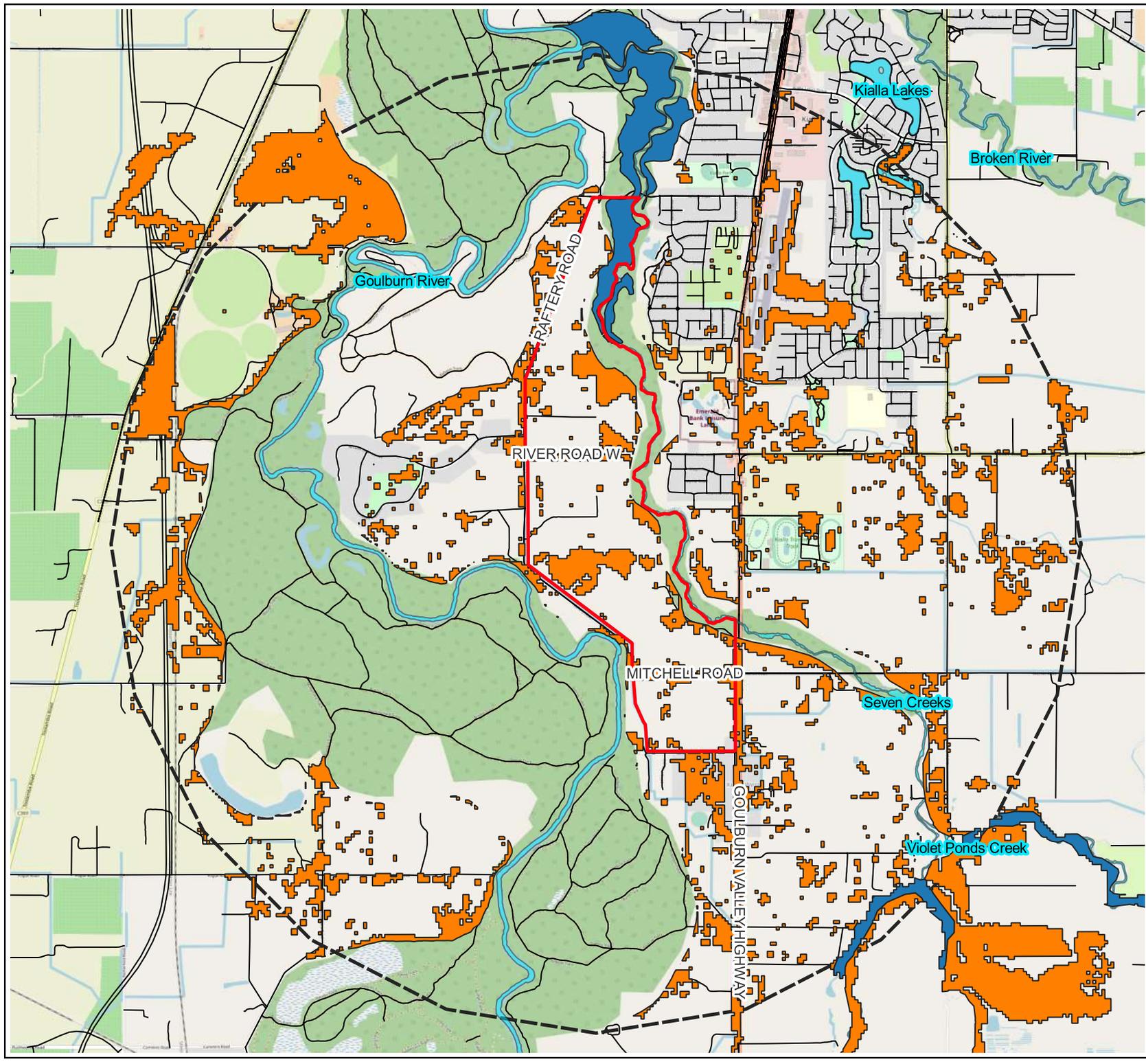
**Figure 3b**  
**Significant Flora within**  
**5km of study area**  
*Kialla West Growth Corridor*  
*Ecological Assessment*



