Urban Wildlife Management Plan -

City of Yarra

Project: 09 -24

Prepared for:

City of Yarra

Ecology Australia Pty Ltd

Flora and Fauna Consultants

www.ecologyaustralia.com.au

admin@ecologyaustralia.com.au

88B Station Street, Fairfield,

Victoria, Australia 3078

Tel: (03) 9489 4191

Fax: (03) 9481 7679

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Summary

Ecology Australia Pty. Ltd. was commissioned by City of Yarra in April 2009 to prepare an Urban Wildlife Management Plan. Specifically, the Plan aims to:

- Identify areas of remaining fauna habitat;
- Identify and address threats to fauna habitat;
- Identify opportunities for potential habitat improvement and protection; and
- Review existing control methods of pest animal species and provide recommendations for updating where required.

Study area - Characteristics

The study area encompasses the entire City of Yarra (c. 19.5 km^2), located immediately 2 km east of the Melbourne Central Business District.

Since European settlement, the vegetation within the City of Yarra has almost entirely been cleared and the area is now predominantly utilised for industrial or high-density residential purposes. Despite this, a total area of 310.4 ha of public open space is present within the City of Yarra. The majority of open space is highly modified, with high recreation use and dominated by exotic flora. However, a few remnants of native vegetation remain along the Yarra River, and small patches along Merri and Darebin Creeks. The three waterways and their associated riparian vegetation provide important habitat for remaining fauna populations, including some threatened fauna species. The most notable and largest patch of fauna habitat within the study area is the Yarra Bend Park.

Study area – Fauna habitats and Area Types

In order to direct the allocation of resources for fauna management, the study area has been divided into three Area Types: Area Type 1 – Waterways and remnant vegetation; Area Type 2a (Urban Parks – urban bushland plantings) – Area Type 2b (Urban Parks – predominantly sporting ovals, exotic parks); and Area Type 3 – Street Trees.

Within these three Area Types there are a range of fauna habitat types present including: waterways; off-stream wetlands; riparian Vegetation; scattered indigenous trees with or without revegetation; exotic Grassland; and indigenous, non-indigenous and exotic plantings.

Area Type 1 contains the highest value for fauna habitat and as such resources to maintain and enhance biodiversity values should be placed within these areas. Some of these sites support or have the potential to support a number of significant species listed under National and State legislation. Most notably, a large camp of Grey-headed Flying Fox *Pteropus poliocephalus* (listed under the Federal *Environment Protection and Biodiversity Conservation Act 1999*) is located within the Yarra Bend Park and potential and known habitat along the Yarra River exists for State threatened Azure Kingfisher and Nankeen Night-Heron.

The numerous other parks, reserves and street trees (Area Types 2a & b and 3) generally support low fauna habitat values and common, urban-adapted species. Remnant or planted flowering eucalypts within these Area Types may occasionally support threatened fauna species which are known to forage in fruiting/flowering trees of highly urbanised areas (e.g. Grey-headed Flying Fox).

Urban Wildlife Management Plan

The Urban Wildlife Management Plan covers 12 key elements:

- Protection of terrestrial fauna habitats.
- Protection of in-stream habitat and off-stream wetlands.
- Revegetation (consistent with EVCs) to augment habitat and improve habitat link.
- Artificial nest boxes.
- Fauna friendly lighting.
- Weed Management.
- Securing fauna habitat through overlays and zoning.
- Feral animal control (including foxes, feral cats and rabbits).
- Overabundant/aggressive fauna (native & exotic).
- Domestic animal control.
- User related issues (recreational activities).
- Education and community engagement.

Recommendations for management and opportunities to enhance habitat are made for each of these plan elements. Site specific habitat enhancements and overall management goals are provided in the document. Key legislation and policy that may contribute to achieving conservation outcomes are summarised and suggestions made for coordination amongst relevant stakeholders.

Recommendations for Management

A brief summary of the recommendations for conserving and enhancing fauna values in priority areas (e.g. Area Type 1 and 2a- Yarra River; Merri and Darebin Creeks) include:

- Protect and enhance all terrestrial and in-stream fauna habitat;
- Improve water quality in whole catchment;
- Liaise closely with other land managers to coordinate actions. Stakeholders include, Melbourne Water, Parks Victoria, City of Boroondara, City of Darebin, Department of Sustainability and Environment, Department of Primary Industries, Merri Creek Management Committee and Darebin Creek Management Committee;
- Maintain remnant vegetation and existing areas of revegetation;

- Improve connectivity and provide a habitat link along the length of the Yarra River and its tributaries;
- Retain hollow bearing trees and stags;
- Retain or augment terrestrial and in-stream habitat with large woody debris;
- Undertake staged removal and control of weeds as determined by the Weed Management Plan;
- Revegetate with indigenous flora of local provenance and base revegetation programs on EVCs as determined by a Revegetation Management Plan;
- Undertake in conjunction with Melbourne Water, in-stream rehabilitation through aquatic plantings as appropriate;
- Permanently fence areas of fauna habitat such as wetlands and temporarily fence those areas of rehabilitation and revegetation;
- Undertake control and monitor for pest animals in conjunction with other stakeholders;
- Create dog exclusion zones around fauna habitat such as wetlands. All other areas of fauna habitat dogs 'on-leash' only;
- Promote and encourage environmental awareness through education campaigns; and
- Install fauna friendly lighting in and adjacent to all areas of fauna habitat.

1 Introduction

Ecology Australia Pty. Ltd. was commissioned by the City of Yarra (April 2009) to prepare an Urban Wildlife Management Plan. The plan is required to guide the management of remaining remnant vegetation, streetscapes, parks and other public open spaces, with the aim of ensuring that native wildlife can continue to survive in the context of a highly modified inner city environment.

The land covered by the City of Yarra, historically once supported a number of different Ecological Vegetation Communities (City of Yarra 2008) and their associated fauna. However, as a result of development and severe modifications to the indigenous vegetation and ecosystems, native fauna populations have declined and remaining values are threatened by a variety of processes (City of Yarra 2008).

The City of Yarra is now predominantly used for industrial and high-density residential land uses, with much open space now dedicated to recreational uses and dominated by introduced flora species. Only a few native vegetation remnants remain, including those along the Yarra River and small patches along the Merri and Darebin Creeks.

The Urban Wildlife Management Plan aims to encompass all areas of fauna habitat in the City of Yarra and lead towards an informed and coordinated approach for conservation, particularly focusing on a few key areas of habitat. Fauna and their habitats in the study area are threatened with continued degradation and therefore a reduction in their long-term viability. The objectives of this plan are to identify areas of importance, prevent further degradation of environmental values and where possible outline recommendations to enhance existing conditions through opportunities to improve fauna habitat value and connectivity.

In the preparation of the Urban Wildlife Management Plan, the following key direction and statement from the Yarra Open Space Strategy was taken into consideration:

"to provide habitat for native fauna in open space reserves through appropriate planning, design and management of open space. Wildlife habitat values of bushland in open space reserves can be increased by taking into consideration the needs of native fauna in future planting designs and revegetation projects, particularly along waterways and linear reserves."

1.1 Specific Objectives

The specific aims of the Urban Wildlife Management Plan are to:

- Identify areas of remaining fauna habitat including remnant vegetation, revegetation, open parkland and street trees. These fauna habitat types will be evaluated for their potential to support key fauna species;
- Identify and address threats to fauna habitat such as fragmentation, degradation from weed invasion and predation pressure;

- Identify opportunities for potential habitat improvement (e.g. revegetation along waterway corridors to link areas of remaining habitat, retention of hollow bearing trees). These habitat improvements may be in conjunction with other land managers or stakeholders (e.g. Parks Victoria);
- Recommendations for other protection and enhancement measures for fauna habitat, which may include interpretative signage to improve community understanding of fauna habitat values and fencing environmentally sensitive areas; and
- Review existing control methods of pest animal species and provide recommendations for updating where required.

2 Study Area

The study area encompasses the entire City of Yarra, located immediately east (c. 2 km) of the Melbourne Central Business District. The study area is approximately 19.5 km^2 and is roughly bounded by the Yarra River to the east and south, the lower reaches of Darebin Creek and Merri Creek to the north, and Princes Park, Nicholson Street and Punt Road to the west (see Figure 1).

The City of Yarra is located across two bioregions (DSE 2009): the Victorian Volcanic Plain and the Gippsland Plain Bioregion. The majority of the City is located within the Victorian Volcanic Plain, with only small section in the north-west and south –west of the study area within the Gippsland Plain Bioregion.

The monthly average for maximum daily temperatures varies between 13.1 °C in July and 26 °C in February, and the average annual rainfall is 734 mm (Bureau of Meteorology 2009).

The City of Yarra contains/borders three waterways: the Yarra River and two of its tributaries, Merri and Darebin Creeks. The study area is at the base of a 4078 km^2 catchment (City of Yarra 2008).

Since European settlement, the vegetation within the City of Yarra has almost entirely been cleared and the area is now predominantly utilised for industrial or high-density residential purposes. The Yarra River has also been extensively realigned and widened and swamps have been drained and filled (City of Yarra 2008). The urbanisation surrounding the lower reaches of the Yarra River and its tributaries, have also lead to major hydrological changes including increased hard surfaces resulting in urban runoff and higher sediment loads (from surrounding land use practices). These changes have caused a reduction in the water quality and impacts on downstream values as the river flows into Port Phillip Bay (City of Yarra 2008).

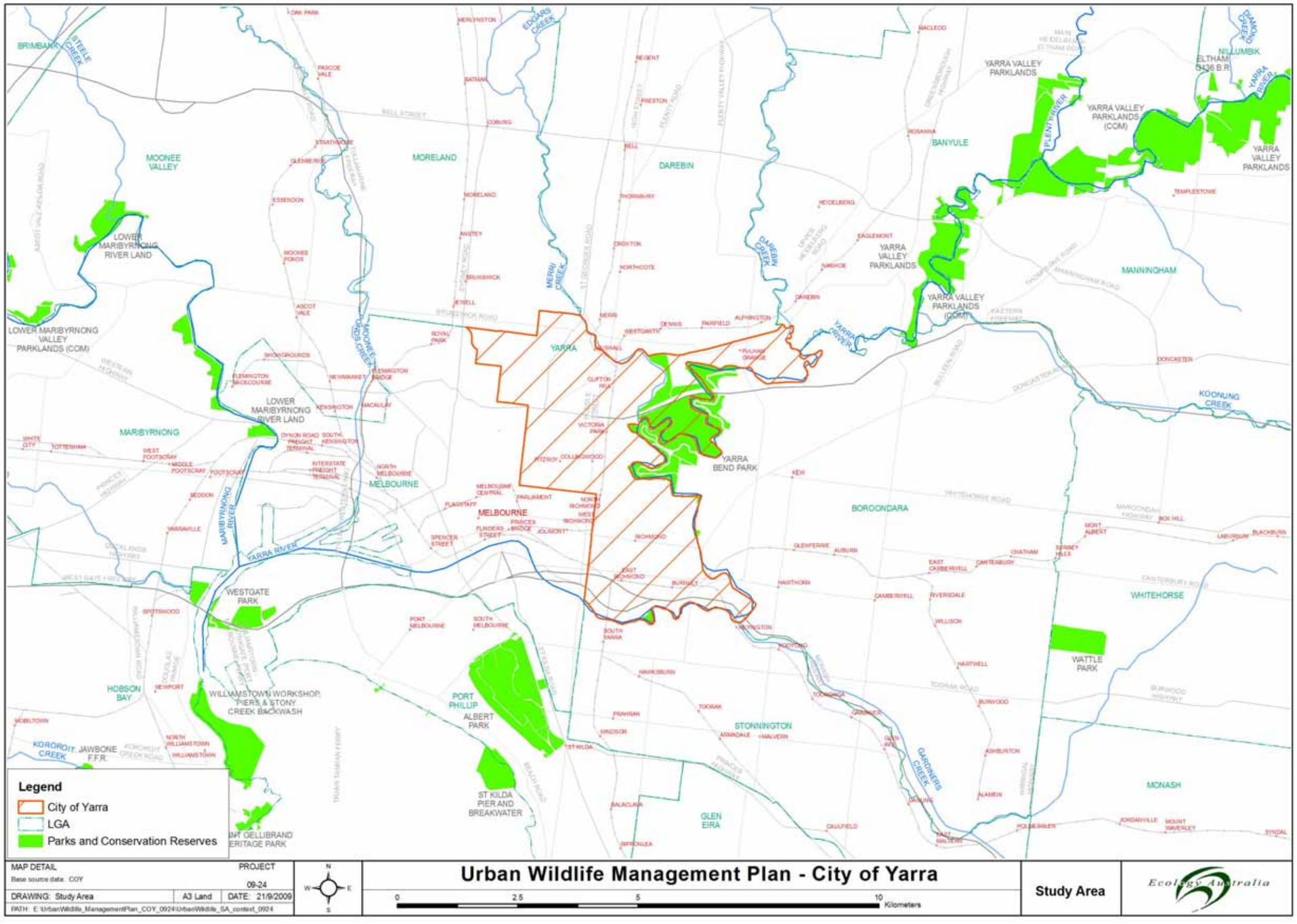
The City of Yarra contains a total area of 310.4 ha of public open space that is managed by a number of responsible authorities (e.g. City of Yarra, Parks Victoria, Melbourne Water, private land holders) and utilised for a variety of purposes including, outdoor recreation, passive outdoor enjoyment and nature conservation. The majority of open space is highly modified or managed as European style gardens dominated by exotic flora. However, a few remnants of native vegetation remain including patches along the Yarra River, Merri and Darebin Creeks.

The three waterways and their associated riparian vegetation provide important habitat for remaining fauna populations in the area. The most notable and largest remaining area of natural bushland within the study area and inner Melbourne is the Yarra Bend Park. The park is split on either side of the Yarra River, located in both the City of Yarra and City of Boroondara. Yarra Bend Park has high ecological values for flora and fauna and is an important source population for many smaller reserves in the surrounding area. The biodiversity values of park are highest on the east side of the river within the City of Boroondara, where large patches of Yellow Gum Woodland and riparian vegetation remain.

Fauna habitats within the City of Yarra are connected to the surrounding landscape through existing corridors such as the Yarra River. Large patches of remnant vegetation on public land and

other areas of open space up-stream along the Yarra River provide valuable habitat for a diversity of fauna species. The waterway and riparian vegetation along the Yarra River may function as a movement corridor allowing fauna to disperse between these habitats. The thin strip of riparian vegetation along the length of the Merri and Darebin Creeks provides some connectivity to areas of fauna habitat such as Darebin and Merri Parklands. Figure 1 provides a broad overview of the major parks and conservation reserves within the greater surrounding landscape.

Figure 1 City of Yarra – Study area location and landscape context – Major parks and conservation areas surrounding the City of Yarra.



3 Methods

3.1 Database and information review

Information in databases and literature pertaining to the study area and surrounds was analysed to compile the following information:

1. The current biodiversity values of the study area; and
2. Key fauna species that may occur in the study area.

The databases and information used was sourced from the following:

- Fauna records within 10 km of the study area held in the Victorian Fauna Display (DSE 2007a);
- DSE Biosites;
- Fauna species listed under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) using the EPBC Protected Matters Database;
- Miscellaneous sightings (e.g. consultant reports);
- Aerial photography and mapping;
- Ecological Vegetation Class (EVC) mapping/modelling;
- Melbourne Water Databases (e.g. Frog Census database);
- Natural Heritage Study and maps (Biosis Research 2001);
- Yarra Open Space Strategy (Thompson Berrill Landscape Design 2006) http://www.yarracity.vic.gov.au/Leisure/Parks/Open%20space%20strategy.asp
- The Yarra Environment Strategy http://www.yarracity.vic.gov.au/leisure/Parks/Our%20sustainable%20future.asp
- the Yarra Street Tree Policy and Precinct Planting Master plans (Thompson Berrill Landscape Design 2004) http://www.yarracity.vic.gov.au/Leisure/Parks/Precinct%20planting.asp
- the Yarra Domestic Animal Management Plan (People and their Pets) (City of Yarra 2007b) http://www.yarracity.vic.gov.au/consultation/pdf/animal%20management%20strategy.pdf
- The Yarra Planning Scheme. Especially Local Policy 22.08 http://www.dse.vic.gov.au/planningschemes/yarra/home.html

- Existing legislation (local, state and federal) for flora and fauna, e.g. Victorian *Flora and Fauna Guarantee Act* 1988 and the Federal *Environment Protection and Biodiversity Conservation Act* 1999;
- Existing policy and management guidelines for fauna within Yarra and other inner-city areas for comparison (where available); and
- Ecological reports or any other relevant literature and unpublished reports of the immediate or surrounding area (e.g. Todd et al. 1992, Carr et al. 1999, and Parks Victoria 2000).

3.2 Stakeholder consultation and liaison

There are a wide range of stakeholders within the City of Yarra. These include City of Yarra Council, Parks Victoria, Melbourne Water, Department of Sustainability and Environment (DSE), Merri Creek Management Committee (MCMC), Darebin Creek Management Committee (DCMC), and community groups such as Yarra River Keepers Association, Victorian Advocates for Animals (VAFA), Animal Active, Friends of Merri Creek, Friends of Burnley Park and Greenlink Yarra Bend Park. The local volunteers from 'friends of' groups undertake a range of activities including weed control, rubbish removal and revegetation under the guidance of City of Yarra, MCMC and Parks Victoria.

A scoping meeting was held with City of Yarra at the initiation of this project (8 April 2009) to outline the key objectives, scope, limitations and opportunities for management relevant to the Urban Wildlife Management Plan. A presentation of preliminary findings and recommendations was undertaken on 4 June 2009. This presentation provided an opportunity to provide initial comments on the structure of the plan, findings and management recommendations. Further informal stakeholder consultation was undertaken throughout the remainder of the assessment. Stakeholder consultation provided a forum for:

- Exchanging information;
- Identifying areas of remaining habitat;
- Compiling historic and contemporary records of fauna species from the study area;
- Identifying important populations of fauna for protection and management;
- Identifying existing habitat links and opportunities for habitat links between areas of remaining habitat;
- Identifying threats; and
- Obtaining the input of 'local knowledge' from management agencies and stakeholder groups.

Key personnel (in alphabetical order) consulted during the project included:

- Adam Hall City of Boroondara;
- Brian Bainbridge – Merri Creek Management Committee;
- Carrie Lindsay – (Open Space Planner) City of Yarra;
- Craig McGrath –)Parks and Habitat Officer) City of Yarra;
- David Taylor - Melbourne Water;
- Jaynce McMurtrie – City of Boroondara
- Lawrence Pope – Victorian Advocates for Animals (VAFA);
- Luke Sandham – (Bushland Management) City of Darebin
- Mark Bernhardt – (Coordinator, Community Amenity) City of Yarra;
- Mark Dornau - (Manager Environmental Services) City of Yarra;
- Peter Lynch – (Team Leader Environment Yarra Bend Park) Parks Victoria;
- Ray Radford – (Secretary) Friends of Merri Creek and (Admin/Info Officer) Merri Creek Management Committee;
- Rheya Linden – Animal Active;
- Sherrie Hopkins – (Coordinator Strategic Planning) City of Yarra;
- Shirley Diez – (Senior Biodiversity Officer) Department of Sustainability and Environment
- Silvana Predebon – (Coordinator Environmental Sustainability Unit) City of Yarra; and
- Steven McMurray – (Manager, Building and Regulatory Services) City of Yarra.

Exhibition of the draft plan for public comment was undertaken to inform the wider community and receive feedback on the findings and recommendations for management of wildlife in the City of Yarra.

3.3 Field Assessment

Brief field surveys by two zoologists were carried out on 7 and 8 May 2009.

Twenty sites were selected for field assessment that covered a range of broad habitat types (e.g. waterways, riparian vegetation or other areas of remnant vegetation, revegetation and/or exotic gardens,) present in the study area. Sites were also strategically selected to ensure key fauna management issues were addressed and

provided a snapshot of the habitat available, native fauna composition and current threats to these populations. Sites visited are listed in Appendix 1.

3.3.1 Habitat assessment

The field survey comprised of rapid assessments of existing reserves/open spaces, waterway corridors and other areas considered important for fauna. A field proforma sheet was used for collection of data and to ensure a standardised rapid assessment of each site. Data collected included:

- An inventory of vertebrate fauna found in the study area, based on direct observation and indirect evidence (diggings, scats, tracks, nests, burrows, etc.) (See Appendix 3);
- Identification of fauna habitats present;
- Assessment of the likelihood of occurrence of key fauna species;
- Identification of threats; and
- Identification of management opportunities for protection and enhancement of current fauna habitat and wildlife populations.

Note: This fauna inventory is not a comprehensive list of all fauna that may potentially be found at each site. The inventory is a 'snapshot' list of species recorded during the brief field assessment. Furthermore, it was not within the scope of this project to undertake targeted surveys (e.g. Elliot or Harp trapping) for various fauna groups.

During the site inspection, habitat assessment focussed on the extent of native vegetation cover, composition and structure, as well as other features important in determining habitat quality. For example, the presence or absence of particular habitat attributes for key fauna species (e.g. in-stream habitat and associated riparian vegetation and ground layer characteristics, including leaf litter, logs and rocks) and the level of disturbance and threats (e.g. weed invasion). Other habitat attributes noted include:

- Size and shape of patch;
- Connectivity (habitat links or corridors);
- Presence of specific habitat features (e.g. swamps or other water bodies); and
- Structural heterogeneity of vegetation.

3.4 Conservation Status

Species conservation status is determined by reference to DSE's Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2007b), listings under the Victorian

Flora and Fauna Guarantee Act 1988 (FFG Act) and the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

3.5 Nomenclature and Taxonomy

The scientific names, common names, and systematic orders of fauna species follow the Atlas of Victorian Wildlife (DSE 2007a).

4 Existing Conditions

This section outlines the existing conditions of the study area. It provides an assessment of the fauna habitat values, key fauna species and a list of important fauna habitat sites within the City of Yarra. The assessment is based on expert consultation, extensive literature and database review as well as rapid site assessments of selected locations within the study area.

4.1 Area Types and fauna habitats

In order to direct the allocation of resources for fauna management, the study area has been divided into three Area Types:

- Area Type 1 – Waterways and remnant vegetation. The primary focus for land management should be the conservation of flora and fauna values, with additional values and uses being managed to compliment urban bushland and wildlife habitat.
- Area Type 2a – Urban Parks (Urban Bushland plantings). The primary aim for land management should be to maintain and extend urban bushland plantings where possible, maintain exotic planting where appropriate and provide for passive recreation.
- Area Type 2b – Urban Parks (predominantly exotic parks and sporting ovals). The primary focus for land management should be on the recreational values with conservation of fauna habitat as a secondary purpose.
- Area Type 3 – Street Trees (provide landscape amenity and low values as fauna habitat).

Within these three Area Types there are a range of fauna habitats present:

1. Waterways;
2. Off-stream wetlands;
3. Riparian Vegetation;
4. Scattered indigenous trees with or without revegetation;
5. Exotic Grassland; and
6. Indigenous, non-indigenous and exotic plantings.

The three Area Types and their fauna habitat types present are outlined in Table 1 and Figure 2. Area Type 1 contains the highest values for fauna habitat and as such resources to maintain and enhance biodiversity values should be placed within these areas. Most sites are considered to have local fauna habitat values but a few key sites

(outlined in Section 4.2) are considered to support high biodiversity values. These sites also support or have the potential to support a number of EPBC-listed, FFG-listed and DSE-significant species. A large camp of EPBC-listed Grey-headed Flying Fox *Pteropus poliocephalus* is located within the Yarra Bend Park and potential and known habitat along the Yarra River exists for Azure Kingfisher and Nankeen Night-Heron (Emison et al. 1987, Marchant and Higgins 1990).

Figure 2 Fauna Habitat Area Types within the City of Yarra.

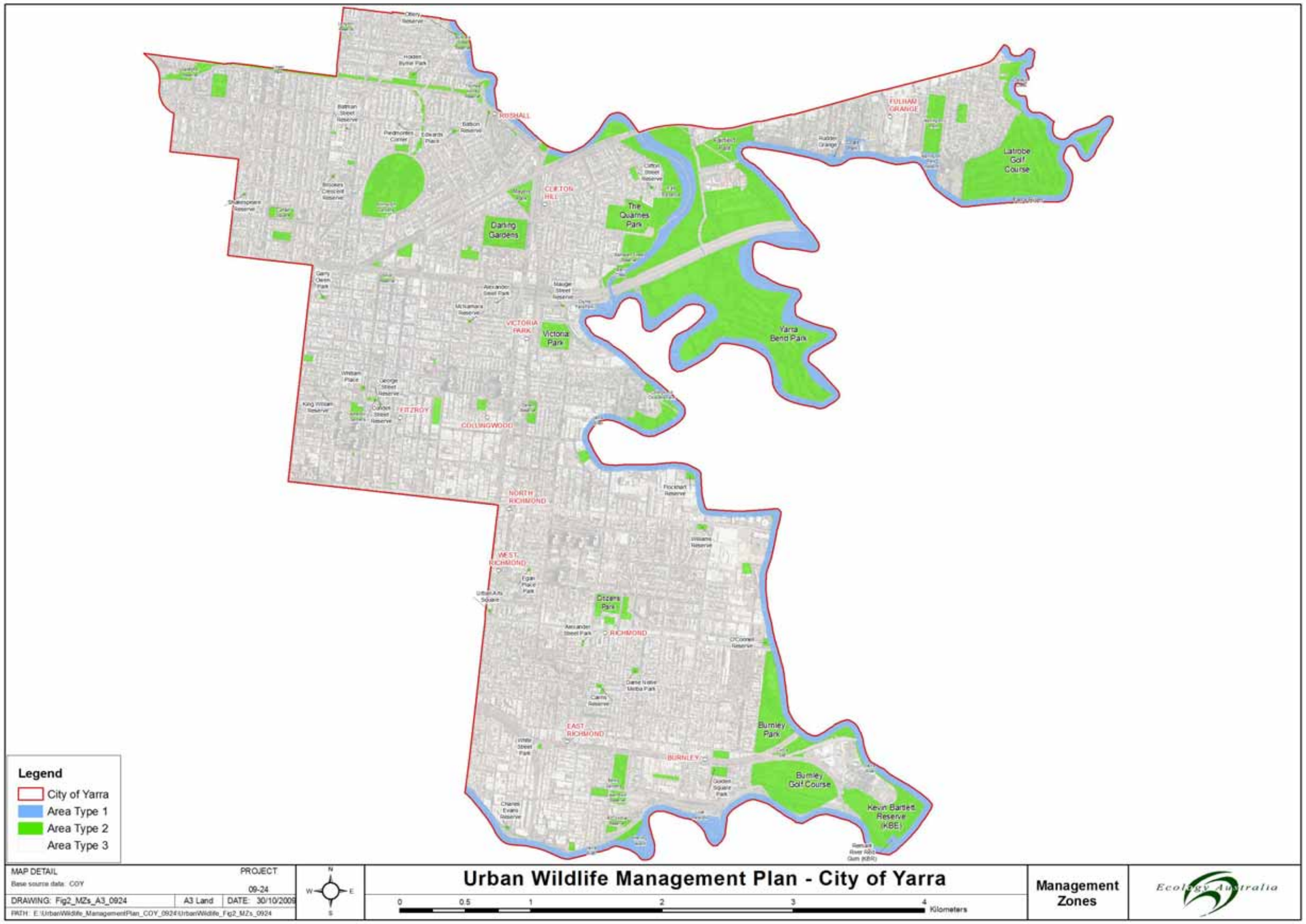


Table 1 Area Types and fauna habitats present within the City of Yarra.

