

Biodiversity in Glen Eira

Prepared for Glen Eira City Council
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– Graeme Lorimer

Executive Summary

In support of Glen Eira City Council's *Environmental Sustainability Strategy 2016-2021*, this report aims to provide a clear, contemporary understanding of what constitutes Glen Eira's biodiversity, where biodiversity is concentrated, what threatens it and what sustains it. It is focused on the natural world and hence on wild flora and fauna, particularly indigenous species. For practical reasons and because of lack of prior data, the report deals only fleetingly with invertebrates, fungi, algae, lichens and microbes.

Past information about Glen Eira's biodiversity has been very incomplete and often misleading. This study uncovered numerous wild, indigenous plant species that were not previously known to exist in the municipality. It also provided the first documented records of indigenous frogs, fish and lizards in Glen Eira for over a century.

None of Glen Eira's habitat at the time of European colonisation has survived without major modification. Nevertheless, some small patches remain with remnants of the pre-colonisation flora and a few artificial lakes have become occupied by some of Glen Eira's original wetland flora and fauna. Some birds, possums and insects have adapted to the urban environment.

The most important 'biodiversity hotspots' in Glen Eira are identified in Chapter 7 as:

- The Moorabbin Reservoir property (675 Warrigal Rd, Bentleigh East), which has a substantially greater diversity of wild, indigenous flora, and in a more resilient state, than anywhere else in Glen Eira, including twelve plant species not found elsewhere in this study;
- Yarra Yarra Golf Course, where substantially more bird species have been observed in recent years than anywhere else in Glen Eira. The course's botanical significance could not be adequately checked due to lack of permission to enter the property;
- The railway cutting and adjacent road verges in Elsternwick, where there is remnant vegetation, many locally rare plant species, healthy revegetation, lizards and an apparently functional wildlife corridor;
- Rippon Lea Estate, whose lake and its surroundings support seven locally rare plant species, a number of locally rare birds and the amazing migratory species, Shortfin Eel;
- Caulfield Racecourse Reserve, and particularly its two lakes, which support many locally rare birds and plants;
- Boyd Park in Murrumbeena, and particularly the fenced and gated sanctuary at its southern end, for the presence of some large, old River Red Gums, some locally rare plants (including what may be Glen Eira's last remaining wild orchids) and some bushy understorey that suits small insect-eating birds (apart from the discouraging presence of dogs off-lead);
- Caulfield Park, principally for the waterbirds attracted to the lake; and
- Stands of River Red Gums at the Carnegie and Murrumbeena train stations.

Chapter 8 identifies some sites of somewhat lesser significance for biodiversity.

Nature strips and private gardens can also be important for biodiversity, particularly for birds and insects, as long as they meet certain habitat requirements. Trees are particularly important but are declining in numbers due to urban redevelopment. Retention, care and planting of trees, particularly of indigenous or Australian native species, is becoming increasingly important. Indigenous shrubs in gardens can also play a very important role in conserving indigenous birds and insects.

The report concludes with some advice about planting and gathering further wildlife information.

1. Introduction

Glen Eira City Council's *'Environmental Sustainability Strategy 2016-2021'* includes an aspirational goal of 'Natural heritage integrated within the City in a way that supports the region's flora and fauna, supports liveability and also recognises this City as an urban area'. In pursuit of this goal, one of its priorities is to 'Protect biodiversity and environmental heritage on Council-managed land and advocate for protection by others'.

To help achieve these goals, this report aims to provide a clear, contemporary understanding of what constitutes Glen Eira's biodiversity, where biodiversity is concentrated, what threatens it and what sustains it.

Firstly, we need to establish what aspects of biodiversity and natural heritage to focus on. In the broadest sense, Glen Eira's biodiversity could be taken to include the diversity of all kinds of organisms, from viruses to insects to majestic trees. For practical reasons, little information is available about Glen Eira's microbes, invertebrates and non-vascular flora such as fungi. Therefore, this report contains little information about these 'lower' organisms, but we should still recognise that they are critically important to higher organisms, including humans.

Consistent with the Environmental Sustainability Strategy's focus on nature and environmental heritage, this report primarily focuses on wild organisms, particularly those which are indigenous or that improve or detract from the habitat for indigenous species. (By 'indigenous', we mean organisms whose lineage in Glen Eira pre-dates European colonisation.) Domesticated animals and cultivated plants are addressed only where they affect indigenous species, e.g. by providing habitat for wildlife. It is nevertheless recognised that domesticated animals and gardens provide considerable benefits to the Glen Eira community.

Because of the focus on wild, and particularly indigenous, species, most of the fieldwork for this report was done in areas that were known or suspected to support such species. The detected hotspots for indigenous flora and fauna are individually described in detail in Chapter 7, and lesser sites in Chapter 8. In addition, the author scouted around for flora, fauna and habitats while driving or walking throughout the municipality, often with the car window down to listen for bird calls. Examples of the things detected in this way include tiny patches of indigenous mosses and groundcovers in some nature strips, and a Black-faced Cuckoo-shrike hunting in highly urbanised Bentleigh. Such detections helped to build a general understanding of the distribution of flora and fauna in Glen Eira, e.g. which species are widely distributed throughout and which ones are confined to one or two specific locations. 'Citizen science' data assisted this process.

Biodiversity includes not just the diversity of species, but also the genetic diversity within each species and the diversity of ecosystems that the species form.

This report addresses infraspecific genetic diversity in Glen Eira by noting any outwardly visible distinctiveness or variability of local organisms compared with the species' full range of characters.

The diversity of ecosystem types in Glen Eira is complicated by the current lack of natural ecosystems. There are a few semi-natural areas where some of the pre-colonisation interactions between species persist. These sites are among the biodiversity hotspots described in Chapter 7. The rest of the municipality is covered with artificial environments such as buildings and gardens where the interrelationships between species are governed or strongly mediated by continual human activity. This report deals with ecosystems by:

- Summarising the diversity of natural ecosystems that occurred in Glen Eira at the time of European colonisation (Chapter 4);
- Documenting and mapping what remains of those natural ecosystems or has been recreated;

- Suggesting measures that will help conserve and restore as much as possible of the indigenous ecosystems; and
- Explaining the role of artificial environments and the Glen Eira community in conserving indigenous flora or fauna (Chapter 9).

2. The Importance of Nature and Biodiversity

Nature, of which biodiversity is part, is critically important to humanity and the other 8.7 million species on Earth. An understanding of that importance has been an important guide to how the present study has been conducted.

Table 1 provides a classification of the important attributes of nature in Glen Eira.

Table 1. Categories of nature's importance.

Category of Nature's Importance	Examples
1. Practical 'ecosystem services'	The role of trees in purifying air and providing shade and wind protection; Stormwater purification by organisms in wetlands.
2. (a) Fulfilment of humanity's innate desire to engage with nature and feel its inspiration, comfort and restorative powers; and (b) Consequent benefits to human health, wellbeing and quality of life	The attraction of flowers and waterfalls; The popularity of gardens, zoos and 'green & leafy' neighbourhoods; Natural retreats for restoring one's soul and energy; Greater productivity and faster recovery from illness when people have contact with plants and animals; The use of natural themes and inspiration in the arts and architecture.
3. Natural heritage – nature's contribution to sense of place and our concepts of who we are, how we fit into history and nature's grand design, and what we should pass on to future generations	Pre-colonisation trees that are conserved to provide a connection with the past; The Aboriginal concept of 'caring for country'.
4. Altruistic recognition that humanity should respect the existence of the other 8.7 million species on Earth and the ecosystems they form, independently of any practical benefit that humanity may derive from them	Campaigns to stop whaling; Governmental measures to save threatened species.

The more natural something is, the more it can embody the values above, and the less readily it can be replaced. This report therefore focuses more on wild flora and fauna than domesticated species such as cultivated plants and pets. It also focuses more on wild indigenous species than wild non-indigenous species because the former represent the essence of nature, in decline, whereas the latter are artifices of human activity, in no danger of disappearing.

Item 1 in Table 1 is not specifically covered in this report, nor the non-living aspects of nature, such as geology, hydrology and climate.

3. The Study Approach

3.1 Survey of Literature and Pre-existing Information

Apart from direct observations during the present study, the most reliable records of flora and fauna species that have occurred in Glen Eira over the past 150 years or so are specimens in museums and herbaria. Records of those specimens are mostly catalogued in the online 'Atlas of Living Australia', which was consulted for this study.

In addition to specimen records, both the Atlas of Living Australia and the state government's Victorian Biodiversity Atlas contain records of flora and fauna that are not backed up by specimens. These records were analysed for this study, as have data from the 'eBird' database (www.ebird.org) and BirdLife Australia's 'citizen science' projects such as 'Birds in Backyards'. Records without specimens or photographs to back them up (called 'unvouchered') usually cannot be given as much weight as specimen records because their reliability is often unknown or questionable, and sometimes clearly erroneous. Most of the unvouchered records for Glen Eira simply support the direct observations made during this study. The author sought to authenticate most of the remaining records by consulting the observer and/or seeking to observe the same species. Unreliable records were discounted.

Both vouchered and unvouchered records require careful interpretation. For example, the maps in the Atlas of Living Australia and the Victorian Biodiversity Atlas include a 1980 bird list, including Little Penguin and other seabirds, on Glen Eira's eastern boundary. On inspection, the location is described as 'Coatesville Reserve', which can be taken today to mean Mackie Rd Reserve, a short distance from the mapped location. However, the nearest plausible location for a penguin or the other seabirds on the list is 8 km away, outside Glen Eira. The list may genuinely include birds observed at Coatesville (Mackie Rd) Reserve but its coverage also clearly extends to Port Phillip Bay. It is therefore not helpful for this study. More generally, it is important to always take a discriminating approach to acceptance of lists of flora or fauna that appear specific to Glen Eira or any other specific area. Equally, it proved important to check records that have been mapped outside Glen Eira, some of which are actually from within the municipality.

One must also draw a distinction between birds that make use of habitat in Glen Eira and those which are just seen flying over on their way toward habitat beyond. For example, a White-bellied Sea-eagle has been seen flying over Glen Eira but it would not make any material use of habitat there.

A major proportion of indigenous plant species in Glen Eira have been planted. It is important to take into account that most database records of flora or fauna do not indicate whether the associated plants or animals were wild. Even in fieldwork, it is sometimes difficult to determine whether a plant of an indigenous species is wild, planted or a descendant from a planted plant.

This study took into account the Glen Eira Environment Group's brochures about the natural assets of Boyd Park and the Elster Creek corridor. The group's Mr Paul Caine also provided his observations of remnant plants, going back as far as 1992, at Boyd Park, Brighton Cemetery, Caulfield Racecourse, Glen Huntly Park and rail reserves. He also recalled the cessation of annual burning of rail reserves in about 1982–3.

Mr Lewis Hiller, who is a very experienced local bird observer, made a very valuable contribution to this study through the copious bird observations he has entered into the eBird database over recent years. He provided this study with additional information about his more unusual observations and he used his extensive local knowledge of birds to make sure that each species'

distribution and status in Glen Eira has been accurately described below, particularly in Appendix C (p. 76).

The Department of Environment, Land, Water and Planning's online mapping of native vegetation includes a map of different vegetation types ('Ecological Vegetation Classes', or EVCs) that were present in 1750. This helps to inform what indigenous species were likely to occur at each location in Glen Eira and hence what plant species might be planted in ecological restoration work. The mapping of EVCs that remained in 2005 shows native vegetation at seven locations within Glen Eira, but in all but one case, they are actually artificial water bodies that have been erroneously mapped as woodland. (By chance, there really is native vegetation beside the covered reservoir at 675 Warrigal Rd in Bentleigh East, but not inside the reservoir, where it has been mapped.)

Another source of information investigated in this study was a report on biodiversity by the Australian Research Centre for Urban Ecology (ARCUE) in 2015 to support the preparation of Glen Eira City Council's '*Environmental Sustainability Strategy 2016-2021*'. It relied on the same sources just discussed but it did not consider the reliability of the data or mapping and it ignored data prior to 1994. No fieldwork was done.

In order to check the reliability and completeness of the ARCUE report, Glen Eira City Council asked me to do some basic ground-truthing in 2015. I spent half a day inspecting sites and scouting for undocumented remnant trees. The resulting information has been carried over into the present study.

Mr Rob Scott, formerly of the St Kilda Indigenous Nursery Co-operative and now of Naturelinks, provided useful botanical information from his personal records and recollections. The information relates to plants that he and his colleagues observed and planted at two sites: Boyd Park during 2009–2016; and along the Sandringham Railway Line through Elsternwick during 2000–2004. The information was invaluable for determining which of the plants currently at these sites have been planted.

Staff of Council's Parks department provided information about the birds they have seen in Glen Eira, as did several residents who were encountered during fieldwork.

3.2 Fieldwork

Fieldwork was done between 28th April and 2nd June 2017. The tasks undertaken were to:

- Inspect all locations where native vegetation, wetlands or significant fauna observations have been reported, and scout around for additional locations while driving or walking through Glen Eira;
- Map the locations of native vegetation, wetlands, isolated wild plants of indigenous species and significant fauna observations;
- Describe the vegetation structure and composition within each wetland, area of native vegetation and planted wildlife habitat;
- Record a thorough inventory of species of indigenous plants and environmental weeds wherever native vegetation or wetland was found, including population estimates of each scarce or uncommon indigenous species;
- Record all birds, frogs, butterflies and native mammals observed in or near areas of native vegetation or wetlands. (Butterfly observations were very scarce because of the time of year);
- Record wildlife signs and habitat features; and
- Take photographs to illustrate important aspects of this report.

More than half of the fieldwork effort was at the ‘biodiversity hotspots’ described in Chapter 7. The sites described in Chapter 8 have rather less habitat and therefore took rather less fieldwork time. Searches for wild flora and fauna were also conducted in neighbourhoods around the ‘hotspots’, in other leafy neighbourhoods and along almost the full lengths of all railway reserves (but somewhat impeded by ‘skytrain’ construction work).

Binoculars were carried at all times to aid identification of birds. Lakes at Caulfield Racecourse, Caulfield Park and Rippon Lea Estate were visited at daytime, dusk and night, at least twice, to maximise the detection of birds and frogs. No fishing was attempted.

Native vegetation, wildlife and a lake at Yarra Yarra Golf Course could only be viewed from outside the property fence, due to lack of permission to enter the property.

April, May and June are not ideal months to be conducting botanical fieldwork. This probably prevented the detection of Cotton Fireweed (*Senecio quadridentatus*), one or two wallaby-grass species (*Rytidosperma*) and a few other species of flowering plants. Inaccessibility of the tall railway cutting near Elsternwick Station may well have prevented detection of a few other indigenous plant species, including Common Rice-flower (*Pimelea humilis*). Mosses and liverworts were particularly hard to identify because of the time of year and the weather in the lead-up to the fieldwork, and it is likely that the ten species detected are only a small fraction of what might be found in an exhaustive survey.

The time of year of this study is not ideal for detecting some bird species, and any study less than several years in duration will inevitably fail to observe some rare visitor species. This obstacle has been overcome by experienced local bird observers, who have done an excellent job in lodging their observational data into ‘citizen science’ databases (particularly eBird) over some years. Any bird species not included in this report must be very rare visitors and unlikely to make any material contribution to Glen Eira’s biodiversity.

April to June are very poor months for detecting most frog species and only two species could be found. Unlike birds, frogs are very poorly recorded in Glen Eira, the only relevant prior data being a few undocumented observations by Ms Christine Renowden. In a summer survey, other species may well be detected, and in many additional locations (as discussed in Section 9.2 on p. 66).

Invertebrates are also very hard to detect in April to June, but they are not a focus of this study, anyway. Those months are good for fungi, but no attempt was made to detect and record them in this study.

4. Glen Eira's Vegetation Prior to Colonisation

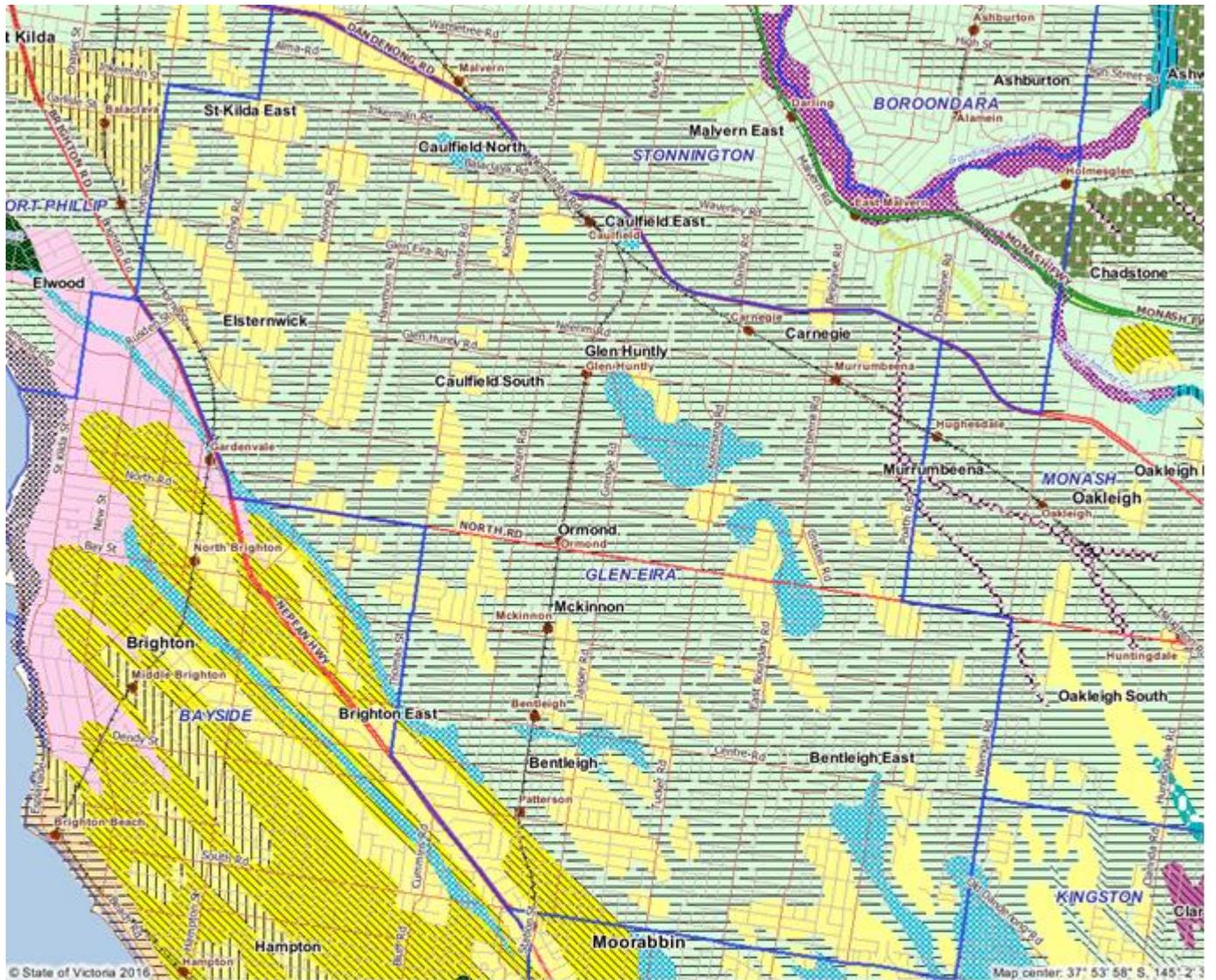
Unfortunately, very few naturalists or pioneers around the time of colonisation collected specimens from Glen Eira or wrote about the flora or fauna. Our understanding of nature and biodiversity prior to colonisation must therefore be determined largely from the much more detailed historical records of nearby areas with similar soils and topography. For example, the vegetation of Brighton to Sandringham was well visited and documented by nineteenth century naturalists and we can extrapolate to similar areas of Glen Eira. Even today, it is possible to visit locations neighbouring Glen Eira where remnants of the pre-colonisation flora provide models for what must have once been also in Glen Eira; e.g. at Royal Melbourne Golf Course and Grange Reserve.

