

Flora and Fauna Assessment

Kooyong Park Sustainable Development - Stage 2 Local Environment Plan Rezoning

(LEP amendment under the "gateway system" of DoP)

Moama

NSW

Prepared for
Perpetual Green Developments Pty Ltd
November 2011

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Creating a Sustainable Future

FIRE

ENERGY

SOILS

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Address of Site	Moama Street, Moama, NSW 2731
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Name of Project Manager	Mr. Matthew O'Farrell
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County	Cadell
Parish	Moama
Title details	Lot 1 DP 1098204 and Lots 1 & 2 DP1078090
Development Application No	Addendum to the LES

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Report Checklist

Location map.	Yes
Aerial photograph of the proposed development site.	Yes
Complete plant list categorised according to whether they are native or exotic.	Yes
Description of vegetation structure.	Yes
Description of the condition and integrity of the vegetation	Yes
Assessment of the plant communities and if they have adequate representation in conservation reserves or are otherwise protected.	Yes
Vertebrate fauna list (including the scientific names).	Yes
Vertebrate fauna species which are protected threatened or listed under any international agreement.	Yes
A list of those vertebrate fauna species known or likely to breed in the area.	Yes
A list of vertebrate fauna species which have specific habitat requirements within the area.	Yes
A list of known or likely threatened species (flora and fauna) as listed under Schedules 1 and 2 (<i>Threatened Species Conservation Act 1995</i>) which might occur at the site.	Yes
Assessment of the requirements of SEPP No. 44 Koala Habitat Protection	Yes
'Seven Part Test of Significance' for threatened flora and fauna recorded or likely to be recorded on the development site.	Yes
Assessment of the significance of the impact of the development at both the site and at the regional scale on flora and fauna.	Yes

Flora and Fauna Assessment

"Kooyong Park Sustainable Development - Stage 2"

Executive Summary

This report has been provided as an addendum to a Local Environment Study (LES) provided by Coombe's Consulting in 2008 and forms part of the Department of Planning "Gateway Planning Process" for a rezoning of cleared agricultural land (~47 ha) bordered by Moama Street, Holmes Street and parts of Old Deniliquin Road, approximately 1.5 km east of central Moama. While the **rezoning** encompasses the entire property (47 ha) the proposed **development** area would exclude the 6.68 ha "home block" at the present time.

This report provides information on site habitat, flora and fauna and provides mitigation measures to address relevant environmental issues at the site of the proposed Kooyong Park Sustainable Development Stage 2, located 1.5 km east of the Moama township centre. Council approval for Stage 1 (15 Lots 4.63 ha) on Part of Lot 1 DP 1098204 was provided in 2010.

The report was prepared following field investigations and database research relating to the site. The study area includes:

- (i) The farm area (~ 47 ha), the homestead site; and
- (iii) Roadside Reserve areas, adjacent the agricultural area.

The key findings with regard to **flora** are:

1. There is extremely limited floristic diversity in both the farm area and the proposed development area.
2. The only possibly threatened flora species listed as Vulnerable is the Slender darling pea (*Swainsonia murrayana*). The species was not found on the site and is not recorded in the within 9 km of the site.

The key findings with regard to **fauna** are:

1. There were no threatened fauna species found within the 47 ha farm area.

Various habitat enhancement measures have been recommended and will be incorporated into a series of management plans these include:

- Environmental Design (including resource efficiency) and Vegetation - Landscape Plan;
- Environmental Management Plan (Operational phase);
- Infrastructure Design and Management Plan;
- Traffic Management Plan;
- Fire and Flood Management and Emergency Plan.

The proposed development offers substantial opportunities to improve habitat with extensive revegetation and landscape development, including a wetland.

Flora and Fauna Assessment

"Kooyong Park Sustainable Development - Stage 2"

Introduction

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Specifically, this report provides information on habitat, flora and fauna and provides mitigation measures to address relevant environmental issues at the site of the proposed Kooyong Park Sustainable Development Stage 2 located 1.5 km east of the Moama township centre. Council approval for Stage 1 (15 Lots 4.63 ha) on Part of Lot 1 DP 1098204 was provided in 2010.

The report was prepared following field investigations and database research relating to the site. The study area includes:

- (i) The farm area (~ 47 ha), the homestead site; and
- (iii) Roadside Reserve areas, adjacent the agricultural area.

The area (Figure 1) where development is to be concentrated (footprint area) is the 47 ha, surrounded by Moama Street, Holmes Street and Old Deniliquin Road, approximately 500 m east of Moama.

The site topography is flat and since having been cleared in the 1870's the land has been used for dryland cereal cropping and irrigated pasture. The property is surrounded by well vegetated road reserves. Surrounding land use includes hobby farming with grazing and some cropping on larger holdings.

The flora and fauna assessment has been prepared in order to satisfy the requirements of the NSW Environment and Planning Assessment Act 1979 and Threatened Species Conservation (TSC) Act 1995 which identifies and protects native plants and animals in danger of becoming extinct. The TSC Act also provides for species recovery and threat abatement programs.

While the site is remote from the Murray River, the river's classification as an Endangered Ecological Community (EEC) (DPI 2009) means that off-site impacts must be considered in relation to the Murray River downstream of Hume Weir.

Threatened species within Murray Shire consist of 19 fauna species considered Vulnerable and 5 considered Endangered; while for flora there are 2 Vulnerable, 3 Endangered and 1 Critically Endangered species (NPWS Wildlife Atlas 2009).

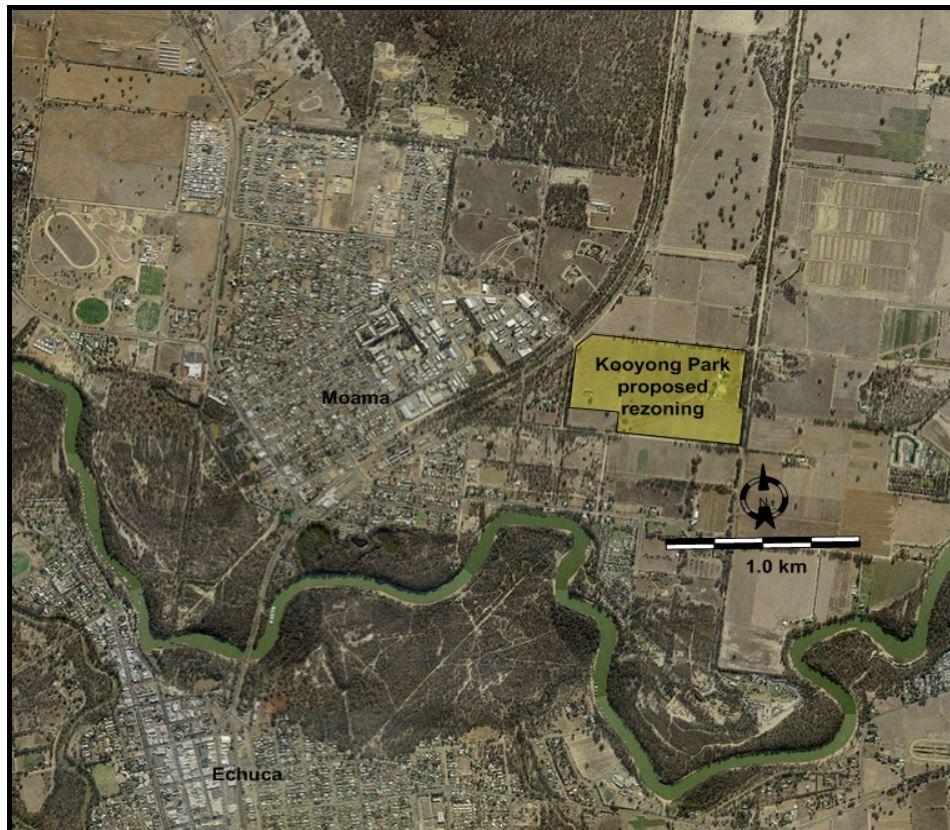


Figure 1. Location of rezoning and development site

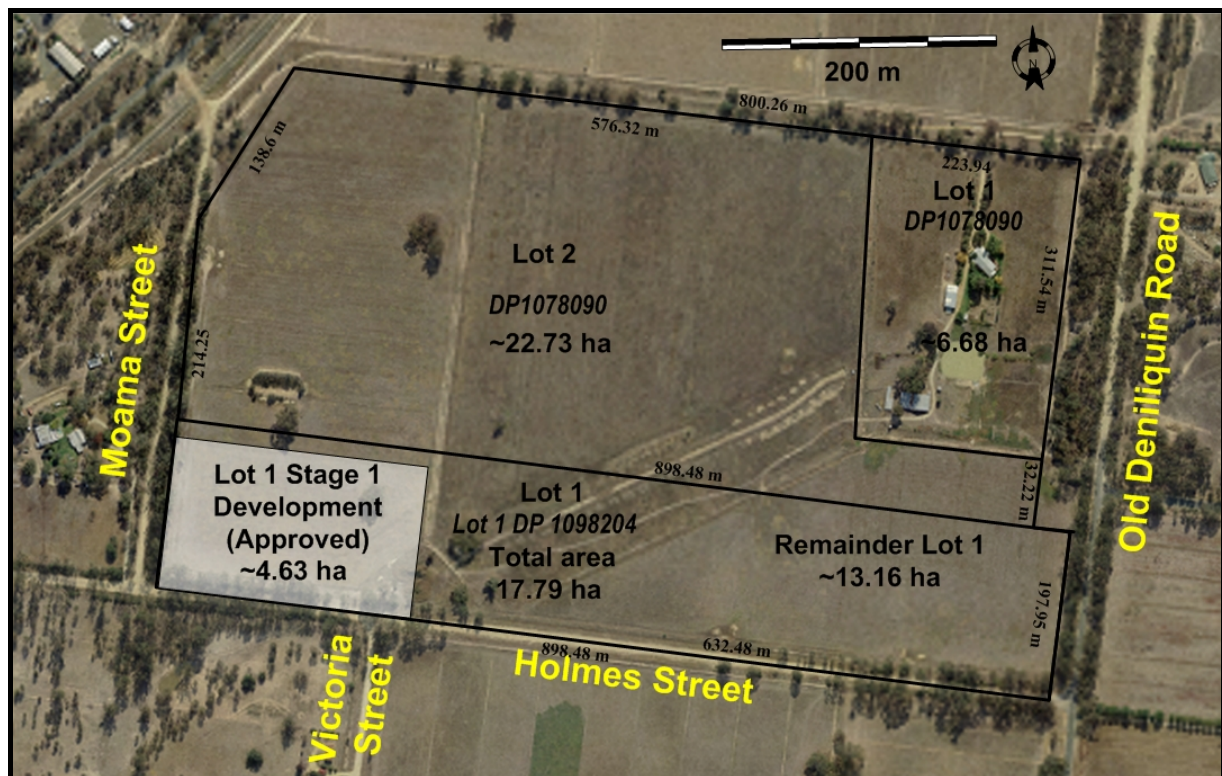


Figure 2. Proposed rezoning/development area and surrounding survey area

1. Policy and Planning Instruments

There are a number of State, regional and local policy and planning instruments guiding development and protection of habitat in and around Murray Shire.

The Murray Shire Local Environment Plan 1989 and the Development Control Plan (DCP) 2005 reinforce the aims and objectives of the Murray Regional Environmental Plan No 2, particularly in relation to habitat protection; other planning instruments include Murray Shire's Strategic Land Use Plan (SLUP) and Biocertification overlay (discussed below).

Policy Framework

The NSW Regulatory framework in relation to flora and fauna is governed by the Environment and Planning Assessment Act 1979. The Act provides for a Seven Part Test, which determines if a Species Impact Statement should be prepared under the Threatened Species Conservation (TSC) Act 1995. If threatened species are confirmed or likely to be in an area, the Seven Part Test should be applied.