Area Type and fauna habitats present	Habitat features	Overall Values	Key Species
Area Type 1 – Waterways and remnant vegetation - Predominantly conservation focus			
Yarra River and associated environs	**Waterway** - open water, muddy and rocky banks. Sparse in-stream vegetation. In-stream woody debris. Rehabilitated and artificial off-stream wetlands - shallow water bodies, muddy substrate some emergent and submergent vegetation. **Vegetation** – Most of the riparian vegetation along the length of the Yarra within the study area is narrow and degraded (e.g. from weed invasion). However, scattered indigenous trees and small remnant patches of riparian woodland including large old River Red Gums with hollows are present within the study area. Revegetation with indigenous and non-indigenous plantings has been undertaken at many sites. Despite the highly disjunct nature of the riparian vegetation, the greatest biodiversity values for terrestrial fauna within the City of Yarra are located within this area. Yarra Bend Park is the largest remaining area of natural bushland within inner Melbourne. This area has high ecological values for flora and fauna. Fauna habitat value is highest on the east side of the river within the City of Boroondara where large patches of Yellow Gum Woodland and riparian vegetation remain. The City of Yarra side contains smaller patches of remnant vegetation, with areas of regenerating or rehabilitated understorey. There are also large cleared areas supporting scattered remnant and non-indigenous trees with an exotic grassy understorey.	• Overall moderate to high fauna values • The Yarra River has been highly modified with variable water quality along its length. • The Yarra River is listed as an ecologically important stream in the State Environment Protection Policy – Waters of Victoria (SEPP – Waters of Victoria). • The Yarra River is considered to be of Regional significance under Biosite criterion 1.2.6 (DSE 2004). • Riparian vegetation has been identified as moderate to high fauna habitat significance and as a habitat link within a regional network (Beardsell 1997). • Yarra Bend Park (#3588) and Dights Falls (#4862) along the Yarra River have been listed as DSE Biosites.	The riparian zone provides habitat for hollow dependent fauna (e.g. Eastern Rosella, Galah, Red-rumped Parrot, bats and Common Brushtail Possum), nectar-feeding birds (e.g. White-plumed Honeyeater) and mid-storey shrubs often required by small insectivorous birds (e.g. Silvereyes, Brown Thornbill, Superb Fairy Wren) and other fauna species not typically found to persist in urban environments . The ground layer of woody debris and vegetation cover provides suitable habitat for a variety of reptile species including Pale-Flecked Sun Skink and Blue Tongue Lizards. Threatened fauna species have been recorded in the area including EPBC-listed Grey-headed Flying Fox and State-significant Azure Kingfisher and Nankeen Night Heron (Ecology Australia 2006). A large permanent camp of Grey-headed Flying Fox is located within Yarra Bend Park. The open water provides habitat for EPBC-listed Australian Grayling, FFG-listed Australian Mudfish and water dependant birds such as ducks, grebes, darter and cormorants. The banks may provide basking areas for common frogs (e.g. Common Froglet) and reptiles (e.g. Long-necked Turtle), and burrowing habitat for Water Rat. Higher quality areas may provide potential foraging habitat for platypus and Southern Myotis.

Area Type and fauna habitats present	Habitat features	Overall Values	Key Species
Merri Creek and associated environs	**Waterway** - rocky, with flowing water, rock riffles and pools. Sparse in-stream vegetation. Confluence with the Yarra River near Dight's Falls. **Vegetation** - narrow and highly modified, often dominated by exotic species. Scattered remnant trees (some with hollows) are present along the waterway and extensive work has been undertaken to rehabilitate the understorey in some sections with weed removal and revegetation. The riparian vegetation provides habitat for mostly common and urban adapted fauna species and may be used as a movement corridor for mobile species such as birds and bats. Some areas provide suitable foraging and burrowing habitat for Water Rat. Scattered basalt boulders and the associated escarpment provide suitable basking and shelter habitat for reptiles and frogs.	• Areas of high, moderate and low fauna habitat value • Highly modified, disjunct and degraded vegetation. • Variable water quality along the length of Merri Creek. • In-stream and riparian habitat of Merri Creek between Heidelberg Road and Normanby Ave (listed as a DSE Biosite #5051). The City of Yarra contains a portion of this biosite on the south/west side of Merri Creek from Heidelberg Road to St Georges Road. • Merri Creek is listed as ecologically important stream in the State Environment Protection Policy – Waters of Victoria (SEPP – Waters of Victoria) • Merri Creek and its riparian vegetation has been identified as habitat link within the strategic habitat link concept developed by Beardsell (1997)	Merri Creek provides habitat for common fish fauna, birds (e.g. Little Pied Cormorants, Pacific Black Duck), frogs (e.g. Southern Brown Tree Frog, Spotted Marsh Frog, and Common Froglet) (MCMC 2009), mammals such as the Water Rat (Williams and Serena 2004) and potentially the State-significant Southern Myotis. Platypus appear to be no longer resident within Merri Creek (MCMC 2009). The fish fauna of the creek is generally poor in numbers and diversity (Amenta 2002) due in part to poor water quality and lack of habitat (MCMC 2009). Koster (2002) recorded Short-finned Eels as the most abundant fish species. Escarpments may provide important habitat for a variety of reptile (e.g. basking and shelter sites for Pale-flecked Garden Sun skink or Blue-tongue Lizards) and frog species (e.g. over-wintering habitat). Overhanging vegetation provides shade for the creek and perching/roosting sites for birds. Hollow-bearing trees may provide shelter and nesting resources for bats, parrots and possums.
Darebin Creek and associated environs	**Waterway** - shallow with flowing water, rocky substrate and banks but become steeper near its confluence with the Yarra River. In-stream vegetation is sparse and patchy. Confluence with the Yarra River adjacent to La Trobe Golf Course. **Vegetation** - Disjunct and narrow strip of riparian vegetation supporting scattered remnant trees (some with hollows) and shrubs with a predominantly exotic understorey. Movement corridor for mobile species such as birds and bats.	• Moderate fauna values • Highly modified, disjunct and degraded vegetation. • Variable water quality • The creek has been identified as a habitat link within the strategic habitat link concept developed by Beardsell (1997).	Creek environs provide habitat for water dependent birds such as Little Pied Cormorants, Pacific Black Duck, frogs and potential habitat for the Water Rat and the State-significant Southern Myotis. Overhanging vegetation provides shade for the creek and perching/roosting sites for birds. Hollow-bearing trees may provide shelter and nesting resources for bats, parrots and possums.
Area Type 2 –Urban Parks – Predominantly recreational focus			
Area Type 2a – Urban Parks, bushland plantings	Urban bushland plantings – revegetation and/or areas of rehabilitation in urban parks. These parks have potential for wildlife habitat and links (e.g. Burnley Park, Quarries Park, and Linear Park, some golf courses), The revegetation and scattered remnant trees provide a variety of resources for native fauna. Exotic plantings and lawn is also present. These areas are used for passive recreation.	• Often highly modified. • Low – moderate fauna habitat values.	Fauna habitat values may increase with the age and structural complexity and increased connectivity of revegetation areas. These areas provide local values for urban adapted species only (possums and other mobile species such as birds). Fruiting trees may occasionally provide opportunistic foraging habitat for species such as Grey-headed Flying Fox.

Area Type and fauna habitats present	Habitat features	Overall Values	Key Species
Area Type 2b – Urban Parks, predominantly cleared and/or exotic planting e.g. sporting ovals and other areas of predominantly cleared open space.	Highly modified high-use urban recreational parks. Dominated by exotic mown grasses with scattered remnant trees and/or exotic plantings.	• Highly modified. • Low fauna values.	Cleared exotic lawn provides low habitat values for most native fauna but may be used for foraging by common urban adapted species such as Australian Magpie, Magpie Lark, Crested Pigeon and Red-rumped Parrots. Scattered trees in these areas provide local values for urban adapted species only (possums and other mobile species such as birds). Fruiting trees may occasionally provide opportunistic foraging habitat for species such as Grey-headed Flying Fox.
Area Type 3 – Street Trees			
Street Trees	Planted non-indigenous and exotic trees and shrubs with a grassy mown understorey.	• Low fauna values.	Local values for urban adapted species only (possums and other mobile species such as birds). Fruiting trees may occasionally provide opportunistic foraging habitat for species such as Grey-headed Flying Fox.

4.2 Key fauna habitat sites

The key fauna habitat sites within the City of Yarra are all located along or adjacent to the three waterways, where remnant or rehabilitated vegetation is present (Area Type 1 and 2a):

1. The in-stream environs of the Yarra River and all associated riparian vegetation including:
    a. Yarra Bend Park (listed as a DSE Biosite # 3588) and Golf Course (this area provides the most important habitat for fauna in the study area) (see Plate 1)
    b. Dights Falls (listed as a DSE Biosite # 4862).
    c. Rudder Grange and Coate Park.
    d. Alphington Wetlands (See Plate 2).
    e. Riparian vegetation within the La Trobe Golf Course (see Plate 3).
    f. Kevin Bartlett Reserve - River Red Gum Woodland.
    g. Loy's Paddock.
2. The in-stream environs of Merri Creek and associated riparian vegetation including:
    a. In-stream and riparian habitat of Merri Creek between Heidelberg Road and Normanby Avenue (listed as a DSE Biosite # 5051).
    b. Escarpment at George Knott Reserve.
    c. Merri Creek through Quarries Park and the confluence with the Yarra River (see Plate 4).
3. The in-stream environs of Darebin Creek and associated riparian vegetation;
    a. Riparian vegetation within La Trobe Golf Course.
    b. Confluence of Darebin Creek and Yarra River.

The numerous other parks, reserves and street trees (Area Type 2b and 3) generally support low fauna habitat values and common, urban-adapted species (Table 1 and Appendix 1). Area Type 2b and 3 mostly support exotic vegetation, revegetation and/or remnant trees, but no remnant vegetation communities are present. Some opportunities exist to enhance fauna habitat values within Area Type 2a and b (e.g. the Linear Reserve, from Princes/Royal Park to its connection with Merri Creek). Remnant or planted flowering eucalypts within these Area Types may occasionally support threatened fauna species which are known to forage in highly urbanised areas (e.g. Grey-headed Flying Fox).

Current key fauna habitat sites are all categorised with Area Type 1 and some within Area Type 2a.

Plate 1 Riparian vegetation along the Yarra River, Yarra Bend Park.

Plate 2 Wetland, Alphington Park.

Plate 3 Riparian vegetation along the Yarra River, La Trobe Golf Course.

Plate 4 Merri Creek, Quarries Park.

4.3 Key fauna species

Despite the almost complete vegetation clearance within the City of Yarra, the area still supports high environmental values, particularly along the three waterways and their associated riparian vegetation. To document the current fauna habitat values in the study area, a suite of key fauna species were selected based on their conservation status, their current or potential distribution in the study area and their habitat requirements. The key species selected include those:

- Threatened under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (e.g. Grey-headed Flying-fox);
- Threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) (e.g. Powerful Owl);
- Listed under DSE's Advisory list for threatened vertebrate fauna in Victoria (DSE 2007a) (e.g. Azure Kingfisher);
- Non-threatened fauna species considered to decline in urban areas (e.g. small insectivorous birds such as Thornbills and Superb Fairy-wren); and
- Non-threatened species requiring specific habitat elements such as hollows (e.g. Gould's Wattle Bat, Crimson Rosella and Red-rumped Parrots), ground layer characteristics such woody debris, leaf litter and tussock grasses (e.g. Blue-tongue Lizard and Pale-flecked Sun Skink) or specific in-stream and bank characteristics (e.g. Water Rat, Platypus or Southern Brown Tree Frog).

These species are not necessarily referred to throughout the Plan but the habitat elements required by these species were utilised to assess the current fauna habitat values present at each site and provide recommendations for habitat enhancement.

Appendix 2 provides a detailed list of key fauna species within the City of Yarra, their conservation status and the year of the latest AVW record within 10 km of the study area.

4.4 Current Threats and Management

A multitude of threats currently faces habitat and the local fauna populations they support. Threats to terrestrial habitat include:

- Habitat loss and fragmentation (this is likely to be small considering most areas have already been developed);
- Habitat degradation due to weed invasion;
- Dieback (caused by defoliation from possums, psyllid infestations etc.);
- Predation by introduced species, (e.g. cats and foxes); and

- Disturbance from human activities (e.g. traffic, walking dogs).

Major threats to waterways in the study area include:

- Degraded and sparse riparian vegetation;
- Changes in water flow;
- High sediment load and poor water quality from urban run-off;
- Fish barriers;
- Weed invasion; and
- Bed and bank erosion.

A key overarching threat to remnant vegetation and fauna communities within the study area is climate change including, reduced rainfall and increasing temperatures.

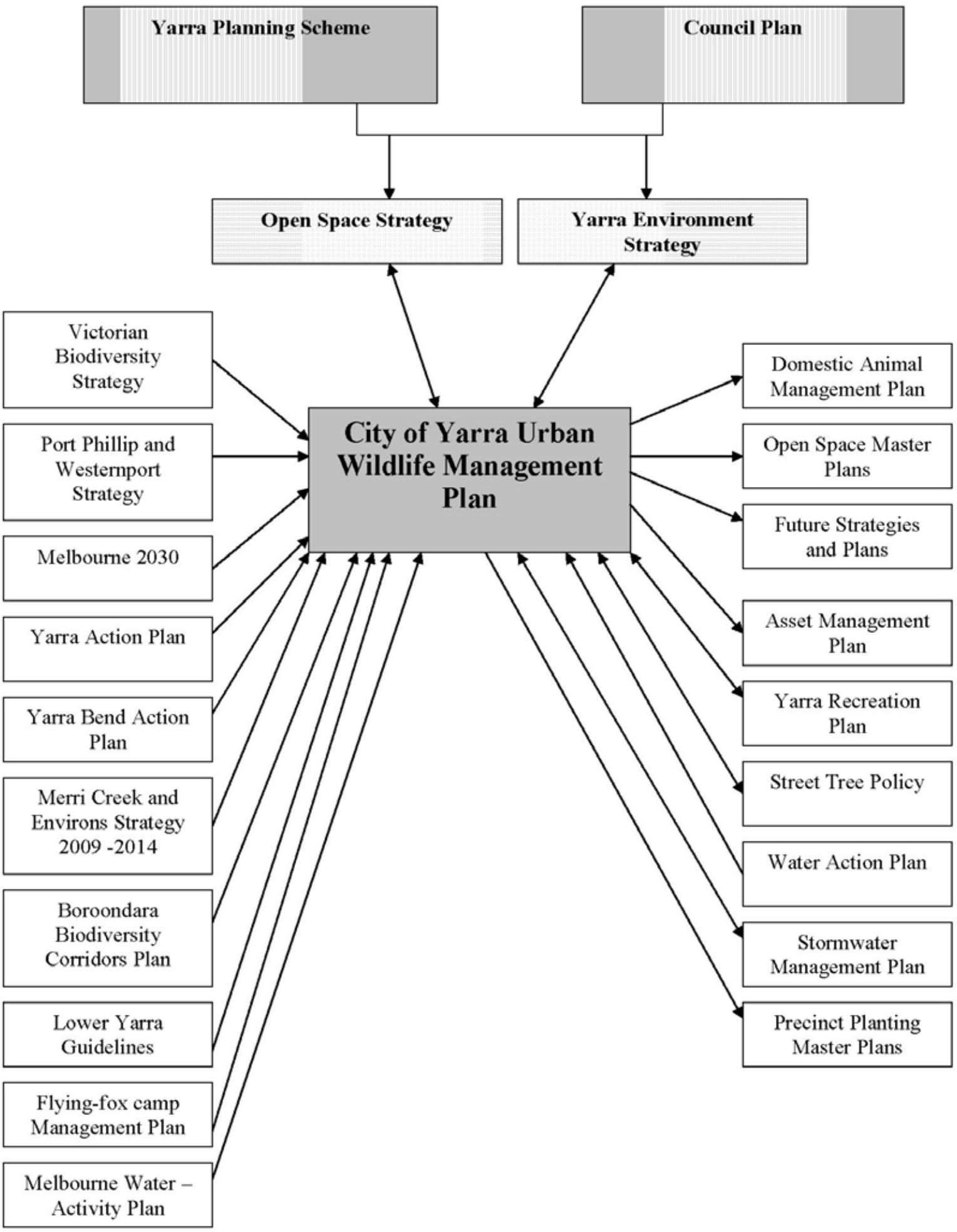
Active management is currently undertaken by the City of Yarra, Parks Victoria, Melbourne Water, Merri Creek Management Committee, Darebin Creek Management Committee and volunteers from 'friends of' groups and must be maintained to counteract the threatening processes and retain and/or enhance existing conditions.

Current activities and further recommended actions to minimise impacts from these threats are outlined in the Plan Elements (see Section 5).

4.5 Relationships of key Council and other documents to the Urban Wildlife Management Plan

Figure 3 illustrates the relationship of the Urban Wildlife Plan to key Council documents and other key local, regional and State plans and strategies. These documents have been referred to in the preparation of the Plan. The arrow directions represent the flow of information during the Plan preparation and/or the possible flow of information for future plan revisions.

Figure 3 Relationship of the Urban Wildlife Management Plan to Council documents and other plans/strategies.



5 Urban Wildlife Management Plan

The Urban Wildlife Management Plan aims to develop a vision and management guide for fauna habitat within the City of Yarra that can be implemented over a 10 to 15 year timeframe. The works required to fulfil the aims of the Plan may vary year to year.

The Environmental and Recreational Services branch at the City of Yarra is responsible for the implementation of this plan. However, liaison and coordination amongst multiple stakeholders will be required to fulfil the objectives and undertake the actions outlined in this plan, including Melbourne Water, Parks Victoria, Merri Creek Management Committee, contractors, DSE, DPI and qualified biologists.

The Plan should have its own review process to be undertaken after years two, five and ten by City of Yarra. For the plan to be successful, key management activities outlined in this plan should be subject to regular assessment and monitoring and altered if necessary (i.e. adaptive management).

The objective of the Urban Wildlife Management Plan is to identify existing fauna habitat values and outline management actions required for the protection, maintenance and enhancement of these values in a highly urbanised landscape. Where possible, the Plan also provides detailed management activities necessary for maintenance of existing populations or provides recommendations for encouragement of key fauna species within the study area.

A summary of legislation and policy most relevant to the Urban Wildlife Management Plan is provided in Section 6 and Appendix 5. It outlines the scope of the act/policy, when it applies to the plan, and relevance to the study area.

The Urban Wildlife Management Plan covers 12 key elements:

- Protection of terrestrial fauna habitats;
- Protection of in-stream habitat and off-stream wetlands;
- Revegetation to augment habitat and improve habitat links;
- Artificial nest boxes;
- Fauna friendly lighting;
- Weed Management;
- Securing fauna habitat through overlays and zoning;
- Feral animal control (including foxes, feral cats and rabbits);
- Overabundant/aggressive fauna (native & exotic);
- Domestic animal control;
- User related issues (recreational activities); and
- Education and community engagement.

5.1 Management Plan Elements

5.1.1 Protection of terrestrial fauna habitats

PLAN ELEMENT	Protection of fauna habitats
Issues	• High fauna habitat values remain along Yarra River/Yarra Bend Park, Merri and Darebin Creeks. • The need to retain essential habitat attributes including: hollow bearing trees and dead stags which provide shelter, roosting and nesting sites for birds (e.g. parrots) and mammals (e.g. possums and bats); leaf litter and woody debris that provide foraging sites for insectivorous birds and shelter for reptiles; and a shrubby mid-storey that provides cover and shelter for small passerine birds. • Key threats to these areas are weed invasion, pest animals, over-development, high recreational use and habitat removal for amenity/safety reasons.
Objectives	To preserve current fauna habitat values and enhance particular habitat attributes required to maintain fauna species diversity. This should focus on areas of remnant vegetation and where known or potential habitat for key fauna species is present (e.g. protection of EPBC-listed Grey-headed Flying-fox in Yarra Bend Park).
Management Actions	• Define protection and enhancement of existing fauna habitat as the first priority and creation of new fauna habitat as a secondary priority. • Minimise clearance of native vegetation. • Assess and evaluate flora and fauna values and potential impacts of all future developments and activities that may require vegetation removal or modification (e.g. major weed removal works). • Where removal of native vegetation is required (e.g. drainage works, pathway construction) a Net Gain habitat hectare assessment may also be required. This assessment must demonstrate the three step process of Net Gain (1- Avoid, 2- Minimise, 3 – Offset). Where vegetation clearance is unavoidable, investigate the possibility to offset losses through revegetation elsewhere within the City of Yarra. • Upon initial inspection of a tree (proposed for removal or significant lopping) by an arborist, a visual inspection and consideration of the potential fauna habitat values should be made (e.g. size, health, structure of the tree, presence of hollows etc). If the initial inspection indicates high habitat values, a formal tree habitat assessment should then be undertaken. • A formal tree habitat assessment should be undertaken by a qualified zoologist that would assess habitat attributes taking into consideration the tree species, age, structural integrity, foliage cover, decorticating bark and the number of hollows. If hollows are present, a suitably qualified wildlife rescue officer

	could be employed to retrieve fauna before tree removal. Consider replacing lost hollow bearing trees with nest boxes to ensure that any displaced fauna have an alternative shelter/nesting site (see Nest Box Plan Element, Section 5.1.4). • Incorporate information on sites of natural and established indigenous vegetation on Council's GIS system to inform land developments. Ensure that information corresponds to the Biodiversity Maps compiled by DSE (Yarra Environment Strategy - City of Yarra 2008). • Protect significant vegetation on public and private land across the municipality (particularly along the Yarra River Corridor) using the most effective planning controls (see Plan Element, Section 5.1.7) (Yarra Environment Strategy - City of Yarra 2008). • Investigate opportunities for the introduction of financial incentives and supporting mechanisms to encourage biodiversity conservation on private land. These mechanisms may include rate relief, credits, development concessions, grants, technical assistance, training and educational programs, management agreements, covenants, local levies and community recognition through local awards. • Support MCMC in the preparation of a biodiversity plan for the whole Merri Creek catchment (MCMC 2009) and incorporate into council plans where appropriate. • Restrict access into areas of fauna habitat by formalising pathways though the use of fencing, brush cutting or other visual deterrents such as delineation of a pathway with logs to prevent degradation and access to vegetation. • Retain hollow bearing trees and dead stags that provide habitat for hollow dependent fauna. • Where possible eradicate populations of feral bees and wasps that utilise tree hollows. These two invertebrate pest species will exclude native vertebrate fauna from hollows where present. Engage a qualified contractor to undertake control actions. • Control pest animals (see Plan Element Section 5.1.8). • Discourage dogs from areas of high fauna habitat (e.g. Loy's Paddock and Alphington Wetland). All other areas of fauna habitat should be dogs 'on leash' only (see Plan Element Section 5.1.10). • Connect existing fauna habitat patches through revegetation (Plate 7). Habitats links should be strengthened along all waterways. Existing corridors such as Yarra River, Merri and Darebin Creek should be high priorities for augmentation of existing fauna habitats and to improve potential for use as a movement corridor (see Plan Element Section 5.1.3). Other opportunities to enhance fauna habitat values and create habitat links exist in areas such as Linear Reserve. This area from Princes Park to Merri Creek currently has low fauna habitat values but some potential to provide a habitat link for mobile

	species through connection to Merri Creek. • Revegetation works must aim to represent EVCs as determined by a Revegetation Management Plan (see Plan Element Section 5.1.3). • Retain and/or augment habitat elements likely to encourage specific fauna groups such as (see Plate 8): o Shrubby mid-storey plants that provide cover for small insectivorous birds o Rocks, woody debris, litter, and ground layer flora such as tussock forming grasses that provide shelter for reptiles. o Retention of large woody debris in terrestrial and in-stream habitat. Fallen limbs from trees should be removed from tracks and re-distributed to augment areas of fauna habitat (See Plate 5). o Retention of hollow bearing trees/stags or augmentation with artificial nest boxes (see Plan Element Sections 5.1.1 and 5.1.4). o Retention of Mistletoe species (e.g. *Amyema* spp. and *Muellerina* spp.) Mistletoe provides an important resource for a large diversity of species including invertebrates and birds (e.g. Mistletoe Bird). • Parks Victoria to implement (City of Yarra to promote and encourage where possible) actions outlined within the Environmental Action Plan for Yarra Bend Park relating to '*Habitat component loss and competition*'. These include: o Investigation of tree hollow use by native and exotic fauna in the park. o Mapping of location for roosting, nesting and breeding sites of waterbirds. o Park patrols to control wood removal by neighbouring land owners. • Implement initiatives for Yarra River as stated within the Metropolitan Strategy, Melbourne 2030: Strengthen current policies and review adequacy of planning controls relating to the Yarra River to ensure the long-term protection of open space and conservation values – with the first priority being the Yarra River Corridor between Punt Road and Burke Road (Victorian Government 2002). • Participate in the Inner Melbourne Action Plan (IMAP) program to plan for improving sustainability of riparian zones and securing public access along waterways (City of Yarra 2008). • Minimise the use of insecticides and pesticides across the municipality, particularly in close proximity to waterways (See 5.1.2), and in golf courses and ovals where potential non-target impacts to ground feeding birds may occur. Council could encourage and provide information to private owners to reduce the impacts of this action.
Timing and Frequency	• Implement actions at the commencement of this plan. • Undertake habitat enhancement works as required.
Responsible Authority	City of Yarra, Melbourne Water, Parks Victoria, DSE, contractors.