Largely by this process of matching information from well-documented areas to other areas with similar soil and topography, the Department of Environment, Land, Water and Planning has produced a map of the types of vegetation that covered Victoria in 1750. A representation of the map for Glen Eira and its surrounds appears in Figure 1, obtained from the department's online 'Biodiversity Interactive Map'. It should be taken as an approximation only, as it conflicts in places with some features marked on nineteenth century maps (e.g. Crown Lands Office plan no. 657 titled 'Part of the Parish of Prahran' and dated 25/6/1857, available from the State Library of Victoria's website). Vegetation types are represented on Figure 1 by the following Ecological Vegetation Classes (EVCs):

- 'Grassy Woodland' (EVC no. 175) – a park-like, densely grassy woodland of flat land, dominated by River Red Gum (*Eucalyptus camaldulensis*). It is mapped as having covered most of the municipality. Parts of it were described on the abovementioned 1857 plan as 'Red Gum Flats', which suggests Plains Grassy Woodland (EVC no. 55) rather than Grassy Woodland;
- 'Heathy Woodland' (EVC no. 48) – dominated by Coast Manna Gum (*Eucalyptus viminalis* subsp. *pryoriana*) and with a rather dense, shrubby or heathy understorey, on low rises with sand and gravel. The 1857 plan labels one instance as 'High land moderately timbered';
- 'Swamp Scrub' (EVC no. 53) – dominated by Swamp Gum (*Eucalyptus ovata*) with thickets of Swamp Paperbark (*Melaleuca ericifolia*), growing in alluvium and swamp deposits, which were in depressions ('Wet flats' on the 1857 plan), along Elster Ck and the drainage line through Yarra Yarra Golf Course;
- 'Creekline Herb-rich Woodland' (EVC no. 164) along the minor creek through Boyd Park, similar to the Swamp Scrub but with only scattered thickets.

There is also a narrow strip in Glen Eira's southwest that is mapped on Figure 1 as having had a mosaic (or patchwork) comprising Grassy Woodland and 'Damp Sands Herb-rich Woodland', too intermingled to map separately. The vegetation of this strip was probably intermediate between the Heathy Woodland and Grassy Woodland that it lies between.

More detailed descriptions of the EVCs are provided by Oates & Taranto (2001).



Legend to Ecological Vegetation Classes

-  175. Grassy Woodland
-  48. Heathy Woodland
-  53. Swamp Scrub
-  164. Creekline Herb-rich Woodland
-  719. Grassy Woodland / Damp Sands Herb-rich Woodland



Figure 1. Map of Ecological Vegetation Classes in and near Glen Eira in 1750, inferred from geology and topography. From the Department of Environment, Land, Water and Planning’s ‘Biodiversity Interactive Map’ website. Municipalities are outlined in dark blue, with Glen Eira in the middle.

5. Wild Plant Species

5.1 Indigenous Plants

Appendix A provides a table of all the wild, indigenous plant species detected during this study, followed by a table of wild, indigenous plant species recorded previously. The table from this study indicates the sites at which each species was seen and how abundant they were. It includes:

- 9 species of moss;
- 2 species of liverwort;
- 1 fern species;
- 9 tree species;
- 9 shrub species;
- 1 mistletoe species;
- 1 climber species;
- 5 species of creeper or scrambler;
- 25 grassy species (in the order Poales);
- 11 aquatic or semi-aquatic species; and
- 15 other flowering species.

This makes a total of 88 species.

The second table of Appendix A includes an additional 5 moss species, 2 fern species and 67 flowering species that have been recorded prior to this study, most of them not for more than a century. A small number of those species are likely to remain and have gone undetected; e.g. Cotton Fireweed (*Senecio quadridentatus*), which often appears in suburban wasteland as a blow-in.

Unfortunately, Glen Eira was largely cleared so early in Melbourne's settlement that the historical records of plants comprise only a small fraction of the species that must once have been present. By comparison with near-pristine examples of vegetation of the kinds that once occurred in Glen Eira, I expect that Glen Eira would once have had over 300 indigenous flowering plant species. Most of them have died out in Glen Eira without ever being recorded. Some of the species that probably once occurred in Glen Eira are commonly used in local revegetation, such as Sticky Boobialla (*Myoporum petiolatum*).

Glen Eira's only surviving indigenous plant species (or rather, hybrid) that is noteworthy in the context of the whole state is represented by a single, ancient tree that appears to be a Studley Park Gum (*Eucalyptus × studleyensis*) – see Figure 2. Being a hybrid, the Studley Park Gum does not qualify as a threatened species under the international 'red list' criteria; however the Victorian Department of Environment, Land, Water and Planning nevertheless lists it as 'endangered'. The name 'Studley Park Gum' is applied to various kinds of hybrid between River Red Gum and Swamp Gum, making it a very variable entity. The kind represented by the tree toward the north of Brighton Cemetery (easily spotted from a distance or on a satellite image) is a little atypical, and it might be argued that the term 'Studley Park Gum' should be reserved for more typical examples. A specimen has been pressed (G.S. Lorimer no. 2669 of 28th April 2017) and will be lodged at the National Herbarium of Victoria for a second opinion on the identity. Regardless, the tree is a magnificent specimen tree and an important part of Glen Eira's natural heritage, as it may pre-date colonisation.



Figure 2. A large, old tree at Brighton Cemetery, believed to be a rare Studley Park Gum.

No other indigenous plants remaining in Glen Eira are rare in the context of the whole state. The following are uncommon in metro Melbourne:

- Running Postman (*Kennedia prostrata*) – A common creeper species around Melbourne until recent decades but now greatly diminished due to poor regeneration in the absence of fire. In Glen Eira, it is represented by five seedlings at the Moorabbin Reservoir property (675 Warrigal Rd, Bentleigh East), where there is a chance that they may have been planted. Three of the seedlings are surrounded by seedlings of Gorse (*Ulex europaeus*), a weed that threatens the Running Postman’s survival directly and as a result of the likely targeting of the Gorse for weed spraying. There may still be some Running Postman on the steep, tall railway embankment southeast of the Elsternwick platforms, but safety issues prevented a close inspection;
- Clustered Bush-pea (*Pultenaea dentata*) – A low shrub of damp, heathy vegetation. It was first discovered in Glen Eira during 2017, when two plants were found in the Yarra Yarra Golf Course.
- Tiny Duckweed (*Wolffia australiana*) – A minute floating species, which can appear sporadically on almost any waterbody visited by waterbirds (which spread it), and which was seen in small numbers on the lake at Rippon Lea Estate. No threats to it were observed but this is a species whose ecology involves sporadic appearance and disappearance from wetlands according to varying water levels.

5.2 Significant Trees

The probable Studley Park Gum at Brighton Cemetery mentioned above is not only significant as a rare type of plant but also for its extreme age and natural heritage value as a living connection with the pre-colonisation period. It can be seen as a mature tree on the 1945 aerial photograph at the ‘1945.melbourne’ website. The 1945 photograph also shows a River Red Gum just west of the lodge at the same cemetery – a tree that remains as an excellent specimen of the species today.

It is recommended that Glen Eira City Council consider giving these trees planning protection under a Heritage Overlay, as has been done for River Red Gums at Murrumbeena and Carnegie railway stations.

A huge, ancient Yellow Box (*Eucalyptus melliodora*) in the vicinity of the Labassa mansion in Caulfield North is equally worthy of consideration for the Heritage Overlay. A specimen from the tree is held at the National Herbarium of Victoria.

The following additional remnant trees seen during this study are worthy of consideration for Heritage Overlay protection for their size, age and connection with the pre-colonisation landscape:

- A large Black Sheoak (*Allocasuarina littoralis*) on the nature strip of Lockerbie Ct, Caulfield North;
- A Coastal Manna Gum (*Eucalyptus viminalis* subspecies *pyroriana*) in the playground at Packer Park, Carnegie (see Section 8.2 on p. 61 and Figure 16 on p. 62);
- River Red Gums (*Eucalyptus camaldulensis*) on the western verge of the Sandringham Railway Line, immediately north of the Nepean Hwy railway bridge;
- A River Red Gum at the northern edge of Booran Reserve, Glen Huntly;
- Coastal Manna Gums (*Eucalyptus viminalis* subspecies *pyroriana*) – one at Springthorpe Gardens and several at the southeastern corner of Caulfield Racecourse Reserve (see Section 7.4, p. 31).

The fieldwork for this study was inadequate to be confident of detecting all trees whose biodiversity significance warrants planning protection.

5.3 Non-indigenous Plants

Over 100 non-indigenous plant species have become naturalised in Glen Eira. Many of them are confined to gardens and wasteland where they have negligible, or no, impact on indigenous flora or fauna. This study did not attempt to document such plants.

The wild, indigenous flora that has survived in Glen Eira occurs entirely in rather unnatural habitats, including car parks, lawns, railway embankments, artificial ponds and filled-in creeks. Human impacts at these sites have created conditions which most of the original flora cannot tolerate.

Inevitably, certain introduced plant species have colonised these unnatural environments alongside the surviving indigenous plants. It is common for people to regard all such introduced species as ‘environmental weeds’. However, it is more helpful to reserve that term for species that are causing the loss of indigenous plants or preventing them from establishing, sometimes called ‘drivers’ of environmental change. Some other introduced plants that co-occur with indigenous plants in Glen Eira are better regarded as symptoms or ‘passengers’ of environmental change, not drivers (MacDougall and Turkington 2005). Removing ‘passengers’ from a site usually results in rapid recolonisation by the same, or similar, species unless one changes the underlying unnatural conditions that led to their presence.

Appendix B lists those non-indigenous plant species that appear to be threatening indigenous flora, not just acting as symptoms of human-induced changes. The occurrences that pose the greatest threat are highlighted in red in the Appendix.

6. Fauna and Habitat

6.1 Fauna Species

Appendix C (page 76) contains a list of the species of vertebrate fauna that are believed to remain present in Glen Eira, at least occasionally. It does not include a few bird species that would find the habitat in Glen Eira quite unsuitable but still have to fly across it occasionally.

The following current-day fauna of significance are:

- Hardhead or White-eyed Duck – This species is on the state list of ‘vulnerable’ species. It appears sporadically at lakes in Glen Eira (Rippon Lea estate, Yarra Yarra Golf Course and probably Caulfield Racecourse). Those lakes are probably important as refuges when wetlands in rural Victoria dry up or when duck shooters displace birds from better habitat;
- Swift Parrot – This migratory species is listed as endangered under the federal *Environment Protection and Biodiversity Conservation Act 1999* and on the corresponding list for Victoria. Its annual migratory route crosses Bass Strait and passes through the Melbourne region, and some birds pass through the eastern half of Glen Eira. In some years, a few birds are seen feeding in eucalypts in Glen Eira for up to a few days before resuming their migration. Clusters of River Red Gums, such as at Yarra Yarra Golf Course, Boyd Park and the Murrumbeena and Carnegie railway stations, may act as important ‘refuelling stations’;
- Nankeen Night Heron – This species is on the state list of ‘near threatened’ species. It is regularly seen at Rippon Lea Estate and Caulfield Park, and is quite possibly a visitor to the lake at Yarra Yarra Golf Course. There is circumstantial evidence that it breeds in Glen Eira.

The Blue-billed Duck is listed by the Victorian government as ‘endangered’ but the only record of it in Glen Eira – a dead bird on Centre Rd – only represents a chance occurrence of a bird flying over, not real habitat for the species. The same is true of chance sightings of White-bellied Sea-eagle, Black Falcon, Leaden Flycatcher and Painted Buttonquail.

Glen Eira also has a core of common urban species of birds such as magpies and blackbirds that can be seen anywhere in the municipality, daily (at least for part of the year). Nearly all of Glen Eira’s bird species other than those just discussed are just rare or occasional visitors that move through but find little if any suitable habitat.

Reptiles and frogs in Glen Eira are much less well known than birds, due to lack of past records and the time of year when this study’s fieldwork was conducted (April to June). A ‘citizen science’ project in summer months could greatly improve the understanding of frogs and reptiles in the municipality, as discussed in Section 9.2 on p. 66.

The only indigenous mammals recorded in Glen Eira are the very common urban species, Common Brushtail Possum and Common Ringtail Possum, plus visits by the Grey-headed Flying-fox (which are very common throughout metro Melbourne). It is quite likely that at least one indigenous microbat would be found if a search was conducted specifically for them.

Only two species of fish were observed in this study (the indigenous migratory species, Shortfin Eel, and the introduced Mosquitofish) and no prior records could be found at all. Even a concerted survey may not find many more fish species (other than domesticated fish) because almost all of Glen Eira’s original creeks and wetlands have been filled in. Today’s fish habitat is artificial lakes, and the only fish that have been able to reach them are eels (which slither overland and through pipes) and fish released by humans.

6.2 Habitat Features

The following fauna habitat features were observed during the fieldwork for this report:

- Lakes or ponds, which provide habitat for aquatic invertebrates, waterbirds and (in at least one case) Shortfin Eel and frogs. The presence of fringing rushes or sedges at some of the waterbodies provides cover and a food source for a range of small wetland fauna. The presence of adjacent trees aids some waterbirds such as the near-threatened Nankeen Night Heron;
- A strip of indigenous vegetation (or revegetation) along the Sandringham Railway Line in Elsternwick, apparently functioning for some species as a wildlife corridor (as evidenced by Spotted Pardalotes observed moving along the strip, despite the absence of any other suitable habitat in Elsternwick);
- Scrubby indigenous undergrowth, particularly along the same strip and at Boyd Park Sanctuary and the Moorabbin Reservoir property (675 Warrigal Rd, Bentleigh East). Such vegetation can provide cover and a feeding ground for small insectivorous birds of the undergrowth (e.g. White-browed Scrubwrens) as long as the birds feel safe from humans, pets and other potential predators. Birds do not feel safe if the scrubby vegetation is so narrow that you can see right through it, or if there is an adjacent path frequented by people and dogs, as usually applies in Glen Eira;
- Stands of eucalypts, sometimes intermingled with various other trees (e.g. at Yarra Yarra Golf Course), providing habitat for a greater diversity of indigenous birds, invertebrates and perhaps microbats than in the absence of eucalypts. Some of the eucalypts are used not only by locally resident fauna but also as ecological stepping-stones by certain nomadic or migratory species such as Swift Parrots;
- Nature strips with a dense canopy of mature street trees (sometimes Australian natives), providing habitat, cover and movement corridors for certain birds and insects;
- Open grassed areas such as ovals, which provide habitat for a small number of indigenous and introduced species of birds (though dogs and humans often scare off the birds);
- Public parks and residential gardens not falling into the previous categories, where one finds common urban fauna such as Common Blackbirds, Rainbow Lorikeets, Grey Butcherbirds and Tawny Frogmouths. (Street lights serve as part of the habitat for frogmouths, as they attract insects that are eaten by frogmouths.).

Each type of habitat was observed to be associated with its own suite of fauna. For example, waterbodies attract waterbirds and frogs; larger stands of eucalypts attract more parrots, honeyeaters and Spotted Pardalotes; dense shrubby vegetation favours small insect-eating native birds such as Brown Thornbills (and in season, more insects).

A 2005 study of the bird communities of Melbourne's eastern and southeastern suburbs* concluded that:

'Remnants of native vegetation act as vital refugia of indigenous fauna in the urban landscape. ...the retention and establishment of native vegetation [=Australian native vegetation] within streetscapes can complement existing remnant vegetation and the bird communities contained therein. Native streetscapes can potentially benefit native birds by:

- *'Facilitating the movement of species throughout the urban landscape;*
- *'Providing habitat that is advantageous to native birds over introduced species; and*

* White J.G., Antos M.J, Fitzsimons J.A. and Palmer G.C. (2005). Non-uniform bird assemblages in urban environments: the influence of streetscape vegetation. *Landscape and Urban Planning* **71**:123-135.

- *‘Enhancing remnant vegetation in parks by diffusing abrupt edges between remnants and the built environment and reducing levels of isolation between parks (e.g. Catterall et al. 1991)’.*

Note that ‘native vegetation’ in this quote refers to Australian native vegetation rather than remnant vegetation or indigenous species.

The conclusions above accord with this study’s bird observations in the field, excluding waterbirds around Glen Eira’s four lakes (at Rippon Lea estate, Caulfield Park, Caulfield Racecourse and Yarra Yarra Golf Course). However, this study’s data does not meet the requirements for a quantitative analysis of that kind.

The abundance of birdlife at most parks appeared to be diminished by the abundance of dogs, particularly in ‘off-lead’ areas. Some off-lead areas include plantings that are intended to provide bird habitat; e.g. at Boyd Park and Packer Park.