Map Scale: 1:90,000 @ A4  
 Coordinate System: GDA94 MGA Zone 55

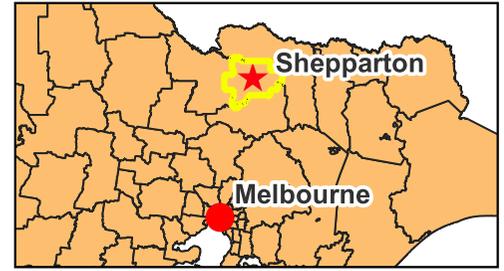


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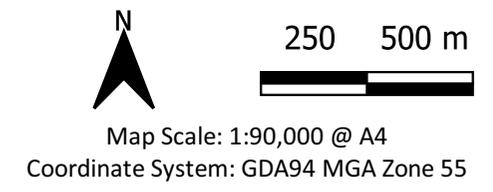
**Legend**

- Study Area
- Roads
- 5km search buffer
- Waterways
- VRiv0068 Creekline Grassy Woodland
- VRiv0803 Plains Woodland



**Figure 3c**  
**Modelled significant communities within 5km of study area**

*Kialla West Growth Corridor Ecological Assessment*



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## Appendix 4 – EVC Benchmarks

# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Riverina bioregion

### EVC 56: Floodplain Riparian Woodland

#### Description:

An open eucalypt woodland or open forest to 20 m tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. Occurs along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall are relatively low and soils are fertile alluviums subject to periodic flooding and inundation.

#### Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	80 cm	15 / ha

#### Tree Canopy Cover:

%cover	Character Species	Common Name
20%	<i>Eucalyptus camaldulensis</i> <i>Eucalyptus melliodora</i>	River Red-gum Yellow Box

#### Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	2	5%	MS
Small Shrub	1	1%	SS
Medium Herb	4	10%	MH
Small or Prostrate Herb	2	1%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	6	35%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Bryophytes/Lichens	na	10%	BL
<b>Total understorey projective foliage cover</b>		<b>90%</b>	

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia dealbata</i>	Silver Wattle
MS	<i>Hymenathera dentata</i> s.l.	Tree Violet
MH	<i>Sida corrugata</i>	Variable Sida
MH	<i>Oxalis perennans</i>	Grassland Wood-sorrel
MH	<i>Persicaria decipiens</i>	Slender Knotweed
SH	<i>Chamaesyce drummondii</i>	Flat Spurge
SH	<i>Azolla filiculoides</i>	Pacific Azolla
LTG	<i>Carex appressa</i>	Tall Sedge
LNG	<i>Phragmites australis</i>	Common Reed
LNG	<i>Eleocharis sphacelata</i>	Tall Spike-sedge
MTG	<i>Poa labillardierei</i>	Common Tussock-grass
MTG	<i>Chloris truncata</i>	Windmill Grass
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Aristida behriana</i>	Brush Wire-grass
MNG	<i>Pseudoraphis spinescens</i>	Spiny Mud-grass
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge

# EVC 56: Floodplain Riparian Woodland - Victorian Riverina bioregion

**Recruitment:**

Episodic/Flood - Desirable period between disturbances is 10 years.

**Organic Litter:**

40 % cover

**Logs:**

30 m/0.1 ha.

**Weediness:**

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
SH	<i>Trifolium glomeratum</i>	Cluster Clover	high	low

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# EVC/Bioregion Benchmark for Vegetation Quality Assessment

## Victorian Riverina bioregion

### EVC 803: Plains Woodland (*syn. Riverina Plains Grassy Woodland*)

#### Description:

An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with <600 mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present.

#### Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	15 / ha
<i>Eucalyptus largiflorens</i>	50 cm	
<i>Allocasuarina</i> spp.	40 cm	

#### Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus microcarpa</i>	Grey Box
	<i>Eucalyptus melliodora</i>	Yellow Box
	<i>Eucalyptus camaldulensis</i>	River Red Gum
	<i>Eucalyptus largiflorens</i>	Black Box
	<i>Eucalyptus leucoxylon</i>	Yellow Gum
	<i>Allocasuarina luehmannii</i>	Buloke

#### Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Medium Shrub	2	1%	MS
Small Shrub	1	1%	SS
Large Herb	1	5%	LH
Medium Herb	11	25%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	1	5%	LTG
Medium to Small Tufted Graminoid	15	45%	MTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Bryophytes/Lichens	na	10%	BL

#### LF Code

#### Species typical of at least part of EVC range

#### Common Name

MS	<i>Acacia montana</i>	Mallee Wattle
MS	<i>Acacia acinacea</i> s.l.	Gold-dust Wattle
MS	<i>Acacia pycnantha</i>	Golden Wattle
MS	<i>Pittosporum angustifolium</i>	Weeping Pittosporum
SS	<i>Pimelea curviflora</i> s.l.	Curved Rice-flower
SS	<i>Eutaxia microphylla</i> var. <i>microphylla</i>	Common Eutaxia
SS	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush
SS	<i>Sclerolaena diacantha</i>	Grey Copperburr
LH	<i>Ajuga australis</i>	Austral Bugle
LH	<i>Senecio quadridentatus</i>	Cotton Fireweed
MH	<i>Calocephalus citreus</i>	Lemon Beauty-heads
MH	<i>Maireana enchylaenoides</i>	Wingless Bluebush
MH	<i>Einadia hastata</i>	Saloop
MH	<i>Einadia nutans</i> ssp. <i>nutans</i>	Nodding Saltbush
SH	<i>Crassula sieberiana</i>	Sieber Crassula
SH	<i>Actinobole uliginosum</i>	Flannel Cudweed
SH	<i>Oxalis perennans</i>	Grassland Wood-sorrel
SH	<i>Calotis hispidula</i>	Hairy Burr-daisy
LTG	<i>Austrostipa aristiglumis</i>	Plump Spear-grass
MTG	<i>Austroanthonia caespitosa</i>	Common Wallaby-grass
MTG	<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily
MTG	<i>Austrostipa scabra</i>	Rough Spear-grass
MTG	<i>Enteropogon acicularis</i>	Spider Grass

# EVC 803: Plains Woodland (*syn. Riverina Plains Grassy Woodland*) - Victorian Riverina bioregion

## Recruitment:

Continuous

## Organic Litter:

10 % cover

## Logs:

10 m/0.1 ha.

## Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	<i>Lycium ferocissimum</i>	Boxthorn	low	high
LH	<i>Brassica tournefortii</i>	Mediterranean Turnip	high	high
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
LH	<i>Opuntia</i> spp	Prickly Pear	low	high
MH	<i>Gazania linearis</i>	Gazania	high	high
MH	<i>Spergularia rubra</i> s.l.	Red Sand-spurrey	high	low
MH	<i>Silene apetala</i> var. <i>apetala</i>	Sand Catchfly	high	low
MH	<i>Silene longicaulis</i>	Portuguese Catchfly	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover	high	low
MH	<i>Arctotheca calendula</i>	Cape Weed	high	low
MH	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover	high	low
MH	<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	high	low
MH	<i>Trifolium subterraneum</i>	Subterranean Clover	high	low
MH	<i>Hypochoeris glabra</i>	Smooth Cat's-ear	high	low
MH	<i>Trifolium dubium</i>	Suckling Clover	high	low
SH	<i>Trifolium glomeratum</i>	Cluster Clover	low	low
SH	<i>Medicago minima</i>	Little Medic	high	low
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	high	high
MTG	<i>Lolium rigidum</i>	Wimmera Rye-grass	low	low
MTG	<i>Schismus barbatus</i>	Arabian Grass	high	low
MTG	<i>Poa bulbosa</i>	Bulbous Meadow-grass	high	high
MTG	<i>Pentaschistis airoides</i> subsp. <i>airoides</i>	False Hair-grass	high	high
MTG	<i>Romulea rosea</i>	Onion Grass	high	high
MNG	<i>Bromus rubens</i>	Red Brome	high	high
MNG	<i>Vulpia myuros</i>	Rat's-tail Fescue	high	low
MNG	<i>Romulea rosea</i>	Onion Grass	high	low
MNG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MNG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MNG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MNG	<i>Aira elegantissima</i>	Delicate Hair-grass	high	low
MNG	<i>Juncus capitatus</i>	Capitate Rush	high	low
SC	<i>Asparagus asparagoides</i>	Bridal Creeper	high	high