Monitoring	• All future developments within the study area (applies to any major works including woody weed removal) to be assessed for impacts on vegetation and fauna habitats in a formal report by a qualified flora and fauna consultant. • Inspect boundaries of vegetated areas and tracks to ensure that recreational use is not impacting on habitat values. • Consider an environmental audit system to measure changes in sites of key fauna habitat across the City of Yarra. This audit could be undertaken every few years and monitor changes in both flora and fauna communities.
Sites where applicable	Area Type 1 and 2a: All riparian or other remnant vegetation along the Yarra River, Merri and Darebin Creeks.

Plate 5 Retained woody debris and augmentation with understorey flora species along the Yarra River, Rudder Grange.

5.1.2 Protection of in-stream fauna habitat and off-stream wetlands

PLAN ELEMENT	Protection of in-stream habitat
Issues	The three waterways within the study area provide important stream habitat for a range of in-stream and water dependent fauna species. The river and creeks themselves function as a corridor linking habitat for fish, birds and aquatic mammals such as the Water Rat. Furthermore, the associated riparian vegetation provides a habitat link for terrestrial fauna species. Issues relating to waterways in the study area include: • Poor water quality from stormwater runoff, containing sediment, pollutants and litter. • High recreational use along the banks and within the water (e.g. boating and rowing within the Yarra River). • Surrounding land use practices (e.g. residential and industrial). • Discarded rubbish. • Barriers to fish movement. • The generally poor, disjunct and narrow strip of riparian vegetation.
Objectives	• To improve water quality in whole catchment (e.g. urban runoff flowing into the creeks and river). • To protect existing in-stream fauna habitat. • To improve connectivity of riparian vegetation along the waterways. Riparian vegetation may act as a buffer to surrounding land use practices.
Management Actions	• Improve storm water quality entering the Yarra River and local creeks by implementing relevant actions from the Water Action Plan (2006), continuing capital works programs in accordance with the Water Sensitive Design Guidelines (Ecological Engineering 2007), and continuing litter prevention programs in accordance with the Lower Yarra Litter Strategy. • Continue to implement relevant actions from the Water Action Plan (Ecological Engineering 2007) that aim to improve stormwater quality entering the Yarra River and other local creeks that may include: o Ensuring appropriate sediment control measures are in place for all construction projects, in accordance with best management practice. o Providing on-going support for improved litter reduction programs and street sweeping initiatives. o Implement WSUD specific projects that aim to improve local stormwater quality and the health of the wider catchment, these projects are located in streets, parks and gardens and include constructed wetlands, bioretention systems or rain gardens. • Continue to implement the Stormwater Management Plan (Yarra Environment

	Plan – City of Yarra 2008). • Extend support to and encourage participation in local Waterwatch programs. • Improve habitat attributes likely to encourage a diversity of fauna species. For example, dense aquatic vegetation on the banks, overhanging riparian vegetation to provide a shading effect, retention of large woody debris in the water creates shelter and perching sites for waterbirds. • Retain in-stream woody debris. This practice is supported by Melbourne Water and "de-snagging" is no longer practised in the most part for indigenous trees. Exotic trees such as Willows may be removed if there is a risk of seed dispersal. Area of very high recreational uses (e.g. Yarra River in the CBD are an exception in these circumstances with snags removed to allow boat usage) (David Taylor Melbourne Water pers. comm.). • Support Melbourne Water in the removal of barriers to fish migration and dispersal (e.g. build fish ladders). • Continue to enhance existing wetland (e.g. Alphington Wetland) habitat through planting of aquatic vegetation (floating, submergent and emergent). Provision of terrestrial habitat components for shelter/refuge (e.g. tussock-forming grasses, rocks and logs) and creation of patches of dense emergent or fringing vegetation to potentially attract more cryptic water dependent birds (e.g. crakes and rails). • Investigate the creation of additional off-stream wetlands that capture stormwater run-off before entering the creeks and river. Storm water management can play a role in fauna habitat if designed appropriately by a biologist and hydrologist to maximise their habitat value while retaining their stormwater management function and user enjoyment (see Plate 6). • Install litter traps adjacent to stormwater drains where feasible. • Continue to avoid use of pesticides, fungicides, insecticides within or in close proximity to all water bodies. • Ensure adequate environment protection protocols are in place to avoid chemical or oil spills or other water/habitat contamination events during any works, and that guidelines for cleaning after spills are adhered to by relevant staff. • Improve connectivity of riparian vegetation by linking patches of fauna habitat through revegetation (see Plan Element Section 5.1.3). Riparian vegetation plays a role in the protection of in-stream habitat by 'buffering' against adjacent land uses. • Continue to support monitoring programs for water quality. Sampling methods should be consistent with Melbourne Water and EPA guidelines for water quality. • Melbourne Water to implement (City of Yarra to support where appropriate) actions as outlined in the Lower Yarra River and Merri Creek Waterway Management Activities Plan. These include:

	o Enhancing rock riffles and the pool and run structure of waterways; and o Supporting exotic tree/woody weed removal programs. • The City of Yarra could encourage long-term management goals as outlined in the Merri Creek Environs Strategy (MCMC 2009): o Encourage DSE to investigate the potential for reintroduction of appropriate native fish species (e.g. Southern Pygmy Perch) into areas of suitable habitat. o Encourage Melbourne Water to investigate the potential for reintroduction of platypus into areas of suitable habitat.
Timing and frequency	• Initiate management actions at the commencement of this plan. • Undertake protection measures as required.
Responsible Authority	Melbourne Water, EPA, City of Yarra, contractors
Monitoring	Melbourne Water undertakes water quality monitoring with the Yarra River and its tributaries.
Sites where applicable	Area Type 1 and 2: Yarra River, Merri and Darebin Creeks

Plate 6 Artificial wetland for stormwater capture, Quarries Park.

5.1.3 Revegetation to augment habitat and improve habitat links (corridors)

PLAN ELEMENT	Revegetation and habitat design
Issues	• Revegetation works are currently undertaken throughout the City of Yarra by Council, Parks Victoria and other land managers. • Collection of propagation materials (seed, cuttings etc.) must be in accordance with DSE protocols. • A Revegetation Management Plan should be prepared. Revegetation works should be planned on a site-by-site basis to represent EVCs.
Objectives	Revegetation should be undertaken: • To augment existing fauna habitat and improve links between fauna habitat patches. • As a follow-up measure associated with particular weed-control activities. • To augment ground layer, large-shrub and tree strata to represent EVCs, as determined by a Revegetation Management Plan. • To improve populations of indigenous woody plant taxa.
Management Actions	• Prepare a Revegetation Management Plan for land managed by the City of Yarra. This Plan would outline priority areas, species selection and propagation, site preparation, implementation, documentation, monitoring and maintenance and formally document existing practices that have been proven effective in establishing urban habitat. A suitably qualified botanist should be engaged to prepare this plan. • All Revegetation works must aim to represent EVCs as determined by a Revegetation Management Plan. • Liaise and coordinate with adjoining land managers to discuss opportunities to link planned revegetation programs. The City of Boroondara Environment Strategy recommends a seminar and field day to discuss ecological restoration and management along both sides of the middle Yarra River Corridor, and possible mechanisms for on-going exchanging information and coordination in planning and environmental management in the area (City of Boroondara 2003). • Consider adopting a policy to plant native species (preferably indigenous species of local-provenance where possible) in all plantings (including Area Type 2a and b: urban parks and Area Type 3: street trees), noting that restrictions in regards to heritage controls and adopted precinct planting plans may determine the actual species planted. Planting indigenous flora of local provenance within areas in close proximity to the waterways is particularly important. Aim to represent EVCs when revegetating in all areas within Area Type 1 and 2a. • Aim to represent the vegetation communities which would have existed prior

	to European settlement. A basic description of these vegetation communities can be obtained from the Ecological Vegetation Class (EVC) pre-1750 vegetation modelling by reference to the DSE (DSE 2009). • Continue implementing planned revegetation works. These works include a large planting from Monash Freeway Bridge to Melbourne Girls College along the Yarra River. • Continue research and trials of suitable native and indigenous trees for streetscapes with an aim to increase indigenous street trees. • Review precinct planting plans and if necessary replace listed weed species with native flora (preferably indigenous species of local provenance). • Connect and provide a habitat link for fauna by revegetating between fauna habitat patches (Plate 7). Habitats links should be established along all waterways. Existing corridors such as Yarra River, Merri and Darebin Creek should be high priorities for augmentation of existing fauna habitats and to improve potential for use as a movement corridor. • The width of a corridor is particularly important and is associated with its ability to support native fauna. Narrow linear habitats can only support a limited number of species and are heavily influenced by edge effects (Bennett 1999, Schaefer and Brown 1992). There is no single answer to determine the appropriate width that fits all situations. Most experts would state 'the wider the better' (Bennett 1999; John McGuckin, Streamline Research, pers. comm.; Peter Robertson, Wildlife Profiles, pers. comm.). The optimal width for any given corridor will depend on a variety of factors including, the ecology of the target species, the distribution and quality of extant habitat, the desired function, surrounding land uses and other catchment characteristics (Ecology Australia 2009). • Improve habitat elements likely to encourage specific fauna groups such as (see Plate 8): o Shrubby mid-storey plants that provide cover for small insectivorous birds o Rocks, woody debris, litter, and ground layer flora such as tussock forming grasses that provide shelter for reptiles. o Retention of large woody debris in terrestrial and in-stream habitat. Fallen limbs from trees should be removed from tracks and re-distributed to augment areas of fauna habitat. o Retention of hollow bearing trees/stags or augmentation with artificial nest boxes (see Plan Element Sections 5.1.1 and 5.1.4). • Identify suitable sports grounds, parks or other areas of open space (Area Type 2b) and establish a woodland canopy of indigenous tree species around the edge for habitat purposes (and shade). Undertake more indigenous understorey planting around sports grounds and parks with indigenous trees (see Plate 9). • Augment habitat values along the Linear Park (Area Type 2) by creating a habitat link to Merri Creek. Currently, Linear Park provides low habitat value

	for most native fauna species. • Implement a maintenance regime for all revegetation plantings whereby all losses are replaced (where practical). • Rehabilitation and replacement plantings will be required along river and creeks as soon as possible following weed removal works. • Parks Victoria to continue to implement (and City of Yarra to promote and support where possible) the actions for revegetation within the Environmental Action Plan for Yarra Bend Park (Parks Victoria 2000). The following revegetation works are planned (Peter Lynch pers. comm.): o Habitat augmentation with mid-storey and ground flora (consistent with EVC) under existing canopy in riparian vegetation within the Yarra Bend Golf Course. o Grassland planting to extend existing grassland site on west of the Yarra Bend Road and to the north of the Eastern Freeway. o Enhancement planting to increase diversity in remnant grassland/grassy woodland sites adjacent to Fairfield NMIT and extending to the top of the Merri Creek escarpment. o Planting over storey and mid-storey flora in mown area of Westfield South, with the intent to approve amenity and habitat value. o Planting, after burning and weed control of an area within the Merri Creek escarpment, south of Quarries Park. o Planting over storey and shrub species around and between ovals to the east of the Park Office within the Yarra Bend Park so as to improve habitat for birds by completing a flyway between the Merri Creek and the Yarra River north of the Eastern Freeway (Peter Lynch pers. comm.) • Melbourne Water to implement (and City of Yarra to encourage and promote where possible) the actions for revegetation within the Middle Yarra River Riparian Vegetation Management Plan (Ecology Australia 2009). • Participate in the Urban Biolink program coordinated by Parks Victoria, to connect, revegetate and improve habitat condition in the strategic wildlife corridor of the Yarra River and tributaries.
Timing and frequency	• Initiate management actions at the commencement of this plan. • Planting to take place in autumn-winter. • Maintenance and monitoring to occur year round.
Responsible Authority	City of Yarra, Melbourne Water, Parks Victoria, Merri Creek Management Committee, Darebin Creek Management Committee, contractors
Monitoring	Undertake periodic monitoring of revegetation to identify potential threats (e.g. herbivory) before they adversely affect plants and to ensure maintenance of habitat values and meeting of objectives. Refer to Section 5.1.6 below for details on weed management during and after rehabilitation.
Sites where	Area Type 1: Augment and connect patches of remnant vegetation, particularly along

applicable	the Yarra River and Merri and Darebin Creeks.

Plate 7 Many opportunities to create fauna habitat links along the waterways exist throughout the City of Yarra. This location above is opposite Kevin Bartlett Reserve, Yarra River and is part of a Council planned revegetation project from Monash Freeway Bridge to Melbourne Girls College.

Plate 8 Revegetation works undertaken by the City of Yarra within Alphington Park. A range of understorey, mid- and over storey flora species have been utilised for these plantings.

Plate 9 Potential opportunity to enhance fauna habitat values within Linear Park, Princes Hill. Augment with understorey and mid-storey flora consistent with EVCs.

5.1.4 Artificial nest boxes

PLAN ELEMENT	Artificial nest boxes
Issues	Nest boxes can be used in areas of remnant vegetation that lack tree hollows and are specifically used for those animals that depend on hollows for shelter, roosting and breeding. Nest boxes come in a multitude of designs that target a particular fauna species. Nest boxes are no substitute for real hollows and where possible retention of hollow bearing trees should always be encouraged over the placement of artificial ones (DNRE 2003). Nest boxes require active management to ensure that pest species do not use and out-compete native fauna. Designs are available that may exclude some pest species. Native species likely to utilise nest boxes (depending on style of nest box) within the City of Yarra may include urban tolerant species whose presence/absence is limited by hollows: • Bats (e.g. Gould's Wattled Bat and White-striped Freetail Bat). • Parrots (e.g. Red-rumped Parrot and Eastern Rosella). The highly abundant Rainbow Lorikeet is likely to utilise and compete with other parrots for use of nest boxes. • Possums (Common Brushtail Possum but also some potential for the Common Ringtail Possum - although they prefer to make their own 'drey' in dense shrubby vegetation). Guidelines for use and type of nest boxes for wildlife are provided by the Department of Natural Resources and Environment (2003) now DSE.
Objectives	To enhance the habitat values of remnant vegetation through the addition of artificial nest boxes in areas lacking natural tree hollows.
Management Actions	• Actively manage whole habitat to maintain fauna values. For example, placement of nest boxes will not be sufficient if the habitat lacks food resources or other elements used for cover. • Consider a one for one replacement of nest boxes to ensure that fauna have an alternative shelter/nesting site available when hollow bearing trees need to be removed or significantly lopped (see Plan Element Section 5.1.4). • Nest boxes should be selected based on the species targeted for habitat enhancement. Nest box design is targeted to specific fauna groups through the size, shape, placement and size of opening access (see DNRE 2003). • Placement and orientation of nest boxes is important and is outlined in DRNE (2003). Different species prefer different box placement such as more open areas for bat boxes and in trees over water for some bird species. • Monitoring of the fauna movement (into or out) of the entrance hole is preferable to inspection inside the box. Frequent inspection inside the box is

	likely to lead to desertion of the nest box. • Investigate means to regularly monitor nest box use by native fauna and notify appropriate personnel if occupied by pest species. • Should a nest box be frequented by a pest species it should be closed for a period of time, removing the nesting materials and/or eggs of a pest bird. • Employ a qualified contractor to eliminate pest species from nest boxes including, Starlings, Indian Mynas, Sparrows, and Honey bees that may take advantage of the nest box.
Timing and frequency	• Implement addition of nest boxes in key habitat areas within 6 months of commencement of this plan. • Once off installation of nest boxes.
Responsible Authority	City of Yarra, Parks Victoria and 'friend's of'groups. DSE (provision of nest box guidelines and advice only).
Monitoring	Regular monthly inspection of the nest box is required to observe use by native fauna or to prevent its use by pest species. More regular monitoring may be required to target particular species during their breeding season. Consider engaging community groups for nest box monitoring.
Sites where applicable	Area Type 1 and 2: Nest boxes could be used to augment habitat where tree hollows are not present or are a limiting factor for fauna.

5.1.5 Fauna friendly lighting

PLAN ELEMENT	**Lighting**
Issues	Artificial lighting originating from street lighting, sports floodlights, housing and security lighting on pathways can alter the habitat suitability for some species, particularly nocturnal native fauna. Impacts from light pollution may include: • Interruption of natural behaviours (e.g. attraction or avoidance to the light) or impact on the light-sensitive cycles of many species. • Exposure to greater levels of predation risks of nocturnal native species whose eyesight may be hindered by bright lights. • Disruption of navigational abilities causing disorientation including structural-related mortality, attract insects and impede the ability of nocturnal frogs to locate and capture prey (Cornell and Hailman 1984, Buchanan 1993). • Predatory birds and reptiles, usually active only during the day, will sometimes forage at night under artificial lights (Longcore and Rich 2004), disadvantaging the prey species over time.
Objectives	To minimise the impact of artificial light spill on fauna species and their habitat,

	particularly along waterways.
Management Actions	• Install and utilise only the minimum amount of light needed for safety. • Minimise light spillage and impacts to fauna through the design of lighting. Such as: o Eliminate bare bulbs and lighting pointing upward (where practicable). o Use narrow spectrum bulbs as often as possible to lower the range of species affected by lighting. o Lighting should be designed as 'down lights' and not directly spill outside the area where light is required. Using a down light and motion sensor lighting in order to reduce light spill and the associated secondary impact on nocturnal fauna species potentially utilizing the adjoining vegetation. o Shield or cut lighting to ensure that light reaches only areas needing illumination. o Use embedded lights if possible to illuminate pathways. o Positioning lighting closer to the ground to avoid disorientation of bird species. • Do not use flood lighting adjacent to remnant vegetation, riparian habitats or directed onto waterways. • All commercial operations adjacent to the waterways and remnant vegetation should use the latest management technologies so that continued growth and expansion leads to no increase in the impact of light pollution (Salmon 2003). • Incorporate management actions for fauna friendly lighting into the revision of the Public Lighting Policy for the City of Yarra.
Timing and frequency	• Install appropriate lights once and replace as required.
Responsible Authority	City of Yarra, Parks Victoria, Vic Roads
Monitoring	N/A
Sites where applicable	Area Type 1, 2 and 3 – Waterways, associated riparian habitats and other remnant vegetation.

5.1.6 Weed Management

Weed management is critical for retaining flora values of the study area. Many weed species compete with and exclude indigenous plants however, the interaction between weed invasion and indigenous fauna is not as clear, as a small proportion of the fauna community are able to utilise exotic plants for food, shelter and nesting sites (Ecology Australia 2009). These fauna species are mostly common vertebrate species known as 'generalists', and can persist in a landscape of exotic and native vegetation. Interactions are varied and may include the use of weedy thickets (Blackberries **Rubus* spp.) as shelter by indigenous birds such as Superb Fairy-wrens and the use of and dispersal of exotic fruiting sources (see Carr 1993) by both indigenous birds and mammals such as the EPBC-listed Grey-headed Flying-fox. Furthermore, exotic woody trees such as Willows (**Salix* spp.) may be used for perching and roosting sites along the river by fauna species such as Little Pied Cormorants, Nankeen Night Heron and Azure Kingfisher (the latter two species both listed as Near Threatened DSE 2007) (Ecology Australia 2009).

However, many other fauna species are unable to survive in such landscapes, with the elimination of crucial food and shelter resources, as well as collapse of trophic webs, structural (physical) and chemical alteration of habitats (e.g. total shading of streams, elimination of basking sites for reptiles by shading, elevated water use by willows compared with indigenous vegetation, altered nutrient cycles and other factors (Ecology Australia 2009).

Weed control works are essential for the protection of remnant vegetation in the City of Yarra. Before weed management activities are implemented, their potential impacts on fauna habitat must be considered. Questions to be considered in relation to weed infestations and their fauna habitat values may be (Ecology Australia 2009):

- What fauna species are utilising the exotic habitat?
- Are these fauna species threatened under Federal or State legislation, or considered regionally important in the Melbourne region?
- Is there alternative (indigenous vegetation) habitat available locally?
- Does the exotic habitat harbour feral animals as well?
- What will be the consequences of retention of exotic vegetation (e.g. further seed dispersal)?
- How soon can indigenous vegetation be provided (e.g. through staged removal of weeds)?
- Are indigenous flora species or communities immediately threatened by the retention of these weeds?

These question must be answered on a case by case basis, taking into consideration the faunal species involved (e.g. conservation and population status, ecology and behaviour) and the nature of its use of the exotic habitat, as well as the weed species being utilised and the threat to flora

populations. However, given the substantial destruction of indigenous flora from weed invasion in the study area, this issue should be dealt with as a matter of urgency.

A summary is provided below that outlines weed management issues and key actions that should be considered when designing and implementing actions to eradicate/control weeds and improve fauna habitat.

Plates 10 to 12 show areas requiring weed management works within the City of Yarra.

PLAN ELEMENT	**Weed Management**
Issues	Weed invasion poses a significant threat to the biodiversity values of the study area. Large portions of the study area are heavily infested with a variety of weed species that inhibit the regeneration of indigenous plants and result in a loss of biodiversity and a breakdown of ecological processes and many plant-animal interactions. Weed control works are currently undertaken throughout the City of Yarra however, long-term management of priority weed species will still be necessary. A Weed Management Plan is required to list priority species, site and outline protocols for eradication and control. The City of Yarra as a public land manager has the responsibility to ensure that weed management is undertaken and implemented as a component of all public land plans.
Objectives	• To enhance and maintain the biodiversity value of remnant vegetation and fauna habitat through elimination and/or control of weeds. • To eliminate, control and/or contain certain weed species within the City of Yarra boundary. These include Regionally Controlled (and Regionally Prohibited where applicable) species listed under the Catchment and Land Protection Act 1994 (Port Phillip and Western Port CMA Region), Weeds of National Significance (WONS), exotic (non-indigenous) environmental weed species, including species native to Australia (but not indigenous to the area) that threaten biodiversity values. • To facilitate the natural recruitment of indigenous plant species by maintaining a weed-free environment as far as is practicable. • To control weeds ubiquitous weed species (e.g. annual herbs) that may adversely affect revegetation programs (namely, species that would not otherwise be targeted for control). • To monitor, and respond as appropriate, to weed invasions in the future. • To prevent, as far as is practicable, the spread of weed species. • To promote cooperative management between management agencies and private land holders. • To prevent or minimise impacts to fauna during all weed control activities.
Management	• Liaise and coordinate with other land managers (including Melbourne Water, Parks Victoria, DPI and adjoining private land holders) to discuss how and where

Actions	priority actions are undertaken. Ensure actions are coordinated across boundaries to reduce reinvasion. • Engage a contractor to devise a detailed weed management plan to guide activities in the short-to-medium term, including prioritisation of control on land managed by the City of Yarra. This person must be suitably qualified (i.e. have the required weed management and plant identification skills). • City of Yarra to continue a staged removal of weeds with rehabilitation works. Staged works ensures some availability of habitat for resident fauna and reduce soil erosion. • Develop a feedback system to ensure all management actions undertaken in this reach may be integrated into a Register of Works. • Encourage community initiatives that undertake weed control works. • Implement an annual weed-monitoring program to detect 'new' weeds and determine effectiveness of control of targeted species. • City of Yarra to continue to implement revegetation as outlined in Plan Element Section 5.1.3. • Investigate external grants and partnership opportunities for Willow and other exotic tree removal. • Relevant staff should undertake appropriate training in noxious and environmental weed identification and management through accredited training providers. • Stabilisation of banks may be required after removal of exotic trees to minimise erosion and bank slumping. Retention of tree stumps in the soil and immediate rehabilitation may be used to minimise this potential impact. • Minimise the use of herbicides where possible. Broadcast use of herbicides in open spaces such as ovals or golf courses may impact on non-target species such as ground feeding birds. • The use of herbicides near water bodies is to be avoided where possible with appropriate controls and licences sought before use. Only herbicides legally certified for use near waterways should be used in these situations. Refer to (Ainsworth and Bowcher 2005). • Prevent and/or minimise impacts to fauna during weed control works. A fauna assessment should be undertaken before all major weed management actions to identify fauna issues and provide recommendations for mitigation of impacts. • Avoid disturbance to in-stream habitats (e.g. physical removal of exotic trees and their root system may disrupt creek banks). • Contractors should undertake an environmental 'induction' process to raise awareness of environmental issues relating to fauna and their habitats. • Strengthen the protection of fauna habitat within private land by providing incentives for landowners to remove environmental weeds and rehabilitate with indigenous plants (Yarra Environment Strategy – City of Yarra 2008). • Parks Victoria to implement (and City of Yarra to encourage and promote where

	possible) the actions for weed control within the Environmental Action Plan for Yarra Bend Park (Parks Victoria 2000). • Melbourne Water to implement (and City of Yarra to encourage and promote where possible) the actions for weed eradication/control within the Middle Yarra River Riparian Vegetation Management Plan (Ecology Australia 2009).
Timing and frequency	• Implement actions at the commencement of the plan. • Respond with weed management activities as appropriate on an ongoing basis. • Optimal times for weed control are species dependent but should generally be undertaken prior to flowering and seed-set. An appropriate work plan should be devised by a contractor within the detailed Weed Management Plan.
Responsible Authority	City of Yarra, Parks Victoria, Department of Primary Industries, Melbourne Water, private land owners and Contractors.
Monitoring	• An annual assessment during spring (early-October) of current and new weed species and population levels should be undertaken by council staff. • Weed contractors will formally document all weed control activities undertaken, including: targeted species; location (with GPS coordinates); date and timing of works; herbicide type(s) and additives (e.g. surfactants), methods of application and dilution rates; other weed control techniques used (e.g. physical removal). This allows for refinement of procedures, as well as informing future weed management activities. • Weed control will be required at least during the establishment phase of any revegetation exercise, and depending on site conditions and capacity for natural regeneration, maintenance weed control will probably be required on a regular (if less frequent) basis thereafter.
Sites where applicable	Area Type 1 and 2: All areas of remnant vegetation, particularly within riparian habitats along the Yarra River and Merri and Darebin Creeks.