No fishing was undertaken in this study by Mr Brendan Ryan of Glen Eira City Council’s Parks department advises that lakes in Caulfield generally contain Common (or European) Carp. That species is known to cause such significant environmental problems in Victoria that it is declared under the *Fisheries Act 1995* (Vic) as a ‘noxious aquatic species’. It agitates mud on lake bottoms, thereby causing turbidity, making conditions less suitable for aquatic plants and generally upsetting wetland ecosystems. Carp also eat native aquatic fauna such as invertebrates and tadpoles.

7. Hotspots for Indigenous Flora and Fauna

This chapter contains a detailed description of places where native vegetation and/or significant indigenous fauna are found in Glen Eira.

To be included as a ‘hotspot’ in this chapter, a site has to have substantially more indigenous flora and/or fauna than found in Glen Eira outside the hotspots. A site cannot instantly be made a biodiversity hotspot by adding caged birds or planting some plants in a garden, however rare the birds or plants may be. The organisms that make a hotspot must be self-sustaining and able to fulfil natural ecological functions. In the case of plants, a hotspot must have either some wild indigenous species or a reasonable number of planted indigenous species that have become self-sustaining. In the case of fauna, a hotspot has to provide habitat that isn’t readily available outside the hotspots, and there should be some evidence (or at least promise) of fauna other than common urban animals such as magpies or brushtail possums.

Sites that don’t qualify as hotspots but that still provide people with contact with nature are covered in the next chapter.

7.1 Sandringham Railway Line Verge, Elsterwick

Summary

This site comprises segments of railway corridor between Hotham St and 1 Riddell Pde, with a gap from the Glen Huntly Rd bridge to Stanley St. It is one of the top three sites in Glen Eira for wild indigenous plant species and, with augmentation by extensive indigenous plantings, it provides habitat for skinks and Spotted Pardalotes that are very scarce elsewhere in Glen Eira. However, the rarest of the wild plant species are each represented by only one or two individuals, raising serious doubts about their medium-term survival if corrective action is not taken. Many of the indigenous species that have been planted have died out, probably during the Millennium Drought in 2000–2009.



Figure 3. A view of the rail reserve looking toward Melbourne from the Glen Huntly Rd bridge.

Flora

The table below lists the 20 indigenous plant species found in 2017 to be growing wild in the site (or thought to be probably wild, in cases indicated by question marks). Bold names indicate the five species that were not detected growing wild anywhere else in Glen Eira during this study. The column headings ‘S’, ‘NW’ and ‘NE’ refer to three sections of rail reserve: ‘S’ for the southern section (beside Riddell Pde), ‘NW’ for north of Glen Huntly Rd and west of the tracks (beside Ripon Gr), and ‘NE’ for north of Glen Huntly Rd and east of the tracks. The symbols in those columns indicate the abundance of each species using the following symbols:

- Scarce, to the extent of being at risk of dying out from the site;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

Wild Indigenous Plant Species in 2017

Scientific name	Common name	S	NW	NE	Population information
<u>Trees</u>					
<i>Acacia implexa</i>	Lightwood	D	✓	D	
<i>Acacia mearnsii</i>	Black Wattle	D?		–	
<i>Acacia melanoxylon</i>	Blackwood		✓	–	
<u>Shrubs</u>					
<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle	–?			1 only, opp. 32 Riddell Pde
<i>Acacia paradoxa</i>	Hedge Wattle		✓?	–	
<i>Bossiaea cinerea</i>	Showy Bossiaea	–			1 only, opp. 46 Riddell Pde
<i>Bursaria spinosa</i>	Sweet Bursaria		M?	M	
<i>Ozothamnus ferrugineus</i>	Tree Everlasting			–?	1 only, opp. 13 Gordon St
<u>Creeper</u>					
<i>Einadia nutans</i>	Nodding Saltbush		✓		10, opp. 263 Glen Huntly Rd
<u>Grassy species (order Poales)</u>					
<i>Austrostipa mollis</i>	a Spear-grass	M		–	
<i>Lomandra filiformis</i>	Wattle Mat-rush	D		✓	
<i>Lomandra nana</i>	Dwarf Mat-rush	–			1 male only, opp. 44 Riddell Pde
<i>Microlaena stipoides</i>	Weeping Grass	–		–	
<i>Rytidosperma caespitosum</i>, ‘blue coastal’ form	Common Wallaby-grass			–	Approx. 10 plants; probably an undescribed subspecies
<i>Rytidosperma fulvum</i>	Leafy Wallaby-grass	M			
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass			–	
<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	M	–		
<i>Themeda triandra</i>	Kangaroo Grass	D			
<u>Other ground flora</u>					
<i>Dianella revoluta</i> group	Black-anther Flax-lily	D			
<i>Pimelea curviflora</i>	Curved Rice-flower	–			2 plants, opp. 34 Riddell Pde

It is quite likely that several additional wild, indigenous species went undetected, mostly because the steep, tall railway cutting batter south of Elsternwick Station could not be viewed up close from a safe position. In particular, a Sheep’s Burr (*Acaena echinata/ovina*) is reliably reported as having been abundant some years ago and is likely to persist on the batter. Common Rice-flower (*Pimelea humilis*) is also reported to have been present and may persist out of sight.

The following wild, indigenous plants in the site are of particular note:

- *Acacia longifolia* subspecies *sophorae* (Coast Wattle): The only wild plant of the subspecies that could be found anywhere in Glen Eira in 2017 grows opposite 32 Riddell Pde. There are no records of that species being planted there, so it may well be wild, and the last of its species in Glen Eira.
- *Bossiaea cinerea* (Showy Bossiaea): Mr Rob Scott recalls two plants growing beside Riddell Pde approximately 15 years ago. He and I could only find one in 2017, opposite 46 Riddell Pde, largely smothered by layers of dumped garden waste. This is probably the last of the species in Glen Eira. Mr Scott’s records show that 87 of the species were planted in the site during 2000–2001, but none of them could be found in 2017;
- *Lomandra nana* (Dwarf Mat-rush): Only two plants could be found anywhere in Glen Eira. One is a male opposite 44 Riddell Pde. A female in the same area was removed and planted into a neighbour’s garden, probably too far away to allow pollen to be transferred from the male. The separation of the plants has probably doomed the species to eventually die out;

- *Pimelea curviflora* (Curved Rice-flower): The only two plants found in Glen Eira in 2017 were opposite 34 Riddell Pde, although others could be growing out of sight on the same tall, steep railway cutting batter;
- *Rytidosperma caespitosum* ‘blue coastal’ (a form of Common Wallaby-grass) refers to a colony of approximately ten plants that were visible in 2017 opposite 25 Gordon St. The ‘blue coastal’ form probably represents an undescribed subspecies.

A major feature of this site is that, in addition to the wild indigenous plants, there has been extensive planting of indigenous species to recreate wildlife habitat and improve the security of the indigenous plants. The following table is analogous to the one above but is for the species which appear to be present only due to planting.

Planted Indigenous Plant Species in 2017

Scientific name	Common name	S	NW	NE	Population information
Trees					
<i>Acacia melanoxylon</i>	Blackwood	✓			West of tracks, south of station
<i>Allocasuarina littoralis</i>	Black Sheoak	✓	✓	✓	
<i>Allocasuarina verticillata</i>	Drooping Sheoak				
<i>Banksia integrifolia</i>	Coast Banksia	–			
<i>Eucalyptus camaldulensis</i>	River Red Gum		–		
<i>Eucalyptus melliodora</i>	Yellow Box	–			
<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>			–		
	Coast Manna Gum				
<i>Leptospermum laevigatum</i>	Coast Tea-tree	–			
<i>Myoporum petiolatum</i>	Sticky Boobialla	✓	✓	✓	
Shrubs					
<i>Acacia paradoxa</i>	Hedge Wattle	D			1 plant only, opp. 2 Sinclair St
<i>Acacia ulicifolia</i>	Juniper Wattle			–	
<i>Bursaria spinosa</i>	Sweet Bursaria	✓			
<i>Correa reflexa</i>	Common Correa	✓			2 plants only
<i>Goodenia ovata</i>	Hop Goodenia		✓	✓	
<i>Hakea decurrens</i>	Bushy Needlewood		–	–	
<i>Kunzea leptospermoides</i>	Yarra Burgan		✓	✓	
<i>Leptospermum scoparium</i>	Manuka	–			
Climbers					
<i>Clematis decipiens</i>	a small-leaved clematis	✓	–		2 plants only
<i>Hardenbergia violacea</i>	Purple Coral-pea	–	–		4 plants only
Ground flora					
<i>Dianella laevis</i>	Smooth Flax-lily		–		4 plants only

Most of the planted species have not been represented by wild plants in Glen Eira for decades.

Mr Scott’s records include the following additional species that were planted during 2000–2004 but could not be found in 2017: *Acacia brownii*, *Acacia suaveolens*, *Acacia verticillata*, *Austrostipa nodosa*, *Banksia marginata*, *Billardiera mutabilis*, *Enchylaena tomentosa*, *Eucalyptus ovata*, *Eucalyptus radiata*, *Hakea nodosa*, *Indigofera australis*, *Kennedia prostrata*, *Leptospermum myrsinoides*, *Lomandra longifolia*, *Olearia axillaris*, *Pelargonium australe*, *Poa sieberiana*, *Pultenaea stricta*, *Solanum laciniatum* and *Trachymene composita*.

The table below shows the wild, introduced species that appeared to threaten the survival of indigenous plants, with the most serious indicated with red shading.

Environmental Weed Species in 2017

Scientific name	Common name	Abundance
<i>Avena barbata</i>	Bearded Oat	✓
<i>Briza maxima</i>	Large Quaking-grass	✓
<i>Chamaecytisus palmensis</i>	Tree Lucerne	✓
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	Boneseed	–
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	M
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	D
<i>Ehrharta longiflora</i>	Annual Veldt-grass	D
<i>Fraxinus angustifolia</i>	Desert Ash	✓
<i>Genista monspessulana</i>	Montpellier Broom	✓
<i>Oxalis pes-caprae</i>	Soursob	D
<i>Phoenix canariensis</i>	Canary Island Date Palm	–
<i>Setaria parviflora</i>	Slender Pigeon Grass	✓

Fauna

The following vertebrate fauna were observed either by this study in 2017 and/or by Ms Debbie Lustig (through eBird) in previous years, as indicated in the 'Latest' column. An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning.

Common name	Scientific name	Latest
<u>Birds</u>		
*Spotted Dove	<i>Spilopelia chinensis</i>	2016
Barn Owl	<i>Tyto alba</i>	2011
Spotted Pardalote	<i>Pardalotus punctatus</i>	2017
Brown Thornbill	<i>Acanthiza pusilla</i>	2017
Red Wattlebird	<i>Anthochaera carunculata</i>	2017
Little Wattlebird	<i>Anthochaera chrysoptera</i>	2017
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	2016
Grey Butcherbird	<i>Cracticus torquatus</i>	2017
Australian Magpie	<i>Gymnorhina tibicen</i>	2011
Little Raven	<i>Corvus mellori</i>	2017
Welcome Swallow	<i>Hirundo neoxena</i>	2017
*Common Blackbird	<i>Turdus merula</i>	2017
*Common Starling	<i>Sturnus vulgaris</i>	2016
*Common Myna	<i>Acridotheres tristis</i>	2017
<u>Reptile</u>		
Skink (?Garden)	? <i>Lampropholis guichenoti</i>	2017

Other common urban bird species and the White-plumed Honeyeater have been reported elsewhere in Elsternwick, and they probably enter the railway reserve occasionally.

Most of the fauna species above are common urban birds. The following species are more important:

- Spotted Pardalote was observed on two of the four days on which the site was visited during this study, both north and south of Glen Huntly Rd and also in the adjacent Rippon Lea estate. It has also been reported previously by Ms Debbie Lustig through the eBird database. This burrow-nesting species feeds by gleaning insects and other arthropods from leaves in the

crowns of native trees. This site and the few adjacent eucalypts of Rippon Lea Estate represent effectively the only feeding ground for Spotted Pardalotes in Elsternwick or nearly all the western quarter of Glen Eira. The indigenous plantings listed above have probably been critical for providing enough habitat for the Spotted Pardalotes to survive in Elsternwick. In order to fulfil their habitat needs, the Spotted Pardalotes seen in this study probably also rely on eucalypts in the nearby Elsternwick Golf Course and Elsternwick Park, both of which are actually in Brighton, outside Glen Eira.

- **Barn Owl:** In September 2011, Ms Debbie Lustig reported a Barn Owl that was displaced from nearby St Clements Anglican Church by harassing magpies, causing the owl to fly toward the railway line. This is the only record of the species in Glen Eira that could be found. If one or more Barn Owls remain in the area, they probably feed and roost mostly at the Elsternwick Golf Course and Elsternwick Park but they may also hunt along the railway line.
- **Skinks:** Even though the site was inspected during May and June when reptiles are hibernating or inactive, several skinks were encountered, probably Garden Skinks. This suggests that a much larger population of that species and possibly several other species may reside in the rail reserve. The only habitat of comparable suitability for skinks in Glen Eira is the Moorabbin Reservoir property (Section 7.8).

Knowledge Base

The author inspected the site on May 5, 10 & 12 and June 2, 2017, totalling approximately six hours. He returned briefly on November 21, 2017, to make a more confident identification of the ‘blue coastal’ wallaby-grass during its flowering season. He was accompanied on one visit by Mr Rob Scott, who recalls the vegetation of 2000–2004 in association with his organisation of extensive indigenous planting in the site. Inspection of the Atlas of Living Australia and the eBird database yielded the records of Ms Debbie Lustig. Additional information was provided by Messrs Paul Caine and Dodge Phoenix, who have taken an interest in the site’s flora since the 1990s.

7.2 Rippon Lea Lake and Surrounds

Summary

The lake in the gardens of the National Trust of Victoria's Rippon Lea estate (192 Hotham St, Elsternwick) provides habitat for indigenous waterbirds, wetland plants, migratory eels and probably frogs. The surrounding trees and shrubs provide habitat for resident and nomadic species of indigenous birds, including the Nankeen Night Heron, which is on Victoria's list of 'near threatened' fauna. The lawns within a radius of typically 25 m of the lake contain a scattering of the indigenous Kidney Weed and Weeping Grass. The eel and seven of the wild plant species were not found occurring naturally anywhere else in this study.

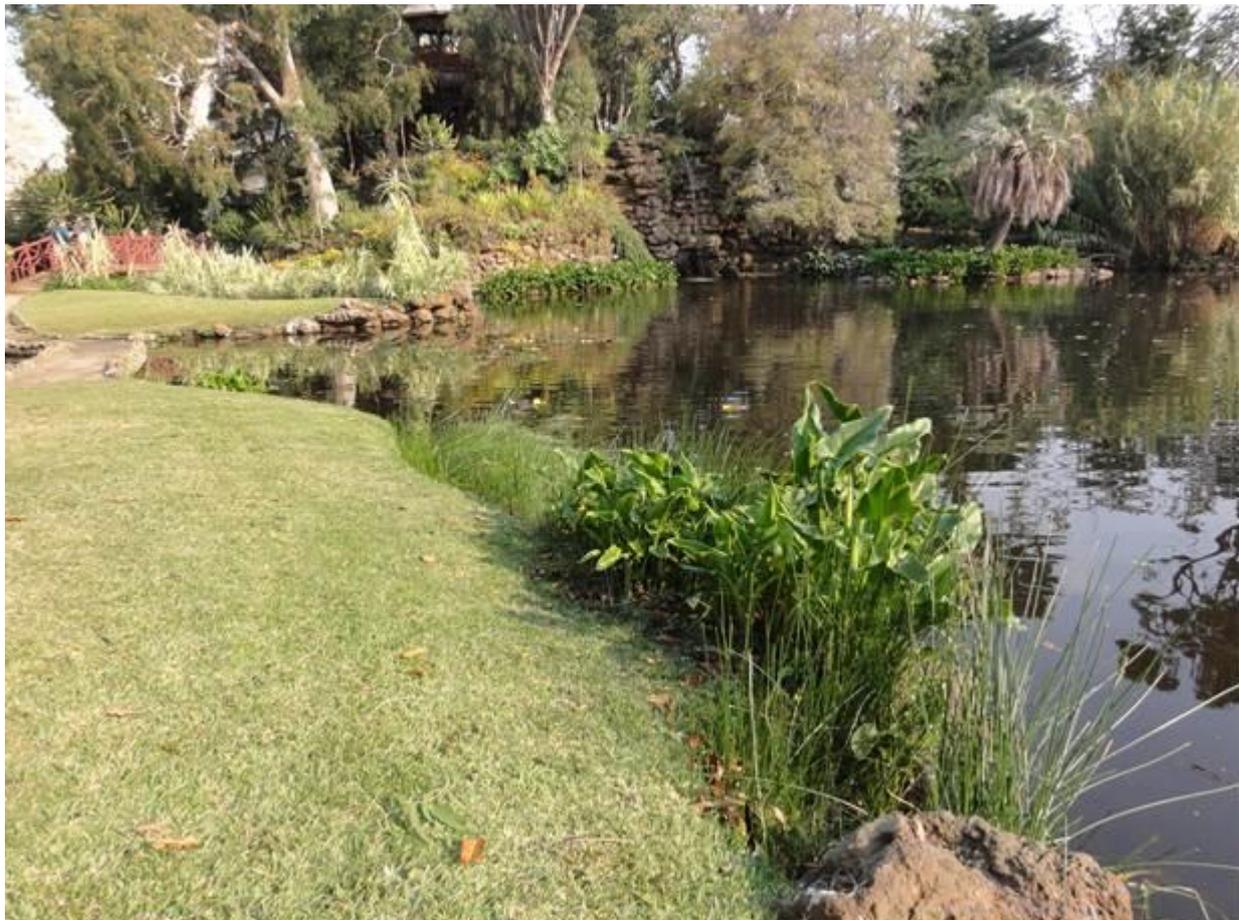


Figure 4. A view of the lake and fringing vegetation at Rippon Lea.

The only plant of Common Spike-rush found in this study is in the bottom-right corner.

Flora

The 2017 study detected the following 14 wild, indigenous plant species, which includes the impressive trunk of a long-dead, pre-colonial River Red Gum on the bank of the lake. Bold names indicate the seven species that were not detected growing wild anywhere else in Glen Eira during this study, but the *Lunularia* would probably be found elsewhere in the right season. The *Landoltia* and *Wolffia* are uncommon in metro Melbourne, brought in by waterbirds. At times, millions of them cover the lake, along with *Lemna minor*.