The objects of the TSC Act are as follows:

- (a) Conserve biological diversity and promote ecologically sustainable development;
- (b) Prevent the extinction and promote the recovery of threatened species, populations and ecological communities;
- (c) Protect the critical habitat of those threatened species, populations and ecological communities that are endangered;
- (d) Eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities;
- (e) Ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed; and
- (f) Encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

Murray Regional Environmental Plan No 2

Murray Regional Environmental Plan No 2 (MREP No 2) - Riverine Land (Environmental Planning and Assessment Act 1979). Regulation 8 of the MREP No 2 applies when:

- (a) Council prepares any Local Environmental Plan (LEP), or
- (b) A consent authority determines a development application, or

- (c) A public authority or person proposes to carry out development, which does not require development consent, but which has the potential to adversely affect the riverine environment of the River Murray.

The objectives of the MREP No 2 are:

- To ensure that appropriate consideration is given to development with the potential to adversely affect the riverine environment of the River Murray, and
- To establish a consistent and co-ordinated approach to environmental planning and assessment along the River Murray, and to conserve and promote the better management of the natural and cultural heritage values of the riverine environment of the River Murray.

Within the context of the proposal appropriate consideration will be given to the design, so that rather than adverse effects, favourable outcomes are generated for the riverine and floodplain environment. For example, the development will incorporate protection measures and extension of habitat for various local wildlife species.

Lower Murray Ecological Community

This ecological community is listed as an endangered ecological community in NSW, meaning that it is likely to become extinct in nature, unless the circumstances and factors threatening its survival and evolutionary development cease to operate. However, artificial canals, water distribution and drainage works, farm dams and off stream reservoirs are excluded from the aquatic ecological community.

Murray Local Environmental Plan (LEP) 1989

Planning decisions within Murray Shire are principally controlled by the provisions of the LEP, as amended. The general aims of the LEP are:

- To encourage the proper management, development and conservation of natural and man made resources within the Shire of Murray by protecting, enhancing or conserving:

2(a) Areas of high scenic or recreational value

- To replace the existing planning controls with a single local environmental plan to help facilitate growth and development of the Shire of Murray in a manner which is consistent with the aims specified in paragraph 2(a).

Murray Development Control Plan

The Murray Development Control Plan (DCP) 2005 provides for the community an indication of Council's preferred approach to acceptable standards for development within the Murray Shire. Several chapters of the DCP are relevant to the development, but in the context of flora and fauna, protection of vegetation and landscaping are considered to be the most important matters.

Strategic land Use Plan (SLUP)

The purpose of the Strategic land Use Plan (SLUP) is to assist in:

- Preparing a new Shire-wide Local Environmental Plan;
- Providing the community with a degree of certainty for the location of various land uses in the future;
- Maintaining in production agricultural land not required for urban expansion;
- Protecting the riverine environment from use and development detrimental to it;
- Separating incompatible land uses;
- Reducing development speculation;
- Considering tourist development proposals; and
- Discouraging development on flood prone land.

The Strategic Land Use Plan (SLUP) indicates that the property is proximal to an area subject to environmental flooding. In this instance the proposed development site is protected by a licenced levee.

Shire Planning Scheme Bio-Certification

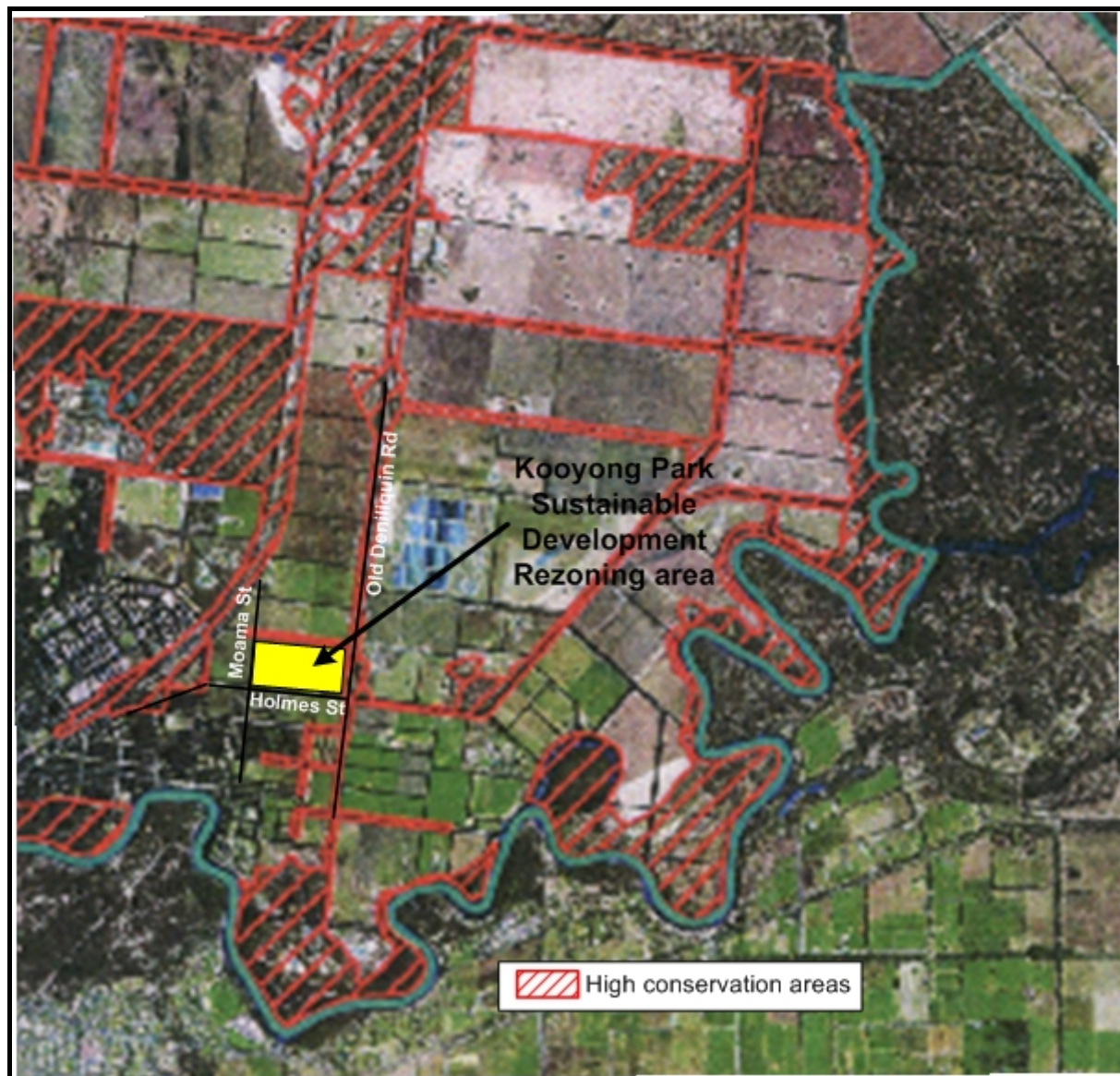


Figure 3. Biocertification - high conservation areas (marked red).

Biodiversity Certification has the potential to protect important biodiversity areas whilst, in turn, streamlining development considerations outside the areas of importance.

The property lies within the Shire Planning Scheme Bio-Certification area and the Grey box/Red gum woodland remnants at the northern side of the agricultural area (~40 ha, Figure 3) and along Old Deniliquin Road are marked as being of high conservation value, but will be enhanced with additional vegetation corridor links throughout the development area. The roadsides along the relevant sections of Holmes and Moama Streets are not mapped as High Conservation Value (Figure 3).

In this instance there is no area where bio-certification can be sought, but the underlying environmental protection principles will be applied as indicated by additional corridor development and landscaping plans related to the proposal.

2. Proposed Development Overview

The land is zoned General Rural 1(a) under the Murray Local Environmental Plan (LEP) 1989, as amended. It should also be noted that the site is adjacent to a low hazard floodway (1:200 ARI)¹ and has a licenced levee protecting it from flooding (refer Groundwater and Flooding Report).



Figure 4. Flora and fauna study zones within Kooyong Park

The rezoning and proposed development area is approximately 47 ha and is currently used for agricultural purposes. The 4.6 ha area in the south west sector, was previously approved for lot consolidation (Stage 1). A more detailed plan of the proposed development is provided in **Error! Reference source not found.** The proposed Kooyong Park Sustainable Development will involve the development of 198 home lots not including the 15 blocks in the SW corner of the development.

Significant revegetation and landscaping works (e.g. wetland-detention storages), including substantial numbers of indigenous plants, will accompany the development. Special care will be taken to ensure that environmental weed species are not used in any revegetation and landscape works. Other sustainable development initiatives will accompany the development and are discussed in the various related reports supplied to Murray Shire.

¹ Figure 4. Murray Shire (2004) Moama Development Strategy Final Draft Report 2004. Mathoura NSW.

3. Development Impacts and Mitigation

Threatening processes

The impacts of the proposal will affect the agricultural area, the development site and roadside areas in different ways as listed in Table 1. One of the threatening processes listed is clearing of native vegetation, leading to loss of shelter. The proposed development does not involve any clearing within the agricultural area. Remnant vegetation will be preserved on the site.

A limited area (~50 m²) of roadside vegetation will need to be cleared on Old Deniliquin road to provide an entry point to the development. This will involve removal of a few dead or suppressed dying trees without hollows that do not constitute a sheltering habitat. Roadside trees with elevated large canopy will be retained as much as is practicable. Any loss of roadside vegetation will be compensated for by the elimination of stock and grazing and establishment of a regenerated habitat (offset) area around the proposed wetland-water storages. Offsets are to be managed to promote an increase in biodiversity value for the landscape, so the net effect of any clearing is not negative.

Consultation with the Murray Catchment Management Authority (MCMA) indicated that an exemption for the appropriate clearance is likely to be provided under the Native Vegetation Act 2003 and would be subject to approval by Murray Shire as the land manager. Detailed assessment by MCMA will be conducted following approval of the development by Murray Shire. The proposed development site is already highly degraded in terms of habitat, the impacts of the proposal on the flora and fauna utilising the site in the future can be viewed as positive, if the mitigation measures in Table 1 and outlined below are adopted.

Due to the already environmentally degraded nature of the proposed development site, it is not considered to act as a corridor, migratory route, or provide a drought refuge to flora and fauna. The maintenance of the potentially hollow bearing trees on the property will provide a resource for those species dependent on hollows.

Domestic pets and predation

Responsible pet ownership will be a requirement for the site. In such instances specific requirements for pet management (e.g. no roaming cats and dogs) will assist in reducing the threat and potential for conflict with wildlife values.

Vegetation

While no specific constraints will apply in relation to landscape planting on specific lots, the pre-sale establishment of buffers between blocks and landscape plantings, using indigenous and native species, will boost the habitat and feeding opportunities, particularly for native birds, bats and insects.

Runoff

Runoff will be increased as a result of the introduction of hard surfaces, such as houses, roads and driveways.

Water quality will be enhanced by filtering sediment and other particulates using water sensitive urban design measures. Runoff from house and shed roofs will be largely stored and used within the households, or within the individual properties. Any excess will be held in the wetland-detention storage.

All runoff from events up to 1:5 ARI will be captured and directed to a detention storage-wetland habitat area. Properly designed runoff and detention storage areas can create habitat for vulnerable species and naturally filter runoff.