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## Appendix 5 – Protected matters search tool report



# 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: 20/10/21 12:24:17

## [Summary](#)

### [Details](#)

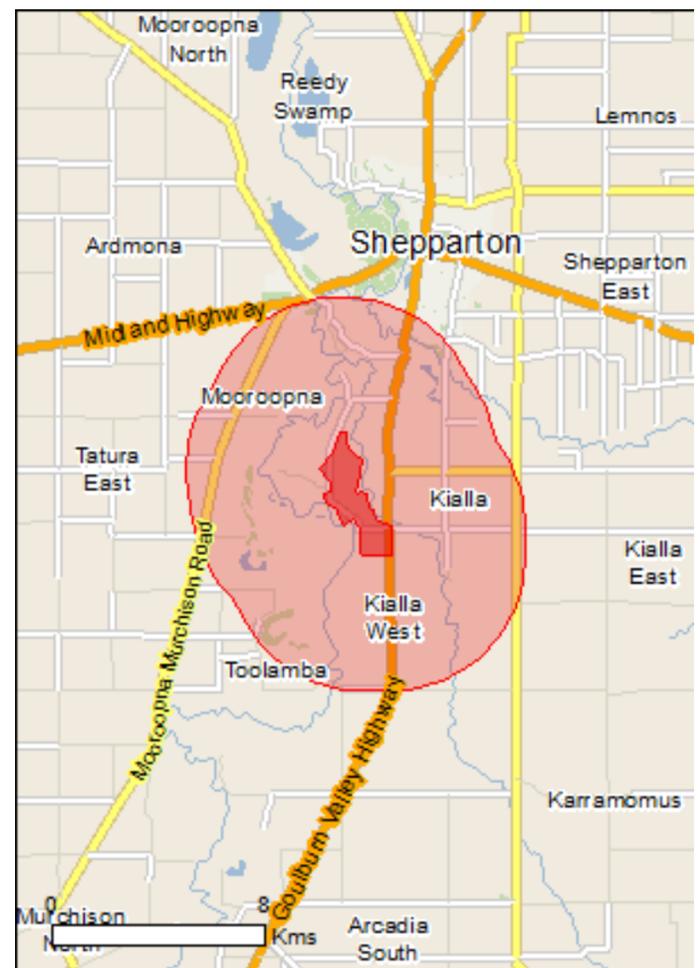
[Matters of NES](#)

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

[Extra Information](#)

### [Caveat](#)

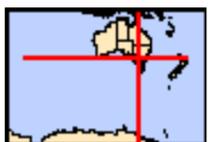
### [Acknowledgements](#)



This map may contain data which are  
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[Coordinates](#)

Buffer: 5.0Km



# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	6
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	5
<a href="#">Listed Threatened Species:</a>	28
<a href="#">Listed Migratory Species:</a>	12

## Other Matters Protected by the EPBC Act

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

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

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

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	18
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	32
<a href="#">Nationally Important Wetlands:</a>	2
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Banrock station wetland complex</a>	500 - 600km upstream
<a href="#">Gunbower forest</a>	50 - 100km upstream
<a href="#">Hattah-kulkyne lakes</a>	300 - 400km upstream
<a href="#">Nsw central murray state forests</a>	50 - 100km upstream
<a href="#">Riverland</a>	400 - 500km upstream
<a href="#">The coorong, and lakes alexandrina and albert wetland</a>	400 - 500km upstream

## Listed Threatened Ecological Communities [ Resource Information ]

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.