Scientific name	Common name	Population information
<u>In the lake and on its banks</u>		
<i>Eleocharis acuta</i>	Common Spike-rush	A small patch not far from the boathouse
<i>Juncus pallidus</i>	Pale Rush	Roughly 100 plants, scattered widely
<i>Landoltia punctata</i>	Thin Duckweed	Many floating on the water
<i>Lemna disperma</i>	Common Duckweed	Very abundant, floating on the water
<i>Lythrum hyssopifolia</i>	Small Loosestrife	Only a few individuals, on the bank
<i>Schoenoplectus tabernaemontani</i>	River Club-rush	3 patches seen, possibly derived from planting
<i>Schoenus apogon</i>	Common Bog-rush	Abundant at water's edge, particularly in the NW
<i>Typha ?orientalis</i>	Cumbungi	Many m ² at the southeast end of the lake
<i>Wolffia australiana</i>	Tiny Duckweed	Sometimes abundant, floating on the water

Surrounding vegetation

<i>Cotula australis</i>	Common Cotula	Scattered through the lawn
<i>Dichondra repens</i>	Kidney-weed	Many patches in lawn and under trees
<i>Eucalyptus camaldulensis</i>	River Red Gum	One large, long-dead trunk on the bank
<i>Lunularia cruciata</i>	Moonwort	Scattered thinly close to the water
<i>Microlaena stipoides</i>	Weeping Grass	Scattered through the lawn

Among the many non-indigenous plants around the lake, one species – St Peter's Wort (*Hypericum tetrapterum*) – is notable as a potentially serious wetland weed. It is fairly abundant at the southern end of the lake.

Fauna

The following vertebrate fauna were observed either within the site during this study in 2017 or (where noted) by Mr Alan Crawford anywhere in Rippon Lea estate in August 2014. An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning.

Common name	Scientific name	Comments
<u>Fish</u>		
Shortfin Eel	<i>Anguilla australis</i>	One seen swimming up a drain into the lake
*Mosquitofish	<i>Gambusia holbrooki</i>	Abundant
<u>Birds</u>		
Australian Wood Duck	<i>Chenonetta jubata</i>	
Pacific Black Duck	<i>Anas superciliosa</i>	
Chestnut Teal	<i>Anas castanea</i>	6 were seen by A. Crawford in 2014
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	
White-faced Heron	<i>Egretta novaehollandiae</i>	
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	One bird roosting in a tree overlooking the lake
Purple Swamphen	<i>Porphyrio porphyrio</i>	
Dusky Moorhen	<i>Gallinula tenebrosa</i>	
Masked Lapwing	<i>Vanellus miles</i>	1 was seen by A. Crawford in 2014
Silver Gull	<i>Larus novaehollandiae</i>	
*Spotted Dove	<i>Spilopelia chinensis</i>	6 were seen by A. Crawford in 2014
*Rock Dove	<i>Columba livia</i>	
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	
Spotted Pardalote	<i>Pardalotus punctatus</i>	One bird heard in trees and along the train line
Brown Thornbill	<i>Acanthiza pusilla</i>	
Red Wattlebird	<i>Anthochaera carunculata</i>	
Little Wattlebird	<i>Anthochaera chrysoptera</i>	
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	1 was seen by A. Crawford in 2014

Common name	Scientific name	Comments
Magpie-lark	<i>Grallina cyanoleuca</i>	1 was seen by A. Crawford in 2014
Willie Wagtail	<i>Rhipidura leucophrys</i>	
Grey Butcherbird	<i>Cracticus torquatus</i>	1 was seen by A. Crawford in 2014
Australian Magpie	<i>Gymnorhina tibicen</i>	
Pied Currawong	<i>Strepera graculina</i>	
Little Raven	<i>Corvus mellori</i>	
*Common Blackbird	<i>Turdus merula</i>	
*Common Myna	<i>Acridotheres tristis</i>	

The presence of the Shortfin Eel is significant. All Shortfin Eels are born in the Coral Sea near New Caledonia and they swim thousands of kilometres, from saltwater into freshwater, such as at Rippon Lea. (See, for example, www.fishesofaustralia.net.au.) At maturity, they swim back to the Coral Sea to breed. This represents a remarkable migration, even when the eels swim up streams that remain similar to their natural state. However, Glen Eira's streams have all been turned into drains, almost all of them underground. The nearest above-ground waterway to the Rippon Lea lake is the Elster Canal, 500 m away. The eels at Rippon Lea have to negotiate their way up stormwater pipes for at least that distance to get to the lake, and then return through the pipes to reproduce.

The presence of a Nankeen Night Heron – roosting and presumably fishing at this site during this study – is significant because that species is on the state list of 'near threatened' species.

In addition to the vertebrate species seen at Rippon Lea in 2017, the property was noted by Rodney Van der Ree in 2003 as a roost site for Grey-headed Flying-foxes. That species probably continues to visit periodically (as it does in gardens throughout Melbourne), though it is apparently no longer a roost site. Common Brushtail Possums and Common Ringtail Possums are also extremely likely to be present, as are the Eurasian Coot and possibly White-browed Scrubwren.

In fact, any of the native vertebrate species detected in this study, anywhere in Glen Eira, may sometimes visit this site. That is because it has practically all the habitat features present elsewhere; specifically: (a) a water body, which can be reached by eels; (b) trees, rushes and lawn fringing the water; (c) an expanse of tall tree canopy that includes Australian species; (d) dense shrub cover in some areas; (e) an effective wildlife corridor to it, being the verge of the Sandringham Railway Line (see Section 7.1); and (f) complimentary habitat nearby (particularly Elsternwick Golf Course and Elsternwick Park).

Knowledge Base

The author spent a total of approximately three hours investigating the site, in day, at dusk and at night, over three days in May and June 2017; also briefly on 1/9/15. The records of Grey-headed Flying-foxes came from the Atlas of Living Australia. Mr Alan Crawford's bird list came from the BirdLog app, via eBird.

7.3 Caulfield Park

Summary

Caulfield Park makes a significant contribution to Glen Eira's community of indigenous birds, particularly waterbirds attracted to the lake. It is also home to some domesticated birds and there is a diverse range of planted trees from around the world. Treed parts of the park other than next to the lake provide habitat mainly for common urban wildlife such as possums and magpies but areas dominated by eucalypts are occasionally used by a few less common birds. There are no remnants of the pre-colonisation flora but the recent creation of the 'Aviary garden' includes a few indigenous plant species in a setting that may occasionally attract indigenous birds such as Brown Thornbills that are otherwise very scarce in the park.



Figure 5. An autumn view of the lake area at Caulfield Park.

Flora

The 2017 study detected only one species of wild indigenous plant – Common Cotula (*Cotula australis*), a common species of lawns. There is a planted River Red Gum west of the lake. A small number of indigenous understorey plants have been included in the recently created 'Aviary' garden next to the Council depot. Indigenous wetland plants are prevented from establishing in the lake by the steep, stone edging, polluted water and consequent water purification work.

Apart from the lake, the western quarter of Caulfield Park is an arboretum of specimen trees from around the world, with lawn beneath. The southeastern corner has mixed non-indigenous

eucalypts (young) and European trees over lawn. The rest of the park contains playing fields, often fringed with non-indigenous eucalypts.

Fauna

The following vertebrate fauna were observed by the author at Caulfield Park in 2017 except where otherwise noted. An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning.

Common name	Scientific name	Latest	Comments
<u>Fish</u>			
*Common (or European) Carp	<i>Cyprinus carpio</i>		reported by B. Ryan
<u>Mammals</u>			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>		seen by B. Ryan
*Black Rat	<i>Rattus rattus</i>		
<u>Birds</u>			
*Greylag Goose	<i>Anser anser</i>		15 are resident
*Domestic Duck			10 were seen, of various breeds
Australian Wood Duck	<i>Chenonetta jubata</i>		
*Mallard	<i>Anas platyrhynchos</i>		resident at the lake
Pacific Black Duck	<i>Anas superciliosa</i>		
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>		
Great Cormorant	<i>Phalacrocorax carbo</i>	2012	seen by D. Fleming
White-faced Heron	<i>Egretta novaehollandiae</i>		2 seen at the lake and on an oval
Nankeen Night Heron	<i>Nycticorax caledonicus</i>		Seen often, including breeding
Dusky Moorhen	<i>Gallinula tenebrosa</i>	2014	1 seen by D. Lustig
Eurasian Coot	<i>Fulica atra</i>	c. 2015	seen by B. Ryan
Masked Lapwing	<i>Vanellus miles</i>		seen by B. Ryan
Silver Gull	<i>Larus novaehollandiae</i>		
*Rock Dove	<i>Columba livia</i>		Abundant
*Spotted Dove	<i>Spilopelia chinensis</i>		
Crested Pigeon	<i>Ocyphaps lophotes</i>	2014	Seen by D. Fleming
Galah	<i>Cacatua roseicapilla</i>		seen by B. Ryan
Yellow-tailed Black-Cockatoo	<i>Calyptrorhynchus funereus</i>	2011	a brief visit seen by D. Fleming
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>		
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>		
Musk Lorikeet	<i>Glossopsitta concinna</i>	2012	seen by L. Hiller
Eastern Rosella	<i>Platycercus eximius</i>		seen by B. Ryan
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	2012	seen by D. Lustig
Brown Thornbill	<i>Acanthiza pusilla</i>	2014	also seen in 2017 opp. council depot
Red Wattlebird	<i>Anthochaera carunculata</i>		
Little Wattlebird	<i>Anthochaera chrysoptera</i>		
Noisy Miner	<i>Manorina melanocephala</i>		
Magpie-lark	<i>Grallina cyanoleuca</i>		
Willie Wagtail	<i>Rhipidura leucophrys</i>	2000	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2000	
Grey Butcherbird	<i>Cracticus torquatus</i>		
Australian Magpie	<i>Gymnorhina tibicen</i>		
Little Raven	<i>Corvus mellori</i>		

Common name	Scientific name	Latest	Comments
*House Sparrow	<i>Passer domesticus</i>	2014	seen by L. Hiller
Welcome Swallow	<i>Hirundo neoxena</i>	2014	seen by L. Hiller
*Common Blackbird	<i>Turdus merula</i>		
*Common Starling	<i>Sturnus vulgaris</i>	2016	seen by D. Lustig
*Common Myna	<i>Acridotheres tristis</i>		

In addition, Grey-headed Flying-foxes would be expected in warmer months.

The regular records of Nankeen Night Herons at the lake over the past decade are significant because that species is on the state list of 'near threatened' species. The birds roost in the trees beside the lake, particularly on the island.

The Great Cormorant is rare in metro Melbourne except along the Yarra River. The solitary record at Caulfield Park in 2012 does not indicate that the park provides suitable habitat; it was probably a brief visit in transit. Similarly, the 2011 record of Yellow-tailed Black-Cockatoo and infrequent records of kookaburras at the park do not indicate that the park provides viable habitat for those species.

The other indigenous fauna species listed above are common in suburbia but the diversity of birds is unusual for Glen Eira, mainly because of the combination of aquatic, arboreal and open grassy habitat.

The lake and its fringing trees represent the most important fauna habitat in the park, hosting herons and a range of other waterbirds. Some of the waterbirds are attracted by food provided by park visitors. That food poses a health risk to some of the birds and it contributes to the nutrient pollution of the lake. Excessive nutrients represent a significant problem, including the health risk of toxic blue-green algal blooms that may harm wildlife and park visitors, particularly children.

Carp tolerate and exacerbate the turbidity and excessive nutrients in the lake.

The recently created 'Aviary' garden has been planted with an eclectic mix of species, mostly from Australia. Plants of different sizes and shapes have been included to mimic the structure of a shrubby forest, with the hope of attracting small native birds such as wrens. However, there are currently few if any of the target bird species in Caulfield North, the garden is small (approximately 800 m²) and no part of it is further than 6 m from a path, which puts off small understorey birds.

The large eucalypts distributed widely around the park provide food for insects and certain indigenous birds, particularly parrots and honeyeaters. A few trees contain hollows that provide nest sites for parrots (including Sulphur-crested Cockatoos) and they may also provide roost sites for native microbats. These types of habitat are steadily improving as the eucalypts age.

When unoccupied by humans and dogs, the playing fields provide feeding grounds for White-faced Herons, Welcome Swallows, Crested Pigeons and the introduced Rock Doves (or domestic pigeons).

Knowledge Base

The survey for this study involved visits at various times of day and at night, between April and June 2017. A standard 20-minute, 2-hectare bird census was conducted on 12/5/17 and again on 2/6/17. The weather was good for fauna observation during every visit but the time of year means that some seasonal fauna would have been missed. The total survey time was roughly eight hours. Additional information about birds was provided by Mr Brendan Ryan of Council's Parks staff and by avid bird observer, Mr Michael Norris. Mr Norris's records are also provided on the

website of the Friends of Caulfield Park. The records of Ms Debbie Lustig, Mr David Fleming and Mr Lewis Hiller were extracted from the eBird database. The Atlas of Living Australia was also consulted but yielded no additional useful information.

7.4 Caulfield Racecourse Reserve

Summary

The two central lakes and their surroundings (Figure 6) support locally rare, indigenous wetland plants and waterbirds – many of them unique in Glen Eira. One underwater plant species is rare throughout central southern Victoria. The diversity of indigenous plants and birds is high for Glen Eira. There are also six Coast Manna Gums (now rare in Glen Eira) around stables southeast of the racetrack, perhaps some of them planted. Scattered grain from horse feed supports a large number of starlings and doves, which in turn provide prey for raptors.



Figure 6. The more southerly lake and fringing vegetation at Caulfield Racecourse Reserve.

Flora

The table below lists the twenty indigenous plant species found in 2017 to be growing wild in the reserve (or thought to be probably wild, in cases indicated by question marks). Bold names indicate the 11 species that were not detected growing wild anywhere else in Glen Eira during this study. The narrow columns represent three sections of the reserve. The symbols in those columns indicate the abundance of each species using the following symbols:

- Scarce, to the extent of being at risk of dying out from the site;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

Wild Indigenous Plant Species in 2017

Scientific name	Common name	North lake	South lake	Other	Comments
<u>Trees</u>					
<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	Coast Manna Gum			-?	6 trees immediately south of the racetrack, around stables
<u>Grassy wetland plants (Order Poales)</u>					
<i>Juncus australis</i>	Austral Rush		D?		wild and planted around north lake
<i>Juncus pallidus</i>	Pale Rush	✓	M		
<i>Juncus sarophorus</i>	Broom Rush		D		8 plants found
<i>Juncus usitatus</i>	Rush		✓?		
<i>Lachnagrostis filiformis</i>	Common Blown Grass		✓		
<u>Aquatic or semi-aquatic species</u>					
<i>Alternanthera denticulata</i>	Lesser Joyweed		✓		approximately 120 plants seen
<i>Crassula helmsii</i>	Swamp Crassula	-			1 patch on nth bank of nth lake
<i>Lobelia anceps</i>	Angled Lobelia	✓			4 plants seen
<i>Myriophyllum verrucosum</i>	Red Water-milfoil		✓		underwater
<i>Persicaria decipiens</i>	Slender Knotweed	M			22 plants, perhaps some planted
<i>Persicaria lapathifolia</i>	Pale Knotweed		✓		
<i>Phragmites australis</i>	Common Reed	D	D		abundant but hidden underwater
<i>Potamogeton ochreatus</i>	Blunt Pondweed		D		
<i>Schoenoplectus tabernaemontani</i>	River Club-rush	-?			
<u>Others</u>					
<i>Dysphania pumilio</i>	Clammy Goosefoot		✓		100 plants at NE of south lake
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	M	✓	-	45 at nth lake; also in bare ground
<i>Helichrysum luteoalbum</i>	Jersey cudweed		M	-	
<i>Lythrum hyssopifolia</i>	Small Loosestrife		✓		

Juncus bufonius is extremely likely to appear in the warmer months.

The records above of *Alternanthera denticulata*, *Crassula helmsii*, *Juncus australis*, *Juncus sarophorus*, *Juncus usitatus*, *Persicaria lapathifolia* and *Potamogeton ochreatus* appear to be the first and only records of those species in Glen Eira. Of these, *Juncus sarophorus* and *Potamogeton ochreatus* may well appear at the Rippon Lea lake (see Section 7.2 on p. 22) as a result of transport by wind or waterbirds.

The Red Water-milfoil (*Myriophyllum verrucosum*) is a submerged plant in the southern lake. Its identity has been determined with 90% confidence and a specimen will be lodged with the National Herbarium of Victoria for confirmation. The species is rare in the Melbourne region. The lake is periodically dredged to prevent plants like this fouling the pump that is used to extract water for watering the racetrack. Dredging has not completely destroyed the population yet but that is a real possibility in future.

The vegetation in and around the southern lake is a close reproduction of a natural wetland. The northern lake is less naturalistic as a result of the species and cultivars planted there and the steep banks around much of the circumference.

Two Coast Manna Gums growing just outside the southernmost extremity of the main racetrack (Figure 7) do not appear in the 1945 aerial photograph at 1945.melbourne online, indicating a

more recent origin. Their location would be odd for a deliberate planting. Some of the other four Coast Manna Gums around the same stables do seem to be present on the 1945 aerial photograph (before the stables were built), suggesting that they may well be wild trees.



Figure 7. Two Coast Manna Gums at the southern extremity of the racetrack.

The following list is similar to the one above but it contains only species that have been planted. They are indigenous species except for the *Lomandra*, which might have been selected on the basis of its similarity to the indigenous *Lomandra longifolia*.

Planted Plant Species in 2017

Scientific name	Common name	North lake	South lake
<u>Grassy wetland plants (Order Poales)</u>			
<i>Baumea articulata</i>	Jointed Twig-rush		D
<i>Ficinia nodosa</i>	Knobby Club-rush	D	
<i>Carex appressa</i>	Tall Sedge		✓
<i>Juncus pallidus</i>	Pale Rush	✓	
<i>Lomandra</i> cultivar	Mat-rush	D	
<i>Bolboschoenus ?medianus</i>	Marsh Club-rush		D

The following list is similar to the ones above but it contains only species that pose a threat to the survival of the indigenous flora. Red indicates species that pose a serious threat.

Environmental Weed Species in 2017

Scientific name	Common name	North lake	South lake
<i>Cenchrus clandestinus</i>	Kikuyu	M	D
<i>Cortaderia selloana</i>	Pampas Grass	-	
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	✓	D
<i>Cyperus congestus</i>	Dense Flat-sedge	-	
<i>Cyperus eragrostis</i>	Drain Flat-sedge	✓	
<i>Fraxinus angustifolia</i>	Desert Ash	-	
<i>Juncus articulatus</i>	Jointed Rush	-	
<i>Paspalum distichum</i>	Water Couch	D	✓
<i>Rubus anglocandicans</i>	Blackberry	-	
<i>Sporobolus africanus</i>	Rat-tail Grass	D	

Fauna

The following vertebrate fauna were observed at Caulfield Racecourse Reserve by the author in 2017, except where a different observer and/or year are given. An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning.