Figure 5. Protected drainage into a detention and water storage site - wetland habitat



Table 1. Development impacts and mitigation measures

Location	Impact/Activity	Mitigation
Development site	Increased runoff from hard surfaces with potential for water quality decline of the aquatic environment during and following construction.	i) Subsurface sand filtration, sediment control barriers and runoff detention basins. Construction of detention basin and wetland for water renovation.
	Nutrient accessions through surface and subsurface systems to the Murray River.	i) System design in accord with DECC and NSW Office of Water requirements ii) Ensure that any use and development of the land will not be detrimental to the quality of water of the Murray River.
	Noise, litter, pollution from human/vehicle activity.	i) Prepare appropriate plans for the site development and management including: <ul style="list-style-type: none"> Environmental Design (including resource efficiency) and vegetation - Landscape Plan; Environmental Management Plan (Operational Phase); Infrastructure Design and Management Plan; Fire and Flood Management and Emergency Plan. Ensure that the density, design and types of activities that occur will be buffered and act to enhance the habitat and amenity of the area. Recreational activities to be of a passive nature. II) Vehicles such as motor bikes (also including go carts) permitted for transport/commuter use only. No recreation use allowed on property.
	Reduced runoff (decreased area available) to recycle storage.	i) No mitigation measures required, but design development to cater for the natural flow of any significant rainfall events.
Roadside areas	Feral animal predation.	i) Embargo on domestic pets, pets to be contained within the property, except when under supervision.
	Loss of ground habitat. firewood gathering.	i) Signage highlighting protection requirements (review conservation status). Embargo on rubbish fires. and incinerators. Cooking fires permitted as per RFS regulation.
	Noise and activity of construction equipment causing disturbance of nesting and foraging habits.	i) Environmental Management Plan (Construction Phase); ii) Minimise earthmoving and disturbance activities close to large tree and roadsides.

4. Flora and Fauna Assessment

Methodology

The area was assessed as required by the Environment and Planning Assessment Act 1979 and the Threatened Species Conservation Act 1995.

The location of the proposed development site is provided in Figure 1 and a detailed plan view in Figure 4. The flora and fauna assessment of the proposed Kooyong Park Development (1.5 km east of central Moama) was undertaken on the 10th, 18th February (day and evening visit) and 25th February 2010.

The following methodologies were adopted to survey the flora and fauna on the site of the proposed facility:

- Flora and fauna transects/searches across irrigation bays.
- Recording of birds and other animal species present at the time of the survey.
- Observation of predator scats.
- A search of the Atlas of New South Wales Wildlife Atlas database.

The investigation takes into account species occurring within the locality (15 km) as well as species that are likely to be or were found on the study areas.

Results

Habitats

Grassland

The larger agricultural area and the development site (46 ha including the 9 ha development) is classed as "grassland". Within the footprint of the development there are several large Red gums (*E. camaldulensis*) all of which will be retained. The trees are not close enough to bring the area into a woodland classification. Notably, except for the large Red gums, past grazing and cropping has eliminated native flora that might be considered as important habitat for native species.

The irrigation bays and open grazing areas of the agricultural land and development site are dominated by Barley grass (*Hordeum leporinum*), Quena (*Sloanea esuriens*), Heliotrope (*Heliotropium europaeum*) and Wireweed (*Polygonum aviculare*) typical of grazed agricultural sites on the riverine plain.

Woodland

Prior to settlement it is likely that substantial parts of the property were covered by River Red gum (*Eucalyptus camaldulensis*), Grey box (*E. microcarpa*) and Black box (*E. largiflorens*) woodland with wattles and a grassy understorey. These communities are found on the surrounding floodplain with representative remnants on the roadside.

The roadside reserves are dominated by Red gum (*Eucalyptus camaldulensis*), Grey box (*E. microcarpa*) and Black box (*E. largiflorens*). The condition of the canopy on the roadsides varies with some trees almost bare, while others have relatively healthy canopies with up to 85 percent foliage cover (PFC).

At the mid-storey level, on the roadside areas, there is regenerating Red gum (5-10 years old, PFC ~90%) and Dwarf cherry (*Exocarpos strictus*). Growth of the lower stratum is limited by the dominant eucalypt overstorey, leaf litter fall and summer dry conditions. Stunted rush plants (*Juncus aridicola*), native and introduced grasses (Refer Appendix 3) were evident in exposed areas.

A complete flora list for the Murray Shire 1:100,000 mapsheet is provided in Appendix 3. A total of 458 species are recorded for Murray Shire. Species identified on and around the development area (9 ha) and the wider agricultural area (46 ha) as well as the roadside reserves are indicated by shading in the flora list (Appendix 3).

A search (20/2/2010) of the Atlas of New South Wales Wildlife found no threatened species records for the proposed development site. Other studies (Lane 2007) found River swamp wallaby grass (*Amphibromus fluitans*) along the Murray River at the end of Old Deniliquin Road (~1 km) from the study site. No suitable viable habitat for River swamp wallaby grass currently exists within the subject study area.



Figure 5. The development footprint area



Figure 6. Red gum woodland vegetation on Moama Street

Potential wetland sites

Two dams are located on the property one is ephemeral (seldom fills) and shallow; while the other is a permanent storage for stock and domestic use and within the house area excluded from this assessment.

SEPP No. 44 Koala Habitat Protection

The proposed development is located within Murray Shire and the area is listed on Schedule 1 (Amendment No. 1) of State Environmental Planning Policy (SEPP) No. 44 and is therefore considered to be within the known distribution of the Koala (*Phascolarctos cinereus*) within New South Wales. The proposed development site does not support "core Koala habitat" (i.e. *"an area of land with a resident population of Koalas, evidenced by attributes such as breeding females and recent sightings of and historical records of a Koala population"*).

On the adjacent roadsides the percentage of River Red gums in the overstorey meet the requirements for potential Koala habitat. "Potential Koala habitat" is defined as "areas of native vegetation where the trees of types listed in Schedule 2 of SEPP No 44 "constitute 15% of the total number of trees in the upper or lower strata of the tree component".

No sightings of Koala were recorded for the roadside areas. The NPWS Atlas of NSW Wildlife records one sighting ~15 km to the west of Moama. More commonly, sightings occur in the Moira and Milewa State Forest, 30-40 km to the north of the proposed development.

Commonwealth EPBC Act 1999

The *Environment and Biodiversity Conservation Act 1999* contains a list of threatened and migratory species together with ecological communities. If there is the potential for a significant impact on nationally threatened species or communities, or listed migratory species then under the Act a referral to the Minister should be considered.

Flora species listed as vulnerable that could be encountered include River swamp wallaby grass, Slender Darling-pea and Western water starwort (*Callitriche cyclocarpa*).

Western water starwort has only been recorded in NSW on the floodway from the Murray to Wakool River, about 26 km NNW of Swan Hill. It also grows in Victoria in damp and swampy habitats as well as River Red Gum (*Eucalyptus camaldulensis*) open woodland with an open grassy understorey dominated by *Paspalidium jubiflorum* along river banks, and with Wallaby grasses (*Austrodanthonia setacea* and *A. caespitosa*) on ground less-frequently inundated.

Examples of fauna species listed and possibly occurring (but not observed) in the area include the Superb parrot (*Polytelis swainsonii*), Barking owl (*Inox connivens*) and the Brown treecreeper (*Climacteris picumnus*). The proposed development may enhance the habitat for these and other species, if grassland is allowed to develop around the wetland-water storage and more indigenous/native trees are planted on the site.

The removal of a small area of roadside vegetation for road construction will not impact on any of the flora and fauna species listed under the Commonwealth EPBC Act 1999. With revegetation around the wetland-water storage, habitat opportunities may be enhanced.

Environment and Planning Assessment Act 1979 and the Threatened Species Conservation Act 1995.

Threatened Flora

No threatened flora, were identified as being present on the footprint area, or on the adjacent roadside reserves. Within Murray Shire, the Atlas of NSW Wildlife lists ten protected (P13), vulnerable (V), endangered species (E1) or critically endangered flora species (E4A); these are listed below together with comments relating to the site or geographic proximity of the relevant species. Small scurf pea has also been considered even though not listed as having been found in Murray Shire.

Common Billy-buttons (*Craspedia variabilis*) P13 - Not recorded at site, Nearest 30 km north near Mathoura.

Drumsticks (*Pycnosorus globosus*) P13 - Recorded 35 km to NW of site.

Floating Swamp Wallaby-grass (*Amphibromus fluitans*) V – nearest record Moama 1 km SE. Mostly requires permanent water. No suitable, viable habitat on study site.

Lowly greenhood (*Pterostylis despectans*) E4A - The only known population is restricted to a small area within the Yellow Water Hole at Barnes Crossing Travelling Stock Reserve (TSR Riverina 120; about 10 km north-east of Moama).

Pink fingers (*Caladenia carnea var carnea*) P13 – Requires gravelly soils (North of Mathoura).

Tall mulla mulla (*Ptilotusexaltatus var. exaltatus*) P13 - Soils too clayey.

Turnip copperburr (*Scleroleana napiformis*) E1 - Not observed on-site (Closest Barnes Crossing Cobb H'way).

Round-leaved wilsonia (*Wilsonia rotundifolia*) E1 - No suitably saline habitat (Closest Bunaloo).

Slender darling pea (*Swainsonia murrayana*) E1 - Not observed on-site. Slender Darling Pea has been recorded from heavy clay and clay loam soils including Bladder Saltbush and grassland communities (Cunningham *et al.* 1992). (Closest Barnes Crossing)

Scented sun orchard (*Thelymitra megcalyptra*) E1 - Nearest recorded occurrence between Moama and Mathoura.

Small scurf pea (*Cullen parvum*) E1 - Not recorded in Murray Shire, although there is the potential for it to grow on the site in seasonally wet areas.

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Table 2. Summary of Seven Part Test for Flora

Threatened Species Seven Part Test of Significance		Adverse effect on lifecycle risk of extinction	Endangered population, likely to be placed at risk of extinction	In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed		In relation to the habitat of a threatened species, population or ecological community						In relation to the habitat of a threatened species, population or ecological community	
				Adverse effect on the extent of the ecological community,	Substantially and adversely modify the composition of the ecological community	Extent to which habitat is likely to be removed or modified as a result of the action proposed	If habitat is to be fragmented or isolated from other areas of habitat as a result of the proposed action	Connection to other areas	Importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality	Any adverse effect on critical habitat	If action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan	If action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of a key threatening process	
<i>Amphibromus fluitans</i>	Floating swamp wallaby-grass V	No	No	No	No	No	No	No	Positive modification	No	No	No	No
<i>Caladenia carnea</i> var <i>carnea</i>	Pink fingers P13	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Cullen parvum</i>	Small scurf pea E1	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Lepidium monoplocoides</i>	Winged peppercress E1	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Pterostylis despectans</i>	Lowly greenhood E4A	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Ptilotusexaltatus</i> var. <i>exaltatus</i>	Tall mulla mulla P13	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Sclerolaena napiformis</i>	Turnip copperburr E1	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Swainsona murrayana</i>	Slender darling pea V	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Thelymitra megalyptra</i>	Scented sun orchid E1	No	No	No	No	No	No	No	Not important	No	No	No	No
<i>Wilsonia rotundifolia</i>	Round-leaved wilsonia E1	No	No	No	No	No	No	No	Not important	No	No	No	No

Seven Part Tests for Flora

The following information addresses questions relating to the development footprint. Although no threatened flora were found, comments relating to flora and the Seven Part test are provided below. In addition, a summary Seven Part Test table has been prepared (Table 2) for all listed threatened flora and detailed comments prepared for the one flora species - Slender Darling Pea (*Swainsona murrayana*), that could possibly be (but unlikely) found on the development site.

Slender Darling Pea (*Swainsona murrayana*)

This species cannot be confirmed as being present or absent, so a precautionary approach has been taken and the seven part test applied.