Name	Status	Type of Presence
<a href="#">Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions</a>	Endangered	Community known to occur within area
<a href="#">Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia</a>	Endangered	Community likely to occur within area
<a href="#">Natural Grasslands of the Murray Valley Plains</a>	Critically Endangered	Community may occur within area
<a href="#">Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains</a>	Critically Endangered	Community likely to occur within area
<a href="#">White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</a>	Critically Endangered	Community may occur within area

## Listed Threatened Species [ Resource Information ]

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Anthochaera phrygia</a> Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Grantiella picta</a> Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species

Name	Status	Type of Presence
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	habitat likely to occur within area Species or species habitat may occur within area
<a href="#">Pedionomus torquatus</a> Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Polytelis swainsonii</a> Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<b>Fish</b>		
<a href="#">Galaxias rostratus</a> Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Maccullochella macquariensis</a> Trout Cod [26171]	Endangered	Species or species habitat likely to occur within area
<a href="#">Maccullochella peelii</a> Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Macquaria australasica</a> Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
<b>Frogs</b>		
<a href="#">Crinia sloanei</a> Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area
<a href="#">Litoria raniformis</a> Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
<b>Insects</b>		
<a href="#">Synemon plana</a> Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<b>Plants</b>		
<a href="#">Amphibromus fluitans</a> River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Brachyscome muelleroides</a> Mueller Daisy [15572]	Vulnerable	Species or species habitat may occur within area
<a href="#">Lepidium monoplacoides</a> Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area
<a href="#">Pimelea spinescens subsp. spinescens</a> Plains Rice-flower, Spiny Rice-flower, Prickly Pimelea [21980]	Critically Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<a href="#">Sclerolaena napiformis</a> Turnip Copperburr [11742]	Endangered	Species or species habitat likely to occur within area
<a href="#">Senecio macrocarpus</a> Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area
<a href="#">Senecio psilocarpus</a> Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat may occur within area

#### Reptiles

<a href="#">Aprasia parapulchella</a> Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
<a href="#">Delma impar</a> Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	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
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#### Migratory Marine Birds

<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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#### Migratory Terrestrial Species

<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area

#### Migratory Wetlands Species

<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

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

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

Name	Threatened	Type of Presence
<b>Birds</b>		

<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
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<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
--	--	--

<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
--	--	--

<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
--	--	--

<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
---	--	--

<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
--	--	---

<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
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<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
--	------------	--

Name	Threatened	Type of Presence
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

## Extra Information

State and Territory Reserves	[ Resource Information ]
Name	State
Arcadia SS.R.	VIC
Goulburn River	VIC

## Invasive Species [ Resource Information ]

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

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<b>Mammals</b>		
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
Lepus capensis Brown Hare [127]		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
<b>Plants</b>		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area  Species or species habitat may 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
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323] Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area  Species or species habitat likely to occur within area

Nationally Important Wetlands		[ Resource Information ]
Name		State
<a href="#">Lower Broken River</a>		VIC
<a href="#">Lower Goulburn River Floodplain</a>		VIC

# Caveat

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

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

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

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

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

## Coordinates

-36.429446 145.371615,-36.429722 145.374018,-36.432554 145.374275,-36.434902 145.376421,-36.436904 145.379597,-36.444223 145.377966,-36.444707 145.37685,-36.44588 145.377537,-36.445535 145.378824,-36.446087 145.380627,-36.449678 145.381743,-36.450644 145.382773,-36.452853 145.383717,-36.454165 145.38715,-36.454441 145.389124,-36.462863 145.38921,-36.462863 145.378996,-36.462311 145.37891,-36.455063 145.37891,-36.453199 145.37625,-36.454579 145.373589,-36.451473 145.370671,-36.450506 145.370928,-36.448504 145.367323,-36.446018 145.366207,-36.445535 145.368954,-36.44298 145.368696,-36.439597 145.364834,-36.435247 145.369211,-36.429446 145.371615

# Acknowledgements

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- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-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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