Common name	Scientific name	Comments; Observer
<u>Mammals</u>		
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	anonymous, 1973
*Red Fox	<i>Canis vulpes</i>	
<u>Frogs</u>		
Common Froglet	<i>Crinia signifera</i>	
<u>Birds</u>		
Australian Wood Duck	<i>Chenonetta jubata</i>	
Pacific Black Duck	<i>Anas superciliosa</i>	
Grey Teal	<i>Anas gracilis</i>	
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	D. Lustig, 2016
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	D. Lustig, 2016
Great Cormorant	<i>Phalacrocorax carbo</i>	L. Hiller
Australian Pelican	<i>Pelecanus conspicillatus</i>	G. Groves, c. 2015
White-faced Heron	<i>Egretta novaehollandiae</i>	E. Noyes
Intermediate Egret	<i>Ardea intermedia</i>	An anonymous 2010 'Birdata' record
White-bellied Sea-eagle	<i>Haliaeetus-leucogaster</i>	Soaring overhead: L Hiller, 18/9/14
?Brown Goshawk	<i>?Accipiter fasciatus</i>	Could have been a Brown Falcon
Purple Swamphen	<i>Porphyrio porphyrio</i>	
Dusky Moorhen	<i>Gallinula tenebrosa</i>	
Eurasian Coot	<i>Fulica atra</i>	
Masked Lapwing	<i>Vanellus miles</i>	
Silver Gull	<i>Larus novaehollandiae</i>	
*Rock Dove	<i>Columba livia</i>	Very abundant
*Spotted Dove	<i>Spilopelia chinensis</i>	
Little Corella	<i>Cacatua sanguinea</i>	L. Hiller, 2016

Common name	Scientific name	Comments; Observer
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	L. Hiller
Red Wattlebird	<i>Anthochaera carunculata</i>	L. Hiller
Little Wattlebird	<i>Anthochaera chrysoptera</i>	L. Hiller
Noisy Miner	<i>Manorina melanocephala</i>	L. Hiller
White-plumed Honeyeater...	<i>Lichenostomus penicillatus</i>	L. Hiller
Magpie-lark	<i>Grallina cyanoleuca</i>	
Willie Wagtail	<i>Rhipidura leucophrys</i>	
Australian Magpie	<i>Gymnorhina tibicen</i>	
Little Raven	<i>Corvus mellori</i>	
*House Sparrow	<i>Passer domesticus</i>	
Welcome Swallow	<i>Hirundo neoxena</i>	
Australian Reed-warbler	<i>Acrocephalus stentoreus</i>	D. Lustig, 2016
*Common Starling	<i>Sturnus vulgaris</i>	
*Common Myna	<i>Acridotheres tristis</i>	

No fishing was attempted in this study. Mr Brendan Ryan of Glen Eira City Council's Parks department advises that Common (or European) Carp are present in all lakes in the municipality. In the Caulfield Racecourse lakes, carp would be expected to disturb the mud and make the habitat less suitable for native aquatic plants (e.g. the water-milfoil), invertebrates, tadpoles and waterbirds.

Additional frog species may well be apparent during the warmer months and Chestnut Teal would be expected at times when they are not so dispersed across Victoria as during this study. Like the Australasian Grebes that were observed during this study, other diving birds (e.g. Blue-billed Ducks) or swans may be attracted by the submerged plants in the southern lake. Ibis are likely to visit, particularly as Straw-necked Ibis were recorded at Caulfield Railway Station in 2016. The Peregrine Falcon recorded by Mr Lewis Hiller in Caulfield in 2014 may well hunt doves at the racecourse. Snipe may be attracted to areas of dense rushes, such as in Figure 6.

The Intermediate Egret is listed as 'endangered' in Victoria. The solitary record from 2010 was probably of a bird using the lakes as a 'stepping-stone' in transit between wetlands with more aquatic vertebrate prey than is present at Caulfield Racecourse Reserve.

The same could be said of the 2017 record of a Great Cormorant, which is a rare species in metro Melbourne except along the Yarra River.

The diversity of birds around the lakes is high by suburban standards, particularly for waterbirds.

Recommendations

The author recommends investigating ways to avoid unnecessary removal of submerged plants in the lakes when work is done to keep clear the inlets to pumps used for watering the racetrack. That is particularly important in the southern lake because of its abundance of submerged plants, including the Red Water-milfoil. Those plants are critically important for pond life, diving birds and overall wetland ecology.

Although relocation of wildlife has become rather strictly regulated by state government in recent years, there is a good ecological case for introducing indigenous frog species that are not already present. A 'citizen science' project in the warmer months would establish which frog species are already present other than the Common Froglets found in the present study – see Section 9.2 on p. 66. Additional frog species could improve the lakes' food chain.

Knowledge Base

The fieldwork for this study covered all publicly accessible areas of the Caulfield Racecourse Reserve. The time taken was roughly eight hours spread over several days in April and May 2017, including morning, afternoon, dusk and early evening. The author also recorded flora and fauna in September 2015, but not exhaustively.

Assistant Racecourse Manager, Mr Greg Groves, provided information about the recent history of the lakes and their vegetation, and also his observations of occasional visits by pelicans. The observations of Ms Debbie Lustig, Ms Emma Noyes and Mr Lewis Hiller were extracted from the eBird database.

7.5 Red Gums at Carnegie & Murrumbeena Train Stations

Summary

There are stands of well-maintained River Red Gums (*Eucalyptus camaldulensis*) at the 'Rosstown Woodland' around Carnegie railway station and in the southern car park of Murrumbeena railway station. One of the trees, opposite Chestnut St, Carnegie, is a very impressive, large example of the species, estimated to be over a century old.

These stands of trees represent biodiversity hotspots because of their values for habitat and natural heritage value, e.g. conveying a key aspect of the pre-colonisation landscape and vegetation. They receive planning protection under the Heritage Overlay of the Glen Eira Planning Scheme, as sites HO132 and HO123 respectively.

The trees provide food, nest sites and roost sites for many of the remaining indigenous birds, and also for insects and possibly microbats.

The nationally endangered Swift Parrot was observed in Murrumbeena in 1998 near Ardyne St and 2001 at 44 Rosella St. Swift Parrots probably migrate annually through Murrumbeena and Carnegie *en route* between their Tasmanian summer breeding sites and their mainland foraging sites, usually going unnoticed. The stands of River Red Gums beside the Carnegie and Murrumbeena railway stations are potential 'refuelling stations' or ecological stepping-stones on the Swift Parrots' migrations.

During this study, the stands of River Red Gums have been obscured from full public view behind fences around the 'skyrail' construction project. Some of the crowns appear to have deteriorated. The undated state government document titled 'Caulfield to Dandenong Level Crossing Removal Project Tree Retention Summary Report' from 2015 or 2016 indicates that at Carnegie, an effort would be made to retain the larger River Red Gums 'where possible'. At Murrumbeena station, the report indicates that at least one large River Red Gum would be removed and for the others, 'Their viability will be monitored and assessed as construction progresses'. The report indicates that the anticipated tree losses at Murrumbeena station relate to the storage of machinery used for the construction.

The continued biodiversity and heritage values of the stands of River Red Gums at the railway stations will depend on how many trees die as a result of the construction work. Damage to eucalypt roots can take several years or more to kill a River Red Gum, often in times of stress such as prolonged dry weather.

7.6 Boyd Park Sanctuary, Murrumbeena

Summary

This ‘biodiversity hotspot’ is the fenced and gated enclosure at the southern end of Boyd Park, extending approximately 50 m north from the edge of the railway reserve. The fenced sanctuary differs from the rest of Boyd Park in that it retains far more remnant plant species from the pre-colonisation flora, despite having been cleared more than once in the past. Indigenous species of shrub, tree and groundcover have been planted over many years to support the wild plants in providing wildlife habitat and a wildflower display in spring.

History

This site is on part of the former Outer Circle Railway, which ceased operating in the 1890s (according to Wikipedia). The construction, demolition and levelling of the railway line would have destroyed any native vegetation that remained in the corridor prior to construction.

By 1945, the aerial photograph available online at ‘1945.melbourne’ shows the Boyd Park Sanctuary having an expanse of grass with two young eucalypts (one matching the tree in Figure 9) and three shrubs or saplings. According to a 2004 management plan for the Outer Circle Railway Linear Park by Mark McWha Pty Ltd, “The land remained as unkempt paddock until 1960, when a ‘local resident group’ formed, with the intention of ‘cleaning up’ the area”.

It follows that almost all the indigenous plants in the fenced sanctuary today have been planted or persisted in the grass or blown in since 1960. Two species that can be confidently stated to have persisted are Wattle Mat-rush (*Lomandra filiformis*) and the Thatch Saw-sedge (*Gahnia radula*) that is so dense in Figure 8. The former has only recently been propagated and its seeds do not disperse far; the latter produces no seeds and cannot be propagated. Species that have almost certainly blown in from elsewhere include Common Blown-grass (*Lachnagrostis filiformis*) and Hairy Willow-herb (*Epilobium hirtigerum*). Some of the indigenous grasses may have been brought in on machinery, clothing or footwear.

In 1984-85, local residents campaigned for the site and the rest of Boyd Park to become parkland rather than a residential subdivision, as had been proposed (according to the abovementioned management plan). Mr Paul Caine was one of the people who took an interest in the site and has provided this study with his recollections of indigenous plant species growing there in 1992. Many of those species are no longer present but many others have been planted since. The management plan of 2004 mentions the role that the Glen Eira Environment Group had already played in planting indigenous species in the area – a role that included Boyd Park Sanctuary. Council’s records of plantings show substantial plantings of indigenous species in 2010 and 2016, which are apparent in Boyd Park Sanctuary and elsewhere in Boyd Park.

The size of many of the non-indigenous eucalypts and wattles present today suggests that they were planted around the time the park was proclaimed, in the late 1980s. Some of them, such as the Green Wattle (*Acacia decurrens*), have produced offspring.

The history of plantings, combined with the lack of contemporaneous documentation of plantings and wild species prior to 2010, make the origins of some currently occurring plant species impossible to tell with any confidence.

During the course of this study, ‘skyrail’ was under construction. A temporary mesh fence was erected on the sanctuary’s southern boundary but rubble and soil from the construction work found their way across the fence into the sanctuary’s native vegetation. Plants of *Lachnagrostis filiformis*

and *Epilobium hirtigerum* that had been previously restricted to the fenceline were destroyed, but there is a reasonable chance that they may recolonise.



Figure 8. The area of dense ground flora next to the railway reserve, which is to the left.



Figure 9. The area of sparser understorey furthest from the railway reserve.

Flora

The table below lists the 36 wild, indigenous plant species that were either found in the fieldwork for the present study, or (in the case of the grey-shaded entries) appear in Mr Paul Caine's 1997 list of species that he recalled having been present five years earlier. Some of the species treated as 'wild' may well be descendants of planted plants; e.g. the somewhat weedy species, *Clematis decipiens*, is germinating naturally but the parents may have been planted. Bold names indicate the six species found in this study that were not found growing wild anywhere else in Glen Eira.

Wild Indigenous Plant Species

Scientific name	Common name	Comments
<u>Moss</u>		
<i>Breutelia affinis</i>	Common Breutelia	
<u>Trees</u>		
<i>Acacia implexa</i>	Lightwood	Possibly planted
<i>Acacia mearnsii</i>	Black Wattle	
<i>Acacia melanoxylon</i>	Blackwood	Wild; possibly also planted
<i>Eucalyptus camaldulensis</i>	River Red Gum	
<i>Eucalyptus ovata</i>	Swamp Gum	Questionably indigenous
<i>Melaleuca ericifolia</i>	Swamp Paperbark	Questionably indigenous
<u>Shrubs</u>		
<i>Bursaria spinosa</i>	Sweet Bursaria	1 only
<i>Cassinia arcuata</i>	Drooping Cassinia	Possibly planted
<i>Goodenia ovata</i>	Hop Goodenia	Possibly planted
<i>Leptospermum ?continentale</i>	Prickly Tea-tree	
<i>Viminaria juncea</i>	Golden Spray	Possibly planted
<u>Climber</u>		
<i>Clematis decipiens</i>	a small-leaved clematis	Wild; possibly also planted; becoming weedy
<u>Creepers and Scramblers</u>		
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	
<i>Geranium sp. 2</i>	Variable Crane's-bill	Offspring from plantings?
<i>Geranium</i> species	an unidentified cranes'-bill	Possibly not indigenous
<i>Tricoryne elatior</i>	Yellow Rush-lily	
<u>Grassy Species (order Poales)</u>		
<i>Eragrostis brownii</i>	Common Love-grass	
<i>Gahnia radula</i>	Thatch Saw-sedge	
<i>Juncus bufonius</i>	Toad Rush	
<i>Juncus pallidus</i>	Pale Rush	5 plants
<i>Lachnagrostis filiformis</i>	Common Blown Grass	
<i>Lomandra filiformis</i>	Wattle Mat-rush	
<i>Microlaena stipoides</i>	Weeping Grass	
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	Some planted, others wild
<i>Schoenus apogon</i>	Common Bog-rush	
<i>Themeda triandra</i>	Kangaroo Grass	
<u>Other ground flora</u>		
<i>Arthropodium ?strictum</i>	Chocolate Lily	
<i>Caesia ?parviflora</i>	Pale Grass-lily	
<i>Cotula australis</i>	Common Cotula	

Wild Indigenous Plant Species

Scientific name	Common name	Comments
<i>Drosera ?hookeri</i>	Branched Sundew	
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	
<i>Hypoxis ?hygrometrica</i>	Golden Weather-glass	
<i>Microtis ?parviflora</i>	Slender Onion-orchid	
<i>Pterostylis curta</i>	Trim Greenhood	Offspring from plantings?
<i>Pterostylis nutans</i>	Nodding Greenhood	A single plant discovered 2017

Sadly, when the author returned to the site in October to check the three orchid species he had seen in August, all that was left in their place was disturbed soil. The onion-orchids should have been in full flower and the other two orchid species should have had withered stems and leaves. The cause of the disappearance of the orchids is unknown.

The mixture of plant species above is different in important ways from any natural plant community. The vegetation structure is very variable, as seen in Figures 8 and 9.

The following list contains species that have been planted, as found in 2017. An asterisk at the start of a species' name indicates that it is not indigenous.

Planted Species seen in 2017

Scientific name	Common name	Comments
<u>Trees</u>		
* <i>Acacia decurrens</i>	Green Wattle	
* <i>Ficinia nodosa</i>	Knobby Club-rush	
<i>Myoporum petiolatum</i>	Sticky Boobialla	Questionably indigenous
<i>Allocasuarina littoralis</i>	Black Sheoak	
<i>Eucalyptus ovata</i>	Swamp Gum	
* <i>Eucalyptus</i> species	various eucalypts	
<i>Eucalyptus viminalis</i> subsp. <i>pyroriana</i>Coast Manna Gum	
<i>Melaleuca ericifolia</i>	Swamp Paperbark	
<u>Shrubs</u>		
<i>Acacia paradoxa</i>	Hedge Wattle	
<i>Correa reflexa</i>	Common Correa	
<i>Goodenia ovata</i>	Hop Goodenia	
* <i>Hakea salicifolia</i>	Willow-leaf Hakea	May have arrived in mulch
<i>Indigofera australis</i>	Austral Indigo	
<i>Kunzea leptospermoides</i>	Yarra Burgan	
<i>Olearia ramulosa</i>	Twiggy Daisy-bush	
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	
<u>Creepers</u>		
<i>Geranium</i> sp. 2	Variable Crane's-bill	
<i>Kennedia prostrata</i>	Running Postman	
<u>Grassy species (order Poales)</u>		
<i>Lomandra longifolia</i> subsp. <i>longifolia</i>Spiny-headed Mat-rush	
<i>Poa labillardierei</i>	Common Tussock-grass	
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	
<i>Rytidosperma ?setaceum</i>	Bristly Wallaby-grass	
<i>Themeda triandra</i>	Kangaroo Grass	

Planted Species seen in 2017

Scientific name	Common name	Comments
<u>Other ground flora</u>		
<i>Bulbine bulbosa</i>	Yellow Bulbine-lily	
<i>Chrysocephalum semipapposum</i>Clustered Everlasting	
<i>Dianella laevis</i>	Smooth Flax-lily	
<i>Dianella tasmanica</i>	Tasman Flax-lily	
<i>Pterostylis curta</i>	Trim Greenhood	planted in 1995 and 2017

Mr Paul Caine of the Glen Eira Environment Group advises that some of the Trim Greenhoods in the sanctuary are the descendants of wild plants transplanted from the corner of Helensea Ave & Merton St, Caulfield North, immediately prior to that property being redeveloped in 1995. Maroonhoods (*Pterostylis pedunculata*) were also transplanted into the sanctuary but none of that species could be found in 2017. He also advises that some other Trim Greenhoods in the sanctuary were planted in autumn 2017 after they had been rescued from a road project in or near Oakleigh, probably the Dingley Bypass.

The following list contains only plant species that pose a threat to the survival of the indigenous flora.

Environmental Weed Species seen in 2017

Scientific name	Common name
<i>Ehrharta erecta</i>	Panic Veldt-grass
<i>Fraxinus angustifolia</i>	Desert Ash
<i>Galium aparine</i>	Cleavers
<i>Hedera helix</i>	Ivy
<i>Ligustrum lucidum</i>	Large-leafed Privet
<i>Oxalis corniculata</i>	Creeping Wood-sorrel
<i>Stellaria media</i>	Chickweed
<i>Vulpia bromoides</i>	Squirrel-tail Fescue
<i>Zantedeschia aethiopica</i>	White Arum Lily

Fauna

During the two hours (approximately) that the author spent in the sanctuary in 2017, he observed only four common urban birds in the fenced sanctuary, plus possum scats. The noisy construction of skyrail probably reduced the presence and detection of fauna. However, any of the vertebrate fauna in Boyd Park more broadly are likely to occur in the sanctuary. Therefore, the list of vertebrate fauna in Section 7.7 (p. 42) is the best indication of the sanctuary's likely fauna.