- a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

Although no individuals of the Slender Darling Pea were found, there is potential habitat that will be developed that could support the Slender Darling Pea. A search (20/5/2009) of the Atlas of NSW Wildlife found no additional records for this species within 5 km of the proposed development site.

- b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

There are no endangered populations of the Slender Darling Pea listed on the schedules of the *Threatened Species Conservation Act 1995*.

- c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
- *Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
 - *Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

There are no endangered ecological communities or critically endangered ecological communities of the Slender Darling Pea listed on the schedules of the *Threatened Species Conservation Act 1995*.

- d) *In relation to the habitat of a threatened species, population or ecological community:*
- *The extent to which habitat is likely to be removed or modified as a result of the action proposed, and*

The development area is at present (due to grazing) unlikely to provide suitable habitat for Slender Darling Pea.

- *Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

There is no suitable habitat area under the current land use. The proposal will only enhance opportunities for connectivity, should they exist.

- *The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;*

As there are no records (Atlas of NSW Wildlife, 2010) of the Slender Darling Pea from the area surrounding the proposed development site it is therefore difficult to determine the importance of the potential habitat. The Slender Darling Pea has been recorded from a few of locations within Murray Shire, the closest being 9 km to the north at Barnes Crossing (NPNSW Wildlife Atlas).

- *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);*

There will be no critical habitat affected by the proposal, as there is no critical habitat listed for the Slender Darling Pea on the Register of Critical Habitat.

- *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

There is no recovery or threat abatement plan for the Slender Darling Pea specifically covering the locality. Furthermore, since no suitable habitat has been identified, there should be no need for action in relation to recovery or threat abatement plans. The elimination of grazing from both the agricultural and forest areas will assist in plant regeneration if seed or plant material were to be present.

- *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of a key threatening process.*

The proposed development actions do not constitute part of any key threatening process over and above those already occurring (grazing and cropping).

Threatened Fauna

A complete fauna list is provided in Appendix 3. A total of 239 animal species have been recorded in Murray Shire 1:100,000 mapsheet (NPNSW Wildlife Atlas 2010). 31 vertebrate species were recorded for the agricultural area, the development site and the roadsides, including two introduced fauna species (Fox - *Vulpes vulpes* and Brown hare - *Lepus capensis*). These are highlighted in the Murray Shire Fauna List (Appendix 3).

No threatened birds or reptiles were recorded on or close to either the agricultural area or the proposed development footprint during the site assessments.

In assessing habitat for vertebrate fauna species recorded within the Shire, none had habitat requirements that were specific to the site. The local area has similar sites nearby for both Open Grassland and Woodland. Vertebrate species recorded are considered ubiquitous, occupying many locations with similar habitat along the Murray corridor.

It is possible that the Yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*) is present. However, it generally requires tracts of forest in excess of 100 ha for habitat and foraging. This could be achieved in areas closer to the river and it is possible that both sides of the Murray River are utilized by the bats. The nearest record for this species is from the Milewa Forest some 40 km to the north of the study site. Similarly, the Large-footed myotis (*Myotis adversus*) utilises tree hollows and forages in the open, as well as forested environments. The nearest record of this species is in the Moira Forest some 30 km to the north of the site. A precautionary management approach will involve protection of the existing large Red gum habitat trees for these and other hollow dwelling species.

The Squirrel glider (*Petaurus norfolcensis*) is a potential inhabitant of hollow bearing trees located on road reserves and in paddocks. The large remnant Red gums within the development footprint may house the species, but since the species was not observed on the site its presence or absence could not be confirmed. Since potential habitat trees will be unaffected by the proposal there are not expected to be any adverse effects on the species were they to occur in the area.

Seven Part Test for Fauna

The majority of listed threatened fauna species for the Murray 1:100,000 mapsheet are not regular inhabitants of the site and the site does not provide for many of their specific requirements. The test is therefore of limited applicability to most of the species listed. Table 3 that follows is a summary of the Seven Part Test relating to fauna.

Table 3. Summary of Seven Part Test for Fauna

Threatened Species Seven Part Test of Significance		Adverse effect on lifecycle of extinction	Endangered population, likely to be placed at risk of extinction	In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed will		In relation to the habitat of a threatened species, population or ecological community							In relation to the habitat of a threatened species, population or ecological community
				Adversely affect the extent of the ecological community	Substantially and adversely modify the composition of the ecological community	Extent to which habitat is likely to be removed or modified as a result of the action proposed	If habitat is to be fragmented or isolated from other areas of habitat as a result of the proposed action	Connection to other areas	Importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality	Any adverse effect on critical habitat	If action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan	If action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of a key threatening process	
Scientific name	Common name and presence comment												
Botaurus poiciloptilus	Australasian bittern V Seasonal No suitable habitat	No	No	No	No	No	No	No	Not important	No	No	No	
Burhinus grallarius	Bush stone-curlew E1 Unlikely b/c disturbed habitat, No cover	No	No	No	No	No	No	No	Not important	No	No	No	
Cinclosoma castanotus	Chestnut quail-thrush V Possible, but limited suitable habitat	No	No	No	No	No	No	No	Not important	No	No	No	
Climacteris picumnus	Brown treecreeper V Possible, poor habitat	No	No	No	Improved	Improved	No	Improved	Not important	No	Yes	No	
Grus rubicunda	Brolga V Possible, limited suitable habitat	No	No	No	No	No	No	No	Not important	No	No	No	
Grantiella picta	Painted honeyeater V Possible	No	No	No	No	No	No	No	Not important	No	No	No	
Inox connivens	Barking owl V Possible	No	No	No	No	No	No	No	Not important	No	No	No	
Lathamus discolor	Swift parrot E1 Possible but unlikely	No	No	No	No	No	No	No	Not important	No	No	No	
Melithreptus gularis gularis	Black-chinned honeyeater (eastern)	No	No	No	No	No	No	No	Not important	No	No	No	

	subspecies) V Possible but unlikely											
Pachycephala inornata	Gilbert's whistler v Possible	No	No	No	No	No	No	No	Not important	No	No	No
Phascogale tapoatafa	Brush-tailed phascogale v Possible but unlikely	No	No	No	No	No	No	No	Not important	No	No	No
Phascolarctos cinereus)	Koala v Possible	No	No	No	No	No	No	No	Not important	No	No	No
Pedionomus torquatus	Plains-wanderer E1 Possible but unlikely	No	No	No	No	No	No	No	Not important	No	No	No
Pyrrholaemus saggitatus	Speckled warbler v No suitable habitat	No	No	No	No	No	No	No	Not important	No	No	No
Melanodryas cucullata	Hooded robin v Possible	No	No	No	No	No	No	No	Not important	No	No	No
Melanodryas cucullata cucullata	Hooded robin (south-eastern form) V Possible	No	No	No	No	No	No	No	Not important	No	No	No
Myotis adversus	Large-footed myotis V Possible (Moirra SF 40 km)	No	No	No	No	No	No	No	Not important	No	No	No
Pomatostomus temporalis temporalis	Grey-crowned babbler (eastern subspecies) V Possible	No	No	No	No	No	No	No	Not important	No	Yes	No
Polytelis swainsonii	Superb parrot v Possible	No	No	No	No	No	No	No	Not important	No	No	No
Rostratula benghalensis australis	Painted snipe (Australian subspecies) E1 Possible	No	No	No	No	No	No	No	Not important	No	No	No
Saccolaimus flaviventris	Yellow-bellied sheath-tail-bat v Possible (Milewa SF 40 km)	No	No	No	No	No	No	No	Not important	No	No	No
Stagonopleura guttata	Diamond firetail v Possible	No	No	No	Improved	Improved	No	No	Not important	No	No	No
Stictonetta naevosa	Freckled duck v Seasonal	No	No	No	No	No	No	No	Not important	No	No	No
Xanthomyza phrygia	Regent honeyeater E1 Possible, but unlikely	No	No	No	No	No	No	No	Not important	No	No	No

Conclusion

None of the Threatened Species listed under the Commonwealth EPBC Act 1999 or the NSW Environment, Planning and Assessment Act 1979 were found on the site, although suitable habitat could occur if grazing were to be removed as a land use activity and some species of birds and other fauna may transit the site from time to time. The small area (50 m²) of roadside vegetation affected by the proposal will not be of significance terms of habitat change.

Importantly, the proposal brings opportunity for habitat enhancement for a range of flora and fauna species including some of those listed as vulnerable.

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Appendix 1 Threatened Flora List

Protected (P13), vulnerable (V), endangered species (E1) or critically endangered species (E4A).

Scientific Name	Common Name	Legal Status
Plants		
Brassicaceae		
<i>Lepidium monoplocoides</i>	Winged peppergrass	E1
Chenopodiaceae		
<i>Sclerolaena napiformis</i>	Turnip copperburr	E1
Convolvulaceae		
<i>Wilsonia rotundifolia</i>	Round-leafed wilsonia	E1
Fabaceae (Faboideae)		
<i>Swainsona murrayana</i>	Slender darling pea	V
Orchidaceae		
<i>Pterostylis despectans</i>	Lowly greenhood	E4A
<i>Thelymitra megacalyptra</i>	Scented sun orchard	E1
Papilionaceae		
<i>Cullen parvum</i>	Small scurf pea	E1
Poaceae		
<i>Amphibromus fluitans</i>	Floating swamp wallaby-grass	V

Protected Species

<i>Craspedia variabilis</i>	Common Billy-buttons (s) P13
<i>Pycnosorus globosus</i>	Drumsticks P13
<i>Caladenia carnea</i> var. <i>carnea</i>	Pink fingers P13.
<i>Ptilotusexaltatus</i> var. <i>exaltatus</i>	Tall mulla mulla P13

Appendix 2. Threatened Fauna List

Protected (P13), vulnerable (V), endangered species (E1) or critically endangered species (E4A).

Highlighted species - Observed on or heard near the site

Scientific Name	Common Name	Legal	Status
Comment			
Aves			
Acanthizidae			
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler	V	No suitable habitat
Anatidae			
<i>Stictonetta naevosa</i>	Freckled Duck	V	Seasonal
Ardeidae			
<i>Botaurus poiciloptilus</i>	Australasian Bittern	V	Seasonal No suitable habitat
Burhinidae			
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1	Unlikely b/c disturbed habitat
Climacteridae			
<i>Climacteris picumnus</i>	Brown Treecreeper	V	Present
Estrildidae			
<i>Stagonopleura guttata</i>	Diamond Firetail	V	Possible
Eupetidae			
<i>Cinclosoma castanotus</i>	Chestnut Quail-thrush	V	Possible but no suitable habitat
Gruidae			
<i>Grus rubicunda</i>	Brolga	V	Possible
Meliphagidae			
<i>Grantiella picta</i>	Painted Honeyeater	V	Possible
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	Possible but unlikely
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E1	Unlikely
Pachycephalidae			
<i>Pachycephala inornata</i>	Gilbert's Whistler	V	Possible
Pedionomidae			
<i>Pedionomus torquatus</i>	Plains-wanderer	E1	Possible but unlikely
Petroicidae			
<i>Melanodryas cucullata</i>	Hooded Robin	V	Possible
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	Possible

Pomatostomidae			
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V Possible	
Psittacidae			
Lathamus discolor	Swift Parrot	E1, Possible but unlikely	
Polytelis swainsonii	Superb Parrot	V Possible	
Rostratulidae			
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	E1 Possible	
Strigidae			
Ninox connivens	Barking Owl	V Possible	
Mammalia			
Dasyuridae			
Phascogale tapoatafa	Brush-tailed Phascogale	V Possible but unlikely (1, Deni, 50 km)	
Emballonuridae			
Saccolaimus flaviventris	Yellow-bellied Sheath-tail-bat	V Possible (Milewa SF 50 km)	
Phascolarctidae			
Phascolarctos cinereus	Koala	V Possible (1.3 km)	
Vespertilionidae			
Myotis adversus	Large-footed Myotis	V Possible, but unlikely (1, Moira SF)	

Appendix 3. Murray Shire Flora List (with site additions)

Protected (P13), vulnerable (V), endangered species (E1) or critically endangered species (E4A).