Plate 10 Ground cover and woody weed invasion, Coate Park Yarra River.

Plate 11 Ground cover and shrubby weed invasion in riparian vegetation along the Yarra River, La Trobe Golf Course. Blackberry **Rubus fructicosus* spp. agg. is the predominant species in the foreground. This may also provide harbour for feral animals such as rabbits and foxes.

Plate 12 Weed invasion within Quarries Park, Merri Creek (Blackberry and other exotic grass, herb, shrub and tree species present within the Park and along the creek).

5.1.7 Securing fauna habitat through the City of Yarra Planning Scheme

In general the long-term security of fauna habitat is constrained by the land tenure, and the zones and overlays in the local Planning Scheme.

Within the City of Yarra, the large majority of fauna habitat that remains is contained within public land that is managed by the City of Yarra, Parks Victoria or Melbourne Water. One exception is the thin linear strip (~2853 m) of riparian habitat along the Yarra River and Darebin Creek that is contained within private land at La Trobe Golf Course.

There are minimal opportunities to link patches of existing habitat through acquisition of land in the City of Yarra. Therefore, the most appropriate way to secure fauna habitat in the long tern is through zoning and/or the use of overlays. All publicly managed open space in the study area is zoned as Public Park and Recreation Zone (PPRZ), except for Alphington Wetlands that is zoned as Public Conservation and Resource Zone (PCRZ). PPRZ does not have a primary focus of conservation and consideration in the long-term could be given to rezoning areas of high biodiversity value to Public Conservation and Resource Zone (PCRZ) to give a higher level of security and protection to these sites. In between these public reserves, zoning is varied and changes with land use. Zoning includes: Residential Zone 1 (RZ1), Business 3 Zone (B3Z), Industrial Zone (IZ), Special Use Zone 1 and 3 (SUZ1 & 3), Urban Floodway Zone (UFZ), Comprehensive Development Zone Schedule 1 (CDZ1) and Public Use Zone- Service and Utility (PUZ1). These zones encompass the riparian vegetation and the waterway immediately adjacent to them.

All waterways and land located immediately adjacent to the Yarra River, Merri and Darebin Creeks are covered by an Environmental Significance Overlay (ESO1, ESO2 and ESO3 respectively). This use of overlays is consistent with recommendations from the Public Land Consultancy (2008) that states that all riparian land within 20 m of a declared waterway on both private and public land be included within an Environmental Significance Overlay (ESO).

ESO1 relates to the Yarra River and its surrounding environments that contain a variety of significant features including flood plain, escarpment, river rapids, grassland, woodland and other habitats for flora and fauna. The aim is to protect the watercourse from development that may cause damage to streamside environments, ecological and recreational resources, including the protection of water quality and streamside habitats and indigenous riparian vegetation, to minimise pest plants and animals, to protect areas identified as local, regional and state significant habitat, and to encourage retention and revegetation along waterways and other habitat links.

ESO2 relates to the Merri Creek and its environs and includes its environmental, heritage and recreational values of the area. The aim is to restore Merri Creek and adjoining area to a more natural and ecologically diverse environment, to protect and enhance riparian escarpment, plains vegetation, and in-stream habitat for flora and fauna, to improve water quality and restore and revegetate with locally indigenous flora species.

ESO3 relates to Darebin Creek and its environs and includes its environmental and recreational values of the area. The aim is to ensure protection and enhancement of riparian environments, protect the watercourse from development, ecological and recreational resources, including the protection of water quality and streamside habitats and indigenous riparian vegetation, to protect areas identified as local and regional habitat in particular remnant River Red Gum species, and to encourage retention and revegetation along the waterway to enhance indigenous flora values and provide a potential habitat link for wildlife movement.

PLAN ELEMENT	**Zoning and overlays**
Issues	The zoning along the three waterways and adjacent vegetation does not always reflect a long-term conservation goal for fauna habitat. Environmental Significance Overlays are however present over all three waterways and adjacent land and aims to encourage protection of stream and riparian environs. The zoning and overlays do not necessarily recognise the potential for increasing ecological values within these areas.
Objectives	To ensure the long-term protection and security of fauna habitat.
Management Actions	• Regularly review planning controls so that they reflect the conservation of biodiversity values along the waterways and associated environments. • Investigate the feasibility of introducing a Schedule 4 to the ESO to address the secondary habitat links. A statement of significance will need to be prepared, and objectives to be achieved from the planning control will need to be

	addressed (Thompson Berrill Landscape Design (2006). • Consider rezoning areas of high biodiversity value to Public Conservation and Resource Zone (PCRZ) to give a higher level of security and protection. • Amend Local Policy 22.08 (Protection of Biodiversity) in the Yarra Planning Scheme to apply to all Yarra (not just areas covered by an ESO). Support the intention of the policy by prohibiting the inclusion of any environmental weeds in council plantings and by introducing an amendment to Local Law No.3 to enable the control and removal of environmental weeds to be enforced across Yarra (Environment Strategy - City of Yarra 2008).
Timing and frequency	• Initiate amendments and/or investigate a review of Local Planning Scheme within twelve months from commencement of this plan.
Responsible Authority	City of Yarra
Monitoring	Review progress of amendments after 12 months.
Sites where applicable	Area Type 1, 2 and 3 – Yarra River, Merri Creek and Darebin Creek. All areas of high quality remnant vegetation.

5.1.8 Feral animal control

Introduced animals pose a threat to the biodiversity values of remaining fauna habitat in the City of Yarra through predation (e.g. foxes and cats) and/or degradation of native vegetation and fauna habitats (e.g. rabbits).

Foxes

Fox predation is outlined as a threatening process under the *Flora and Fauna Guarantee Act 1988* (see Mansergh and Markes 1993), in the National Mammal Action Plans (marsupials and rodents, Lee 1995; Maxwell et al. 1996) and in reviews dealing with impacts of fox predation on native vertebrates (e.g. Saunders et al. 1995; Smith and Quin 1996; DEWHA 2008a).

A fox control program should only be considered if it is possible to incorporate fox control activities into an integrated and co-ordinated fox control program over a large area. Foxes are highly mobile animals that are likely to range across the City of Yarra boundary. Coordination amongst surrounding land managers is critical for the success of a control program (e.g. a co-ordinated community-based scheme over a large area (e.g. see Saunders et al. 1995; Morton et al. 1999)). It should be noted that under the Victorian *Catchment and Land Protection Act 1994*, the fox is declared vermin, and all land owners and managers within a catchment are obliged to undertake fox control (Saunders et al. 1995).

Cats

Feral cats pose a significant threat to native wildlife through predation (Bezuijen and McMahon 1999; Webb et al. 1995; Barratt 1995, 1997, 1998). Cats appear to selectively prey upon small mammals,

particularly nocturnal ground and tree-dwelling species. After mammals, birds appear to be the most preyed upon fauna (Bezuijen and McMahon 1999).

Predation of native wildlife by cats is listed as a Threatening Process on the Flora and Fauna Guarantee Act 1988. Action Statement No. 80 (Seebeck and Clunie 1997) has been produced to ameliorate the adverse effects of this process.

Rabbits

Rabbits could potentially pose a threat to flora and fauna values within the City of Yarra through land degradation and over-grazing, particularly to revegetation efforts (DEWHA 2008c). Rabbit impacts may include:

- Overgrazing and inhibiting the regeneration of native vegetation (Cooke 1987). Rabbits selectively graze the seedlings of many native tree and shrub species. As an example Cooke (1987) has found that as few as 2-3 rabbits per hectare are sufficient to prevent regeneration of some important native species on the Coorong in South Australia.
- Erosion of soil (Norman 1988).
- Furthermore, high numbers of rabbits could potentially support elevated densities of Red Fox, to the detriment of native fauna species (Smith and Quin 1996).

Threat Abatement Plans for the European Fox (DEWHA 2008a), Feral cats (DEWHA 2008b) and the European Rabbit (DEWHA 2008c) provide further background information on biology and current management practices for control of these introduced species.

PLAN ELEMENT	**Introduced fauna**
Issues	Foxes • The degree of fox predation on native fauna within the City of Yarra has been estimated as 3000 – 3500 individuals per annum (Mark Fenby – Out Foxed, pers. comm.). • Small reptiles and waterbirds in the study area may be at particular risk from the threat of predation. • The current control program within the study area is coordinated by Parks Victoria in conjunction with the City of Yarra and City of Boroondara (Peter Lynch, Parks Victoria, pers. comm.). This includes: o A fox control program from late August to early September (approximately four weeks each year - depending on the climate and breeding condition of animals). o A combination of soft jaw trapping and den fumigation (e.g. 'monoxide') and destruction (e.g. collapsing dens) (Craig McGrath, Parks and Habitat Officer-City of Yarra, pers. comm.). o The traps are considered to be the most appropriate devices (as they do not

	kill the animals) to use within the high recreation area where domestic dogs may potentially gain access to areas where traps are placed. A poisoning program is not undertaken and is not recommended within the area. • A single fox scat was observed during the field assessment within Quarries Park, Merri Creek. However, the study area is known to have a high population density (Craig McGrath pers. comm.) and general estimates of fox density within the Melbourne area range from 3–16 foxes km ^{2} (Marks and Bloomfield 1999) <u>Cats</u> • The distribution and number of feral cats and their impacts on native wildlife within the City of Yarra is unknown (Mark Bernhardt City of Yarra, pers. comm.) • Feral cats have been observed within the Yarra Bend Park around the Park Depot, the Golf House and café and the Yarra Lookout (Parks Victoria 2000). • The City of Yarra does not have a program for trapping of feral cats within areas of fauna habitat. • Traps are provided to residents with a feral/stray cat problem with animals collected by council staff. These trapped animals are generally caught in residential areas. <u>Rabbits</u> • Rabbit numbers appear to be extremely low (currently no rabbits occur within the Yarra Bend Park), except for the occasional incursion from an isolated population outside of the study area (south of the Yarra River, upstream of the Chandler Bridge) (Peter Lynch, Parks Victoria, pers. comm.). • Parks Victoria, are working in conjunction with the appropriate land managers within this area to eliminate weeds that shelter rabbit populations and have also installed a rabbit proof fence to isolate the population and minimise the dispersal of individuals (Peter Lynch, pers. comm.). • Even a low population density of rabbits can seriously impede efforts of rehabilitation and revegetation in fauna habitat. • No evidence of the presence of rabbits was recorded during the field assessment.
Objectives	• Protect native fauna species and/or habitat, by eliminating and/or controlling feral exotic fauna within the City of Yarra. • To minimise habitat opportunities for rabbits and foxes through the elimination of harbour sites. • To continue minimising rabbit incursions through monitoring of their presence and incursions through the rabbit proof fence.
Management Actions	• City of Yarra to investigate the implementation of a pest animal policy specifically addressing pest animal species with potential environmental impacts.

	• The City of Yarra to continue liaising and coordinating with other land managers during feral animal control programs (Parks Victoria, City of Boroondara, and DSE).
	• City of Yarra (in conjunction with Parks Victoria and City of Boroondara) to continue the following:
	  • Monthly monitoring for signs of foxes during the breeding period (August to October).
	  • Utilising soft jaw traps and den fumigation as the preferred method of fox control. Poison baiting is not recommended due to the high numbers of domestic animals in the City of Yarra.
	  • Engage a suitably qualified contractor to undertake feral animal control on-site.
	  • Immediately contact a feral animal control contractor as soon as possible once active fox dens are found on-site.
	  • Monitor for the presence of rabbits within and along boundaries.
	  • Parks Victoria in conjunction with other stakeholders to continue to maintain rabbit proof fence around isolated rabbit population (outside the study area - south of the Yarra River beside the Chandler Highway).
	  • Remove weeds that may harbour rabbits and foxes. Ensure that all harbour removed is not the only available habitat for key fauna species. A staged removal and revegetation may be necessary (see Plan Element Sections 5.1.3 and 5.1.6) (see Plate 11).
	• Monitor for feral cats in areas of fauna habitat and undertake control (trapping) as required.
	• Encourage residents to report observations of feral cats, particularly within areas of key fauna habitat (e.g. Yarra Bend Park and Alphington Wetlands).
	• Document all actions undertaken as part of a feral animal control program.
	• Discuss other control strategies with the pest animal control contractor and implement these, as appropriate.
	• Parks Victoria to implement (and City of Yarra to encourage and promote where possible) pest management actions as outlined within the Environmental Action Plan for Yarra Bend Park (Parks Victoria 2000).

Timing and frequency	• Implement a pest animal policy within six to twelve months from commencement of this plan. • Continue fox control program on an annual basis from late August to early September
Responsible Authority	City of Yarra, Parks Victoria, Merri Creek Management Committee, Darebin Creek Management Committee, Commercial operators (e.g. La Trobe Golf Course) and Contractors
Monitoring	• Review every 12 months and refine pest animal management approach and effectiveness • Monitor for signs of active fox dens, feral cats, rabbit scratching and active

	warren entrances. This can give an indication as to when (and if) control works are needed. • Undertake monitoring twice per year (e.g. April and October) for abundance of rabbits within open spaces in the study area looking for individuals as well as diggings, droppings and warrens. If appropriate devise a rabbit control program. • Ongoing and regular patrolling and maintenance of rabbit-proof fences. • Document eradication programs.
Sites where applicable	Area Type 1: All areas of remnant vegetation, particularly within the riparian habitats along the Yarra River and Merri and Darebin Creeks.

5.1.9 Native (and exotic) fauna that may be problematic

Problematic fauna are not only those classified as feral exotic animals such as foxes but may also include those native animals that are often highly abundant, out-competing many other native species through aggressive behaviour. Fauna species that may be considered problematic have been separated below into possum and native/exotic bird management.

PLAN ELEMENT	**Possums**
Issues	• The native Common Brushtail and Common Ringtail Possums are an important component of the fauna community. • Their diet comprises of the leaves, buds, flowers and fruits of many plants. • In some circumstances such as urbanised parklands, possum numbers can become problematic, increasing dramatically, and detrimentally impacting on flora communities (most often Common Brushtail Possum). Certain plants can become the focus of repeated feeding bouts for extended periods (days or even weeks), with the concentrated feeding causing severe defoliation or even death of the plant. • In some areas, intervention and management is needed for the welfare of trees. However, possum control should only be undertaken if severe damage to vegetation caused by feeding is recorded. • The Brushtail Possum is protected under the *Wildlife Act 1975* which prohibits trapping or eradicating without a Licence. Possums may be trapped (with a permit) but must be released on the same property with 50 m of the capture site. The relocation of possums is prohibited. The Common Ringtail Possum is also fully protected under the same Act but **must not** be trapped (DSE 2003). • The Department of Sustainability and Environment (DSE) has developed a set of guidelines for municipal councils to help manage possum populations and minimise damage (DSE 2003). • Possums are often considered to be 'overabundant' in the urban area. It is very

	difficult to define the term 'over abundance'. The term largely has to do with human values and as such tends to involve subjective, value laden judgements open to controversy. The abundance of possums within a given area will depend on many factors including the size of the reserve, availability of food and nesting resources, competition and predation. Therefore, the overabundance of possums in a given area must be evaluated on a site by site basis, with health of trees (e.g. foraging resource) providing some indication as to the requirements for population management. • Possum numbers vary through the year (Temby 2005) with far greater numbers reported in November and December as newly independent young leave their mothers. There is a high mortality amongst these young animals (Temby 2005).
Objectives	• To protect all native fauna species and encourage species richness in fauna communities; • To manage possum populations on a site-by-site basis. • To protect the health of vegetation and its ability to support a diversity of native fauna species.

Management Actions	• Undertake regular observation and monitoring of tree health to determine the need to manage possums. Where tree damage is perceived to be caused by possums, engage a zoologist to conduct a nocturnal survey to determine the possum species and size of populations in the park or immediate vicinity. Engage an arborist or ecologist to provide a tree or vegetation health report.
	• Undertake management actions for possum control only when the health of a tree or vegetation community is endangered, and in strict accordance with DSE guidelines.
	• Recommendations from DSE (2003) for the prevention of access to trees by possums include:
	  • Protect heavily damaged trees by placing bands around their trunks. Bands can be made from sheet metal or from polycarbonate, perspex or similar materials and should be not less than 60 cm wide. Place bands so that possums can not jump from one tree to another. Make sure bands are properly fitted to prevent possums squeezing under them. Trees in close proximity (2 m or less) should also be banded or their interconnecting branches trimmed.
	  • Wherever possible bands should always be placed above the first fork of the tree to provide possums with a refuge if pursued by dogs (dogs should be required to be on leashes in parks with signposts and enforcement (DSE 2003).
	• Feeding of possums should be discouraged. Prevent access to all sources of non-natural food through public education and possum proofing of rubbish bins (DSE 2003). Feeding possum's non-natural food may artificially increase the carrying capacity of habitat (e.g. increased abundance of

	possums) and may also decrease the health of individual possums.
	• Develop a "site vegetation management plan" for sites where the health of a tree or vegetation community is determined to be endangered by over-feeding or over-occupation by possums. In most cases, it is expected that this will involve temporary or rotational banding of trees to allow vegetation to recover to optimal health, although other management actions may be identified. The plans should include an on-site signage and notification to interested stakeholders.
	• Continue to liaise with DSE and with other land managers such as Parks Victoria, City of Boroondara, City of Darebin, and Melbourne City Council to ensure the most appropriate management technique is undertaken.
	• Engage a suitably qualified contractor to undertake tree protection measures on-site.
	• Undertake possum banding in conjunction with supportive measures such as:
	  • Checking trees and their hollows prior to banding for the presence of possums. This should be undertaken by a suitably qualified contractor engaged to remove and release animals appropriately.
	  • Providing possums with alternative shelter (e.g. nest box) when denied access to a hollow, and releasing possums according to DSE protocols (DSE 2003).
	• Document all actions undertaken as part of a possum management program.
	• Discuss other management strategies with stakeholders, fauna experts and the animal control contractors and implement options where appropriate and feasible.

Timing and frequency	• Develop site vegetation management plans as required and implement in a timely manner. • Assess the requirement for tree guards when significant impacts are evident.
Responsible Authority	DSE, City of Yarra, Parks Victoria, Merri Creek Management Committee, Darebin Creek Management Committee, Commercial operators (e.g. La Trobe Golf Course and Contractors.
Monitoring	• Review every 12 months and refine possum management approach and effectiveness as required. • Yearly monitoring of tree health, particularly large, old indigenous trees. • Document management programs.
Sites where applicable	Area Type 1 and 2: Areas of remnant vegetation, particularly within the riparian habitats along the Yarra River and Merri and Darebin Creeks. Important indigenous, non-indigenous and exotic trees in urban parks may also require protection from severe defoliation.

PLAN ELEMENT	Problematic native and exotic birds

Issues	• The clearance of native vegetation and the loss of natural community processes often results in the favouring of a small number of native and/or exotic species that can become highly abundant and affect other species through aggressive behaviour, competition, or predation (Land and Water Australia 2008).
	• Two native birds, the Bell Miner (*Manorina melanophrys*) and Noisy Miner (*Manorina melanocephala*) often become highly abundant in urban reserves and small fragmented woodland or forest patches. These species are highly aggressive, colonial breeders that out-compete and exclude smaller native birds from their territories (Clarke and Schedvin, 1999). The Land and Water (2008) lists the control of 'overabundant' birds in particular the Noisy Miner as one of the ten key steps for conserving biodiversity in highly modified landscapes.
	• Exotic birds such as Indian Mynas and Starlings also develop high population densities in urban areas and may require control to contain their abundance.
	• Impacts from highly abundant native bird species are well known and include:
	  • A decline in small insectivorous birds due to competitive exclusion (Land and Water Australia 2008).
	  • Broad-scale canopy dieback associated with over-abundant populations of psyllids that are 'farmed' by over-abundant Bell Miners (Wardell-Johnson et al. 2006). Psyllid populations are able to increase to the extent that they lead to substantial canopy damage (Stone and Simpson 2006).
	• Dieback causes:
	  • Reduced reproductive success of eucalypts
	  • Poor recruitment of new individuals due to reduced seed production.
	  • In severe cases dieback results in the loss of forest structure.
	  • Loss of old canopy trees reduces habitat for other fauna such as possums.
	• Management of highly abundant aggressive birds may involve culling.
	• Experimental culling of Noisy Miners and Bell Miners in some locations has resulted in rapid recolonisation by the suite of smaller bird species otherwise excluded by miners. As the only available management option this is often not realistic due to community opposition, probable rapid recolonisation by Miners, and difficulties for the excluded bird species moving through a fragmented landscape full of Miner populations.

Objectives	Protect native fauna species and encourage species richness in fauna communities by liaising with DSE and discussing control of 'overabundant' and aggressive native fauna species.
Management Actions	• Investigate in conjunction with DSE, the requirement for a management strategy for over-abundant native and exotic birds (DSE 2003). The management of over-abundant and aggressive native fauna species should be addressed within a management strategy.

	• The City of Yarra to liaise with DSE, Parks Victoria, City of Boroondara and researchers to gain the latest knowledge and to ensure the most appropriate management technique is undertaken if control is required. • A suitably qualified contractor should be engaged to undertake management actions if required. • Provide information (website, booklet or fact sheet) to local residents: • To discourage Indian Mynas (and other pest animals) by removing pet food (including seed) from outside areas where access is available.
Timing and frequency	• Develop a management strategy for overabundant native and exotic birds within two years of commencement of this plan if deemed to be necessary in discussions with DSE. • Assess the requirement (by a qualified biologist) for the control of overabundant birds as appropriate.
Responsible Authority	DSE. City of Yarra and other relevant stakeholder should liaise with DSE and undertake actions as appropriate. Contractors would be engaged to undertake monitoring and control actions.
Monitoring	• Review every 12 months and refine management approach and effectiveness. • Consider monitoring every 12 months interactions between target birds and other native fauna. If causing significant impacts to native fauna and/or their habitats, devise a control program in association with DSE and Parks Victoria. • Document all actions.
Sites where applicable	Area Type 1: Areas of high fauna habitat value, particularly within the riparian habitats along the Yarra River and Merri and Darebin Creeks.

5.1.10 Domestic animal control

A large number of domestic dogs and cats reside within the City of Yarra. Using estimates of dogs and cats registered with councils in Victoria (McMurray 2004), as many as 6,998 dogs and 8,190 cats could be present within households in the City of Yarra in 2007 (City of Yarra 2007). The actual number of registered animals is lower than these figures (City of Yarra 2007).

Currently, many local residents walk their dogs within public open space of the study area, including Yarra Bend Park, Quarries Park, Merri Creek Reserve, Dights Falls Park, Barkly Gardens and Edinburgh Gardens. Some of these areas including areas adjacent to important fauna habitat are designated as 'off leash' zones (e.g. parts of Yarra Bend Park: Westfield Reserve, Deep Rock Road etc). Only small areas currently prohibit dog access including Yarra Bend Golf Course and other parts of Yarra Bend Park within the City of Boroondara. Dogs are allowed access to all other areas of Yarra Bend Park while on a leash (City of Yarra 2007). Dogs may impact on a variety of biodiversity values within the City of Yarra, often through indirect mechanisms such as disturbance.

Domestic cats may impact directly on environmental values within the City of Yarra as outlined above in Plan Element 5.1.8. Domestic cats may regularly wander into remnant vegetation, particularly in residential areas that back onto the riparian vegetation along the creeks and river in the study area.

The impact of domestic animals on the environment values of the study area is discussed with actions to ameliorate potential problems. It is acknowledged that pets are an integral part of society and their management needs to be approached with flexibility and appreciation for both environmental and community needs. Solution may include additional pet exclusion zones, control of the movement of pets, provision for removal of dog faeces and the implementation of cat curfews.

PLAN ELEMENT	**Domestic animal control**
Issues	Domestic cats: • Selectively preying upon small mammals, and birds (Bezuijen and McMahon 1999). • The impact of domestic cats on native wildlife within the study area is unknown. • There is currently no requirement to keep cats indoors at anytime (e.g. cat curfews) (City of Yarra 2007). • The City of Yarra does not undertake a regular cat trapping program within areas of fauna habitat (Mark Bernhardt City of Yarra pers. comm.). Trapping is sporadically undertaken by residents, with cats transferred to Council staff for owner retrieval or humane disposal. Domestic dogs: • Can pose a threat to native wildlife, although more often via indirect processes rather than direct predation. Dogs being exercised irresponsibly may cause individuals or flocks of foraging or roosting birds to take flight. They may also flush birds from nests during incubation and breeding. • Nutrient enrichment or eutrophication associated with dog faeces can exacerbate weed infestation and increase pollution of storm water, as well as transmit potential diseases to humans (from faeces), especially children.
Objectives	• To minimise impacts of domestic animals on native fauna and habitat. • To restrict access of domestic animals to environmentally sensitive habitats such as wetlands and higher quality riparian vegetation zones.
Management Actions	• Introduce cat and dog exclusion zones within areas of high fauna habitat values such as remnant or revegetation areas in accordance with the Domestic Animal Management Plan. Waterbirds rely on areas such as Loy's Paddock and Alphington Wetlands for roosting and foraging sites and are particularly prone to disturbance impacts from dogs. • Increase extent of area where dogs must be 'on-leash', this is particularly important within or adjacent to fauna habitat. • Off leash zones should be fenced and away from areas of fauna habitat. • Continue to monitor and review exclusion zones in accordance with the

	Domestic Animal Management Plan and install regulatory signage advising 'On-leash Areas' and 'Off-leash Areas' at appropriate sites. • City of Yarra to continue to enforce fines on unrestrained dogs. • Trap domestic/stray/feral cats in fauna habitat, particularly where harmful predation is suspected. Domestic/stray cats will be held for a period of time to allow retrieval by owners. Enforce fines for cat retrieval. • Encourage residents to report observations of cats, particularly within areas of key fauna habitat (e.g. Yarra Bend Park and Alphington Wetlands). • Encourage responsible pet ownership to residents through information presented in education leaflets and signage. • Parks Victoria to respond promptly when 'owned' dogs and cats are found unaccompanied in Yarra Bend Park. Close liaison with the City of Yarra is essential for enforcement by local officers under the *Domestic Animal (Feral and Nuisance) Regulations Act 1996* (Parks Victoria 2002). • Provide specific bins and bags to encourage responsible removal of faeces from walking tracks and other open space areas. This will also avoid nutrient-enrichment problems (City of Yarra 2007). • Continue to engage members of the public through community consultation (e.g. Council questionnaire/survey) to learn and consider the needs of local pet owners. This will ensure the most appropriate management decisions with regards to potentially controversial legislation such as night curfews and exclusion zones. • Encourage confinement and registration of pets and compulsory de-sexing. • Investigate cat curfews within or directly adjacent to areas covered by an Environmental Significance Overlay (ESO). • Provision of a map showing the location of on-leash and off-leash areas for dogs. • Review the Domestic Animal Management Plan every 12 months, placing importance on habitat values and giving priority consideration to areas of high habitat value like Loy's Paddock.
Timing and frequency	• Introduce management actions over a 12 month period from the commencement of this plan. • On-going community education.
Responsible Authority	City of Yarra and Parks Victoria.
Monitoring	• Random patrolling of open space areas to ensure that management measures are effective.
Sites where applicable	Area Type 1 and 2. Particular focus on dog control should be directed toward Area Type 1, specifically in areas of high fauna habitat value (e.g. Yarra Bend Park, Alphington Wetlands and Loy's Paddock).