The sanctuary's trees, in combination with those elsewhere in Boyd Park, may occasionally serve as a 'refuelling station' or ecological stepping-stone for migrating Swift Parrots, which are recorded some years in or near Murrumbena. Swift Parrots are listed as endangered under the federal *Environment Protection and Biodiversity Conservation Act 1999*.

Recommendations

It is recommended for Council to investigate the cause of the disappearance of the three orchid species between August and October 2017. The objective would be to prevent a similar incident if any orchids reappear in future.

Re-emergence of orchids should be checked in June 2018 at the locations that have been provided to Council. If any orchids are found, protective measures should be considered not only to avoid the cause of the disappearances in 2017 but also to reduce the damage done by snails or slugs. To avoid risk to dogs, iron-based baits (with low toxicity to mammals) could be placed in bait stations that prevent access by dogs or children.

During and soon after the skyrail construction work on the sanctuary's southern edge, checks should be made for any requirements to minimise harm to the sanctuary's vegetation from incursions of weeds, soil and construction waste.

Knowledge Base

Approximately two hours of fieldwork was done within the fenced sanctuary for this study in May to August 2017, some of it in the company of Mr Rob Scott and the Council staff who manage the vegetation. The orchids were re-checked on 26th October 2017. The author also recorded flora and fauna in September 2015, but not exhaustively. Mr Paul Caine provided his 1990s plant list and information about the origins of the greenhoods. Additional data were sought from the usual sources such as the Atlas of Living Australia and eBird but there were no records specifically relevant to the sanctuary. Data for a broader area around the sanctuary are discussed in the next section, about the rest of Boyd Park.

7.7 Boyd Park, Murrumbeena (excluding the Sanctuary)

Summary

Leaving aside the sanctuary at its southern end, Boyd Park is mostly a typical urban park with lawns and gardens, but it is a biodiversity hotspot because it includes:

- A few old River Red Gums, one of them estimated as 100+ years old;
- A colony of Trim Greenhoods, whose only known additional occurrence in Glen Eira is in the sanctuary at the park's southern end (see three pages up);
- Small numbers of other indigenous plants that have survived past clearing or recolonised subsequently;
- Extensive plantings of indigenous plant species in mulched garden beds, mostly planted in recent years; and
- A tree canopy formed by indigenous and Australian native species that provides habitat for native birds that are uncommon in most of Glen Eira, probably sometimes including the endangered, migratory Swift Parrot.

History

Prior to European colonisation, Murrumbeena Ck flowed northward along an alignment that went through the current-day Springthorpe Gardens, along the footpath from Omama Rd into Boyd Park and along the western edge of Wilson St. The original cadastre in the 19th Century set aside a drainage reserve for the creek, which now forms part of Boyd Park. A 1925 plan of the area* shows the creek flowing in a natural channel until just north of Waroongaa Rd, then diverted into a straight channel to what is now the northeastern corner of Boyd Park.

The rest of the current-day Boyd Park was reserved for the Outer Circle Railway in the 1880s, which only ran until the 1890s (according to Wikipedia). A bridge was built over the diverted Murrumbeena Ck. The 1925 plan shows that the railway was raised on an earth embankment from Lawrance St to the bridge and from the bridge to Dandenong Rd.

The construction, demolition and levelling of the railway line and its embankments would have destroyed all, or nearly all, native vegetation that remained in the corridor prior to construction.

By 1945, the aerial photograph available online at '1945.melbourne' shows Boyd Park mostly comprising an expanse of grass interrupted by the denuded channel of Murrumbeena Ck. The exceptions were:

- A house and garden centrally located on the Dandenong Rd frontage, since revegetated (Figure 10);
- Three trees opposite Lawrance St, since removed;
- Some medium-sized trees (typically 10 m crown diameter) on the park's western edge for 130 m south from Neerim Rd (some of which remain, e.g. on the right side of Figure 11); and
- Some additional trees of similar size on the eastern edge, within approximately 100 m of the sanctuary (some of which remain, e.g. on the left edge of Figure 11).

* Melbourne Metropolitan Board of Works, 'Detail Plan No. 2564', available from the State Library of Victoria's website.



Figure 10. Near Dandenong Rd, revegetation with a shrubby understorey that would suit small understorey birds if dogs were not so numerous there.



Figure 11. Looking eastward across Boyd Park near its southern end, framed by two old River Red Gums. The gum on the right has hollows suitable for wildlife, and locally rare orchids grow beneath.

According to a 2004 management plan for the Outer Circle Railway Linear Park by Mark McWha Pty Ltd, “The land remained as unkempt paddock until 1960, when a ‘local resident group’ formed, with the intention of ‘cleaning up’ the area”. Council’s historical publication titled ‘The Boyd Walk’ states that Murrumbeena Ck was replaced by an underground pipe in the 1960s, which would have destroyed any remaining indigenous flora along the route (as would extensive sewerage work through the park shown on the 1925 plan).

‘The Boyd Walk’ goes on to say that the land became public open space in 1988, followed by extensive community tree planting in 1989–90 and the official naming as Boyd Park in 1992. The trunk girth of some of the trees today are consistent with having been planted in the late 1980s.

Planting in the park has continued, guided since 2004 by the aforementioned management plan. Since 2000, indigenous species have been the strong focus of planting in the sections south of Neerim Rd and within 60 m of Dandenong Rd, although ‘indigenous’ has been interpreted rather loosely and pre-existent non-indigenous plants remain intermingled with the indigenous ones. A substantial proportion of the indigenous species in the park have been planted in the last few years.

Flora

Revegetation near Dandenong Rd (Figure 10) has similar vegetation structure to some types of native vegetation but the mix of species and the ground cover are unnatural. River Red Gums like those in Figure 11 capture an essential element of the pre-colonisation landscape and provide good wildlife habitat, even though the surrounding vegetation is quite different from 200 years ago.

The history of clearing, draining, construction, demolition and gardening means that nearly all the indigenous plants in the park today have been planted. The exceptions are as follows:

- The large River Red Gum (*Eucalyptus camaldulensis*) in Figure 11, beside the rear of 19 Ricourt Av, is so large in trunk girth and so coincident with a tree in the 1945 aerial photograph that it appears likely to be a wild tree, perhaps over a century old. A few others in that vicinity may also be wild;
- The Trim Greenhoods (*Pterostylis curta*) beneath that River Red Gum may have persisted since European activity began there, or perhaps they are descendants of plants transplanted into the nearby sanctuary in 1995 (see Section 7.6). Inquiries failed to find any evidence that they have been planted;
- Small numbers of other indigenous plants that have survived past clearing or recolonised subsequently;
- A few Wattle Mat-rushes (*Lomandra filiformis*) close to Dandenong Rd may have persisted since prior to colonisation;
- A number of other plant species have probably recolonised the park after arriving by wind or on machinery, dog fur, clothing or footwear.

Based on the fieldwork in this study, the following is a full list of all the twenty plant species that are (or may be) in the categories above. Bold names indicate the three species that were not detected growing wild anywhere else in Glen Eira during this study.

Apparently Wild Indigenous Plant Species

Scientific name	Common name	Comments
<u>Moss</u> <i>Breutelia affinis</i>	Common Breutelia	

Apparently Wild Indigenous Plant Species

Scientific name	Common name	Comments
<u>Trees</u>		
<i>Acacia implexa</i>	Lightwood	Quite possibly planted
<i>Acacia mearnsii</i>	Black Wattle	Possibly planted
<i>Eucalyptus camaldulensis</i>	River Red Gum	
<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>Coast Manna Gum	1 only, probably planted
<i>Melaleuca ericifolia</i>	Swamp Paperbark	Probably planted
<u>Shrubs</u>		
<i>Bursaria spinosa</i>	Sweet Bursaria	Possibly planted
<i>Cassinia arcuata</i>	Drooping Cassinia	Probably blown in
<u>Climbers</u>		
<i>Clematis decipiens</i>	a small-leaved clematis	Some may be wild; others are planted
<i>Muellerina eucalyptoides</i>	Creeping Mistletoe	One on a gum near the William St entrance
<u>Grassy species (order Poales)</u>		
<i>Juncus pallidus</i>	Pale Rush	At least some are wild
<i>Juncus bufonius</i>	Toad Rush	Blown in, for sure
<i>Juncus subsecundus</i>	Finger Rush	Origin quite uncertain
<i>Lachnagrostis filiformis</i>	Common Blown Grass	Blown in, for sure
<i>Lomandra filiformis</i>	Wattle Mat-rush	1 only, near Dandenong Rd
<i>Microlaena stipoides</i>	Weeping Grass	Quite likely partly wild
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	Probably arrived inadvertently with people
<u>Other ground flora</u>		
<i>Cotula australis</i>	Common Cotula	Probably blown in
<i>Dianella revoluta</i> group	Black-anther Flax-lily	Probably planted
<i>Pterostylis curta</i>	Trim Greenhood	25 rosettes, probably wild

The following species have definitely been planted as indigenous species. (No attempt is made here to document all the other plantings, which are not important for botanical biodiversity.)

Planted Species

Scientific name	Common name	Comments
<u>Trees</u>		
<i>Acacia melanoxylon</i>	Blackwood	
<i>Allocasuarina littoralis</i>	Black Sheoak	
<u>Shrubs</u>		
<i>Acacia paradoxa</i>	Hedge Wattle	
<i>Correa</i> species	Correa	Not an indigenous form
<i>Goodenia ovata</i>	Hop Goodenia	
<i>Indigofera australis</i>	Austral Indigo	
<i>Lasiopetalum baueri</i>	Slender Velvet-bush	Not truly indigenous
<u>Climber</u>		
<i>Clematis decipiens</i>	a small-leaved clematis	
<u>Grassy species (order Poales)</u>		
<i>Austrostipa mollis</i>	a spear-grass	
<i>Ficinia nodosa</i>	Knobby Club-rush	Not truly indigenous

Planted Species

Scientific name	Common name	Comments
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<i>Lomandra longifolia</i> subsp. <i>longifolia</i>Spiny-headed Mat-rush	
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<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	
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<i>Themeda triandra</i>	Kangaroo Grass	
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Other ground flora

<i>Dianella tasmanica</i>	Tasman Flax-lily	
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A range of garden weeds inevitably volunteer themselves in the garden beds. On the whole, Council controls them quite effectively. However, White Arum Lily (*Zantedeschia aethiopica*) is defying control in the south and it poses a major threat to the survival of the greenhoods. Two other species are defying control and competing vigorously with planted plants: Caper Spurge (*Euphorbia lathyris*) and Panic Veldt-grass (*Ehrharta erecta*). (In the former case, there is a little doubt about which species of spurge.)

Fauna

The following vertebrate fauna were observed at Boyd Park Sanctuary. Entries without a date were in 2017 and those without an observer's name were by the author in this study. The noisy construction of skyrail in 2017 probably reduced the presence and detection of fauna toward the southern end of Boyd Park. An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning.

Common name	Scientific name	Comments; Observer
<u>Mammals</u>		
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	Debilitating some significant eucalypts
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	as above
<u>Birds</u>		
*Rock Dove	<i>Columba livia</i>	D. Fleming
*Spotted Dove	<i>Spilopelia chinensis</i>	D. Fleming
Crested Pigeon	<i>Ocyphaps lophotes</i>	L. Hiller, 2016
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	L. Hiller, 2016. Occasional visitor
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	
Musk Lorikeet	<i>Glossopsitta concinna</i>	
Eastern Rosella	<i>Platycercus eximius</i>	D. Fleming
Tawny Frogmouth	<i>Podargus strigoides</i>	D. Fleming
White-throated Needletail	<i>Hirundapus caudacutus</i>	E. Thomas, 1985
White-browed Scrubwren	<i>Sericornis frontalis</i>	D. Fleming, 2013. Perhaps died out
Brown Thornbill	<i>Acanthiza pusilla</i>	
Red Wattlebird	<i>Anthochaera carunculata</i>	
Little Wattlebird	<i>Anthochaera chrysoptera</i>	
Noisy Miner	<i>Manorina melanocephala</i>	
Pink Robin	<i>Petroica rodinogaster</i>	D. Fleming, 2013
Golden Whistler	<i>Pachycephala pectoralis</i>	D. Fleming, 2011
Magpie-lark	<i>Grallina cyanoleuca</i>	
Grey Butcherbird	<i>Cracticus torquatus</i>	
Australian Magpie	<i>Gymnorhina tibicen</i>	
Pied Currawong	<i>Strepera graculina</i>	L. Hiller, 2016
Little Raven	<i>Corvus mellori</i>	
Welcome Swallow	<i>Hirundo neoxena</i>	D. Fleming

Common name	Scientific name	Comments; Observer
*Common Blackbird	<i>Turdus merula</i>	
*Common Starling	<i>Sturnus vulgaris</i>	D. Fleming
*Common Myna	<i>Acridotheres tristis</i>	

The White-throated Needletail has undergone a marked decline in Victoria since the 1985 observation of roughly 10,000 flying over Boyd Park, so it has become listed as vulnerable in Victoria. The 1985 observation at Boyd Park does not reflect any importance of the park for the species.

The Pink Robin is an uncommon seasonal visitor to metro Melbourne. It needs dense shrubbery for habitat (see www.birdlife.org.au). Boyd Park provides such habitat near Dandenong Rd (Figure 10), where a bird was seen in 2013, but the abundance of dogs would soon displace such a shy bird.

Golden Whistlers were common urban birds a few decades ago but have become uncommon, particularly in Glen Eira. Mr David Fleming commented that a Golden Whistler was the ‘last bird I expected to see’ in Boyd Park in 2011. That was again near Dandenong Rd, as was the 2016 observation of four Yellow-tailed Black-Cockatoos, which are occasional visitors to Glen Eira as they traverse the suburbs.

White-browed Scrubwrens are in decline in metro Melbourne. They are very sedentary (see www.birdlife.org.au), so the absence of any record of them around Boyd Park since 2013 suggests that they may have died out, e.g. due to cats. There is little chance of recolonisation.

The other fauna in the list above are common urban species, even though the Tawny Frogmouth often goes unnoticed.

The trees in Boyd Park may occasionally serve as a ‘refuelling station’ or ecological stepping-stone for migrating Swift Parrots, which are recorded some years in or near Murrumbeena. Swift Parrots are listed as endangered under the federal *Environment Protection and Biodiversity Conservation Act 1999*. Swift Parrots breed in Tasmania in summer and migrate through southeastern mainland Australia in the winter. One of the local records corresponds to a stop-off during northward migration and the other corresponds to a stop-off during southward migration. In both cases, it seems likely that the Swift Parrots paused because of the presence of flowering eucalypts. Swift Parrots probably migrate through the area annually but mostly go undetected.

Recommendations

The habitat value of the reconstructed bushland within 60 m of Dandenong Rd is seriously compromised by the prevalence of dogs, particularly as it is an ‘off lead’ area. If there is to be any hope of shy birds like the Pink Robin making more than rare, momentary visits, dogs should be excluded from the bushy area except on the footpath. The presence of roaming or cavorting dogs also detracts greatly from feelings of contact with nature in the bushy area.

If no Trim Greenhoods emerge in the fenced sanctuary in 2018 (as discussed in Section 7.5), it is recommended that some of the Trim Greenhoods beneath the large River Red Gum in Figure 11 be bred up in a nursery for re-planting in both locations. That would improve the species’ security in the event of further misadventure.

The greatest threats to the survival of the Trim Greenhoods are: (a) smothering by White Arum Lilies; (b) smothering by mulch, which they have already survived at least once; and (c) slugs or snails, which have been eating the orchids’ leaves.

It is therefore recommended:

- To undertake careful but concerted destruction of the White Arum Lilies around the orchids;

- For the Parks staff to note the undesirability of applying mulch over the orchids, particularly during April to October each year; and
- To place snail bait around the orchids periodically during April to September. To avoid risk to dogs, iron-based baits (with low toxicity to mammals) could be placed in bait stations that prevent access by dogs or children.

Knowledge Base

Approximately five hours of fieldwork was done in Boyd Park for this study, on 10th & 12th May, 22nd August and 26th October 2017. The author also recorded flora and fauna in September 2015, but not exhaustively.

The fauna observations by Mr David Fleming and Mr Lewis Hiller were extracted from the eBird database and the observation of needletails by Evan Thomas came from the Victorian Biodiversity Atlas.

Mr Brendan Ryan provided records of recent plantings and a copy of the 2004 management plan for Boyd Park. Three of his staff met the author on site and took him to the Trim Greenhoods, which had not been identified until then.

Mr Rob Scott also met the author on site and provided information about recent plantings and management.

7.8 Moorabbin Reservoir, Bentleigh East

Summary

Moorabbin Reservoir is at 675 Warrigal Rd, Bentleigh East. The grounds, and particularly the embankments and raised ground, support a substantially greater diversity of wild, indigenous flora, and in a more resilient state, than anywhere else in Glen Eira. That is despite the soil having been shifted and shaped into a quite unnatural form. A total of 31 wild, indigenous plant species was found in this study's inspection on 28th April 2017. Of those, 5 species of moss, 1 liverwort and 6 species of flowering plant are the only known surviving occurrences in Glen Eira, although some of these may well be found elsewhere in the right season. More species would be detected around the reservoir at other times of year.

No significant fauna have been recorded from the site or its immediate surroundings, but a more protracted study might detect reptiles, frogs and invertebrates whose rarity in Glen Eira is similar to the site's flora.

The site is not open to the public but some of the indigenous flora can be seen from the footpath along Warrigal Rd.



Figure 12. The southern embankment, with plantings of woody species over wild native grasses and a drift of wild Sandhill Sword-sedge (*Lepidosperma concavum*). Native mosses are diverse and abundant.



Figure 13. The western embankment, dominated by indigenous plantings, including grasses.



Figure 14. The property's northwest corner, with *Leptospermum continentale* and *Dianella tasmanica* of uncertain origin, and a dense screen of Yarra Burgan that would suit small insect-eating birds.

History

When the covered reservoir was constructed in 1932, the locality name was Moorabbin*, hence the name ‘Moorabbin Reservoir’ despite being in current-day Bentleigh East.

Part of the construction of the reservoir involved amassing an earth mound on the southern side of the reservoir, easily seen from Warrigal Rd. At the time of this study’s site inspection, several bare patches on the slope (batter) of the western embankment exposed the orange mixture of sand and gravel that is distinctive of the ‘Red Bluff Sandstone’ geological formation. Figure 14 is an example. The Geological Survey of Victoria shows that prior to colonisation, there was a windblown dune overlaid upon the Red Bluff Sandstone. The past presence of the dune explains why this study found drifts of the Sandhill Sword-sedge (*Lepidosperma concavum*) on the site – the only known occurrences in Glen Eira.