* Exotic (non-native) species.

		Highlighted species - Observed on or near the site		
Plants	Scientific Name	Common Name	Legal Status	Shire Count
Adiantaceae	Cheilanthes austrotenuifolia	Rock Fern		1
	Cheilanthes sieberi	Rock Fern		1
Alismataceae	Alisma lanceolatum*			6
	Damasonium minus	Starfruit		5
Anacardiaceae	*Schinus molle var. areira	*Pepper tree		
Amaranthaceae	Alternanthera denticulata	Lesser Joyweed		9
	Alternanthera nana	Hairy Joyweed		1
	Alternanthera sp. A			16
	Amaranthus albus*	Tumbleweed		1
	Ptilotus erubescens	Hairy tails		1
	Ptilotus exaltatus var. exaltatus	Tall Mulla Mulla		1
	Ptilotus semilanatus	Lambs tails		1
Anthericaceae	Arthropodium minus	Small Vanilla Lily		2
	Dichopogon fimbriatus	Nodding Chocolate Lily		1
Apiaceae	Daucus glochidiatus	Native Carrot		4
	Daucus glochidiatus f. D	Native Carrot		1
	Eryngium rostratum	Blue Devil		2
Apocynaceae	Marsdenia liisae	Large-flowered Milk Vine		3
Asparagaceae	Asparagus asparagoides*	Bridal Creeper		2
Asphodelaceae	Bulbine bulbosa	Bulbine Lily		1
	Bulbine semibarbata	Wild Onion		1
Asteraceae	Actinobole uliginosum	Flannel Cudweed		1
	Anthemis cotula*	Stinking Mayweed		1
	Arctotheca calendula*	Capeweed		24
	Aster subulatus*	Wild Aster		1
	Brachyscome basaltica var. gracilis	Swamp Daisy		4
	Brachyscome chrysoglossa			2
	Brachyscome lineariloba	Hard-headed Daisy		1
	Calocephalus sonderi	Pale Beauty-heads		3
	Calotis anthemoides	Cut-leaved Burr-daisy		1
	Calotis cuneifolia	Purple Burr-Daisy		2
	Calotis erinacea	Tangled Burr-daisy		1
	Calotis hispidula	Bogan Flea		1

	Calotis scabiosifolia	Rough Burr-daisy	3	
	Calotis scapigera	Tufted Burr-daisy	1	
	Carduus pycnocephalus*	Slender Thistle	5	
	Carduus tenuiflorus*	Winged Slender Thistle	14	
	Cassinia arcuata	Sifton Bush		2
	Centaurea melitensis*	Maltese Cockspur	3	
	Centipeda cunninghamii	Common Sneezeweed	14	
	Centipeda minima	Spreading Sneezeweed		13
	Centipeda minima var. minima		1	
	Chrysocephalum apiculatum	Common Everlasting	5	
	Chrysocephalum semipapposum	Clustered Everlasting	2	
	Cirsium vulgare*	Spear Thistle	15	
	Conyza bonariensis*	Flaxleaf Fleabane	1	
	Conyza sumatrensis*	Tall fleabane	2	
	Cotula australis	Common Cotula	12	
	Cotula bipinnata*	Ferny Cotula	10	
	Cotula coronopifolia*	Water Buttons	5	
	Craspedia variabilis	Common Billy-buttons	2	P13
	Eclipta platyglossa	Yellow Twin-heads	1	
	Eriochlamys squamata		1	
	Euchiton sphaericus	Star Cudweed	2	
	Hyalosperma praecox		1	
	Hypochaeris glabra*	Smooth Catsear	36	
	Hypochaeris radicata*	Catsear	9	
	Isoetopsis graminifolia	Grass Cushion	1	
	Lactuca serriola*	Prickly Lettuce	12	
	Leiocarpa leptolepis	Pale Plover-daisy	1	
	Leiocarpa panaetioides	Woolly Buttons	1	
	Leontodon taraxacoides subsp. taraxacoides*	Lesser Hawkbit	2	
	Leptorhynchus squamatus	Scaly Buttons	1	
	Leptorhynchus squamatus subsp. squamatus		2	
	Leptorhynchus tetrachaetus	Beauty Buttons	1	
	Myriocephalus rhizocephalus	Woolly-heads	3	
	Olearia pimeleoides		1	
	Onopordum acaulon*	Stemless Thistle	2	
	Picris echioides*		2	
	Pseudognaphalium luteoalbum	Jersey Cudweed	8	
	Pycnosorus globosus	Drumsticks	3	P13
	Pycnosorus thompsonianus		1	P13
	Rhodanthe corymbiflora	Small White Sunray		3
	Rutidosis multiflora		2	
	Scorzonera laciniata*		1	
	Senecio bathurstianus		1	
	Senecio laetus subsp. dissectifolius			1
	Senecio quadridentatus	Cotton Fireweed		11
	Senecio runcinifolius	Tall Groundsel	5	
	Solenogyne belliioides	Solenogyne	2	
	Sonchus asper subsp. glaucescens*	Prickly Sowthistle		10
	Sonchus oleraceus*	Common Sowthistle	37	
	Tragopogon porrifolius*	Salsify		2
	Triptilodiscus pygmaeus	Common Sunray	4	
	Vittadinia cuneata	A Fuzzweed	4	
	Vittadinia gracilis	Woolly New Holland Daisy	7	
	Xanthium spinosum*	Bathurst Burr	3	
	Xerochrysum bracteatum	Golden Everlasting	3	
Azollaceae				
	Azolla filiculoides	Pacific Azolla	9	
	Azolla pinnata		7	
Boraginaceae				
	Amsinckia calycina*	Hairy Fiddleneck	1	
	Amsinckia intermedia*	Common Fiddleneck	9	
	Cynoglossum suaveolens	Sweet Hound's-tongue	1	
	Echium plantagineum*	Patterson's Curse	20	
	Heliotropium europaeum*	Potato Weed	1	
	Myosotis discolor*	Forget-me-not	1	
Brassicaceae				
	Brassica spp.*	Brassica	2	
	Capsella bursa-pastoris*	Shepherd's Purse	2	
	Cardamine astoniae	Spreading Bitter-cress	2	
	Cardamine moirensis		1	
	Lepidium africanum*	Common Peppergrass	5	
	Lepidium monolocoides	Winged Peppergrass	1	E1
	Lepidium pseudohyssopifolium	Peppergrass	1	
	Rorippa laciniata		1	
	Rorippa palustris*	Yellow Cress	4	

	Sisymbrium erysimoides*	Smooth Mustard	4	
	Sisymbrium irio*	London Rocket	3	
	Sisymbrium officinale*	Hedge Mustard	1	
Callitricheaceae	Callitriche sonderi		4	
Campanulaceae	Wahlenbergia communis	Tufted Bluebell	1	
	Wahlenbergia fluminalis	River Bluebell		22
	Wahlenbergia gracilentia	Annual Bluebell	3	
	Wahlenbergia luteola	Bluebell	1	
Caryophyllaceae	Cerastium glomeratum*	Mouse-ear Chickweed		11
	Gypsophila tubulosa	Annual Chalkwort	1	
	Petrorhagia velutina*	Velvet Pink	13	
	Sagina apetala*	Annual Pearlwort	1	
	Scleranthus minusculus			1
	Silene gallica var. gallica*	French Catchfly	1	
	Silene gallica*	French Catchfly	1	
	Spergularia rubra*	Sandspurry		7
	Stellaria angustifolia	Swamp Starwort	1	
	Stellaria media*	Common Chickweed	2	
	Stellaria spp.*	Prickly Starwort	2	
Casuarinaceae	Allocasuarina luehmannii	Bulloak	10	
	Allocasuarina verticillata	Drooping Sheoak	1	
	Casuarina pauper	Black Oak	1	
Chenopodiaceae	Atriplex leptocarpa	Slender-fruit Saltbush	1	
	Atriplex nummularia	Old Man Saltbush	1	
	Atriplex semibaccata	Creeping Saltbush	4	
	Atriplex spinibractea	Spiny-fruit Saltbush	2	
	Chenopodium desertorum subsp. microphyllum		4	
	Chenopodium desertorum subsp. virosum		1	
	Chenopodium multifidum*	Scented Goosefoot	1	
	Chenopodium murale*	Nettle-leaf Goosefoot	8	
	Chenopodium pumilio	Small Crumbweed	6	
	Dysphania glomulifera subsp. glomulifera		1	
	Einadia hastata	Berry Saltbush	2	
	Einadia nutans	Climbing Saltbush	6	
	Enchylaena tomentosa	Ruby Saltbush	5	
	Halosarcia pergranulata subsp. pergranulata		1	
	Maireana aphylla	Cotton Bush	2	
	Maireana decalvans	Black Cotton Bush	1	
	Maireana enchylaenoides	Wingless Fissure-weed	1	
	Maireana humillima		1	
	Maireana microphylla	Small-leaf Bluebush	2	
	Maireana pentagona	Hairy Bluebush, Fissure-weed	3	
	Maireana pyramidata	Black Bluebush	1	
	Salsola kali var. kali	Buckbush	4	
	Sclerolaena birchii	Galvanized Burr	5	
	Sclerolaena convexula	Tall Copperburr	1	
	Sclerolaena diacantha	Grey Copperburr	1	
	Sclerolaena muricata	Black Rolypoly	4	
	Sclerolaena muricata var. semiglabra	Black Rolypoly	1	
	Sclerolaena napiformis	Turnip Copperburr	E1 7	
	Sclerolaena stelligera	Star Copperburr	1	
Clusiaceae	Hypericum spp.*		1	
Colchicaceae	Wurmbea dioica subsp. dioica	Early Nancy	1	
Convolvulaceae	Calystegia sepium subsp. roseata		1	
	Convolvulus erubescens	Pink Bindweed	1	
	Convolvulus wimmerensis		1	
	Cressa australis		2	
	Wilsonia rotundifolia	Round-leafed Wilsonia	E1 1	
Crassulaceae	Crassula colorata	Dense Stonecrop	3	
	Crassula decumbens var. decumbens	Spreading Stonecrop		5
	Crassula peduncularis	Purple Stonecrop	13	
	Crassula sieberiana	Australian Stonecrop	12	
Cucurbitaceae	Citrullus lanatus var. lanatus*	Wild Melon, Camel Melon, Bitter	4	
	Cucumis myriocarpus subsp. leptodermis*	Paddy Melon	2	
Cupressaceae				