5.1.11 User – related issues (recreational activities)

The large areas of public open space within the City of Yarra not only accommodate areas of high conservation value but also active and passive recreational use. Recommendations are provided below to minimise or eliminate potential impacts from recreational use in areas of high conservation value.

PLAN ELEMENT	Recreational Activities
Issues	Many sites within the study area, such as the Yarra River, Merri and Darebin Creeks and their associated public open space are major local and regional recreational resources (DSE 2006a; Parks Victoria 2006) for active and passive pursuits. Activities include walking and hiking, picnicking, fishing, canoeing and swimming and nature study. These activities take place in the formal reserve system of parks (e.g. Yarra Bend Park), municipal reserves (e.g. Quarries Park) and opportunistically where access and land tenure allow. Both high use and passive recreational activities may impact on the biodiversity values of habitat and their associated fauna populations through direct (e.g. trampling by foot traffic) and indirect impacts (e.g. disturbance). Management of recreational activities is essential to ensuring the long-term sustainability of biodiversity values in the study area.
Objectives	• To provide an opportunity for the public to experience and enjoy local flora and fauna. • Minimise human impact on the biological values of the study area. • To ensure recreational activities are confined to designated areas only • Provide controlled access to sensitive habitats. • Educate residents and visitors about the biological values of the study area.
Management Actions	• Continue to promote and educate the public about the values and reasons for protection of biodiversity (see Section 5.1.12). • Ensure a clear delineation of trails to encourage path use. • Permanently fence (with appropriate signage) areas of fauna habitat value to regulate human and dog access. These areas may include riparian vegetation, Loy's Paddock or wetlands such as Alphington. • Temporarily fence (with appropriate signage) revegetation zones. • Create designated access routes to the river bank (e.g. fishing spots) and discourage use of informal tracks. Revegetation in the riparian zone may help to designate areas (see Plan Element Section 5.1.3). • Prohibit dogs if possible (or at least enforce a strict dogs 'on leash' policy) in areas of high conservation value (refer to Plan Element Section 5.1.10). • Continue to prohibit riding of trail bikes and horses on tracks • Continue to prohibit removal of fallen timber and other plant material. • Continue to prohibit exotic fish introductions into creeks or wetlands.

	• Enforce a strict 'No dumping policy' for rubbish or litter (e.g. signs with litter fine amounts). Signage near public facilities would be helpful to explain that leaving food waste and rubbish may encourage pest animals such as foxes and rodents; • Supply rubbish bins and recycling stations near entry and exit points to parks.
Timing and frequency	• On-going as required.
Responsible Authority	• City of Yarra, Parks Victoria and Melbourne Water.
Monitoring	• Monitor frequency and types of activities to determine any adverse impacts on habitat such as trampling on existing vegetation or revegetation.
Sites where applicable	Area Type 1 and 2.

5.1.12 Education and community engagement

Most members of the public have a poor understanding of the biodiversity values of the area and education campaigns can be used to illustrate conservation values, threatened fauna populations and conflicts that may arise in the highly urbanised area. Public education using a variety of media can create community understanding of environmental issues and management within the City of Yarra. Media options range from local papers, radio, television, websites, publications, mail outs, interpretive signage and direct discussions with key stakeholders. The information provided should target people most likely to utilise the areas of fauna habitat, such as local residents, visitors, commercial operators and school groups.

The City of Yarra can play an integral role in community education of environmental values and in the support of community initiatives by:

- Providing information on environmental management issues and biodiversity values in communication packages (e.g. mail out, websites, leaflets);
- Providing interpretive signage in areas of interest;
- Encouraging public consultation during environmental projects or projects likely to impact on the environmental values of the study area; and
- Supporting community education programs (e.g. water watch) and encouraging participation and support for local community groups ('friends of' groups).

PLAN ELEMENT	**Education and community engagement.**
Issues	Current education and community engagement initiatives within the City of Yarra include:

	• The partnership between City of Yarra and Melbourne Water in supporting the creation of rain gardens in primary schools (Environmental Engineering 2007). • The litter blitz program in conjunction with the EPA and the Victorian Police. The role of Council is to educate residents, visitors and traders on the impacts of littering. The core message was to convey the impact of litter on local waterways (Environmental Engineering 2007). • Council also provides ongoing support and involvement through participation in the Lower Yarra Litter Strategy, and programs offered by Merri Creek Management Committee and Darebin Creek Management Committee. Council also supports Water Watch (Environmental Engineering 2007). • Interpretive signage is currently used in a few locations such as the restored grassland in Yarra Bend Park, Rudder Grange, Alphington Park and Quarries Park along Merri Creek. • Various guidelines have been developed to tackle stormwater pollution arising from commercial and residential precincts. Council Community Amenity officers are able to monitor all building works within Yarra to ensure all waste is retained on-site. • Melbourne Water Frog Census (see www.melbournewater.com.au/frogs).
Objectives	• To highlight environmental issues and biodiversity values within the City of Yarra through a variety of media. • To engage the public in relation to biodiversity issues and support local community initiatives. • To provide interpretive signage which could be used to inform and attract attention of visitors to certain environmental features within the City of Yarra. Interpretive signage aims to: • Provide an educational experience for visitors • Encourage visitors to care about the environment. • Minimise the environmental damage caused by various activities by explaining the potential consequences.

Management Actions	• Increase media coverage outlining the environmental values of remnant vegetation and fauna habitat.
	• Educate and encourage awareness and action on key areas of indigenous vegetation/fauna habitats and the fauna species they support. The information could be made available in the form of on-site interpretive signage, via the City of Yarra website, a booklet, or a series of fact sheets, to provide suggestions for residents to:
	  • Protect and enhance biodiversity in their back gardens by planting indigenous flora of local provenance;
	  • Provide nest boxes for hollow dependent fauna;
	  • Manage native wildlife that may be perceived as problematic (e.g. possums and snakes). For example: providing information on the protection of

	possums under the *Wildlife Act 1975* which prohibits trapping or eradicating without a Licence (see Section 5.1.9); provides suggestions for management actions if nesting in a roof cavity; discourages feeding of possums and ensuring that rubbish bins are possum proof (see Section 5.1.9). Information on snakes within residential properties (e.g. protection of snakes, ways to discourage snakes residing within the property, appropriate behaviour, actions and contacts for snake removal). Management information for snakes on residential properties will soon be available on the City of Yarra website (Craig McGrath, pers. comm.) • Create small areas of habitat on their properties for invertebrates, frogs, amphibians and small reptiles. • Translate information into the main languages spoken in Yarra (Yarra Environment Strategy – City of Yarra 2008). • Implement actions for community engagement as outlined within the Yarra Environment Strategy (City of Yarra 2008) including: • Reinstate the 'Our Place Yarra' project to train and accredit disengaged youth in natural resource management; and • Promote and support local action for environmental sustainability through an annual community grants program. • Encourage residents to join 'Friends of' groups and participate in management activities such as planting/revegetation days, flora monitoring (e.g. health of River Red-gums); fauna monitoring (e.g. Grey-headed Flying Fox census, nest box checking, Melbourne Water Frog census and Friends of Merri Creek bird monitoring); and stream monitoring through the Merri Creek and Darebin Creek Water Watch coordinators. • Continue to participate in and support the Management Committees associated with Merri and Darebin Creeks (Yarra Environment Strategy – City of Yarra 2008) and support forums and management programs in conjunction with other stakeholders. • Investigate the feasibility of using interpretive signage in areas of key fauna habitat to enhance visitor understanding and enjoyment and provide incentive (knowledge) to protect these areas. As stated in the Yarra Environment Strategy "Develop a coordinated approach to providing interpretation about open space in Yarra. Ensure that new Master Plans for parks incorporate a communications plan for interpreting sign information, and review existing master plans to identify opportunity to add interpretive elements to sites during the implementation stage". Signage could include information on the following topics: • Significant native vegetation and fauna habitat, including the importance of the Yarra River as a wildlife corridor. • Types of threatened native fauna found within area (e.g. Grey-headed Flying Fox, Azure Kingfisher and Nankeen Night Heron, and potential

habitat for the Southern Myotis. These signs will not give the detailed location of individual populations.

- Information on the biology and ecology of flying-foxes (DSE 2005). This would also highlight the importance of the Yarra Bend Park and the role that this important remnant plays as an urban refuge for indigenous flora and fauna (DSE 2005).
    - Interpretive signage for flying foxes within the Yarra Bend Golf Course that focuses on appropriate behaviours and legal responsibility (DSE 2005).
- Snakes – signage to be used along paths to alert residents of the potential for snakes in the area and would address:
    - The importance of snakes within a faunal community, promote their ecological and biodiversity values and likely habitats;
    - The protection of all snakes under the *Wildlife Act 1975;*and
    - Outline the appropriate behaviour (for people and pets) in areas where snakes may be present to protect both humans and snakes.
- Weed hot spots. Signs would identify areas that are being managed for weed invasions and encourage avoidance of areas to eliminate the spread of seeds between sites.
- Areas of high fauna habitat where activities could have a potentially degrading impact.
- The impacts of dumped garden waste and the importance of controlling the invasion of environmental weeds or other exotics. Recommendations for garden plantings in areas adjacent to remnant vegetation (i.e. avoidance of all environmental weeds).
- Information discouraging the feeding of ducks in urban wetlands. Feeding ducks artificial food (e.g. bread) may cause a number of problems including:
    - Poor nutrition, which could lead to health problems.
    - An imbalance of populations to favour those species that are commonly fed (often exotic duck species thus creating competition for native ducks).
    - Eutrophication of waterbodies.
    - Augmentation of the wetland with submergent, emergent and
- Waterway health including: the prohibition of stocking with exotic fish; the potential non-target impacts of using pesticide/herbicides use near water; and the dumping of rubbish.
- Fire Danger, including the risks and dangers of fire and when restrictions occur.
- A map showing the location of reserves, off-leash areas for dogs and public facilities (refer to Plan Element Section 5.1.10).

	• Conduct a community education campaign about environmental weeds, their impacts, priority species and how to control their spread. Extend from the pocket-sized environmental weeds booklet developed in 2006, by introducing an amendment to a local law that allows for notices to be issued where environmental weeds are encroaching from private land onto areas of urban bushland. Support the Sustainable Gardening Australia initiative to encourage local nursery outlets to provide information on environmental weeds. • Review Councils education and enforcement programs for domestic animals to ensure that information is available in the Domestic Animal Policy on the impacts of cats and dogs on native wildlife and ways to reduce these impacts.
Timing and frequency	• Prepare a plan to introduce additional educational signage within one year of commencement of this plan. • Develop a pilot program for local community networks within six months of commencement of this plan.
Responsible Authority	City of Yarra, Parks Victoria, DSE, Melbourne Water, EPA, Merri Creek Management Committee, Darebin Creek Management Committee and 'friends of' groups.
Monitoring	• Yearly reporting on implementation, progress and effectiveness of education campaigns.
Sites where applicable	On-ground education should be focused on Area Type 1 and 2b. All areas of significant remnant vegetation, revegetation work or other areas of particular importance (e.g. Yarra Bend Park, Alphington Wetlands and multiple opportunities along the Yarra Trail).

6 Legislative Framework

A summary of the legislation, policy and guidelines relevant to the Urban Wildlife Management Plan in a national, state, regional and local context is provided in Appendix 5. It covers the relevant legislation/policy, the scope of the legislation/policy, when it applies and it's relevance to the City of Yarra.

7 Summary of the key management actions and issues

The recommended management actions and key issues aimed to protect and enhance fauna habitat values in the study area are tabulated below. These management actions have been divided into the three Area Types and key sites within those zones. Overall priority should be given to enhancing existing areas of remnant vegetation and fauna habitat, with creation of habitat and habitat links as a secondary priority. The most important and significant fauna habitats within the City of Yarra are located along the Yarra River, specifically the Yarra Bend Park. Priorities for actions have been assigned by the threatening process present, the size and quality of the remnant vegetation, the fauna species present or potential habitat for threatened or other key species, and the overall flow-on effects of management for a variety of species.

Management actions are assigned the following priority: High – must do over next 1-3 years; Moderate – should do, although action not as urgent over the next 4-8 years; and Low – should be done, but not urgent over the next 9-15 years.

The implementation of these actions in conjunction with other relevant stakeholders will help maintain existing fauna values and potentially increase the species richness through habitat enhancement. Opportunities can also be created for fauna movement through creation/augmentation of habitat links (consistent with EVCs) along the Yarra River and its tributaries. Improving the structural complexity by revegetating with understorey and mid-storey flora may encourage a variety of key fauna species to utilise these habitats including small insectivorous birds such as Thornbills, Superb Fairy-wren, and Grey Fantail and also ground dwelling fauna such as Pale-flecked Sunskink and Eastern Blue-tongued Lizard. Improvements in water quality, aquatic and riparian vegetation along the waterways may improve habitat values for frogs (e.g. Southern Brown Tree Frog), reptiles (e.g. Eastern Snake-necked Turtle) and mammals (e.g. Water Rat). The maintenance of large old canopy trees provides: roosting and foraging habitat for EPBC-listed Grey-headed Flying-fox; and perching habitat along waterways for state significant Pied Cormorant and Azure Kingfisher. The retention of hollow bearing trees provides nesting/roosting habitat for birds (e.g. Red-rumped Parrots, Rainbow Lorikeet and Eastern Rosella) and mammals (e.g. White-striped Freetail-bat and Common Brushtail Possum). Furthermore, controlling threatening processes such as feral cats and foxes or disturbance from domestic dogs will benefit a variety of native fauna species at risk of predation in the study area.

Tables 2 – 4 summarise the key actions within each Area Type and where possible outlines actions for specific fauna habitat sites and the authority responsible for the implementation of actions at each site.

7.1.1 General Management Actions recommended for Area Type 1

The following is a summary of the general management actions recommended for Area Type 1 (Yarra River; Merri and Darebin Creeks) and their priority rating. Details of each action are outlined within the Plan Elements, Section 5.1. Management Actions include:

- Protect and enhance all terrestrial and in-stream fauna habitat (High priority – on-going management required) (see Section 5.1.1 and 5.1.2).
- Improve water quality in whole catchment (e.g. improve stormwater management; reduce loads of litter, pollutants, and sediment into the Yarra River and its tributaries, and support increase of environmental flows to the river) (High priority – on-going management required) (Section 5.1.2).
- Liaise closely with Melbourne Water, Parks Victoria, City of Boroondara, DSE, DPI, Darebin Creek Management Committee and Merri Creek Management Committee and other relevant stakeholders to coordinate management actions (High priority – on-going management required) (Section 8).
- Maintain existing remnant vegetation (High priority – on-going management required).
- Improve connectivity and habitat links along the length of the Yarra River and its tributaries (Moderate priority – on-going management required) (Section 5.1.3).
- Retain hollow bearing trees and stags (High priority – on-going management required) (see Section 5.1.1).
- Retain or augment with large woody debris (see Section 5.1.1).
- Stage removal and control of weeds and document current practices and proposed future actions in a Weed Management Plan (High priority – on-going management required).
- Revegetate with indigenous flora (preferably of local provenance) (High priority – on-going management required) (Section 5.1.3).
- Undertake in conjunction with Melbourne Water, in-stream rehabilitation through aquatic plantings as appropriate (Moderate - High priority) (Section 5.1.2).
- Permanently fence areas of fauna habitat such as wetlands and temporarily fence those areas of rehabilitation and revegetation (Moderate - High priority) (Section 5.1.11).
- Monitor and implement pest animal control (High priority– on-going management required) (Section 5.1.8).
- Promote and encourage environmental awareness through education campaigns (Moderate priority) (Section 5.1.12).
- Install fauna friendly lighting in and adjacent to areas of fauna habitat where lighting is already present or deemed necessary (Low priority) (Section 5.1.5).

7.1.2 General recommendations for Area Type 2 and 3

The following is a summary of the general management actions recommended for Area Type 2a and b: urban parks with bushland plantings/sporting ovals/golf courses. Details of each action are outlined within Plan Elements, Section 5.1. Recommendations for Area Type 2 include:

- Maintain recreation focus.
- Consider adopting a policy to plant native species (preferably indigenous and local-provenance where possible) for plantings, noting that restrictions in regards to heritage controls and adopted precinct planting plans may determine the actual species planted. Planting indigenous flora of local provenance within areas in close proximity to the waterways is particularly important (Moderate – high priority) (Section 5.1.3).
- Identify suitable sports grounds with available space and establish a woodland canopy of indigenous tree species around the edge of the reserve for habitat purposes (and shade). Undertake more indigenous understorey planting around sports grounds with indigenous canopy trees (Moderate priority) (Section 5.1.3).
- Remove environmental weeds from existing planting guides (High priority).
- Encourage use of existing habitat by a variety of mobile and urban adapted native fauna by utilising indigenous flora of local provenance in all replacement plantings (High priority) (Section 5.1.3).
- Retain all hollow bearing trees and stags (High priority) (Section 5.1.1).
- Investigate use of nest boxes to augment habitat and where already present engage volunteers to monitor fauna use and **exclude** exotic species (Low priority) (Section 5.1.4).
- Investigate control of overabundant aggressive fauna species such as Noisy Miners and Bell Miners that out-compete and exclude other native species. This will encourage greater biodiversity values in urban parks (Low priority) (Section 5.1.9).
- Monitor health of trees for signs of possum damage. Install possum bands where the overall health of tree is determined to be endangered (High priority, on-going management required) (Section 5.1.9).

Recommendations for Area Type 3 (street trees) include:

- Consider planting indigenous species (preferably local-provenance) where feasible, noting that restrictions in regards to heritage controls and adopted precinct planting plans may determine the actual species planted. Planting indigenous flora of local provenance within areas in close proximity to the waterways is particularly important (Moderate – low priority).
- Remove environmental weeds from existing planting guides (High priority).

7.1.3 Summary of key management actions for selected sites within the three Area Types

The following tables (Table 2 – 4) and Figure 4 summarises management actions for specific sites within the City of Yarra. These actions are in addition to and should supplement the general management actions outlined for Area Type 1 (Section 7.1.1) and Area Type 2a and b (Section 7.1.2). Details of these actions are outlined in Plan Elements, Section 5.1.

Table 2 Management actions for specific sites along the Yarra River

Site	Management Action	Priority	Responsible Authority
Yarra Bend Park and Yarra Bend Golf Course	• Maintain existing fauna habitat throughout the park, particularly within the riparian zone.	High	Parks Victoria, DSE, Melbourne Water and City of Yarra.
	• Utilise a range of indigenous flora of local provenance (consistent with EVCs) to augment existing remnant vegetation and connect patches.	High	
	• Ensure follow up monitoring and maintenance of revegetation sites.	High	
	• Retain hollow bearing trees.	High	
	• Retain logs and smaller woody debris for ground dwelling fauna (e.g. reptiles).	High	
	• Exclude dogs where possible and increase 'on leash' only areas. Enforcement regulations by random patrolling.	High	
	• Support and promote the protection and monitoring of the EPBC-listed Grey-headed Flying-Fox population.	High	
	• Provide interpretive signs to increase interest and awareness in the environment.	Moderate	
	• Control visitor access to areas of existing fauna habitat in riparian zone or revegetation beds by fencing.	Moderate	
	• Install and monitor nest box use by exotic fauna.	Low	
Yarra Trail - River Street, Richmond, Yarra River	Dogs 'on leash' and enforcement (as above).	High	Melbourne Water, Parks Victoria, City of Yarra

Site	Management Action	Priority	Responsible Authority
	Interpretive signage (as above).	Moderate	
Yarra Trail - Flockhart Street – Flockhart Reserve, Richmond, Yarra River	Dogs 'on leash' and enforcement (as above). Interpretive signage (as above).	High Moderate	City of Yarra, Melbourne Water
Collingwood Children's Farm, Yarra River	Priority for weed removal, particularly within the riparian zone. Monitor and maintain revegetation in riparian zone. Monitor existing nest boxes.	High High High	Committee of Management, Melbourne Water
Kevin Bartlett Reserve	Maintain high quality revegetation under remnant patch of River Red Gums. Enforce dogs 'on leash' only to protect rehabilitation efforts.	High High	City of Yarra, Melbourne Water
Coate Park, Yarra River	Priority for weed removal, particularly within the riparian zone. Implement a dogs 'on leash' policy at all times.	High High	City of Yarra, Melbourne Water
Rudder Grange, Yarra River	Implement a dogs 'on leash' policy at all times. In conjunction with Melbourne Water capture and treat storm water entering the Yarra River via a concrete drain. A small wetland, with aquatic vegetation could be designed and may also provide additional habitat for fauna such as	High Low	City of Yarra, Melbourne Water

Site	Management Action	Priority	Responsible Authority
	frogs.		
Alphington Park and Wetlands, Yarra River	Maintain high quality revegetation.	High	City of Yarra, Melbourne Water
	Maintain intensive weed control program.	High	
	Control visitor access to areas of environmental sensitivity such as the wetland or revegetation beds by fencing and signage where required.	Moderate	
	Exclude dogs from wetland habitat and revegetation areas. Enforce dogs 'on-leash' only.	High	
	Augment wetland through additional aquatic plantings.	High	
	Provide interpretive signs that aim to increase interest and awareness of the environment.	Moderate	
Loy's Paddock	Control visitor access by fencing and signage.	High	City of Yarra, Melbourne Water
	Consider the exclusion of dogs to ensure that roosting habitat for waterbirds is protected when reviewing the Domestic Animal Management Plan.	High	

Table 3 Management actions for specific sites along Darebin Creek.

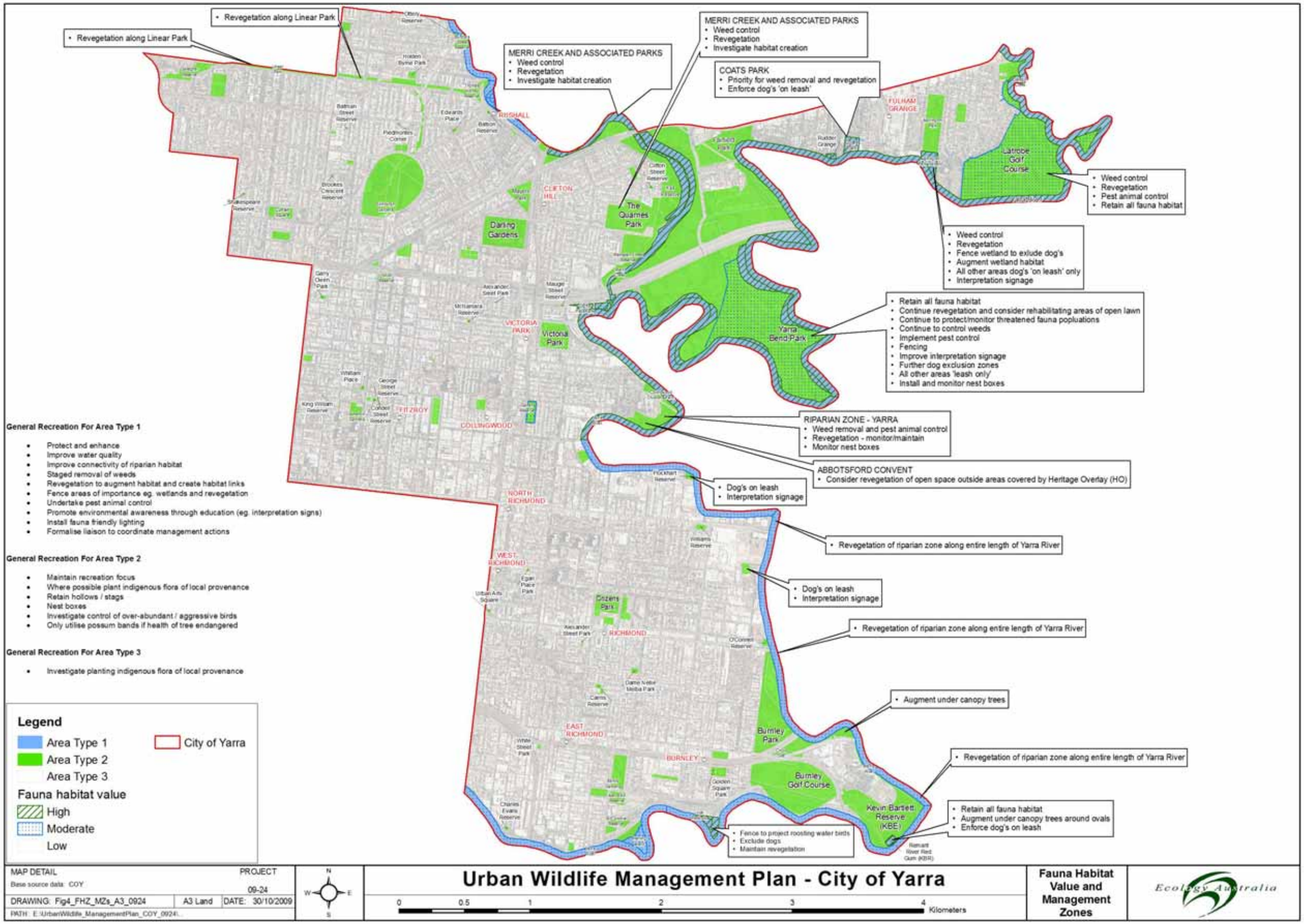
Site	Management Action	Priority	Responsible Authority
La Trobe Golf Course (Confluence of Darebin Creek and Yarra River)	Protect existing fauna habitat values of the riparian vegetation and large hollow bearing trees on-site	High	Private land, Melbourne Water, Darebin Creek Management Committee

Site	Management Action	Priority	Responsible Authority
	City of Yarra and Melbourne Water to encourage private landowners of the Golf Course to undertake control and eradication of invasive weeds (e.g. blackberry) and to continue involvement in pest animal management.	High	

Table 4 Management Actions for specific sites along or in close proximity to Merri Creek

Site	Management Action	Priority	Responsible Authority
George Knott Reserve, Merri Creek	Maintain weed control program. Revegetate (consistent with EVCs) immediately after weed control works and to augment fauna habitat.	High	City of Yarra, Melbourne Water, Merri Creek Management Committee
Quarries Park, Merri Creek	Improve connectivity in the riparian zones through revegetation with canopy and woody mid-storey species.	Moderate	City of Yarra, Melbourne Water, Merri Creek Management Committee
	Monitor and maintain existing revegetation.	High	
	Liaise with stakeholders to undertake control of invasive weeds as required.	High	
	Provide interpretive signage to create awareness and interest in environmental values	Moderate	
	Investigate the opportunity to create feature wetland (permanent and ephemeral ponds) by utilising existing depression adjacent to quarry face and retain eucalypts. This could be investigated in conjunction with Melbourne Water to capture storm water run before in enters Merri Creek. Utilise existing rock rubble to provide habitat for frogs and reptiles. Melbourne Water to assist in the design and function. A qualified Zoologist/Botanist should be engaged to assist in revegetation and habitat enhancement.	Moderate	
	Maintain fencing around revegetation beds.	Moderate	City of Yarra
Linear Park	Investigate opportunity to revegetate and create habitat link between Hardy Gallagher Reserve, Linear Park and Thomas Kidney Reserve before connecting to Merri Creek. Monitor and maintain revegetation.	Low to Moderate	

Figure 4 Fauna habitat value and the key management actions required within selected sites.