As seen in the photographs above, the embankments are much steeper than the natural terrain of the area and the soil has been substantially altered. The reservoir’s construction would have destroyed almost all the pre-existing vegetation. The grounds were planted with a mixture of introduced trees (e.g. the pines in Figure 12) and Australian native trees and shrubs, followed in recent years by plantings of indigenous and nearly-indigenous species (Figure 13).

Despite all these alterations to the land and its vegetation, a remarkable number of indigenous plant species have recolonised, dominating the understorey over substantial areas.

Flora

The table below lists the 31 indigenous plant species found on 28th April 2017 to be growing wild in the site (or thought to be probably wild, in cases indicated by question marks). Bold names indicate the 12 species that were not detected growing wild anywhere else in Glen Eira during this study, but the *Crassula*, *Chiloscyphus* and some of the mosses may well be found elsewhere in the right season. The symbols in the ‘Abundance’ column have the following meanings:

- Scarce, to the extent of being at risk of dying out from the site;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

Apparently Wild Indigenous Plant Species

Scientific name	Common name	Abundance	Comments
<u>Mosses & liverworts</u>			
<i>Campylopus clavatus</i>	Broody Swan-neck Moss	✓	
<i>Campylopus introflexus</i>	Heath Star Moss	–	On the western embankment
<i>Chiloscyphus semiteres</i>	Green Worms	✓	
<i>Hypnum cupressiforme</i>	Common Hypnum	D	Abundant on the southern embankment
<i>Polytrichum juniperinum</i>	Common Juniper-moss	–	Near the mobile phone tower
<i>Rosulabryum billarderi</i>	Common Thread-moss	✓	
<u>Trees</u>			
<i>Acacia melanoxylon</i>	Blackwood	✓?	Approximately 7 on the west embankment
<i>Melaleuca ericifolia</i>	Swamp Paperbark	✓	Along southern periphery
<u>Shrubs</u>			
<i>Acacia paradoxa</i>	Hedge Wattle	M?	mainly western embankment
<i>Bursaria spinosa</i>	Sweet Bursaria	–?	2 only, on western embankment

* See article on p. 3 of *The Argus* of 8th April 1932, available at trove.nla.gov.au/newspaper/article/4445677.

Apparently Wild Indigenous Plant Species

Scientific name	Common name	Abundance	Comments
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	–?	4 only, on western embankment
<u>Fern</u>			
<i>Pteridium esculentum</i>	Austral Bracken	D	Southern end of western embankment
<u>Creepers</u>			
<i>Einadia nutans</i>	Nodding Saltbush	–	4 SW of reservoir; 1 in NE
<i>Kennedia prostrata</i>	Running Postman	–?	3 on SE embankment; 2 at 'valve 10' in NW
<u>Grassy species (order Poales)</u>			
<i>Austrostipa mollis</i>	a Spear-grass	M	Widespread
<i>Eragrostis brownii</i>	Common Love-grass	✓	c. 100 on flat ground just south of reservoir
<i>Juncus pallidus</i>	Pale Rush	–	1 only
<i>Lepidosperma concavum</i>	Sandhill Sword-sedge	D	40 m ² & 100 m ² patches on southern batter
<i>Lomandra filiformis</i> ssp. <i>coriacea</i>	Wattle Mat-rush	✓	c. 50, widespread
<i>Lomandra filiformis</i> ssp. <i>filiformis</i>	Wattle Mat-rush	✓	c. 26, SW of reservoir on flat & embankment
<i>Lomandra longifolia</i> ssp. <i>longifolia</i>...	...Spiny-headed Mat-rush	–	4 only; at least one is not planted
<i>Microlaena stipoides</i>	Weeping Grass	✓	
<i>Rytidosperma fulvum</i>	Leafy Wallaby-grass	D	
<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass	✓	
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	✓	
<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	✓	
<u>Other ground flora</u>			
<i>Crassula decumbens</i>	Spreading Crassula	–	
<i>Dianella ?tasmanica</i>	Tasman Flax-lily	–?	2 in NW corner and 1 on SE corner of batter
<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>Variable Willow-herb	–	Just downhill of southern embankment
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	✓	Just downhill of southern embankment
<i>Lythrum hyssopifolia</i>	Small Loosestrife	–	Just downhill of southern embankment

The Sandhill Sword-sedge (*Lepidosperma concavum*) is rare in metro Melbourne. The closest records from the past twenty years are:

- 5 km to the southeast, at The Grange Reserve in Clayton South, where it was recorded in 2001 and is probably still present;
- 6 km to the southwest at Bay Rd Reserve in Sandringham, where it was recorded in 2003 and is probably still present;
- 6 km to the south-southwest in Cheltenham Park, where it was recorded in 2003 and may still be present;
- 7 km to the southwest at George St Reserve and adjacent golf courses in Sandringham, where it was recorded in 2002 and is very likely to remain present;
- 7 km to the southeast at what has since become the intersection of the Dingley Bypass Rd and the Westall Rd Extension, where it was recorded in 1999 and may still be present, if it survived recent roadworks;
- At Picnic Point in Hampton until at least 2003, but it was not present when I checked in 2017.

The Running Postman (*Kennedia prostrata*) has become similarly rare in metro Melbourne to the Sandhill Sword-sedge. The only records within 10 km from the past twenty years are:

- 3½ km to the north, beside Scotchmans Ck, where it was recorded in 2005 but possibly from planted plants, and in any case, it is probably no longer present;
- 6 km to the south-southwest in Cheltenham Park, where it was recorded in 2001 but may well have died out since;
- 6 km to the southwest at Bay Rd Reserve in Sandringham, where it was recorded in 2002 and is probably still present (at least after the periodic burns there);
- 7 km to the southwest at George St Reserve and adjacent golf courses in Sandringham, where it was recorded in 2009 and is probably still present;
- 9 km to the northeast at Highbury Park, where it was recorded in 2005 but has most likely died out.

The two plants of Running Postman on the western embankment beside the sign for ‘valve 10’ appear to be in no immediate peril but they may be producing few seeds due to restricted pollination and they may disappear in the absence of the fire or soil disturbance that is needed for seeds to germinate. The three (approximately) intertwined plants on the southeastern corner of the embankment, close to the property gate, are at great peril. They germinated following recent soil disturbance, which has also stimulated germination of many plants of the very serious weed, Gorse (*Ulex europaeus*). The Gorse could kill the Running Postman plants by outcompeting them. Otherwise, the likely use of herbicide to kill the Gorse would also kill the Running Postman unless great care is taken.

There is potential scientific importance in the presence of flax-lily plants that appear to be an unusual form of *Dianella tasmanica*, one of which is seen as the strappy-leafed plant in the foreground of Figure 14. However, the flax-lilies may belong to a different species from far away, if it has been planted. In that case, it would be of little scientific interest, if any.

The following list contains the Victorian native species (mostly native to the sandbelt) that have been planted around the reservoir, adding to the habitat of the wild indigenous plants.

Planted Indigenous Species

Scientific name	Common name	Abundance	Comments
<u>Trees</u>			
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle	✓	Not indigenous to the site
<i>Acacia melanoxylon</i>	Blackwood	✓	
<i>Leptospermum laevigatum</i>	Coast Tea-tree	D	Not indigenous to the site
<u>Shrubs</u>			
<i>Acacia paradoxa</i>	Hedge Wattle	✓	
<i>Acacia stricta</i>	Hop Wattle	–	
<i>Banksia marginata</i>	Silver Banksia	–	
<i>Indigofera australis</i>	Austral Indigo	–	
<i>Melicytus dentatus</i>	Tree Violet	–	
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	–	
<u>Grass</u>			
<i>Poa labillardierei</i>	Common Tussock-grass	✓	

The following list contains wild, non-indigenous species found during the 2017 site inspection. The species are colour-coded to indicate the author’s assessment of the level of environmental

hazard that each species poses, with red for ‘serious’, orange for ‘moderate hazard’ and green for inconsequential.

Wild, Introduced Species		Abun-	
Scientific name	Common name	dance	Comments
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle	✓	
<i>Agrostis capillaris</i>	Brown-top Bent	✓	
<i>Aira caryophylla</i>	Silvery Hair-grass	✓	
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	M	
<i>Avena barbata</i>	Bearded Oat	–	
<i>Brassica ?fruticulosa</i>	Twiggy Turnip	✓	
<i>Briza maxima</i>	Large Quaking-grass	M	
<i>Bromus catharticus</i>	Prairie Grass	–	
<i>Cenchrus clandestinus</i>	Kikuyu	D	
<i>Chamaecytisus palmensis</i>	Tree Lucerne	–	
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	✓	
<i>Dysphania pumilio</i>	Clammy Goosefoot	✓	North of the reservoir
<i>Ehrharta erecta</i>	Panic Veldt-grass	✓	
<i>Ehrharta longiflora</i>	Annual Veldt-grass	✓	
<i>Erigeron sumatrensis</i>	Fleabane	–	
<i>Galenia pubescens</i>	Galenia	✓	
<i>Hypochaeris radicata</i>	Cat’s Ear	✓	
<i>Ligustrum lucidum</i>	Large-leafed Privet	–	
<i>Lycium ferocissimum</i>	African Box-thorn	–	
<i>Oxalis ?pes-caprae</i>	Soursob	✓	
<i>Pittosporum undulatum</i>	Sweet Pittosporum	✓	
<i>Romulea rosea</i>	Common Onion-grass	✓	
<i>Salpichroa organifolia</i>	Pampas Lily-of-the-Valley	–	
<i>Sporobolus africanus</i>	Rat-tail Grass	✓	
<i>Ulex europaeus</i>	Gorse (Furze)	✓	
<i>Vulpia bromoides</i>	Squirrel-tail Fescue	✓	
<i>Vulpia myuros</i>	Rat’s-tail Fescue	–	
<i>Portulaca oleracea</i>	Pigweed (Common Purslane)	–	

Fauna and Habitat

Only very common urban birds were observed during the two hours of site inspection on 28th April 2017. Traffic noise from Warrigal Rd made detection of birds difficult. There is abundant evidence of digging and grazing by rabbits around the property, but not to the extent that the author has concerns about environmental harm. (Native animals would once have had similar effects, and removal of rabbits would threaten the survival of some indigenous plant species by allowing weeds to dominate.)

The only other fauna records within 500 m of the reservoir that could be found are from a residence on Tudor St, again involving only very common urban birds. There are copious eBird records from nearby Huntingdale Golf Course by Mr David Fleming but they are not particularly relevant to the Moorabbin Reservoir because of large habitat differences; e.g. the golf course records include many waterbirds that would find no habitat at the covered Moorabbin Reservoir.

In season, pine nuts at the Moorabbin Reservoir property probably attract cockatoos. Dense plantings of indigenous shrubs, mainly on the western embankment, may attract small insect-eating birds such as Brown Thornbills. The trees and shrubs, generally, would provide nest sites for a range of birds, both native and introduced. Open, grassy areas with adjacent shrub cover may

provide habitat for common lizards such as Garden Skinks. The diversity of indigenous plants may provide habitat for indigenous invertebrates that have no habitat in the surrounding urbanised environment.

Recommendations

Prioritisation of land management effort might be helped by checking whether records of past plantings within the property suggest that some of the locally rare plant species may be just the result of planting. This particularly applies to Running Postman, Tasman Flax-lily and Tree Everlasting. If they have been planted, they are not as precious, or need as much attention, as if they are the last wild remnants of their species in the municipality.

As discussed above, the three (approximately) plants on the southeastern corner of the embankment, close to the property gate, are at great peril from Gorse and the likely use of herbicide to kill the Gorse. It is recommended that the Gorse be urgently killed by cut-and-paint method, taking great care not to affect the Running Postman.

Knowledge Base

Two hours of fieldwork were done at the Moorabbin Reservoir property for this study, on 28th April 2017. Thanks to South East Water for making the inspection possible.

Information about the site's vegetation and wildlife was sought from South East Water (particularly through Mr Doug Stewart) and from Mr Mark Mooney of Local Habitat Pty Ltd, which is the vegetation management contractor for the site.

Further data was sought from the sources cited above and from all the sources described in Section 3.1.

7.9 Yarra Yarra Golf Course, Bentleigh East

Summary

Based on all available bird observation data, Yarra Yarra Golf Course has the most diverse birdlife of anywhere in Glen Eira, including some species not present elsewhere in the municipality. The large expanse of park-like tree cover and a substantial waterbody in the south combine to provide habitat that is different from anywhere else in Glen Eira. The significance of the course's flora is uncertain because there are no prior plant records and this study did not have permission to enter the property. However, it has been determined that there are at least two plants of the Clustered Bush-pea, which is rare throughout metro Melbourne. Viewed from outside the fence, the course is seen to have indigenous wetland vegetation and many habitat trees with nest hollows (e.g. Figure 15).



Figure 15. Many of the course's trees are large and have hollows that suit nesting or roosting by microbats, possums, owls, kookaburras and parrots such as these Rainbow Lorikeets, seen near the McGuiness Rd gate.

Flora

The following table of wild, indigenous plant species is likely to be quite incomplete, as it derives from inspections from the few locations on the golf course boundary where there is no wall blocking the view. Abundances cannot be inferred from such a selective sample of the course. Views of the lake were at considerable distance, revealing many indigenous rushes but not with adequate clarity to identify individual species. The presence of at least two wild plants of Clustered Bush-pea in 2017 was demonstrated by a series of photographs provided to the author. That species is rare throughout metro Melbourne.

Apparently Wild Indigenous Plant Species

Scientific name	Common name
<u>Tree</u>	
<i>Acacia melanoxylon</i>	Blackwood
<i>Melaleuca ericifolia</i>	Swamp Paperbark
<u>Shrub</u>	
<i>Cassinia arcuata</i>	Drooping Cassinia
<i>Pultenaea dentata</i>	Clustered Bush-pea
<u>Fern</u>	
<i>Pteridium esculentum</i>	Austral Bracken
<i>Austrostipa mollis</i>	a Spear-grass
<u>Grassy species (order Poales)</u>	
<i>Juncus amabilis</i>	Hollow Rush
<i>Juncus pallidus</i>	Pale Rush
<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass

Fauna and Habitat

Treed golf courses usually provide good habitat for birds due to the combination of trees, grassy expanses and waterbodies, so they are often well surveyed by bird observers. As a result, the ‘citizen science’ database, ‘eBird’, contains 76 bird lists from Yarra Yarra Golf Course in recent years. The following table shows the accumulated eBird list combined with the data from the present study, which provided all the 2017 records. Pre-2017 records are all from Mr Lewis Hiller except for Grey Shrike-thrush, which is from Mr David Fleming. An asterisk indicates an introduced species.

Wild Fauna			Latest year
Scientific name	Common name		
<u>Mammal</u>			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		2017
<u>Birds</u>			
Australian Wood Duck	<i>Chenonetta jubata</i>		2017
Pacific Black Duck	<i>Anas superciliosa</i>		2016
Grey Teal	<i>Anas gracilis</i>		2015
Chestnut Teal	<i>Anas castanea</i>		2016
Hardhead	<i>Aythya australis</i>		2015
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>		2016
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>		2015
Darter	<i>Anhinga melanogaster</i>		2015
Pied Cormorant	<i>Phalacrocorax varius</i>		2015
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>		2015
Great Cormorant	<i>Phalacrocorax carbo</i>		2015
Australian Pelican	<i>Pelecanus conspicillatus</i>		2015
White-faced Heron	<i>Egretta novaehollandiae</i>		2016
Great Egret	<i>Ardea alba</i>		2014
Australian White Ibis	<i>Threskiornis molucca</i>		2015
Straw-necked Ibis	<i>Threskiornis spinicollis</i>		2016

Wild Fauna

Scientific name	Common name	Latest year
Black-shouldered Kite	<i>Elanus axillaris</i>	2015
Black Kite	<i>Milvus migrans</i>	2015
Whistling Kite	<i>Haliastur sphenurus</i>	2015
Spotted Harrier	<i>Circus assimilis</i>	2015
Swamp Harrier	<i>Circus approximans</i>	2015
Brown Goshawk	<i>Accipiter fasciatus</i>	2016
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	2016
Wedge-tailed Eagle	<i>Aquila audax</i>	2015
Little Eagle	<i>Hieraaetus morphnoides</i>	2015
Brown Falcon	<i>Falco berigora</i>	2015
Australian Hobby	<i>Falco longipennis</i>	2015
Black Falcon	<i>Falco subniger</i>	2015
Peregrine Falcon	<i>Falco peregrinus</i>	2016
Purple Swamphen	<i>Porphyrio porphyrio</i>	2017
Dusky Moorhen	<i>Gallinula tenebrosa</i>	2016
Eurasian Coot	<i>Fulica atra</i>	2016
Masked Lapwing	<i>Vanellus miles</i>	2016
Pacific Gull	<i>Larus pacificus</i>	2015
Silver Gull	<i>Larus novaehollandiae</i>	2017
unidentified tern species (overhead)		2015
*Rock Dove	<i>Columba livia</i>	2016
*Spotted Dove	<i>Spilopelia chinensis</i>	2017
Common Bronzewing	<i>Phaps chalcoptera</i>	2015
Crested Pigeon	<i>Ocyphaps lophotes</i>	2017
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus</i>	2014
<i>funereus</i>		
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	2015
Galah	<i>Cacatua roseicapilla</i>	2017
Long-billed Corella	<i>Cacatua tenuirostris</i>	2016
Little Corella	<i>Cacatua sanguinea</i>	2016
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	2015
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	2017
Musk Lorikeet	<i>Glossopsitta concinna</i>	2016
Little Lorikeet	<i>Glossopsitta pusilla</i>	2016
Australian King-Parrot	<i>Alisterus scapularis</i>	2015
Crimson Rosella	<i>Platycercus elegans</i>	2015
Eastern Rosella	<i>Platycercus eximius</i>	2017
Swift Parrot	<i>Lathamus discolor</i>	2015
Tawny Frogmouth	<i>Podargus strigoides</i>	2017
White-throated Needletail	<i>Hirundapus caudacutus</i>	2015
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	2015
Spotted Pardalote	<i>Pardalotus punctatus</i>	2015
White-browed Scrubwren	<i>Sericornis frontalis</i>	2015
Brown Thornbill	<i>Acanthiza pusilla</i>	2016
Red Wattlebird	<i>Anthochaera carunculata</i>	2017
Little Wattlebird	<i>Anthochaera chrysoptera</i>	2017
Noisy Miner	<i>Manorina melanocephala</i>	2017
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2015
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	2015
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	2015
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	2012
Magpie-lark	<i>Grallina cyanoleuca</i>	2017
Grey Fantail	<i>Rhipidura fuliginosa</i>	2015

Wild Fauna

Scientific name	Common name	Latest year
Willie Wagtail	<i>Rhipidura leucophrys</i>	2016
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2015
Grey Butcherbird	<i>Cracticus torquatus</i>	2017
Australian Magpie	<i>Gymnorhina tibicen</i>	2017
Pied Currawong	<i>Strepera graculina</i>	2017
Grey Currawong	<i>Strepera versicolor</i>	2014
Little Raven	<i>Corvus mellori</i>	2017
*House Sparrow	<i>Passer domesticus</i>	2016
*European Greenfinch	<i>Carduelis chloris</i>	2013
*European Goldfinch	<i>Carduelis carduelis</i>	2015
Welcome Swallow	<i>Hirundo neoxena</i>	2017
Tree Martin	<i>Hirundo nigricans</i>	2014
Silvereye	<i>Zosterops lateralis</i>	2016
*Common Blackbird	<i>Turdus merula</i>	2017
*Common Starling	<i>Sturnus vulgaris</i>	2017
*Common Myna	<i>Acridotheres tristis</i>	2016

The tally of 85 bird species far exceeds any other site list in Glen Eira.