Cyperaceae	Callitris glaucophylla	White Cypress Pine	1	9
	Callitris gracilis subsp. murrayensis	Murray Pine		
Cyperaceae	Bolboschoenus medianus		1	
	Carex appressa	Tall Sedge	2	
	Carex bichenoviana		1	
	Carex inversa	Knob Sedge	33	
	Carex spp.		2	
	Carex tereticaulis		24	
	Cyperus brevifolius*		1	
	Cyperus difformis	Dirty Dora	1	
	Cyperus eragrostis*	Umbrella Sedge	3	
	Cyperus exaltatus		3	
	Cyperus victoriensis		1	
	Eleocharis acuta		38	
	Eleocharis pallens	Pale Spike Sedge	3	
	Eleocharis plana	Flat Spike-sedge	9	
	Eleocharis pusilla		24	
	Fimbristylis aestivalis		2	
	Isolepis hookeriana		1	
	Isolepis spp.	Club-rush	4	
	Isolepis victoriensis		1	
Davalliaceae	Arthropteris spp.		14	
Droseraceae	Drosera glanduligera	Pimpinel Sundew	1	
	Drosera peltata	A Sundew	2	
Elatinaceae	Elatine gratioloides	Waterwort	14	
Euphorbiaceae	Chamaesyce drummondii	Caustic Weed	18	
Fabaceae (Faboideae)	Cullen tenax	Emu-foot	1	
	Dillwynia cinerascens		5	
	Eutaxia microphylla		1	
	Genista monspessulana*	Montpellier Broom	1	
	Glycine clandestina	Twining glycine	1	
	Glycyrrhiza acanthocarpa	Native Liquorice	1	
	Lathyrus angulatus*	Angular Pea	1	
	Lotus corniculatus*	Birds-foot Trefoil	1	
	Medicago minima*	Woolly Burr Medic	5	
	Medicago polymorpha*	Burr Medic	27	
	Medicago spp.*	A Medic	4	
	Swainsona murrayana	Slender Darling Pea	5	
	Swainsona procumbens	Broughton Pea		
	Trifolium angustifolium*	Narrow-leaved Clover		
	Trifolium arvense*	Haresfoot Clover	33	
	Trifolium campestre*	Hop Clover	38	
	Trifolium cernuum*	Drooping-flowered Clover	23	
	Trifolium glomeratum*	Clustered Clover	36	
	Trifolium hirtum*	Rose Clover	1	
	Trifolium spp.*	A Clover	4	
	Trifolium striatum*	Knotted Clover	3	
	Trifolium tomentosum*	Woolly Clover	22	
Fabaceae (Mimosoideae)	Acacia acinacea	Gold-dust Wattle	9	
	Acacia dealbata subsp. dealbata	Silver Wattle	3	
	Acacia hakeoides	Hakea Wattle	1	
	Acacia implexa	Hickory Wattle	2	
	Acacia montana	Mallee Wattle	1	
	Acacia oswaldii	Miljee	3	
	Acacia pycnantha	Golden Wattle	1	
	Acacia rigens	Needle Wattle	1	
	Acacia salicina	Cooba	3	
	Acacia vestita	Weeping Boree	1	
Fumariaceae	Fumaria bastardii*	Bastards Fumitory	1	1
	Fumaria densiflora*	Narrow-leaved Fumitory		
	Fumaria muralis subsp. muralis*	Wall Fumitory	2	
Gentianaceae	Centaurium spp.		1	
Geraniaceae	Erodium botrys	Big Herons bill		
	Erodium cicutarium*	Common Crowfoot	2	
	Erodium crinitum	Blue Storksbill, Blue Crowfoot	2	

	<i>Erodium moschatum</i> *	Musky Crowfoot	1	
	<i>Geranium retrorsum</i>	Cranesbill Geranium	1	
	<i>Geranium solanderi</i>	Native Geranium	1	
	<i>Geranium solanderi</i> var. <i>solanderi</i>		1	
	<i>Geranium</i> spp.	A Geranium	7	
Goodeniaceae				
	<i>Goodenia gracilis</i>		3	
	<i>Goodenia heteromera</i>		2	
	<i>Goodenia macbarronii</i>	McBarron's Goodenia	2	
	<i>Goodenia paniculata</i>		1	
	<i>Goodenia pusilliflora</i>		1	
	<i>Goodenia</i> spp.		2	
Haloragaceae				
	<i>Gonocarpus</i> spp.	Raspwort	1	
	<i>Haloragis glauca</i> f. <i>glauca</i>		1	
	<i>Myriophyllum crispatum</i>			13
	<i>Myriophyllum papillosum</i>		1	
	<i>Myriophyllum</i> spp.		1	
	<i>Myriophyllum verrucosum</i>	Red Water-milfoil	6	
Hydrocharitaceae				
	<i>Ottelia</i> spp.			2
Hypoxidaceae				
	<i>Hypoxis glabella</i> var. <i>glabella</i>	Tiny Star	1	
Iridaceae				
	<i>Moraea setifolia</i> *	Thread Iris	2	
	<i>Romulea flava</i> var. <i>minor</i> *		1	
Isoetaceae				
	<i>Isoetes</i> spp.		3	
Juncaceae				
	<i>Juncus amabilis</i>		11	
	<i>Juncus aridicola</i>	Tussock Rush	28	
	<i>Juncus articulatus</i> *	A Rush	1	
	<i>Juncus flavidus</i>		32	
	<i>Juncus holoschoenus</i>		3	
	<i>Juncus ingens</i>	Giant Rush	7	
	<i>Juncus phaeanthus</i>		1	
	<i>Juncus semisolidus</i>		1	
	<i>Juncus subglaucus</i>	Rush	1	
	<i>Juncus subsecundus</i>	Finger Rush	3	
	<i>Juncus usitatus</i>		3	
Juncaginaceae				
	<i>Triglochin</i> spp.		24	
Lamiaceae				
	<i>Ajuga australis</i>	Austral Bugle	2	
	<i>Marrubium</i> spp.*		2	
	<i>Marrubium vulgare</i> *	Horehound	5	
	<i>Mentha pulegium</i> *	Pennyroyal	1	
	<i>Teucrium racemosum</i>	Grey Germander	1	
Linaceae				
	<i>Linum usitatissimum</i> *	Flax	1	
Lobeliaceae				
	<i>Isotoma tridens</i>		1	
	<i>Lobelia anceps</i>		1	
	<i>Lobelia pratioides</i>		1	
	<i>Pratia concolor</i>	Poison Pratia	5	
Lomandraceae				
	<i>Lomandra effusa</i>	Scented Mat-rush	1	
Loranthaceae				
	<i>Amyema linophyllum</i> subsp. <i>orientale</i>		1	
	<i>Amyema miquelii</i>	Box Mistletoe	3	
	<i>Amyema miraculosum</i> subsp. <i>boormanii</i>		1	
	<i>Lysiana exocarpi</i> subsp. <i>exocarpi</i>		2	
Lythraceae				
	<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife	4	
	<i>Lythrum salicaria</i>	Purple Loosestrife	1	
Malvaceae				
	<i>Malva parviflora</i> *	Small-flowered Mallow	5	
	<i>Sida corrugata</i>	Corrugated Sida	11	
	<i>Sida fibulifera</i>		1	
	<i>Sida trichopoda</i>	High Sida	1	
Marsileaceae				
	<i>Marsilea drummondii</i>	Common Nardoo	8	
Menyanthaceae				
	<i>Nymphoides crenata</i>	Wavy Marshwort		2
Myoporaceae				

	Eremophila deserti	Turkeybush	1		
	Eremophila longifolia	Emubush	2		
	Myoporum montanum	Western Boobialla	1		
Meliaceae	Myoporum platycarpum	Sugarwood			1
	Melia azadarach White cedar (introduced to site)				
Myrsinaceae	Anagallis arvensis*	Scarlet/Blue Pimpernel	4		
Myrtaceae	Callistemon sieberi	River Bottlebrush	1		
	Calytrix tetragona	Fringe Myrtle	1		
	Eucalyptus blaxlandii		1		
	Eucalyptus camaldulensis	River Red Gum	29		
	Eucalyptus largiflorens	Black Box	9		
	Eucalyptus melliodora	Yellow Box	13		
	Eucalyptus melliodora var. brachycarpa		1		
	Eucalyptus microcarpa	Western Grey Box	5		
	Leptospermum juniperinum	Prickly Tea-tree	1		
	Melaleuca lanceolata		2		
Oleaceae	Fraxinus angustifolia subsp. angustifolia*	Desert Ash	1		
Onagraceae	Epilobium billardioreanum		1		
	Epilobium hirtigerum		5		
	Epilobium spp.		2		
	Ludwigia peploides subsp. montevidensis	Water Primrose	4		
	Oenothera stricta subsp. stricta*		1		
Ophioglossaceae	Ophioglossum lusitanicum	Adder's Tongue	1		
	Ophioglossum spp.		6		
Orchidaceae	Caladenia carnea var. carnea		P13	1	
	Pterostylis despectans		E4A	1	
	Thelymitra megacalyptra	Scented Sun Orchid	P13		1
Oxalidaceae	Oxalis perennans			10	
	Oxalis pes-caprae*	Soursob		1	
	Oxalis spp.			20	
Pittosporaceae	Bursaria spinosa	Native blackthorn			
	Pittosporum angustifolium	Pittosporum		1	
Plantaginaceae	Plantago drummondii	Dark Sago-weed		1	
	Plantago gaudichaudii	Narrow-leaf Plantain		1	
	Plantago turritifera	Small Sago-weed		1	
Plumbaginaceae	Limonium australe	Native Sea Lavender		1	
Poaceae	Aira cupaniana*	Silvery Hairgrass	U	5	
	Aira spp.*	A Hairgrass		17	
	Amphibromus fluitans	Floating Swamp Wallaby-grass	V	3	
	Amphibromus macrorhinus			1	
	Amphibromus nervosus	Swamp Wallaby Grass			19
	Austroanthonia caespitosa	Ringed Wallaby Grass		9	
	Austroanthonia duttoniana	Brown-back Wallaby Grass		3	
	Austroanthonia setacea	Small-flowered Wallaby Grass		7	
	Austrostipa aristiglumis	Plains Grass		1	
	Austrostipa bigeniculata	Yanganbil			1
	Austrostipa gibbosa	Speargrass			1
	Austrostipa nodosa	A Speargrass		1	
	Austrostipa scabra	Speargrass			1
	Austrostipa scabra subsp. falcata	Rough Speargrass		1	
	Austrostipa scabra subsp. scabra	Rough Speargrass		10	
	Avena barbata*	Bearded Oats		8	
	Avena fatua*	Wild Oats		1	
	Avena spp.*	Oats		30	
	Briza minor*	Shivery Grass		5	
	Bromus alopecuroides*			15	
	Bromus diandrus*	Great Brome		29	
	Bromus hordeaceus subsp. molliformis*	Soft Brome		12	
	Bromus hordeaceus*	Soft Brome		17	
	Bromus madritensis	Madrid Brome		4	
	Bromus rubens*	Red Brome			24
	Bromus spp.	A Brome		2	
	Bromus tectorum*	Droopong Brome		23	