8 Coordination of Management Actions and funding

8.1 Stakeholder coordination

To ensure that management activities to protect and enhance fauna values within the City of Yarra achieve success, it is important that actions are coordinated between stakeholders both within the municipality (e.g. City of Yarra, Parks Victoria, Merri Creek Management Committee, and Darebin Creek Management Committee) and within adjoining municipalities (e.g. City of Boroondara, Darebin City Council and City of Melbourne). The importance of coordinating management actions, in particular weed control is well understood and is addressed in both Department of Sustainability and Environment (DSE) and Port Phillip and Westernport Catchment Management Authority (PPWCMA) publications (DNRE 2002a, 2002b; PPWPCMA 2006). In addition to weed control, many management activities such as revegetation, feral animal control and threatened species monitoring should be coordinated with surrounding stakeholders.

Informal liaison between the City of Yarra and other land managers and stakeholders is currently undertaken. Liaison may be formalised through a consultative forum or targeted workshops with the aim to plan and coordinate management actions within and adjacent to the study area. This liaison would aim to:

- Create a forum (with relevant land managers) that is capable of coordinating management activities (weed removal, pest control, revegetation, etc.) throughout the area.
- Prioritise actions across the landscape. Coordinate works in areas of high priority (e.g. within riparian habitat along the creeks and river and other areas of remnant vegetation).
- Pool funds if necessary to undertake works in key fauna habitats.
- Apply for funds (e.g. as group of stakeholders) to assist with habitat enhancements for key fauna species.
- Document existing management and outcomes within a database.
- Exchange information derived from documentation of works undertaken (where, when, herbicide records, target species, outcomes, etc.) and monitoring activities, especially for emerging weed species/populations.
- Seek and share technical advice as provided by weed management studies, extension officers and other sources of information.
- Produce a detailed management plan for weed removal/revegetation across the municipality that outlines the various actions required, priorities and responsible authority.
- Develop training programs and utilise existing ‘friends of’ groups to carry out specific tasks.

8.2 Funding of fauna habitat management actions

Management actions outlined within this plan can be implemented over a number of years with high priority actions undertaken in the short-term and moderate or low priority actions undertaken as part of long-term management goals. It was not within the scope of this report to provide information regarding the specific resources necessary to complete each action.

Funding could be allocated progressively through Council's budget distribution process. Furthermore, funding can be sought through external grants or collaboration with other stakeholders to reduce the cost of projects. Grants programs are available through both State and Federal Government including:

- Australian Government Environment, Water, Heritage and the Arts Grants (http://www.environment.gov.au/about/programs/index.html);
- Caring for our Country (http://www.nrm.gov.au/);
- Threatened Species Network Community Grants (http://www.environment.gov.au/biodiversity/threatened/ts-day/index.html#grants);

Sponsorships from local business and industry or fundraising by local schools and/or community groups may also be sought. Resources could be pooled in partnership with other land managers, DSE and non-government organisations.

The identification of important actions to maintain and enhance fauna values in this document provides a justification and basis for preparing grant submissions and applications for other external funding, as well as proposals for sponsorships and partnerships.

9 Recommendations for further work

Recommendations for further work to maintain and enhance biodiversity values within the City of Yarra include:

- Preparation of a weed management plan by suitably qualified botanist for all sites managed by the City of Yarra. This document would:
    1. Outline all weed species present;
    2. Prioritise sites for management and species to target for control/eradication;
    3. Outline management techniques, timing, monitoring, maintenance; and documentation
    4. Outline protocols for coordination amongst stakeholders.
- Preparation of a revegetation plan by a suitably qualified botanist for all sites managed by the City of Yarra. This document would:
    1. Outline indigenous flora species of local provenance for use in different vegetation communities and areas;
    2. Prioritise sites for rehabilitation;
    3. Outline management techniques, propagation, timing of plantings, monitoring maintenance and documentation; and
    4. Outline protocols for coordination amongst stakeholders.
- Investigation of the requirement for a pest animal policy that addresses feral exotic fauna such as foxes, cats and rabbits. Furthermore, it may be necessary to develop vegetation management plans to mitigate impacts of 'problematic' fauna on a site-by-site basis. These plans should be undertaken by a suitably qualified zoologist and botanist, in consultation with DSE and other relevant stakeholders.

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Luke Sandham – (Bushland Management) City of Darebin

Mark Bernhardt - (Coordinator, Community Amenity) City of Yarra

Mark Dornau - (Manager Environmental Services) City of Yarra

Peter Lynch - (Team Leader Environment – Yarra Bend Park) Parks Victoria

Rheya Linden - Animal Active

Sherrie Hopkins – (Coordinator, Strategic Planning) City of Yarra

Shirley Diez – (Senior Biodiversity Officer) Department of Sustainability and Environment

Silvana Predebon - (Coordinator Environmental Sustainability Unit) City of Yarra

Steven McMurray - (Manager, Building and Regulatory Services) City of Yarra

Appendix 1 Sites visited during the field assessment and their fauna habitat values. Sites are broken down into their applicable Area Types. Key fauna habitat sites are categorised as Area Type 1 and 2a.

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Area Type 1					
Yarra Bend Park and Yarra Bend Golf Course	North of Yarra River - Yarra Bend Rd, Clifton Hill. Eastern Freeway splits Yarra Bend Park into two sections within the City of Yarra.	Yarra Bend Park comprises a total of 260 ha of Crown Land across two sides of the Yarra River: within the City of Yarra and City of Boroondara. The park is the largest remaining area of natural bushland within inner Melbourne and is considered to be of high ecological value for both flora and fauna. Of the 260 ha, approximately 130 ha is covered by indigenous vegetation. Most of the large patches of remnant woodland are located within the City of Boroondara (e.g. Yellow Gum Woodland). This park contains a number of Ecological Vegetation Classes (EVCs), identified by the Land Conservation Council and outlined in the Environmental Action Plan for Yarra Bend. Yarra Bend Golf Course, adjacent to the Yarra Bend Park is publicly owned and managed by Parks Victoria. The Yarra Bend Park contains good connectivity to valuable fauna habitat upstream along the Yarra River. This area may be an important movement corridor for fauna along both the waterway and/or the associated riparian vegetation.	In-stream habitat of the Yarra River and Merri Creek; Riparian vegetation; scattered remnant trees; exotic grassland; exotic, non-indigenous and indigenous plantings	• Listed as a DSE Biosite of State significance. Fauna values are considered regionally significant. (Biosite report #3558) • This area supports the highest fauna values within the City of Yarra. • The diversity of native vertebrate fauna is regarded as regionally significant (115 species). This includes a high diversity of native birds (90 sp.), mammals (10 sp.) and herpetofauna (15 sp.) (Biosite report #3558) • Large old River Red Gums with hollows; • Large permanent EPBC-listed Flying-fox campsite • Rehabilitated patch of Basalt Plains Grassland • Good connectivity to upstream fauna habitat	• Threatened fauna species have been recorded within Yarra Bend Park (Parks Victoria 2000). These include 13 species, four of these listed under the EPBC Act, four under the FFG Act and 5 are considered threatened in Victoria. • EPBC-listed Grey-headed Flying-Fox – large campsite located within Yarra Bend Park. • EPBC-listed Swift Parrot - likely to be vagrant to the area (Biosite report #3558) – some records of high population densities • Sightings of Powerful Owl and Barking Owl (Biosite report #3558) • AVW records for State-significant Nankeen Night-Heron and DSE-listed Azure Kingfisher (DSE 2007a) • Habitat for hollow dependent fauna such as Crimson Rosella, Eastern Rosella and Red-rumped Parrots • Shrubby mid storey plants within the riparian vegetation provides habitat for small insectivorous birds • Ground layer flora such as tussocks, leaf litter and woody debris provides suitable habitat for a variety of reptiles • Potential habitat within the Yarra River for EPBC-listed Australian Grayling and FFG-listed Australian Mudfish • Potential Water Rat habitat

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Dight's Falls	Located along the Yarra River, near the confluence with Merri Creek.	Dight's Falls was a natural rock barrier but is now an artificial weir capped with concrete and is the location along the Yarra River where the upstream freshwater system meets the downstream tidal influenced system. Dight's Falls supports important in-stream habitat for a variety of native fish. The riparian vegetation along the banks provides habitat for a variety of fauna species. Remnant and regenerating riparian vegetation is present near Dight's Falls. This area also contains some large remnant River Red Gums, Yellow Box and Yellow Gum and is the only scattered area of remnant vegetation on the western bank of the Yarra in the area (City of Yarra 2008)	Waterways, riparian vegetation	• Listed as a State significant biosite (# 4862) • High diversity of freshwater fish: 12 species of freshwater fish have been recorded for this section of the Yarra River. This is the highest recorded single site diversity for freshwater fish in Victoria (Biosite information sheet 4862). • Connectivity to upstream Yarra catchment is improved providing greater fauna habitat values. Downstream connectivity is poor and constrained by urban development close to the bank (City of Yarra 2008)	• EPBC-listed Australian Grayling (Biosite information sheet 4862). • FFG-listed Australian Mudfish (Biosite information sheet 4862). • FFG-listed Great Egret
River Street, Richmond, Yarra River	Small recreational park situated adjacent to the Yarra trail at the end of River Street, Richmond.	Residential housing in close proximity to the Yarra River. The River is separated from this development by a thin and highly disjunct strip of riparian vegetation, dominated by exotic scattered trees with an exotic grassy understorey and the Yarra trail (a shared bike and walking path). Some sections along the river contain only exotic grass to the waters edge. A small high-use recreational park of open exotic grassland with scattered planted exotic and non-indigenous trees is present at the end of River Street.	Waterways; disjunct riparian vegetation; scattered remnant trees; exotic grass; Indigenous, non-indigenous and exotic plantings.	• Low fauna values in riparian vegetation • Highly disjunct riparian vegetation along the bank with mostly planted exotic trees. • Poor connectivity for terrestrial fauna • Moderate in-stream habitat values	• Common urban adapted fauna species • Potential Water Rat habitat on the opposite bank • The in-stream habitat may provide a foraging resource for water dependent birds such as ducks, grebes, and cormorants. • The exotic trees along the bank may also provide perching habitat for waterbirds such as darters and cormorants
Flockhart Street, Abbotsford, Yarra River	Small recreational park situated adjacent to the Yarra River at the end of Flockhart Street, Abbotsford.	Highly industrial area in close proximity to the Yarra River. A small recreational park supporting open exotic grassland and planted exotic and non-indigenous trees is located at the end of Flockhart Street, adjacent to the Yarra River. The riparian vegetation is thin and highly disjunct, dominated by a variety of exotic and non-indigenous scattered trees with an exotic grassy understorey. Some sections along the river contain only exotic grass to the waters edge. A thin strip of revegetation is present along a portion of the bank.	Waterways; riparian vegetation; scattered indigenous trees; exotic grass; Indigenous, non-indigenous and exotic plantings.	• Highly disjunct riparian vegetation along the bank with mostly planted exotic and scattered native/indigenous trees. • Poor connectivity for terrestrial fauna ▪ Moderate in-stream habitat	• Common native and exotic urban adapted fauna species • Water dependent birds (e.g. Dusky Moorhen) • Hollow dependent fauna (e.g. Rainbow Lorikeet) • Potential Water Rat habitat on the opposite bank; • The in-stream habitat may provide a foraging resource for water dependent birds such as ducks, grebes, and cormorants. • The overhanging vegetation may also provide perching sites for waterbirds such as darters and cormorants

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Collingwood Children's Farm, Yarra River	St Heliers Street Abbotsford.	Collingwood Children's Farm is located on Crown Land and managed by a Committee of Management. The site contains paddocks with stock and small patches of cultivated land. The riparian vegetation between the farm and the Yarra River is approximately 20 to 30 m wide and supports a good canopy cover and shrubby mid storey layer dominated by Acacia spp. The ground layer is predominantly covered in exotic grasses and weeds, with some planted native species.	Waterways; riparian vegetation; scattered remnant trees; exotic grass; Indigenous, non-indigenous and exotic plantings.	▪ The riparian vegetation and waterway provides moderate – high fauna habitat values ▪ Shrubby mid-storey layer	• Tawny Frog Mouth roosting in an Acacia within the riparian vegetation adjacent to the Yarra River. • Small insectivorous birds such as Superb Fairy-wren, Willie Wagtail, Striated Thornbill and Spotted Pardalote. • Some potential Water Rat habitat • The in-stream habitat may provide a foraging resource for water dependent birds such as ducks, grebes, and cormorants. • The overhanging vegetation may also provide perching sites for waterbirds such as darters and cormorants
Coate Park, Yarra River	Located along the Yarra River between Yarraford Street and the Chandler Highway Bridge, Alphington.	Coate Park (0.46 ha) supports a small remnant patch of Plains Grassy Woodland (EVC #). Some rehabilitation has been undertaken but areas of high weed invasion remain, particularly those areas adjacent to the Yarra River. Coate Park is surrounded by residential development and is connected to Rudder Grange via a thin strip of highly modified and weedy riparian vegetation located on a single freehold title that allows pedestrian access between the sites.	Waterway; riparian vegetation; scattered remnant trees; Indigenous, non-indigenous and exotic plantings.	▪ Moderate for riparian vegetation along Yarra and in-stream values ▪ Large old eucalypts with hollows; ▪ Some areas of well managed revegetation ▪ Areas of high weed invasion provide low fauna habitat values	• Habitat for hollow dependent fauna. • Potential Water Rat habitat • The in-stream habitat may provide a foraging resource for water dependent birds such as ducks, grebes, and cormorants. • The overhanging vegetation may also provide perching sites for waterbirds such as darters and cormorants or the state significant Azure Kingfisher
Rudder Grange and Yarra River	Located along the Yarra River at the end of Alphington Street, Alphington.	Rudder Grange (0.43 ha) supports a small patch of remnant trees with a rehabilitated understorey of planted ground layer flora species (e.g. tussock grasses and sedges) adjacent to the Yarra River. Rudder Grange is surrounded by residential development and is connected to Coate Park (as described above).	Waterway; riparian vegetation; scattered remnant trees; Indigenous, non-indigenous and exotic plantings.	• The riparian vegetation and in-stream habitats along Yarra River support moderate fauna values • Large old River Red Gums with hollows • Good quality understorey revegetation.	• Habitat for hollow dependent fauna. • The rehabilitated ground layer of tussock grasses, sedges, leaf litter and woody debris may provide shelter for a variety of small reptile species (e.g. Pale-flecked Sun-Skink). • Water Rat habitat • The in-stream habitat may provide a foraging resource for water dependent birds such as ducks, grebes, and cormorants. • The overhanging vegetation may also provide perching sites for waterbirds such as darters and cormorants or the state significant Azure Kingfisher

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Alphington Park and Wetlands, Yarra River	Located between Parkview Road, View Street, Riverview Grove and the Yarra River, Alphington	Alphington Park (1.5 ha) contains both high recreational use sporting facilities (e.g. ovals) and areas of high ecological value such as the wetland and surrounding rehabilitated vegetation along the Yarra River. The off-stream wetlands have been rehabilitated and supports shallow water with a muddy bottom and sparse aquatic vegetation. Due to the dry conditions that water level has drawn down exposing most of the aquatic vegetation. The surrounding vegetation supports a variety of large (some with hollows), medium and small eucalypts, with a well managed revegetated shrubby mid-storey and ground cover.	Waterways; rehabilitated wetlands; riparian vegetation; scattered remnant trees; exotic grass; Indigenous, non-indigenous and exotic plantings.	▪ High habitat values for riparian vegetation along Yarra, wetlands and in-stream ▪ Multiple, large, medium and small eucalypts ▪ Many large eucalypts contain hollows; ▪ Large woody debris on ground and in water edge ▪ Aquatic vegetation present in wetland ▪ Good shrubby mid-storey for small birds	• Hollow dependent fauna (e.g. Yellow-tailed Black Cockatoo, Eastern Rosella, Red-rumped Parrot, Common Brushtail Possum) • Water dependent birds such as Chestnut Teal, Eurasian Coot, Pacific Black Duck, Australasian Grebe and Little Pied Cormorant • Frogs (e.g. Common Froglet) • The rehabilitated wetland may provide habitat for other common frog species such as Southern Brown Tree Frog or Banjo Frog. • The rehabilitated ground layer of tussock grasses, sedges, leaf litter and woody debris may provide shelter for a variety of small reptile species (e.g. Pale-flecked Sun-Skink). • Water Rat habitat • The overhanging vegetation may also provide perching sites for waterbirds such as darters, cormorants and the state significant Azure Kingfisher
Kevin Bartlett Reserve (Remnant Red Gums with revegetated understorey). Large sporting ovals part of this reserve complex.	Yarra Blvd, Burnley	Kevin Bartlett Reserve contains large sporting ovals with scattered exotic/native planted trees that provide low habitat value for fauna. A small patch of remnant River Red Gums with recent revegetation works to reinstate ground and mid-storey indigenous vegetation undertaken by the City of Yarra.	Scattered remnant trees; Indigenous, non-indigenous and exotic plantings; exotic grass.	• Low fauna habitat values in sporting fields • Large River Red Gums many containing hollows; • Well managed revegetation; • Small artificial wetland depression; • Good shrubby mid-storey for small birds	• Hollow dependent fauna (e.g. Red-rumped Parrot, and Rainbow Lorikeet) • Nectar feeding birds such as White-plumed Honeyeater • The rehabilitated ground layer of tussock grasses, sedges, leaf litter and woody debris may provide shelter for a variety of small reptile species (e.g. Pale-flecked Sun-Skink). • Small artificial wetland depression designed to capture water runoff from adjacent sporting fields may provide habitat for a variety of common frogs.
George Knott Reserve, Merri Creek	Located between Heidelberg Road and south of Merri Creek, Westgarth	Knott Reserve is an athletics facility but contains significant escarpment habitat adjacent to Merri Creek. The escarpment is considered to have moderate to high conservation value (managed by City of Yarra).	Watercourse, Riparian Vegetation, Exotic Grassland	▪ Moderate fauna habitat values within escarpment habitat. ▪ Low fauna values for sporting fields	• Rocky escarpment provides habitat for species such as Pale-flecked Sun-skink, Blue-tongue Lizard. • Water dependent birds such as Pacific Black Duck and Little Pied Cormorant • In-stream habitat and banks may provide foraging and shelter for the Water Rat • Overhanging vegetation along the creek may provide perching sites for Azure Kingfisher • Foraging habitat for Southern Myotis

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Quarries Park, Merri Creek	Located between The Esplanade and west of Merri Creek, Clifton Hill.	Quarries Park (1.05 ha) supports large open areas of exotic grassland located adjacent to Merri Creek, sporting ovals and high density residential housing. Scattered remnant and planted native trees are present throughout the park. Large revegetation beds have been protected from human disturbance through fencing. The riparian vegetation along Merri Creek has been highly disturbed and modified through clearance of the vegetation. Much of the riparian vegetation has now been completely replaced by exotic grasses to the bank of the creek. Planted native and indigenous vegetation is present in some areas as a thin strip along the bank. The creek supports flowing water and scattered patches of Common Reed (*Phragmites australis*)	Watercourse; artificial wetland; riparian wetland; scattered remnant trees; Exotic Grassland; Indigenous, non-indigenous and exotic plantings.	▪ Low habitat values in park with open mown exotic grassland. ▪ Moderate fauna habitat values in stream with scattered patches of emergent vegetation (reed beds).	• Hollow dependent fauna (e.g. Rainbow Lorikeet) • Water dependent birds such as Australasian Grebe and Little Pied Cormorant • The in-stream and fringing vegetation along Merri Creek may provide habitat for common frog species such as the Common Froglet, Southern Brown Tree Frog or Banjo Frog. • Water Rat habitat
Riparian vegetation within La Trobe Golf Course (Confluence of Darebin Creek and Yarra River)	Located at the confluence of the Yarra River and Darebin Creek, Farm Road, Alphington.	Latrobe Golf Course is privately owned and is situated along the Yarra River and Darebin Creek in the north-east of the study area. The golf course (fairways and scattered trees) is described separately below. The riparian vegetation along the river and creek contains moderate to high fauna habitat values such as: Large Eucalypts (many with hollows); Shrubby mid-storey layer; and a dense understorey ground cover although this is predominantly exotic. The waterways, in particular Darebin contain flowing water, riffles, pools, rocky bottom and bank. –	Waterways; Riparian vegetation; scattered remnant trees, Indigenous, non-indigenous and exotic plantings.	▪ High fauna habitat values for riparian vegetation along Yarra River and Darebin Creek ▪ High in-stream values ▪ Large old eucalypts with hollows ▪ Dense shrubby mid-storey but often dominated by exotic flora species	• Hollow dependent fauna (e.g. Sulphur-crested Cockatoo, Rainbow Lorikeet, Eastern Rosella and Red-rumped Parrot) • Water dependent birds such as Chestnut Teal, Eurasian Coot, Pacific Black Duck, Australasian Grebe and Little Pied Cormorant • Frogs (e.g. Southern Brown Tree Frog) • The dense ground layer of vegetation (mostly weedy), leaf litter and woody debris may provide shelter for a variety of small reptile species (e.g. Pale-flecked Sun-Skink, Blue-tongue Lizard). • Potential Water Rat habitat • The overhanging vegetation may also provide perching sites for waterbirds such as darters, cormorants and the state significant Azure Kingfisher • Foraging habitat for predatory birds (e.g. Powerful Owl, Tawny Frog Mouth etc.).
Area Type 2					
Edinburgh Gardens, Fitzroy North	Located between St Georges Road and Alfred Cr, Fitzroy North	Highly urbanised and isolated with a high recreation usage, this large park supports open mown exotic grassland and scattered planted exotic and native trees.	Exotic grass; Indigenous, non-indigenous and exotic plantings.	• Low fauna values and likely to be utilised by urban adapted species only;	• Common native and exotic urban adapted fauna species ▪ Low likelihood of occurrence for most key fauna species. Mobile urban adapted species (e.g. EPBC-listed Grey-headed Flying-Fox and honeyeaters) may occasionally forage within fruiting and flowering trees
Barkly Gardens, Burnley	Located between Lesney Ave, Coppin Street and Barkley Av, Burnley	Highly urbanised and isolated with a high recreation usage. This park supports open mown exotic grassland and scattered planted exotic and native trees.	Exotic grass; Indigenous, non-indigenous and exotic plantings.	• Low fauna values and likely to be utilised by urban adapted species only;	• Common native and exotic urban adapted fauna species ▪ Low likelihood of occurrence for key fauna species.