	<i>Chloris truncata</i>	Windmill Grass	7	
	<i>Cynodon dactylon</i>	Common Couch	1	
	<i>Cynodon</i> spp.		2	
	<i>Cynodon transvaalensis</i> *	Florida Grass	1	
	<i>Danthonia</i> spp.	Wallaby Grass	29	
	<i>Danthoniacaespitosa</i>	White top		
	<i>Digitaria sanguinalis</i> *	Summer Grass, Crab Grass	1	
	<i>Diplachne fusca</i>	Brown Beetle Grass	15	
	<i>Echinochloa colona</i>	Awnless Barnyard Grass	1	
	<i>Echinochloa crusgalli</i> *	Barnyard Grass	2	
	<i>Ehrharta erecta</i> *	Panic Veldtgrass		
	<i>Ehrharta longiflora</i> *	Annual Veldtgrass	2	
	<i>Elymus scaber</i>	Common Wheatgrass	13	
	<i>Enteropogon acicularis</i>	Curly Windmill Grass	1	
	<i>Enteropogon ramosus</i>	Curly Windmill Grass	2	
	<i>Eragrostis australasica</i>	Canegrass	2	
	<i>Eragrostis cilianensis</i> *	Stinkgrass	3	
	<i>Eragrostis leptocarpa</i>	Drooping Lovegrass	1	
	<i>Eragrostis tef</i> *		1	
	<i>Eriochloa australiensis</i>	Australian Cupgrass	1	
	<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass	1	
	<i>Homopholis prolata</i>		1	
	<i>Hordeum hystrix</i> *	Mediterranean Barley Grass	2	
	<i>Hordeum leporinum</i> *	Barley Grass	20	
	<i>Hordeum marinum</i> *	Sea Barley Grass	2	
	<i>Lachnagrostis filiformis</i>		25	
	<i>Lamarckia aurea</i> *	Goldentop	1	
	<i>Lolium loliaceum</i> *	Stiff Ryegrass	21	
	<i>Lolium perenne</i> *	Perennial Ryegrass	14	
	<i>Lolium rigidum</i> *	Wimmera Ryegrass	19	
	<i>Lolium temulentum</i> *	Darnel	1	
	<i>Ottolochloa</i> spp.		2	
	<i>Panicum capillare</i> var. <i>occidentale</i> *		1	
	<i>Panicum decompositum</i> var. <i>tenius</i>			1
	<i>Panicum effusum</i>	Poison or Hairy Panic	2	
	<i>Panicum gilvum</i> *		1	
	<i>Paspalidium aversum</i>	Bent Summer Grass	1	
	<i>Paspalidium jubiflorum</i>	Warrego Grass	4	
	<i>Phalaris minor</i> *	Lesser Canary Grass	3	
	<i>Phalaris paradoxa</i> *	Paradoxa Grass	13	
	<i>Phragmites australis</i>	Common Reed	1	
	<i>Poa fordeana</i>	Sweet Swamp-grass	3	
	<i>Poa labillardierei</i> var. <i>labillardierei</i>	Tussock	1	
	<i>Poa sieberiana</i> var. <i>hirtella</i>		1	
	<i>Pseudoraphis spinescens</i>	Spiny Mudgrass	4	
	<i>Rostraria cristata</i> *	Annual Cat's Tail	9	
	<i>Sporobolus caroli</i>	Fairy Grass		1
	<i>Stipa</i> spp.		6	
	<i>Themeda australis</i>	Kangaroo Grass	1	
	<i>Vulpia bromoides</i> *	Squirrel Tail Fesque	28	
	<i>Vulpia myuros</i> f. <i>megallura</i> *	Rat's-tail Fescue	33	
	<i>Vulpia</i> spp. Rat's-tail Fescue		6	
Polygonaceae	<i>Fallopia convolvulus</i> *	Black Bindweed	1	
	<i>Muehlenbeckia florulenta</i>	Lignum	3	
	<i>Muehlenbeckia horrida</i>		1	
	<i>Persicaria decipiens</i>	Slender Knotweed	3	
	<i>Persicaria lapathifolia</i>	Pale Knotweed	2	
	<i>Polygonum arenastrum</i> *	Wireweed	1	
	<i>Polygonum aviculare</i> *	Wireweed	5	
	<i>Polygonum plebeium</i>	Small Knotweed	1	
	<i>Rumex brownii</i>	Swamp Dock	32	
	<i>Rumex crispus</i> *	Curled Dock	2	
	<i>Rumex dumosus</i>	Wiry Dock	11	
	<i>Rumex tenax</i>	Shiny Dock		14
Portulacaceae	<i>Calandrinia eremaea</i>	Small Purslane	4	
	<i>Calandrinia granulifera</i>		1	
	<i>Neopaxia australasica</i>		1	
Potamogetonaceae	<i>Potamogeton</i> spp.		2	
Proteaceae	<i>Banksia marginata</i>	Silver Banksia	1	
	<i>Grevillea huegelii</i>		1	
	<i>Hakea leucoptera</i>	Needlewood	1	

	Hakea leucoptera subsp. leucoptera			1
	Hakea tephrosperma	Hooked Needlewood	3	
Ranunculaceae	Myosurus minimus var. australis	Mousetail	2	
	Ranunculus amphitrichus		4	
	Ranunculus inundatus	River Buttercup	6	
	Ranunculus pachycarpus		1	
	Ranunculus pentandrus			5
	Ranunculus pumilio		2	
	Ranunculus sceleratus*	Celery Buttercup		1
	Ranunculus sessiliflorus	Common Buttercup	17	
	Ranunculus sessiliflorus var. pilulifer	Common Buttercup		1
Rosaceae	Aphanes australiana	Australian Pert	4	
	Rubus rosifolius	Rose-leaf Bramble	1	
Rubiaceae	Asperula conferta	Common Woodruff	2	
	Galium murale*	Small Bedstraw	1	
Rutaceae	Citrus glauca	Desert Lime	1	
Santalaceae	Exocarpos strictus	Dwarf Cherry	7	
	Santalum lanceolatum	Northern Sandalwood	2	
Scrophulariaceae	Euphrasia collina		1	
	Glossostigma elatinoides		1	
	Gratiola pedunculata		5	
	Mimulus gracilis	Slender Monkey-flower	4	
	Stemodia florulenta	Bluerod	2	
	Verbascum spp.		1	
	Verbascum virgatum*	Twiggy Mullein, Green Mullein	1	
	Veronica peregrina*	Wandering Speedwell	3	
Solanaceae	Cestrum parqui*	Green Cestrum	1	
	Lycium ferocissimum*	African Boxthorn	4	
	Physalis viscosa*	Sticky Ground Cherry	3	
	Solanum elaeagnifolium*	Silver-leaved Nightshade	1	
	Solanum nigrum*	Black-berry Nightshade		3
Stackhousiaceae	Stackhousia spp.		2	
Stylidiaceae	Stylidium despectum	Dwarf Triggerplant	1	
Typhaceae	Typha domingensis	Narrow-leaved Cumbungi	1	
Urticaceae	Parietaria debilis	Native Pellitory	1	
	Urtica urens*	Small Nettle	3	
Verbenaceae	Phyla nodiflora*	Carpet Weed, Lippia	1	
Violaceae	Viola betonicifolia	Native Violet	1	
Zygophyllaceae	Tribulus terrestris*	Cat-head	2	

Appendix 4. Murray Shire Fauna List

* Exotic (non-native) species **Highlighted species** - Observed or heard on or near the site

<u>Amphibia</u>	Scientific Name	Common Name	Legal Status	Shire Count
Bufonidae	Bufo marinus*	Cane Toad		1
Hylidae	Litoria peronii	Peron's Tree Frog	P	9
Myobatrachidae	Crinia parinsignifera	Eastern Sign-bearing Froglet	P	6
	Crinia signifera	Common Eastern Froglet	P	9
	Limnodynastes dumerilii	Eastern Banjo Frog	P	4
	Limnodynastes fletcheri	Long-thumbed Frog	P	3
	Limnodynastes peronii	Brown-striped Frog	P	4
	Limnodynastes tasmaniensis	Spotted Grass Frog	P	1

Aves

Acanthizidae					
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	P	47	
	<i>Acanthiza lineata</i>	Striated Thornbill	P	45	
	<i>Acanthiza nana</i>	Yellow Thornbill	P	46	
	<i>Acanthiza pusilla</i>	Brown Thornbill	P	3	
	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	P	89	
	<i>Aphelocephala leucopsis</i>	Southern Whiteface	P	11	
	<i>Gerygone fusca</i>	Western Gerygone	P	26	
	<i>Pyrrholaemus saggitatus</i>	Speckled Warbler	V	3	
	<i>Sericornis frontalis</i>	White-browed Scrubwren	P	20	
	<i>Smicronis brevirostris</i>	Weebill	P	121	
Accipitridae					
	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	P	3	
	<i>Accipiter fasciatus</i>	Brown Goshawk	P	5	
	<i>Accipiter novaehollandiae</i>	Grey Goshawk	P	1	
	<i>Aquila audax</i>	Wedge-tailed Eagle	P	39	
	<i>Circus approximans</i>	Swamp Harrier	P	24	
	<i>Circus assimilis</i>	Spotted Harrier	P	2	
	<i>Elanus axillaris</i>	Black-shouldered Kite	P	3	
	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	P	7	
	<i>Haliastur spheurnus</i>	Whistling Kite	P	41	
	<i>Hieraetus morphnoides</i>	Little Eagle	P	8	
	<i>Milvus migrans</i>	Black Kite	P	2	
Aegothelidae					
	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	P	7	
Alcedinidae					
	<i>Ceyx azureus</i>	Azure Kingfisher	P	13	
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	P	80	
	<i>Todiramphus sanctus</i>	Sacred Kingfisher	P	76	
Anatidae					
	<i>Anas castanea</i>	Chestnut Teal	P	4	
	<i>Anas gracilis</i>	Grey Teal	P	73	
	<i>Anas rhynchotis</i>	Australasian Shoveler	P	5	
	<i>Anas superciliosa</i>	Pacific Black Duck	P	99	
	<i>Aythya australis</i>	Hardhead	P	9	
	<i>Biziura lobata</i>	Musk Duck	P	12	
	<i>Chenonetta jubata</i>	Australian Wood Duck	P	63	
	<i>Cygnus atratus</i>	Black Swan	P	34	
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	P	7	
	<i>Oxyura australis</i>	Blue-billed Duck	V	6	
	<i>Stictonetta naevosa</i>	Freckled Duck	V	1	
	<i>Tadorna tadornoides</i>	Australian Shelduck	P	13	
Anhingidae					
	<i>Anhinga melanogaster</i>	Darter	P	29	
Ardeidae					
	<i>Ardea alba</i>	Great Egret		P	35
	<i>Ardea intermedia</i>	Intermediate Egret	P	27	
	<i>Ardea pacifica</i>	White-necked Heron	P	28	
	<i>Botaurus poiciloptilus</i>	Australasian Bittern	V	2	
	<i>Egretta garzetta</i>	Little Egret	P	3	
	<i>Egretta novaehollandiae</i>	White-faced Heron	P	44	
	<i>Ixobrychus minutus</i>	Little Bittern	P	2	
	<i>Nycticorax caledonicus</i>	Nankeen Night Heron	P	18	
Artamidae					
	<i>Artamus cyanopterus</i>	Dusky Woodswallow	P	46	
	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	P	8	
	<i>Artamus personatus</i>	Masked Woodswallow	P	2	
	<i>Artamus superciliosus</i>	White-browed Woodswallow	P	11	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	P	11	
	<i>Cracticus torquatus</i>	Grey Butcherbird	P	2	
	<i>Gymnorhina tibicen</i>	Australian Magpie	P	124	
	<i>Strepera graculina</i>	Pied Currawong	P	3	
Burhinidae					
	<i>Burhinus grallarius</i>	Bush Stone-curlew	E1	2	
Cacatuidae					
	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	P	151	
	<i>Cacatua sanguinea</i>	Little Corella	P	12	
	<i>Cacatua tenuirostris</i>	Long-billed Corella	P	34	
	<i>Eolophus roseicapillus</i>	Galah	P	191	
	<i>Nymphicus hollandicus</i>	Cockatiel	P	3	
Campephagidae					
	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	P	63	
	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike	P	10	
	<i>Lalage tricolor</i>	White-winged Triller	P	16	