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Outer Circle Railway Linear Reserve	Located along Park Street between Hardy Gallagher Reserve (Princes Hill) and Thomas Kidney Reserve (North Fitzroy).	Highly urbanised with a high recreation usage, the linear reserve supports a narrow strip of open mown exotic grassland with scattered planted exotic and native trees.	Exotic grass; Indigenous, non-indigenous and exotic plantings.	• Low fauna values and likely to be utilised by urban adapted species only	• Common native and exotic urban adapted fauna species ▪ Low likelihood of occurrence for key fauna species.
Thomas Kidney Reserve	Located north of Park Street, Fitzroy North.	Highly urbanised, this park supports scattered planted native trees. Good quality revegetation using understorey species (e.g. tussock grasses). Artificial wetland depression was dry during the assessment and contains scattered rocks around the margins.	Indigenous, non-indigenous and exotic plantings; artificial wetland (dry);	• Rehabilitated and well managed revegetation • Low fauna values and likely to be utilised by urban adapted species	• Common native and exotic urban adapted fauna species • Low likelihood of occurrence for most key fauna species. • The rehabilitated ground layer of tussock grasses, leaf litter may provide shelter habitat for small reptiles • Nectar feeding birds such as honeyeaters may utilise the eucalypts when in flower
Hardy Gallagher Reserve	Located between Holtam Street West and Lang Street, Princes Hill	Highly urbanised and isolated park with a high recreation usage. The park supports open mown exotic grassland and scattered planted exotic and native trees.	Exotic grass; Indigenous, non-indigenous and exotic plantings.	▪ Low fauna values and likely to be utilised by urban adapted species only	• Common native and exotic urban adapted fauna species • Low likelihood of occurrence for key fauna species.
Curtain Square	Located between Curtain Street and Newry Street, Carlton North.	Highly urbanised and isolated park with a high recreation usage. Planted exotic, non-indigenous and indigenous trees are present. Multiple large fig trees *Ficus sp*. are present and may provide occasional foraging habitat for Grey-headed Flying-fox when in fruit.	Exotic Grassland; Indigenous, non-indigenous and exotic plantings	▪ Low fauna values and likely to be utilised by urban adapted species only ▪ Medium sized planted eucalypts; ▪ Large Fig trees *Ficus sp*. may provide occasional foraging habitat for EPBC-listed Grey-headed Flying Fox.	• Common native and exotic urban adapted fauna species • Low likelihood of occurrence for key fauna species. Mobile urban adapted species (e.g. Grey-headed Flying-Fox) may occasionally forage within fruiting and flowering trees
La Trobe Golf Course	Located at the confluence of the Yarra River and Darebin Creek, Farm Road, Alphington.	The privately owned golf course is located adjacent to the Yarra River and Darebin Creek that supports a thin strip of riparian vegetation (see description above). The golf Course itself supports open mown exotic grassland and a variety of scattered native and exotic trees. Some of these are large old eucalypts that support multiple hollows and may be remnant.	Exotic Grassland; Indigenous, non-indigenous and exotic plantings; scattered remnant indigenous trees	▪ Golf fairways provide low fauna habitat, ▪ Large hollow bearing trees within the golf course ▪ Riparian vegetation provides important fauna habitat for a variety of species.	• Common native and exotic urban adapted fauna species within the golf fairways See above for utilisation of adjacent riparian vegetation along the Yarra River and Darebin Creek.
Burnley Public Golf Course	Located between Monash Freeway and Madden Grove, Burnley.	The golf course supports open mown exotic grassland and a variety of scattered native and exotic trees and stags. Some of these are large old eucalypts that support hollows. Planted non-indigenous vegetation is located around the perimeter, some areas providing dense shrubby vegetation that may provide habitat for a variety of small native birds. The golf course is isolated from the Yarra River by the Monash Freeway.	Exotic Grassland; Scattered trees; Indigenous, non-indigenous and exotic plantings	▪ Low fauna habitat values on fairways ▪ Medium to large eucalypts with hollows	• Common native and exotic urban adapted fauna species • Low likelihood of occurrence for most key fauna species. Mobile urban adapted species (e.g. honeyeaters) may forage within flowering trees • Hollow bearing trees provide habitat for fauna such as parrots and possums
Area Type 3					

Site Name	Location in the study area	Brief Description	Fauna habitats	Other values	Key Fauna (recorded or potential habitat) – (this list is a sample of fauna species occurring within areas)
Street trees	Throughout the City of Yarra	Scattered exotic, native and indigenous planted trees are located throughout the residential and industrial areas of Yarra.	Exotic Grassland; Scattered trees; Indigenous, non-indigenous and exotic plantings	▪ Low fauna values and likely to be utilised by highly mobile urban adapted species only (e.g. avian flyway)	• Common native and exotic urban adapted fauna species • Low likelihood of occurrence for most key fauna species. Mobile urban adapted species (e.g. honeyeaters) may forage within flowering trees • Hollow bearing trees provide habitat for fauna such as parrots and possums

Appendix 2 Key fauna species selected for the Urban Wildlife Plan for the City of Yarra, their conservation status and their last record within 10 km of the study area

KEY
EPBC – Environmental Protection and Biodiversity Conservation Act 1999
NAP – National Action Plan
FFG – Flora and Fauna Guarantee Act 1988
DSE – Status according to DSE (2007c): Advisory List of Threatened Vertebrate Fauna in Victoria – 2007.
CE – Critically Endangered; EN – Endangered; VU – Vulnerable; NT – Near Threatened
L – Listed under the FFG Act 1988.
Mi – Migratory species under the EPBC Act 1999
M – Marine overfly species under the EPBC Act 1999
Last – Year of last record
Rec – Number of records in Fauna DRA
♦- Species identified in the EPBC Protected Matters Search but not in the DRA

Common Name	Scientific Name	Last	Recs	Code	EPBC	NAP	FFG	DSE
EPBC								
Grey-headed Flying-fox	*Pteropus poliocephalus*	2006	1094	1280	VU	VU	L	VU
FFG								
Powerful Owl	*Ninox strenua*	2006	17	248			L	VU
DSE								
Nankeen Night-Heron	*Nycticorax caledonicus hilli*	2007	115	192	M			NT
Pied Cormorant	*Phalacrocorax varius*	2001	58	99				NT
Azure Kingfisher	*Ceyx azurea*	2006	25	319				NT
Non-threatened key species								
Emergent, floating and submergent vegetation along creeks and river								
Dusky Moorhen	*Gallinula tenebrosa*	2006	478	56				
Purple Swamphen	*Porphyrio porphyrio*	2006	108	58	M			
Eurasian Coot	*Fulica atra*	2005	242	59				
Little Grassbird	*Megalurus gramineus*	2001	28	522	Mi			
Australian Reed-Warbler	*Acrocephalus australis*	2001	65	524	Mi			
Golden-headed Cisticola	*Cisticola exilis*	2001	67	525				
Deep Water, riparian vegetation providing perching sites								
Great Cormorant	*Phalacrocorax carbo*	2005	190	96				
Little Black Cormorant	*Phalacrocorax sulcirostris*	2005	301	97				
Black-faced Cormorant	*Phalacrocorax fuscescens*	1988	4	98	M			NT
Pied Cormorant	*Phalacrocorax varius*	2001	58	99				NT
Little Pied Cormorant	*Phalacrocorax melanoleucos*	2005	377	100				
Darter	*Anhinga melanogaster*	2005	81	101				
Predatory Birds								
Southern Boobook	*Ninox boobook*	2005	28	242	M			
Barn Owl	*Tyto alba*	2001	10	249				
Tawny Frogmouth	*Podargus strigoides*	2004	142	313				
Laughing Kookaburra	*Dacelo novaeguineae*	2005	223	322				
Hollow dependant								

Rainbow Lorikeet	*Trichoglossus haematodus*	2006	616	254				
Musk Lorikeet	*Glossopsitta concinna*	2006	143	258				
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	2006	88	267				
Sulphur-crested Cockatoo	*Cacatua galerita*	2006	252	269				
Galah	*Eolophus roseicapilla*	2006	173	273				
Crimson Rosella	*Platycercus elegans elegans*	2001	61	282				
Eastern Rosella	*Platycercus eximius*	2005	314	288				
Red-rumped Parrot	*Psephotus haematonotus*	2006	326	295				
Small insect eating birds								
Restless Flycatcher	*Myiagra inquieta*	2000	8	369				
Eastern Yellow Robin	*Eopsaltria australis*	2006	58	392				
Grey Fantail	*Rhipidura albiscapa*	2006	220	361				
Willie Wagtail	*Rhipidura leucophrys*	2006	719	364				
Striated Thornbill	*Acanthiza lineata*	2005	17	470				
Yellow Thornbill	*Acanthiza nana*	2005	21	471				
Brown Thornbill	*Acanthiza pusilla*	2005	257	475				
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	2003	81	486				
White-browed Scrubwren	*Sericornis frontalis*	2006	334	488				
Superb Fairy-wren	*Malurus cyaneus*	2006	273	529				
Spotted Pardalote	*Pardalotus punctatus punctatus*	2005	165	565				
Nectar feeders								
White-naped Honeyeater	*Melithreptus lunatus*	2001	23	578				
Yellow-faced Honeyeater	*Lichenostomus chrysops*	2005	6	614				
Yellow-tufted Honeyeater	*Lichenostomus melanops*	1983	2	619				
Eastern Spinebill	*Acanthorhynchus tenuirostris*	2005	164	591				
Little Wattlebird	*Anthochaera chrysoptera*	2006	387	637				
Red Wattlebird	*Anthochaera carunculata*	2006	898	638				
New Holland Honeyeater	*Phylidonyris novaehollandiae*	2006	74	631				
Mammals								
Platypus	*Ornithorhynchus anatinus*	2002	25	1001				
Short-beaked Echidna	*Tachyglossus aculeatus*	2006	14	1003				
Common Ringtail Possum	*Pseudocheirus peregrinus*	2006	363	1129				
White-striped Freetail-bat	*Tadarida australis*	2006	46	1324				
Gould's Wattled Bat	*Chalinolobus gouldii*	2005	163	1349				
Water-rat	*Hydromys*	2006	57	1415				

	chrysogaster							
Reptiles								
Eastern Snake-necked Turtle	*Chelodina longicollis*	2005	12	2017				
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*	2006	35	2451				
Eastern Blue-tongued Lizard	*Tiliqua scincoides*	2005	24	2580				
Southern Water-skink	*Eulamprus tympanum tympanum*	2005	10	2956				
Frogs								
Eastern Banjo Frog	*Limnodynastes dumerilii*	2005	40	3058				
Brown Tree Frog	*Litoria ewingii*	2004	319	3182				

Appendix 3 Vertebrate species recorded within and immediately adjacent to the study area, 7 and 8 May 2009

Note: This is not an exhaustive list of fauna species occurring within the City of Yarra. The results below are based on 'rapid assessments' of the selected sites.

Species	Yarra Bend Park & Golf Course	Edinburgh Gardens	Barkly Gardens, Burnley	Thomas Kidney-Linear & Hardy Gallagher Reserve	River Street, Yarra River	Flockhart Street, Yarra River	Collingwood Child-Farm, Yarra River	Coate Park	Rudder Grange	Alphington Park and Wetlands	George Knott Reserve	Kevin Bartlett Reserve	La Trobe Golf Course	Burnley Golf Course	Quarries Park, Merri Creek	Curtain Square	*Frequency of occurrence %*
Birds																	
Crested Pigeon	X													X	X		**18.8**
Dusky Moorhen	X					X	X		X	X		X					**37.5**
Eurasian Coot										X							**6.3**
Australasian Grebe										X			X		X		**18.8**
Little Black Cormorant								X									**6.3**
Little Pied Cormorant										X					X		**12.5**
Australian Wood Duck	X						X						X				**18.8**
Pacific Black Duck	X									X			X				**18.8**
Chestnut Teal										X							**6.3**
Silver Gull				X													**6.3**
Rainbow Lorikeet	X	X		X		X			X	X		X	X	X	X		**62.5**
Yellow-tailed Black-Cockatoo										X							**6.3**
Sulphur-crested Cockatoo													X				**6.3**
Crimson Rosella	X																**6.3**
Eastern Rosella	X									X			X				**18.8**
Red-rumped Parrot	X									X		X	X	X			**31.3**
Tawny Frogmouth							X										**6.3**
Laughing Kookaburra	X							X				X					**18.8**
Welcome Swallow										X		X	X				**18.8**
Grey Fantail												X					**6.3**
Willie Wagtail	X					X	X										**18.8**
Magpie-lark	X				X	X				X			X	X	X		**43.8**
Striated Thornbill							X										**6.3**
Brown Thornbill															X		**6.3**
Superb Fairy-wren							X								X		**12.5**
Spotted Pardalote						X	X					X	X				**25.0**
White-plumed Honeyeater												X					**6.3**
Bell Miner	X				X	X											**18.8**
Noisy Miner	X		X				X	X		X		X	X	X	X		**56.3**
Red Wattlebird	X	X		X	X	X	X		X				X		X		**56.3**
Pied Currawong	X					X	X					X	X		X		**37.5**
Grey Butcherbird						X						X					**12.5**
Australian Magpie	X			X	X			X				X	X	X			**43.8**
Little Raven	X					X		X				X	X			X	**37.5**
Rock Dove		X		X			X								X	X	**31.3**
Spotted Turtle-Dove							X		X	X		X		X	X		**37.5**
Common Blackbird	X						X		X	X		X	X		X		**43.8**
House Sparrow							X										**6.3**

Species	Yarra Bend Park & Golf Course	Edinburgh Gardens	Barkly Gardens, Burnley	Thomas Kidney-Linear & Hardy Gallagher Reserve	River Street, Yarra River	Flockhart Street, Yarra River	Collingwood Child-Farm, Yarra River	Coate Park	Rudder Grange	Alphington Park and Wetlands	George Knott Reserve	Kevin Bartlett Reserve	La Trobe Golf Course	Burnley Golf Course	Quarries Park, Merri Creek	Curtain Square	*Frequency of occurrence %*
Common Myna	X		X	X		X	X		X	X		X	X		X		**62.5**
Common Starling	X											X			X		**18.8**
Mammals																	
Common Ringtail Possum								X									**6.3**
Common Brushtail Possum										X							**6.3**
Red Fox															X		**6.3**
Frogs																	
Common Froglet										X							**6.3**
Southern Brown Tree Frog													X				**6.3**
Species richness	**20**	**3**	**2**	**6**	**4**	**11**	**15**	**6**	**6**	**18**	**0**	**17**	**18**	**7**	**16**	**2**	

Appendix 4 Fauna species recorded from within a 10 km radius of the study area

Key
S- Seen, H- Heard, K- Killed/dead specimen, *- Exotic species, ^-Non-threatened species listed under the Migratory and/or Marine Overfly Schedules of the EPBC Act
NAP – National Action Plan
FFG – Flora and Fauna Guarantee Act 1988
DSE – Status according to DSE (2007): Advisory List of Threatened Vertebrate Fauna in Victoria – 2007.
CE – Critically Endangered; EN – Endangered; VU – Vulnerable; NT – Near Threatened; LC – Least Concern; LR-NT – Lower Risk- Near Threatened; R-IK – Rare or Insufficiently Known; R/R – Rare and Restricted; DD – Data Deficient; CD – Conservation Dependent.
L – Listed under the FFG Act 1988.
N – Nominated for listing under the FFG Act 1988
I – Ineligible for listing under the FFG Act 1988.
Mi – Migratory species under the EPBC Act 1999
M – Marine overfly species under the EPBC Act 1999
Last – Year of last record
Rec – Number of records

Common Name	Scientific Name	EPBC	NAP	FFG	DSE	Last	Recs
Birds							
Little Penguin	*Eudyptula minor*	M				1996	17
Stubble Quail	*Coturnix pectoralis*	M				2006	5
Brown Quail	*Coturnix ypsilophora*				NT	1985	1
Painted Button-quail	*Turnix varia*					2000	5
Plains-wanderer	*Pedionomus torquatus*	VU	EN	L	CE	1985	6
Superb Fruit-Dove	*Ptilinopus superbus*	M				1984	2
Peaceful Dove	*Geopelia placida*					1990	1
Diamond Dove	*Geopelia cuneata*			L	NT	1905	1
Common Bronzewing	*Phaps chalcoptera*					2005	55
Crested Pigeon	*Ocyphaps lophotes*					2005	47
Lewin's Rail	*Rallus pectoralis*		NT	L	VU	1991	2
Buff-banded Rail	*Gallirallus philippensis*	M				2002	9
Australian Spotted Crake	*Porzana fluminea*					1991	5
Baillon's Crake	*Porzana pusilla palustris*	M		L	VU	2001	8
Spotless Crake	*Porzana tabuensis*	M				2006	6
Black-tailed Native-hen	*Gallinula ventralis*					1988	3
Dusky Moorhen	*Gallinula tenebrosa*					2006	478
Purple Swamphen	*Porphyrio porphyrio*	M				2006	108
Eurasian Coot	*Fulica atra*					2005	242
Great Crested Grebe	*Podiceps cristatus*					1999	15
Australasian Grebe	*Tachybaptus novaehollandiae*					2005	188
Hoary-headed Grebe	*Poliocephalus poliocephalus*					2003	95
Great Cormorant	*Phalacrocorax carbo*					2005	190
Little Black Cormorant	*Phalacrocorax sulcirostris*					2005	301
Black-faced Cormorant	*Phalacrocorax fuscescens*	M			NT	1988	4
Pied Cormorant	*Phalacrocorax varius*				NT	2001	58
Little Pied Cormorant	*Phalacrocorax melanoleucos*					2005	377
Darter	*Anhinga melanogaster*					2005	81

Australian Pelican	*Pelecanus conspicillatus*	M				2006	69
Caspian Tern	*Sterna caspia*	Mi,M		L	NT	1988	6
Silver Gull	*Larus novaehollandiae*	Mi,M				2006	699
Masked Lapwing	*Vanellus miles*	Mi				2006	232
Banded Lapwing	*Vanellus tricolor*	Mi				1984	1
Black-fronted Dotterel	*Elseyornis melanops*	Mi				2003	71
Black-winged Stilt	*Himantopus himantopus leucocephalus*	Mi,M				2003	42
Latham's Snipe	*Gallinago hardwickii*	Mi,M			NT	2001	11
Australian Painted Snipe	*Rostratula australis*	VU,Mi, M	VU	L	CE	1970	1
Brolga	*Grus rubicunda*	Mi		L	VU	1991	1
Glossy Ibis	*Plegadis falcinellus*	Mi,M			NT	1962	2
Australian White Ibis	*Threskiornis molucca*	M				2006	294
Straw-necked Ibis	*Threskiornis spinicollis*	M				2002	39
Royal Spoonbill	*Platalea regia*				VU	2003	15
Yellow-billed Spoonbill	*Platalea flavipes*					2001	29
Little Egret	*Egretta garzetta*	M		L	EN	2005	5
Intermediate Egret	*Ardea intermedia*	M		L	CE	2004	4
Great Egret	*Ardea alba*	Mi,M		L	VU	2004	93
White-faced Heron	*Egretta novaehollandiae*					2005	267
White-necked Heron	*Ardea pacifica*					1999	30
Nankeen Night-Heron	*Nycticorax caledonicus hilli*	M			NT	2007	115
Australian Little Bittern	*Ixobrychus dubius*		NT	L	EN	1976	1
Australasian Bittern	*Botaurus poiciloptilus*		VU	L	EN	1949	1
Cape Barren Goose	*Cereopsis novaehollandiae*	Mi,M			NT	1998	1
Magpie Goose	*Anseranas semipalmata*	Mi,M		N	VU	1999	4
Australian Wood Duck	*Chenonetta jubata*	Mi				2002	272
Black Swan	*Cygnus atratus*	Mi				2006	286
Australian Shelduck	*Tadorna tadornoides*	Mi				2000	8
Pacific Black Duck	*Anas superciliosa*	Mi				2006	700
Chestnut Teal	*Anas castanea*	Mi				2006	276
Grey Teal	*Anas gracilis*	Mi				2006	97
Australasian Shoveler	*Anas rhynchotis*	Mi			VU	1994	5
Pink-eared Duck	*Malacorhynchus membranaceus*	Mi				2000	11
Hardhead	*Aythya australis*	Mi			VU	2003	92
Blue-billed Duck	*Oxyura australis*	Mi		L	EN	2000	3
Musk Duck	*Biziura lobata*	Mi,M			VU	2005	32
Spotted Harrier	*Circus assimilis*	Mi			NT	1983	1
Swamp Harrier	*Circus approximans*	Mi,M				2000	5
Grey Goshawk	*Accipiter novaehollandiae*	Mi		N	VU	2006	6
Brown Goshawk	*Accipiter fasciatus*	Mi,M				2005	96

Collared Sparrowhawk	*Accipiter cirrhocephalus*	Mi				2006	23
Wedge-tailed Eagle	*Aquila audax*	Mi				1995	6
Little Eagle	*Hieraaetus morphnoides*	Mi				2003	16
Whistling Kite	*Haliastur sphenurus*	Mi,M				2006	13
Black-shouldered Kite	*Elanus axillaris*	Mi				2006	71
Australian Hobby	*Falco longipennis*	Mi				2006	165
Peregrine Falcon	*Falco peregrinus*	Mi				2006	37
Black Falcon	*Falco subniger*	Mi			VU	1987	5
Brown Falcon	*Falco berigora*	Mi				2001	25
Nankeen Kestrel	*Falco cenchroides*	Mi,M				2006	66
Southern Boobook	*Ninox boobook*	M				2005	28
Barking Owl	*Ninox connivens*		NT	L	EN	2001	3
Powerful Owl	*Ninox strenua*			L	VU	2006	17
Barn Owl	*Tyto alba*					2001	10
Rainbow Lorikeet	*Trichoglossus haematodus*					2006	616
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*					2000	9
Musk Lorikeet	*Glossopsitta concinna*					2006	143
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*					2005	11
Little Lorikeet	*Glossopsitta pusilla*					2005	42
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*					2006	88
Gang-gang Cockatoo	*Callocephalon fimbriatum*					2001	29
Sulphur-crested Cockatoo	*Cacatua galerita*					2006	252
Little Corella	*Cacatua sanguinea*					1999	2
Long-billed Corella	*Cacatua tenuirostris*					2000	10
Galah	*Eolophus roseicapilla*					2006	173
Cockatiel	*Nymphicus hollandicus*					2005	5
Australian King-Parrot	*Alisterus scapularis*					2006	6
Crimson Rosella	*Platycercus elegans elegans*					2001	61
Eastern Rosella	*Platycercus eximius*					2005	314
Red-rumped Parrot	*Psephotus haematonotus*					2006	326
Turquoise Parrot	*Neophema pulchella*		NT	L	NT	2000	1
Blue-winged Parrot	*Neophema chrysostoma*	M				1991	3
Swift Parrot	*Lathamus discolor*	EN,M	EN	L	EN	2005	22
Budgerigar	*Melopsittacus undulatus*					1985	2
Tawny Frogmouth	*Podargus strigoides*					2004	142
Australian Owlet-nightjar	*Aegotheles cristatus*					1988	1
Dollarbird	*Eurystomus orientalis*	M				1988	1
Azure Kingfisher	*Ceyx azurea*				NT	2006	25
Laughing Kookaburra	*Dacelo novaeguineae*					2005	223
Red-backed	*Todiramphus*				NT	1991	2

Kingfisher	*pyrrhopygia*						
Sacred Kingfisher	*Todiramphus sanctus*	M				2005	101
White-throated Needletail	*Hirundapus caudacutus*	Mi,M				2007	19
Fork-tailed Swift	*Apus pacificus*	Mi,M				1994	7
Pallid Cuckoo	*Cuculus pallidus*	M				2000	28
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	M				2002	38
Brush Cuckoo	*Cacomantis variolosus*	M				2000	2
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*	M				2006	24
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*	M				2001	17
Australian Koel	*Eudynamys cyanocephala*	M				2000	5
Welcome Swallow	*Hirundo neoxena*	M				2006	576
Tree Martin	*Hirundo nigricans*	M				2005	16
Fairy Martin	*Hirundo ariel*					2002	10
Grey Fantail	*Rhipidura albiscapa*					2006	220
Rufous Fantail	*Rhipidura rufifrons*	M				2001	18
Willie Wagtail	*Rhipidura leucophrys*					2006	719
Leaden Flycatcher	*Myiagra rubecula*					1998	4
Satin Flycatcher	*Myiagra cyanoleuca*	M				1992	5
Restless Flycatcher	*Myiagra inquieta*					2000	8
Jacky Winter	*Microeca fascinans*					1979	1
Scarlet Robin	*Petroica boodang*					2001	12
Red-capped Robin	*Petroica goodenovii*					1982	1
Flame Robin	*Petroica phoenicea*	M				2001	45
Pink Robin	*Petroica rodinogaster*	M				2000	4
Rose Robin	*Petroica rosea*					1999	4
Eastern Yellow Robin	*Eopsaltria australis*					2006	58
Golden Whistler	*Pachycephala pectoralis*					2004	53
Rufous Whistler	*Pachycephala rufiventris*					2006	20
Olive Whistler (Eastern Victoria)	*Pachycephala olivacea olivacea*					1999	1
Olive Whistler (Central-South Victoria)	*Pachycephala olivacea bathychroa*					1999	1
Grey Shrike-thrush	*Colluricincla harmonica*					2005	87
Magpie-lark	*Grallina cyanoleuca*	M				2006	825
Crested Shrike-tit	*Falcunculus frontatus*					2002	65
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	M				2006	187
White-winged Triller	*Lalage tricolor*					1991	10
White-fronted Chat	*Epthianura albifrons*					2003	38
White-throated Gerygone	*Gerygone olivacea*					1979	1
Western Gerygone	*Gerygone fusca*					2002	1
Striated Thornbill	*Acanthiza lineata*					2005	17
Yellow Thornbill	*Acanthiza nana*					2005	21

Brown Thornbill	*Acanthiza pusilla*					2005	257
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*					2003	81
White-browed Scrubwren	*Sericornis frontalis*					2006	334
Brown Songlark	*Cincloramphus cruralis*	Mi				1982	2
Rufous Songlark	*Cincloramphus mathewsi*	Mi				2003	10
Little Grassbird	*Megalurus gramineus*	Mi				2001	28
Australian Reed-Warbler	*Acrocephalus australis*	Mi				2001	65
Golden-headed Cisticola	*Cisticola exilis*					2001	67
Superb Fairy-wren	*Malurus cyaneus*					2006	273
Masked Woodswallow	*Artamus personatus*					1982	2
White-browed Woodswallow	*Artamus superciliosus*					1982	8
Dusky Woodswallow	*Artamus cyanopterus*					2002	53
Varied Sittella	*Daphoenositta chrysoptera*					1991	1
Brown Treecreeper	*Climacteris picumnus victoriae*		NT		NT	1904	1
White-throated Treecreeper	*Cormobates leucophaeus*					1976	1
Mistletoebird	*Dicaeum hirundinaceum*					2005	65
Spotted Pardalote	*Pardalotus punctatus punctatus*					2005	165
Silvereye	*Zosterops lateralis*	M				2005	295
White-naped Honeyeater	*Melithreptus lunatus*					2001	23
Brown-headed Honeyeater	*Melithreptus brevirostris*					1987	1
Eastern Spinebill	*Acanthorhynchus tenuirostris*					2005	164
Tawny-crowned Honeyeater	*Phylidonyris melanops*					1983	2
Regent Honeyeater	*Xanthomyza phrygia*	EN,Mi	EN	L	CE	1993	13
Fuscous Honeyeater	*Lichenostomus fuscus*					1983	2
Yellow-faced Honeyeater	*Lichenostomus chrysops*					2005	6
White-eared Honeyeater	*Lichenostomus leucotis*					1999	2
Yellow-tufted Honeyeater	*Lichenostomus melanops*					1983	2
Yellow-plumed Honeyeater	*Lichenostomus ornatus*					2005	2
White-plumed Honeyeater	*Lichenostomus penicillatus*					2006	785
New Holland Honeyeater	*Phylidonyris novaehollandiae*					2006	74
Bell Miner	*Manorina melanophrys*					2006	231
Noisy Miner	*Manorina melanocephala*					2005	238
Little Wattlebird	*Anthochaera chrysoptera*					2006	387

Red Wattlebird	*Anthochaera carunculata*					2006	898
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*					2000	12
Noisy Friarbird	*Philemon corniculatus*					2000	1
Little Friarbird	*Philemon citreogularis*					1989	2
Australian Pipit	*Anthus australis*	M				2001	25
Diamond Firetail	*Stagonopleura guttata*		NT	L	VU	1976	1
Red-browed Finch	*Neochmia temporalis*					2005	85
Olive-backed Oriole	*Oriolus sagittatus*					2003	38
White-winged Chough	*Corcorax melanorhamphos*					1999	1
Pied Currawong	*Strepera graculina*					2005	133
Grey Currawong	*Strepera versicolor*					2005	27
Grey Butcherbird	*Cracticus torquatus*					2005	290
Australian Magpie	*Gymnorhina tibicen*					2006	684
Bassian Thrush	*Zoothera lunulata*	Mi				1998	5
Red-vented Bulbul*	*Pycnonotus cafer*					1942	2
Australian Raven	*Corvus coronoides*					2001	45
Mallard*	*Anas platyrhynchos*	Mi				2005	77
Little Raven	*Corvus mellori*	M				2006	527
Rock Dove*	*Columba livia*					2006	548
Striated Pardalote	*Pardalotus striatus*					2001	27
Cattle Egret	*Ardea ibis*	Mi,M				2001	47
Spotted Turtle-Dove*	*Streptopelia chinensis*					2006	838
Red-whiskered Bulbul*	*Pycnonotus jocosus*					2006	8
Common Blackbird*	*Turdus merula*					2006	863
Song Thrush*	*Turdus philomelos*					2005	186
Skylark*	*Alauda arvensis*					2000	32
Eurasian Tree Sparrow*	*Passer montanus*					2005	104
House Sparrow*	*Passer domesticus*					2006	668
European Goldfinch*	*Carduelis carduelis*					2006	149
European Greenfinch*	*Carduelis chloris*					2005	109
Common Myna*	*Acridotheres tristis*					2006	971
Common Starling*	*Sturnus vulgaris*					2006	819
Mammals							
Platypus	*Ornithorhynchus anatinus*					2002	25
Short-beaked Echidna	*Tachyglossus aculeatus*					2006	14
Common Brushtail Possum	*Trichosurus vulpecula*					2006	433
Common Ringtail Possum	*Pseudocheirus peregrinus*					2006	363
Sugar Glider	*Petaurus breviceps*					1988	2
Feathertail Glider	*Acrobates pygmaeus*					1967	2
Common Wombat	*Vombatus ursinus*					1991	2
Swamp Wallaby	*Wallabia bicolor*					2006	8
Eastern Grey Kangaroo	*Macropus giganteus*					2001	2
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	VU	L	VU	2006	1094

Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*					1990	2
White-striped Freetail-bat	*Tadarida australis*					2006	46
Lesser Long-eared Bat	*Nyctophilus geoffroyi*					1991	7
Gould's Wattled Bat	*Chalinolobus gouldii*					2005	163
Chocolate Wattled Bat	*Chalinolobus morio*					2006	4
Southern Myotis	*Myotis macropus*		NT		NT	1993	1
Little Forest Bat	*Vespadelus vulturnus*					1991	8
Large Forest Bat	*Vespadelus darlingtoni*					1991	2
Black Rat*	*Rattus rattus*					2006	41
Brown Rat*	*Rattus norvegicus*					2005	22
House Mouse*	*Mus musculus*					2005	32
Water-rat	*Hydromys chrysogaster*					2006	57
Rabbit*	*Oryctolagus cuniculus*					2001	44
Fox*	*Vulpes vulpes*					2006	66
Cat*	*Felis catus*					2006	28
Dog*	*Canis lupus familiaris*					2004	3
Reptiles							
Eastern Snake-necked Turtle	*Chelodina longicollis*					2005	12
Marbled Gecko	*Christinus marmoratus*					2005	35
Striped Legless Lizard	*Delma impar*	VU	VU	L	EN	1975	3
Jacky Lizard	*Amphibolurus muricatus*					1988	3
Robust Ctenotus	*Ctenotus robustus*					2000	2
Cunningham's Skink	*Egernia cunninghami*					2000	4
White's Skink	*Egernia whitii*					1994	14
Highlands Forest-skink	*Nannoscincus maccoyi*					1976	1
Dark-flecked Garden Sunskink	*Lampropholis delicata*					1983	4
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*					2006	35
Weasel Skink	*Saproscincus mustelinus*					2005	30
South-eastern Slider	*Lerista bougainvillii*					1991	5
Blotched Blue-tongued Lizard	*Tiliqua nigrolutea*					1994	3
Eastern Blue-tongued Lizard	*Tiliqua scincoides*					2005	24
Eastern Tiger Snake	*Notechis scutatus*					2005	42
Bold-striped Cool-skink	*Acritoscincus duperreyi*					1994	9
Swampland Cool-skink	*Pseudemoia rawlinsoni*		RIK		NT	1991	2
Red-bellied Black Snake	*Pseudechis porphyriacus*					1997	2
Eastern Brown Snake	*Pseudonaja textilis*					1986	6
Southern Water-skink	*Eulamprus tympanum tympanum*					2005	10
Striped Tussock Skink	*Pseudomoia pagenstcheri*					2005	1
Frogs							
Eastern Smooth Frog	*Geocrinia victoriana*					2000	41

Eastern Banjo Frog	*Limnodynastes dumerilii*					2005	40
Brown-striped Frog	*Limnodynastes peronii*					1994	69
Spotted Grass Frog	*Limnodynastes tasmaniensis*					2000	78
Sudell's Frog	*Neobatrachus sudelli*					1968	12
Brown Toadlet	*Pseudophryne bibronii*		IK		EN	2005	5
Southern Toadlet	*Pseudophryne semimarmorata*				VU	1991	11
Common Eastern Froglet	*Crinia signifera*					2005	222
Brown Tree Frog	*Litoria ewingii*					2004	319
Leseur's Frog	*Litoria lesueuri*					1967	1
Victorian Frog	*Litoria paraewingi*					1972	2
Peron's Tree Frog	*Litoria peronii*					1994	5
Growling Grass Frog	*Litoria raniformis*	VU	VU	L	EN	1996	61
Verreaux's Tree Frog	*Litoria verreauxii verreauxii*					1970	4
Fish							
Short-headed Lamprey	*Mordacia mordax*					1996	32
Pouched Lamprey	*Geotria australis*					1994	6
Short-finned Eel	*Anguilla australis*					2002	84
Rainbow Trout*	*Onchorhynchus mykiss*					1996	2
Quinnat Salmon*	*Onchorhynchus tshawytscha*					1982	2
Brown Trout*	*Salmo trutta*					1999	16
Australian Smelt	*Retropinna semoni*					2000	16
Australian Grayling	*Prototroctes maraena*	VU	VU	L	VU	1993	43
Climbing Galaxias	*Galaxias brevipinnis*					2000	34
Common Jollytail	*Galaxias maculatus*					2002	72
Spotted Galaxias	*Galaxias truttaceus*					1996	25
Goldfish*	*Carassius auratus*					1999	32
European Carp*	*Cyprinus carpio*					1995	33
Roach*	*Rutilus rutilus*					2000	68
Freshwater Catfish	*Tandanus tandanus*			L	EN	2000	1
Fly-specked Hardyhead	*Craterocephalus stercusmuscarum fulvus*			L	DD	2000	2
Murray Cod	*Macullochella peelii*	VU		L	EN	2000	5
Golden Perch	*Macquaria ambigua*			I	VU	1993	4
Macquarie Perch	*Macquaria australasica*	EN	PK	L	EN	1993	40
Australian Bass	*Macquaria novemaculeata*					1991	4
Yarra Pygmy Perch	*Nannoperca obscura*	VU	VU	L	NT		1
Redfin Perch*	*Perca fluviatilis*					2000	15
River Blackfish	*Gadopsis marmoratus*					1970	5
Sea Mullet*	*Mugil cephalus*					1991	1
Tamar River Goby	*Afurcagobius tamarensis*					2000	2
Swan River Goby	*Pseudogobius olorum*					2000	5
Flathead Gudgeon	*Philypnodon grandiceps*					2002	15

Appendix 5 Legislation, Policy and guidelines relevant to the Urban Wildlife Management Plan under a National, State, Regional and local context.

Legislation or policy	Scope	When it applies	Relevance to the City of Yarra
Federal			
Environment Protection and Biodiversity Conservation Act 1999	Pertains to matters of national environmental significance including Ramsar Wetlands, listed threatened species and Ecological communities, listed migratory species and Commonwealth Marine Areas. The proponent is obliged to refer matters to the Commonwealth Environment Minister if such values may be affected by a proposed action. The Department of the Environment, Water, Heritage and the Arts decides whether there will be a significant impact and if it needs to be a 'controlled action'. The commonwealth can intervene to modify or block an action if it deems this necessary for the protection of a species or community of national significance.	Public and Private land. A referral is necessary whenever a proposed action is considered likely to impact on a species or ecological community listed in the Act. Protection of terrestrial and in-stream fauna habitat (Sections 5.1.1 and 5.1.2)	Nine EPBC-listed fauna species have been recorded recently (last 20 years) on the AVW database within 10 km of the study area. One of these species, Grey-headed Flying-Fox (listed as Vulnerable under the EPBC Act) has a large permanent camp situated within Yarra Bend Park. This area provides important roosting and foraging habitat for this species. Indigenous and exotic street and garden trees within the City of Yarra also provide foraging habitat for this species. Any action that may impact on the Grey-Headed Flying Fox must be referred to the Commonwealth Environment Minister. The Yarra River may also provides potential habitat for the EPBC-listed Australian Grayling, Yarra Pygmy Perch and Murray Cod.
National Strategy for the Conservation of Australia's Biological Diversity	Maintenance of flora and fauna communities and ecological processes	Private and public land. Protection of terrestrial and in-stream fauna habitat (Sections 5.1.1 and 5.1.2)	The City of Yarra has the responsibility to protect biological diversity and promote ecologically sustainable development.
Threat Abatement Plan for the predation by the European Red Fox (DEWHA 2008a)	Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities.	Private and public land. Protection of terrestrial habitats through the control of feral animals that predate on native fauna (Section 5.1.8)	Foxes are known to predate on a variety of native and exotic fauna species in the study area. The current control program for this species is coordinated with both Parks Victoria and the City of Boroondara.
Threat Abatement Plan for the predation by feral cats (DEWHA 2008b)	Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities.	Private and public land. Protection of terrestrial habitats through the control of feral animals that predate on native fauna (Section 5.1.8)	It is unknown if predation by feral cats is an issue for native wildlife in the City of Yarra. No control is currently undertaken.
Threat Abatement Plan for competition and land degradation by European rabbits (DEWHA 2008c)	Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities.	Private and public land.	Rabbit abundance within the City of Yarra is low. No rabbits are present within the Yarra Bend Park. Occasional incursions occur from an isolated population outside of the study area. Parks Victoria is actively involved in monitoring for the presence of this species within their land.
State			

Legislation or policy	Scope	When it applies	Relevance to the City of Yarra
Flora and Fauna Guarantee Act 1988	The FFG Act lists species and ecological communities recognised as rare or threatened in Victoria. Under the Act, there are also provisions for listing of threatening processes and Protected Flora. Protected Flora include those species listed as threatened under the Act, plant species that belong to listed communities and plant species that are not threatened, but require protection for other reasons (e.g. from over-collection - orchids). The full extent of the FFG Act only applies to Public land, but the intent of the Act also applies to other land tenures through the Action Statements, Victoria's Biodiversity Policy, and through the planning scheme referral process. This is the State's primary legislation for flora and fauna.	Public land (may have implications for private to the extent planning authorities enforce).	Twelve FFG-listed fauna species have been recorded on the AVW within 10 km of the study area. Two of these species are considered to have a moderate likelihood of occurrence within the study area. These are: Great Egret that may occur along the water margins, muddy banks and emergent/fringing vegetation of the Yarra River; and the Powerful Owl that may occasionally forage within the riparian and other remnant vegetation along the Yarra River, particularly Yarra Bend Park. Fifteen potential threatening processes listed under the FFG Act are relevant to fauna and their habitats in the study area: • Alteration to the natural flow regimes of rivers and streams. • Alteration to the natural temperature regimes of rivers and streams. • Degradation of native riparian vegetation along Victorian rivers and streams. • Increased sediment input into Victorian rivers and streams due to human activities. • Input of toxic substances into Victorian rivers and streams. • Introduction of live fish into waters outside their natural range within a Victorian river catchment after 1770. • Habitat fragmentation as a threatening process for fauna in Victoria • Invasion of native vegetation by Blackberry *Rubus fruticosus L.* agg • Invasion of native vegetation by environmental weeds • Loss of large woody debris from Victorian native forests and woodland. • Loss of hollow bearing trees from Victorian native forests. • Predation of native wildlife by the introduced Red Fox *Vulpes vulpes* • Predation of native wildlife by the cat, *Felix catus* • Prevention of the passage of aquatic biota as a result of the presence of in-stream structures • Removal of woody debris from Victorian Streams
Wildlife Act 1975	Lists protected fauna species.	Public and private	Some proposed uses and management of protected fauna must be licensed under the Act. A permit is required from DSE under the Act to 'take' protected wildlife such as possums.
Catchment and Land Protection Act 1994 (CaLP Act) (amended 2003)	Provides a legislative framework for the management of land including the control of declared noxious weeds and pest animals. The 2007 amendments include a revised list of noxious weeds and increased maximum penalties for poor land management.	Private and public land. If pest plants or animals are detected (or other poor land management practices identified) land managers are given notice and fined if no action is taken.	Noxious weeds that are declared under the Act and found within the area will require control. If land managers are given notice and no action is undertaken, a fine may be issued. Pest animal control must also be undertaken by the relevant land manager.

Legislation or policy	Scope	When it applies	Relevance to the City of Yarra
Victoria's Native Vegetation Framework	Is a policy for the protection, enhancement and revegetation of native vegetation in Victoria. The Framework is based on the principle of 'Net Gain'. Net Gain is the outcome for native vegetation and habitat where individual losses are avoided where possible. The losses and gains are determined by a combined quality-quantity measure over a specified area and period of time.	Private and public land.	Proposed developments which include losses of native vegetation or indigenous trees, are subject to a 'Net Gain' assessment. Three steps need to be addressed in order to fulfil the requirements of Net Gain: • avoid adverse impacts; • If impacts cannot be avoided, minimise impacts through appropriate consideration in planning; & • Identify appropriate offset options.
Planning and Environment Act 1987 (Amended 2003)	Sets out objectives for planning in Victoria. One of these objectives is 'to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity'. This Act established Native Vegetation retention controls (c. 52.17): these require a planning permit to remove, destroy or lop native vegetation (subject to certain exemptions).	Private or public land of greater than 0.4 ha. The 0.4 ha threshold does not necessarily apply if the land is affected by a planning overlay (e.g. ESO, SLO). DSE is a mandatory referral authority for applications to remove: • more than 15 trees < 40 cm DBH (diameter at breast eight; • more than 5 trees > .40 cm DBH; • more than 0.5 ha of an Endangered, Vulnerable or Rare EVC; • more than 1.0 ha of a Depleted or Least Concern EVC.	Is implemented through the City of Yarra with permits required to remove native vegetation.
Environment Protection Act 1970 (Amended 2006)	The *Environment Protection Act 1970* established the powers, duties and functions of the EPA. The key aims of the Act include the sustainable use and holistic management of the environment and encouraging a co-operative approach to environment protection.		The stormwater and run-off needs to be managed to protect the waterways and native vegetation.
State Environmental Protection Policy (Waters of Victoria) 1999	State Environmental Protection Policy (Waters of Victoria) 1999 sits under the *Environment Protection Act 1970*. The State Environment Protection Policies (SEPPs). SEPPs are important as they provide goals and blueprints to protect the environment for the community both now and into the future. The SEPP Waters of Victoria details the uses and values of our water environments (beneficial uses), sets measurements and indicators so we know how well they are being protected (environmental quality objectives) and outlines what needs to be done to protect them (attainment program).	Private and public land.	The stormwater and run-off needs to be managed to protect the waterways and native vegetation.
Victorian Water Act (1989)	The Victorian Water Act (1989) was designed to enable integrated management of surface water and groundwater and to eliminate inconsistencies in the treatment of surface water and groundwater resources and waterways. The mechanism to achieve this is through the development of water management plans and licensing provisions.	Private and public land.	The stormwater and run-off needs to be managed to protect the waterways and native vegetation.

Legislation or policy	Scope	When it applies	Relevance to the City of Yarra
Domestic (Feral and Nuisance) Animal Act 1994.	The purpose of this Act is to promote animal welfare, the responsible ownership of dogs and cats and the protection of the environment by feral and nuisance dogs and cats.	Private and public land.	Uncontrolled domestic dogs and cats and feral foxes may directly and indirectly impact on environmental values within the City of Yarra.
Victoria's Biodiversity Strategy 2002	The Biodiversity Strategy complements the FFG Act and details actions to ensure biodiversity is managed in a manner that is ecologically sound and sustainable, preventing further loss of habitat and ensuring a better management of existing habitats. The Strategy encourages Victorian organisations and individuals, in this case the City of Yarra, to better understand and appreciate the State's diverse flora and fauna and ecosystems, and to take an active part in the their conservation and management for future generations.	All remnant vegetation/fauna habitat and their associated fauna populations on private and public land	The identification of threatened species in the study area requires the land manager to ensure that any new developments and activities are consistent with the Strategy and will not seek to harm threatened species.
Healthy Rivers, Healthy Communities and Regional Growth - Victorian River Health Strategy	The Victorian River Health Strategy outlines the Government's long-term policy for managing Victoria's rivers. It includes a vision for Victorian river management, policy direction on river health issues and a blueprint to integrate all work on Victorian rivers to gain the best river health outcomes.	River and creeks in the study area	All land managers along the Yarra River and Merri and Darebin Creeks have the responsibility to protect the systems and use water sustainably.
The White Paper	The White paper water policy follows on from the Green Paper: Securing Our Water Future, the Government's White Paper on water reform. Our Water Our Future is an integrated water strategy outlining over 100 actions for water around Victoria. The White Paper focuses on rivers and groundwater systems, water conservation and re-use, water use on farms, water allocation and water trading. It looks at water from environmental, recreation, tourism, household, agricultural and industry perspectives and includes issues surrounding pricing, population and climate change. Our Water Our Future sets the scene for water across Victoria for the next 50 years	Waterways and water catchments in the study area and surrounds.	City of Yarra has the responsibility to promote, encourage and use water sustainably.
The Urban Stormwater Best Practice Environmental Management Guidelines (BPEMG) (CSIRO 1999)	The Best Practice Guidelines are used to assist urban catchment managers protect storm water quality and urban run-off into waterways. It includes environmental performance objectives, tools, best practices and examples of storm water management plans.	The entire area within the City of Yarra	The stormwater and run-off needs to be managed to protect the waterways and native vegetation.
Regional			
Port Phillip and Westernport Regional Catchment Management Strategy (2004)	Identifies management issues and priorities in catchments relating to water quality, maintenance of biodiversity, resource use and social issues		

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Port Phillip & Western Port Native Vegetation Plan 2006	This plan: (i) sets out a coordinated and strategic approach to managing the region's native vegetation consistent with the Native Vegetation Management Framework; (ii) establishes regional priorities and targets for retaining, protecting, enhancing and restoring native vegetation; (iii) provides direction to authorities who consider permit applications to clear native vegetation; (iv) guides investments in native vegetation planning and management; and (v) provides detailed information about the region's native vegetation.	This plan is a key action of the Port Phillip & Westernport Catchment Strategy, Victorian Planning Provisions and Victorian Native Vegetation Management Framework.	This vegetation plan supports the Net Gain policy and provides offset requirements, particularly for scattered native trees (small – large).
Local			
Local Planning Policy	Contains the Municipal Strategic Statement (MSS) and Local Planning Policies. MSS encapsulates significant planning directions for the municipality and in turn provides the strategic basis for the application of the zones, overlays and particular provisions in the planning scheme.	Public and private land. A planning scheme is binding on all people and corporations on every Minister, government department, public authority and municipal council.	Permits are likely to be required to remove native vegetation.
Yarra Environment Strategy	Sets out the councils core principles of sustainability and protection of the environment. The Yarra Environment Strategy: Towards Local Sustainability has been developed to guide Council to work with the community towards environmental sustainability. The plan is set out in four parts: the strategic context, detailing the environmental values, key trends and issues and councils capacity to meet future challenges; the collective vision and strategic directions that outlines the direction of actions and decisions; the action plan that defines the roles, programs and resource priorities to deliver the strategy; and the monitoring and review process	Public and private land.	This plan replaces the Yarra Environment Strategy adopted by Council in late 2000. It provides the guide for development and environmental improvements and programs in the City of Yarra.
Yarra Open Space Strategy (Thompson Berrill Landscape Design 2006).	The strategy guides the future provision, planning, design and management of public land reserved for recreation and nature conservation purposes - the parks, gardens and other reserves that make up Yarra's open space network. It provides a comprehensive review of the current public open space network and a strategic basis for Council's future open space program.	All public open space	City of Yarra and other relevant land managers and stakeholders have the responsibility to implement management actions, encourage responsible use of and protection of the environment in public open space
City of Yarra – People and their pets: Domestic Animal Management Strategy.	The strategy aims to guide Council and the community toward the goal of responsible pet ownership and management. The plan aims to ensure that animal welfare is prioritised and that conflicts between people and pets in public open spaces are minimised through effective community awareness and enforcement of suitable community laws.	The strategy applies to both private and public land in the City of Yarra where animals are kept, except where animals are kept for business or commercial purposes where town planing approval is required from Council.	Domestic pets may impact on fauna habitat within the study area through direct predation and indirect disturbance (See Section 5.1.10).
Merri Creek and Environs Strategy 2009 - 2014	This strategy provides the overarching goals for the Merri Creek catchment and the vision and objectives for the waterway corridor. The roles and responsibilities of agencies and stakeholders along the corridor are provided.	Merri Creek and riparian corridor in the study area.	The lower reach of Merri Creek and it's confluence with the Yarra River is situated within the study area. The plan provides direction for protection and enhancement of the creek and its environs (See Sections 5.1.1 and 5.1.2).

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Yarra Bend Park – Environmental Action Plan (Parks Victoria 2000)	Parks Victoria have developed the Environmental Management System to: support ecological management decision making; establish standardised reporting on ecological management performance; and develop targeted research, monitoring and reporting on the trend in ecological condition and health. The plan provides a guide to set priorities for resource allocation for environmental management and forms the basis for reporting on Parks Victoria environmental management performance in the Yarra Bend Park.	Yarra Bend Park	Yarra Bend Park provides the most important area for fauna habitat in the City of Yarra .
City of Yarra – Water Action Plan	The plan establishes broad management principles, objectives and targets to guide the implementation of sustainable water management. An action plan is presented to implement projects that will achieve City of Yarra's targets and allow continuous improvement and adaptive management approach to water within Council and community activities.	All residents, workers, visitors and commercial operators in the City of Yarra.	The Council has the responsibility to promote and encourage sustainable use of water.
City of Yarra – Water Sensitive Urban Design Guidelines	The strategy describes councils approach to water management and outlines the actions required in Council and the Yarra community to progress towards sustainability in our water management practices. The guidelines also give direction and practical water management options on how to achieve the sustainable water objectives as outlined in the plan.	All residents, workers, visitors and commercial operators in the City of Yarra.	The Council has the responsibility to promote, encourage and implement actions for sustainable use of water.
Draft Public Lighting Policy	The policy is to address public lighting across the City of Yarra, where public lighting is defined as lighting in a public place with unrestricted public access	Public lighting includes street lighting, lighting in open space (namely parks and gardens, car parks and bike paths) and feature lighting in commercial and industrial areas	Public lighting may impact on fauna habitat through potential disturbance of nocturnal fauna species (See Section 5.1.5)
Flying-Fox Campsite Management Plan – Yarra Bend Park	The plan aims to provide a clear framework for managing Melbourne's flying-fox colony at Yarra Bend Park and creating a sustainable campsite. It includes background information on Grey-headed Flying Fox in Victoria and explains the basis for consolidating the colony at Yarra Bend Park. The plan provides a five-year action program with details of the management actions proposed to protect and manage the colony, enhance and promote Yarra Bend Park, minimise impacts of the colony on park users, local residents and the wider community and increase community appreciation and understanding of flying-fox management issues.	Applies principally to the management of the flying-fox campsite on public land in Yarra Bend Park. Flying-foxes will forage in a variety of areas within the urban and semi-urban areas of greater Melbourne.	The Grey-headed Flying-Fox is listed as Vulnerable under the EPBC Act and threatened under the FFG Act. Parks Victoria, DSE and other relevant stakeholders must contribute to the protection and management of this species within the City of Yarra and surrounds.