Casuariidae	Dromaius novaehollandiae	Emu	P	5	
Charadriidae	Erythronys cinctus	Red-kneed Dotterel	P	2	
	Vanellus miles	Masked Lapwing	P	6	
Climacteridae	Climacteris picumnus	Brown Treecreeper	V	203	
	Cormobates leucophaea	White-throated Treecreeper	P	125	
Columbidae	Columba livia*	Rock Dove		1	
	Geopelia placida	Peaceful Dove	P	62	
	Ocyphaps lophotes	Crested Pigeon	P	12	
	Phaps chalcoptera	Common Bronzewing	P	34	
Coraciidae	Eurystomus orientalis	Dollarbird	P	9	
Corcoracidae	Corcorax melanorhamphos	White-winged Chough	P	58	
Corvidae	Corvus coronoides	Australian Raven	P	100	
	Corvus mellori	Little Raven	P	10	
Cuculidae	Cacomantis flabelliformis	Fan-tailed Cuckoo	P	8	
	Chalcites basalis	Horsfield's Bronze-Cuckoo	P	10	
	Chalcites lucidus	Shining Bronze-Cuckoo	P		1
	Cuculus pallidus	Pallid Cuckoo	P	5	
Dicaeidae	Dicaeum hirundinaceum	Mistletoebird	P	49	
Dicruridae	Grallina cyanoleuca	Magpie-lark	P	40	
	Myiagra inquieta	Restless Flycatcher	P	33	
	Myiagra rubecula	Leadon Flycatcher	P	1	
	Rhipidura albiscapa	Grey Fantail	P	91	
	Rhipidura leucophrys	Willie Wagtail	P	105	
Estrildidae	Neochmia temporalis	Red-browed Finch	P	12	
	Stagonopleura guttata	Diamond Firetail	V	22	
	Taeniopygia guttata	Zebra Finch	P	1	
Eupetidae	Cinclosoma castanotus	Chestnut Quail-thrush	V	1	
Falconidae	Falco berigora	Brown Falcon	P	7	
	Falco cenchroides	Nankeen Kestrel	P	2	
	Falco longipennis	Australian Hobby	P	2	
	Falco peregrinus	Peregrine Falcon	P	5	
	Falco subniger	Black Falcon	P	4	
Fringillidae	Carduelis carduelis*	European Goldfinch			1
Gruidae	Grus rubicunda	Brolga	V	3	
Hirundinidae	Hirundo neoxena	Welcome Swallow	P	64	
	Petrochelidon ariel	Fairy Martin	P	6	
	Petrochelidon nigricans	Tree Martin	P		39
Laridae	Chlidonias hybridus	Whiskered Tern	P	3	
Maluridae	Malurus cyaneus	Superb Fairy-wren	P	153	
Meliphagidae	Acanthorhynchus tenuirostris	Eastern Spinebill	P	1	
	Anthochaera carunculata	Red Wattlebird	P	1	
	Entomyzon cyanotis	Blue-faced Honeyeater	P	3	
	Epthianura tricolor	Crimson Chat	P	1	
	Grantiella picta	Painted Honeyeater	V	1	
	Lichenostomus chrysops	Yellow-faced Honeyeater	P	1	
	Lichenostomus fuscus	Fuscous Honeyeater	P	1	
	Lichenostomus penicillatus	White-plumed Honeyeater	P	211	
	Manorina melanocephala	Noisy Miner	P	18	
	Melithreptus albogularis	White-throated Honeyeater	P	1	
	Melithreptus brevirostris	Brown-headed Honeyeater	P		38
	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	21	
	Melithreptus lunatus	White-naped Honeyeater	P	1	
	Philemon citreogularis	Little Friarbird	P	65	
	Philemon corniculatus	Noisy Friarbird	P	46	
	Phylidonyris albifrons	White-fronted Honeyeater	P	3	
	Xanthomyza phrygia	Regent Honeyeater	E1	1	

Meropidae	Merops ornatus	Rainbow Bee-eater	P	32	
Motacillidae	Anthus australis	Australian Pipit	P	2	
Muscicapidae	Turdus merula*	Eurasian Blackbird		2	
Neosittidae	Daphoenositta chrysoptera	Varied Sittella	P	11	
Oriolidae	Oriolus sagittatus	Olive-backed Oriole	P	3	
Pachycephalidae	Colluricincla harmonica	Grey Shrike-thrush	P	P	184
	Falcunculus frontatus	Eastern Shrike-tit	P	30	
	Pachycephala inornata	Gilbert's Whistler	V	14	
	Pachycephala pectoralis	Golden Whistler	P	16	
	Pachycephala rufiventris	Rufous Whistler	P	96	
Pardalotidae	Pardalotus punctatus	Spotted Pardalote	P	38	
	Pardalotus striatus	Striated Pardalote	P	220	
Passeridae	Passer domesticus*	House Sparrow		2	
Pedionomidae	Pedionomus torquatus	Plains-wanderer	E1	3	
Pelecanidae	Pelecanus conspicillatus	Australian Pelican	P	37	
Petroicidae	Melanodryas cucullata	Hooded Robin	V	11	
	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	3	
	Microeca fascians	Jacky Winter	P	83	
	Petroica boodang	Scarlet Robin	P	8	
	Petroica goodenovii	Red-capped Robin	P	40	
	Petroica phoenicea	Flame Robin	P	4	
Phalacrocoracidae	Phalacrocorax carbo	Great Cormorant	P	34	
	Phalacrocorax melanoleucos	Little Pied Cormorant	P	69	
	Phalacrocorax sulcirostris	Little Black Cormorant	P	46	
Phasianidae	Coturnix pectoralis	Stubble Quail	P	1	
	Coturnix ypsilophora	Brown Quail	P	7	
Podargidae	Podargus strigoides	Tawny Frogmouth	P	11	
Podicipedidae	Podiceps cristatus	Great Crested Grebe	P	17	
	Poliiocephalus poliocephalus	Hoary-headed Grebe	P	4	
	Tachybaptus novaehollandiae	Australasian Grebe	P	8	
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler	P	28	
	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	9	
Psittacidae	Aprosmictus erythropterus	Red-winged Parrot	P	3	
	Glossopsitta concinna	Musk Lorikeet	P	1	
	Lathamus discolor	Swift Parrot	E1	1	
	Neophema chrysostoma	Blue-winged Parrot	P	1	
	Parrot Hybrid	Yellow Rosella/Turquoise Parrot	P	1	
	Platycercus adscitus eximius	Eastern Rosella	P	30	
	Platycercus elegans flaveolus	[Yellow Rosella]	P	164	
	Polytelis swainsonii	Superb Parrot	V	308	
	Psephotus haematotus	Red-rumped Parrot	P	75	
Rallidae	Fulica atra	Eurasian Coot	P	14	
	Gallinula tenebrosa	Dusky Moorhen	P	9	
	Gallinula ventralis	Black-tailed Native-hen	P	1	
	Porphyrio porphyrio	Purple Swamphen	P	26	
	Porzana fluminea	Australian Spotted Crane	P	1	
Recurvirostridae	Himantopus himantopus	Black-winged Stilt	P	2	
Rostratulidae	Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	E1	1	
Strigidae	Ninox boobook	Southern Boobook	P	47	
	Ninox connivens	Barking Owl	V	8	
Sturnidae	Sturnus vulgaris*	Common Starling		7	
Sylviidae	Acrocephalus australis	Australian Reed-Warbler	P	18	

Threskiornithidae	Cincloramphus cruralis	Brown Songlark	P	2	
	Cincloramphus mathewsi	Rufous Songlark	P	9	
	Megalurus gramineus	Little Grassbird	P	16	
	Platalea flavipes	Yellow-billed Spoonbill	P	33	
	Platalea regia	Royal Spoonbill	P	27	
	Plegadis falcinellus	Glossy Ibis	P	2	
Turnicidae	Threskiornis molucca	Australian White Ibis	P	166	
	Threskiornis spinicollis	Straw-necked Ibis	P	178	
Tytonidae	Turnix pyrrhoroax	Red-chested Button-quail	P	1	
Zosteropidae	Tyto alba	Barn Owl	P	17	
	Zosterops lateralis	Silvereye	P	16	
Mammalia Map					
	Scientific Name	Common Name	Legal Status	Count	Info
Acrobatidae	Acrobates pygmaeus	Feathertail Glider	P	2	
Bovidae	Capra hircus*	Goat		1	
	Ovis aries*	Sheep (feral)		1	
Canidae	Canis lupus*	Dingo, domestic dog		1	
	Vulpes vulpes*	Fox		33	
Cervidae	Cervus sp.*	Unidentified Deer			2
Dasyuridae	Antechinus flavipes	Yellow-footed Antechinus	P	48	
	Phascogale tapoatafa	Brush-tailed Phascogale	V	1	
Emballonuridae	Saccolaimus flaviventris	Yellow-bellied Sheath-tail-bat		V	4
Felidae	Felis catus*	Cat			1
Leporidae	Lepus capensis*	Brown Hare		1	
	Oryctolagus cuniculus*	Rabbit		5	
Macropodidae	Macropus giganteus	Eastern Grey Kangaroo		P	14
	Wallabia bicolor	Swamp Wallaby	P	3	
Molossidae	Mormopterus "Species 2"	Undescribed Freetail Bat	P	4	
	Mormopterus planiceps	Little Mastiff-bat	P		6
	Mormopterus sp.	mastiff-bat	P	1	
	Tadarida australis	White-striped Freetail-bat	P	51	
Muridae	Hydromys chrysogaster	Water-rat		P	3
	Mus musculus*	House Mouse		27	
	Rattus rattus*	Black Rat		5	
Ornithorhynchidae	Ornithorhynchus anatinus	Platypus	P	8	
Petauridae	Petaurus breviceps	Sugar Glider	P	5	
Phalangeridae	Trichosurus sp.	brush-tail possum	P	16	
	Trichosurus vulpecula	Common Brushtail Possum	P	61	
Phascolarctidae	Phascolarctos cinereus	Koala	V	14	
Pseudocheiridae	Pseudocheirus peregrinus	Common Ringtail Possum	P	32	
Suidae	Sus scrofa*	Pig			1
Tachyglossidae	Tachyglossus aculeatus	Short-beaked Echidna		P	1
Vespertilionidae	Chalinolobus gouldii	Gould's Wattled Bat	P	9	
	Chalinolobus morio	Chocolate Wattled Bat	P	8	
	Myotis adversus	Large-footed Myotis	V	1	
	Nyctophilus geoffroyi	Lesser Long-eared Bat	P	4	
	Nyctophilus gouldi	Gould's Long-eared Bat	P		4
	Nyctophilus sp.	Long-eared bat	P	4	
	Scotorepens balstoni	Inland Broad-nosed Bat	P		6
	Vespadelus darlingtoni	Large Forest Bat	P	5	
	Vespadelus regulus	Southern Forest Bat	P	5	

<u>Reptilia</u>	Vespdelus vulturnus Scientific Name	Little Forest Bat Common Name	P Legal Status	10 Count
Agamidae	Pogona barbata	Bearded Dragon	P	1
Boidae	Morelia spilota variegata	Carpet Python	P	1
Chelidae	Chelodina longicollis	Eastern Snake-necked Turtle	P	3
Elapidae	Pseudechis porphyriacus	Red-bellied Black Snake	P	8
	Pseudonaja textilis	Eastern Brown Snake	P	1
Gekkonidae	Christinus marmoratus	Marbled Gecko	P	1
Scincidae	Eulamprus tympanum	Southern Water-skink	P	1
Typhlopidae	Ramphotyphlops bituberculatus	Prong-snouted Blind Snake	P	1
Varanidae	Varanus sp.	Unidentified Goanna	P	1
	Varanus varius	Lace Monitor	P	1

* Exotic (non-native) species

Selected Flora Illustrations



Winged Peppergrass (*Lepidium monophloeoides*) E1 (Deniliquin)



Turnip Copperburr (*Sclerolaena napiformis*) E1 Endangered (Cobb H'way - Barnes crossing)



Round-leafed Wilsonia (*Wilsonia rotundifolia*) E1 -Endangered (Bunaloo)



Slender Darling-Pea (*Swainsona murrayana*) Vulnerable (Barnes Crossing)



Lowly greenhood (*Pterostylis despectans*) E4A 1 (Barnes Crossing)



Scented sun orchid (E1) (*Thelymitra megalyptra*)



Floating Swamp Wallaby-grass (*Amphibromus fluitans*) V 3 (1 km SE of site at river) Photo Geoff Carr



Western Water-Starwort (*Callitriche cyclocarpa*) V

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