It is instructive to consider why there are so many species in the bird list. There are many waterbirds because of the lake; woodland birds because of the park-like tree cover; forest birds because some areas have fairly dense trees and shrubs; seed-eaters because of the grass and re-seeding of lawn; and raptors because of the good hunting ground provided by the park-like landscape. Proximity to Karkarook Park and several other golf courses allows many bird species to fulfil their habitat needs by moving between those sites, thereby increasing the local bird fauna.

The bird list is also notable for the number of species that are uncommon in metro Melbourne or unique within Glen Eira (e.g. Gang-gang Cockatoo, Collared Sparrow-hawk, Black Kite and Black Falcon). Most of those species have only been recorded once or twice in the past five years, so they are not very reliant on the golf course for their overall habitat needs. Nevertheless, at the very least, the substantial number of such records indicates that the golf course serves as an ecological stepping stone for uncommon birds as they move about the region.

The presence of old trees bearing hollows and crevices means the golf course probably supports microbats. The lake is probably home to frogs but none could be heard on 28th April 2017, which is a poor time of year to be checking. It is difficult to speculate about other fauna without being able to enter the property.

Mr Brendan Ryan of Glen Eira City Council's Parks department advises that Common (or European) Carp are present in all lakes in the municipality. In the lake at Yarra Yarra Golf Course, carp would be expected to disturb the mud and make the habitat less suitable for native aquatic plants, invertebrates, tadpoles and waterbirds.

Recommendations

The golf course may benefit by promoting the birdlife that can be seen on the course. Golf courses can obtain support and guidance for environmental initiatives from:

- The Australian Golf Environment Initiative, which is run by the Australian Golf Course Superintendents' Association;
- The Environmental Strategy for Australian Golf Courses, which was prepared by the Australian Golf Union (Golf Australia);

- The Golf Environment Organisation, GEO (see www.golfenvironment.org); and
- The R&A's 'Working with Nature' web page.

These resources may also help the club to conserve the rare Clustered Bush-peas at the course.

Liaison between the golf club and BirdLife Australia may also be mutually beneficial.

Knowledge Base

During this study, approximately two hours were spent inspecting the golf course from outside, on 28th April 2017. Most of the inspection was in the early afternoon, but frog calls were sought (in vain) during an early evening visit to the gate at the end of Niki Ct, near the lake.

The overall landscape, tree cover and the lake were further investigated using Google Maps' 3D imagery and 'StreetView'.

Additional data was sought from the sources described in Section 3.1.

The presence of Clustered Bush-pea was established by a verbal report supported by series of clearly identifiable photographs taken at the golf course in 2017.

8. Additional Sites

This chapter summarises places in Glen Eira that do not meet the criteria of biodiversity hotspots in the previous chapter but still retain a small amount of native vegetation or provide substantial habitat (or potential habitat) for urban wildlife. This chapter does not document the many occurrences of small numbers of common indigenous plant species in lawns, car parks and similar habitats.

8.1 East Bentleigh Primary School and Moorleigh Community Village

The grounds of East Bentleigh Primary School, Taraleigh Steiner Pre-school and Moorleigh Community Village have a moderate cover of mature eucalypts and smaller native trees. The vegetation provides the structure and food resources for a very good representation of Glen Eira's common urban birds, possums and invertebrates. The trees also provide nest sites. Playing fields provide habitat for ground-feeding birds such as Masked Lapwings and Ibis.

The proximity to Yarra Yarra Golf Course (Section 7.9), other golf courses and Karkarook Park probably increases the abundance of wildlife. Some of the rarer bird species that visit those other sites probably pass through or over the school, pre-school and community village from time to time.

Although the habitat is inadequate to support uncommon fauna, the abundance of common species has a heightened value because it gives so many people contact with nature. That is particularly important for the children at the school and pre-school, for the same reasons that they have vegetable gardens and domestic ducks. The wildlife provides an educational resource and a more natural environment and ambience for childhood development.

8.2 Packer Park and Mallanbool Reserve

Garden beds in the southeast of Packer Park and around the perimeter of Mallanbool Reserve are planted with mixtures of indigenous plants of the sandbelt and other Australian native species. Probably the oldest planting is a large Coast Manna Gum (*Eucalyptus viminalis* subspecies *pryoriana*) that provides a canopy over the playground at Packer Park (Figure 16). (The gum is not a remnant from pre-colonisation; The '1945.melbourne' web page shows that in 1945, the tree's current location was occupied by a blackberry patch in a paddock.) Among the most recent plantings are rain gardens along the floodway in Mallanbool Reserve, comprising rushes with no overstorey. More generally, the understorey varies from absent to dense at all heights.

The tree canopy provides food, perching sites and nest sites for common urban birds. It also provides habitat for possums and invertebrates. Open, grassed areas provide habitat for ground-feeding birds such as Masked Lapwings and Ibis when they are not displaced by humans and dogs.

The areas of denser understorey could provide habitat for small insect-eating birds such as White-browed Scrubwrens and Brown Thornbills if the garden beds were wider. As it is, the dense understorey beds are so narrow and close to paths that pedestrians and dogs walk right next to the potential habitat, discouraging shy birds. Probably the best potential for encouraging small birds is in the eastern corner of Packer Park, 100 m northeast of the playground. There, the garden bed is wider and offers more seclusion for birds as plants grow. (Passive surveillance in parks is in conflict with wildlife needs.)

The swale near the playground is occupied by small numbers of three indigenous species of frog (Southern Brown Tree Frog, Pobblebonk and Common Froglet). Only the first of these was

observed during this study (due to time of year) and the others were observed by Ms Christine Renowden.

The areas of greatest habitat potential in Packer Park, being the swale and the garden bed in the southeast, are held back from achieving that potential by their designation as ‘dogs off lead’ areas. Dogs are displacing birds and frogs, and urinating on the rushes where the frogs take cover. (Frogs breathe by diffusion through their skin, which is very vulnerable to contamination.)



Figure 16. The large Coast Manna Gum at Packer Park.

8.3 Glenhuntly Railway Reserve

Some remnant indigenous understorey remains in a strip on the eastern side of the train tracks immediately south of the Glenhuntly Station platform. In a 1994 botanical survey by Mr Damien Cook, this verge was perhaps the best remnant of indigenous wildflowers in Glen Eira. Among the species were Running Postman, two species of bluebell, two species of bindweed and three species of wattle in abundance. Long-term local resident, Mr Paul Caine, recalls the rail reserve being subject to regular burning until c. 1983, which would have encouraged wildflowers.

In 2017, little of the native vegetation remains. Regular, indiscriminate herbicide spraying has killed the wildflowers and favoured weeds including cotoneasters and Canary Island palms; nearly all the wattles have all been removed; and a footpath along Royal Av has been constructed through the eastern fringe of the strip. The only remaining indigenous plants that could be found in this study were two Hedge Wattles (*Acacia paradoxa*), one Jersey Cudweed (*Helichrysum luteoalbum*), some Wattle Mat-rush (*Lomandra filiformis*) and small numbers of three common native grasses (*Microlaena stipoides*, *Rytidosperma fulvum* and *Rytidosperma racemosum*). The extent of native vegetation has contracted to a strip 50 m long and up to 3 m wide, from opposite Waratah Av to the next rail gantry south.

8.4 Booran Reserve

The newly created park, Booran Reserve in Glen Huntly, includes recent plantings of groundcover plants (mostly indigenous species) and three rows of Australian native trees to create an ‘urban forest’ in a fenced enclosure (Figure 17). It also retains an impressive, medium sized, planted River Red Gum on the northern edge.

The groundcover plantings will soon attract a range of indigenous and introduced invertebrates such as bees and hover-flies. It is planned that understorey species will be planted beneath the rows of trees to improve the habitat provided by the urban forest. Without the understorey, the trees (Kanooka and Red Ironbark) will attract only common urban birds and insects, e.g. Rainbow Lorikeets, Magpies and Little Ravens, which are already abundant in the area.

In the mulch beneath the rows of trees, three wild, indigenous groundcover plants have volunteered themselves: two Variable Willow-herbs (*Epilobium billardierianum* subspecies *cinereum*) and one Pale Rush (*Juncus pallidus*). They are vulnerable to being sprayed with herbicide as part of general weed control. The main weeds present are Soursob (*Oxalis pes-caprae*), Couch (*Cynodon dactylon*), Wandering Trad (*Tradescantia fluminensis*), Panic Veldt-grass (*Ehrharta erecta*), Cat’s Ear (*Hypochaeris radicata*) and Sweet Pittosporum (*Pittosporum undulatum*). Only the first three of these have potential to be a protracted problem.



Figure 17. The new ‘urban forest’ at Booran Reserve.

9. Community Contributions to Biodiversity

9.1 Providing Habitat

Glen Eira is a patchwork of habitats, as described in Section 6.2 (p. 14). While some wild indigenous flora and fauna cannot spread far from a ‘biodiversity hotspot’, others can exist in, or even rely on, habitat around homes. For example, Garden Skinks can survive around houses (with no cats), Blue-banded Bees visit flowers in gardens, and Brown Thornbills spend their days foraging from one shrubby garden to the next. Some animals rely on gardens and nature strips to augment their core habitat in a hotspot, particularly in lean times. Some indigenous plant species are mainly found these days in certain kinds of nature strip.

In these ways, the right kinds of nature strips and private gardens play a significant role in the welfare and survival of quite a few indigenous plant and animal species. Let us consider how this role can be improved by Glen Eira’s human community.

Firstly, trees are very important for most native birds and many insects, but not just any sort of trees. As discussed in Section 6.2 (p. 14), a 2005 study of the bird communities of Melbourne’s eastern and southeastern suburbs¹ concluded that hotspots of remnant (wild) native vegetation are vital for maintaining native bird communities and that Australian native trees can provide important supplementary habitat. The authors went on:

‘Many of the benefits of native streetscapes for native birds, as outlined above, are not realised in exotic [i.e. non-native] streetscapes, as evidenced by the findings of this study. Considering the benefits of native streetscapes for bird communities, the implementation of effective strategies and incentives that encourage the planting of native vegetation in streetscapes and gardens should be paramount. This should include the full complement of vegetation life-forms from ground covers to trees. Furthermore, it is likely that the planting of indigenous vegetation would be more beneficial for bird communities by providing resources more closely resembling those of park remnants. Recher (2003) suggests that retaining all remaining native vegetation should be paramount for future restoration actions.’

The habitat that Australian native trees provide for native insects has been shown to be superior to non-native trees in Perth², and that finding can reasonably be extrapolated to Glen Eira. Native reptiles are very dependent on an appropriate type of leaf litter for their habitat³, and it is clear that most non-native trees provide a quite different leaf litter, and with different seasonality, than the trees that have co-evolved with native reptiles.

These research findings provide a clear pointer to the types of trees that people can plant to best support the native bird communities: indigenous species are best, other Australian natives next, and other species are of least benefit (or often none at all). A similar conclusion can be reached regarding shrubs.

Sadly, urban redevelopment is leaving less and less space for trees to be retained. That makes it even more important to take opportunities to plant the right sorts of trees and shrubs where space is available, and to give existing trees adequate care and Arboricultural maintenance.

¹ White J.G., Antos M.J, Fitzsimons J.A. and Palmer G.C. (2005). Non-uniform bird assemblages in urban environments: the influence of streetscape vegetation. *Landscape and Urban Planning* **71**: 123-135.

² Bhullar S. and Majer J. (2000). Arthropods on street trees: a food resource for wildlife. *Pacific Conservation Biology* **6**: 171-173.

³ Jellinek S., Driscoll D.A. and Kirkpatrick J.B. (2004). Environmental and vegetation variables have a greater influence than habitat fragmentation in structuring lizard communities in remnant urban bushland. *Austral Ecology* **29**: 294-304.

It is also important to note that small insect-eating birds do not persist in the absence of a shrub layer that provides them with cover from predators, including pets.

Exotic shrubs and certain Australian native shrubs with prolific nectar production tend to favour aggressive Red Wattlebirds, Noisy Miners or Rainbow Lorikeets, leading to displacement of small insect-eating birds. Loss of small insect-eating birds may lead to outbreaks of insect pests and consequent tree dieback.

The following are some of the best plant species to plant for providing habitat for indigenous fauna. Information about the indigenous species and their growing requirements can be found in the book, '*Flora of Melbourne*'⁴.

Indigenous trees

Allocasuarina verticillata (Drooping Sheoak) – a medium tree

Eucalyptus camaldulensis (River Red Gum) – only with plenty of space around it

Eucalyptus melliodora (Yellow Box) – needs substantial space

Indigenous shrubs

Acacia longifolia var. *sophorae* (Coast Wattle) – medium shrub

Acacia paradoxa (Hedge Wattle) – lots of bright flowers, and prickly to give birds cover

Bossiaea cinerea (Showy Bossiaea) – showy yellow and red flowers in early spring

Bursaria spinosa (Sweet Bursaria) – copious white flowers in summer, good for butterflies

Epacris impressa (Common Heath) – flowers in autumn–spring, attracting insects & spinebills

Goodenia ovata (Hop Goodenia) – small shrub with yellow flowers in much of the year

Indigofera australis (Austral Indigo) – very showy magenta flowers, early in spring

Kunzea leptospermoides/ericoides (Burgan) – large shrub; copious white flowers in summer

Leptospermum myrsinoides (Heath Tea-tree) – small, sparse shrub with white to pink flowers

Ozothamnus ferrugineus (Tree Everlasting) – medium shrub with white 'cauliflower' flowers

Solanum laciniatum (Large Kangaroo Apple) – showy purple flowers for much of the year

Non-indigenous trees

Eucalyptus leucoxyton (Yellow Gum, or Blue Gum in S.A.) – forms vary from small to large

Non-indigenous shrubs

Acacia species (wattles)

Buddleja davidii (Butterfly Bush) – from China, but excellent for native butterflies

Grevillea species

Melaleuca species (paperbarks and honey-myrtles)

Apart from planting, residents can improve habitat by:

- Keeping cats away from birds;
- Preventing dogs from chasing birds in parks, particularly waterbirds when they are nesting;
- Not feeding butcherbirds, currawongs, magpies or other species that eat the young of smaller birds, as that causes the predators to breed up and kill more prey;
- Not leaving pet food or food scraps outdoors where foxes can get it (which increases their breeding rate and population density);
- Installing a 'bee hotel' for native bees;

⁴ Bull M. and others (2014). '*Flora of Melbourne*', 4th edition. Hyland House. 608 pp.

- If lizards are present, leaving a roof tile, small pile of sticks or other cover for them to hide under;
- Creating a ‘frog bog’ if frogs are known to occur nearby (see below).

However, note that it is cruel and counterproductive to entice wildlife to a place where they may be caught by pets.

For more information about providing habitat in private gardens, search the internet for ‘guide to backyard biodiversity’.

9.2 Citizen Science

As noted in Section 5, bird observers have done an excellent job in documenting Glen Eira’s birdlife, but information about frogs, lizards and microbats is woefully scarce. The best opportunity to correct the deficiency for frogs and lizards is through a coordinated campaign of community searching and recording, or ‘citizen science’.

The campaign would be run during the warmer months of the year, when frogs and lizards are active. Glen Eira City Council is the ideal organisation to coordinate such a campaign.

There are some excellent online resources and smartphone apps for the general public to learn how to find and identify fauna, and submit observations and photographs to online databases.

For frogs, the best option for the Glen Eira community is probably the Melbourne Water Frog Census app for smartphones – see www.melbournewater.com.au/frogcensus. It allows users to make a sound recording of frog calls and submit the recording and associated information to Melbourne Water. An expert will then identify the frog (or confirm the submitter’s identification) and enter the observation into both a Melbourne Water database and the Atlas of Living Australia. The app and various other online resources can help people identify frogs for themselves and show the discoveries that others in the community are making.

Searching for lizards and identifying them has to be done differently, as the process is visual rather than aural and there is no analog to the Melbourne Water Frog Census. Searching may involve setting out roof tiles (or similar) to entice lizards to hide underneath, and then checking at times when the lizards are likely to be there. Gloves and care are important for avoiding injury from spiders or other hazardous animals that may hide under the tiles or anywhere that lizards are sought. Once lizards are detected, either incidentally or by searching, it is best to take photographs in the hope of capturing identifying features that can be quite subtle in skins. The Museum of Victoria’s website is a good resource for identifying lizards. Details and photographs of a lizard observation can be easily submitted to the Atlas of Living Australia through its website. Council could set up a ‘project’ within the Atlas of Living Australia to allow participants to readily see what each other are discovering, and to build a sense of group ownership of the information being gathered.

Gathering data about microbats is more difficult. The usual professional methods are trapping and analysis of ultra-high-frequency sound recordings, neither of which is feasible for citizen science. An alternative that is more feasible but less thorough would be to erect ‘bat boxes’ – similar to nest boxes but designed for roosting bats – and periodically check whether microbats occupy them. Care must be taken to avoid hazardous climbing, handling of animals or allowing feral bees to occupy a bat box. If and where microbats are found to occupy a bat box, a professional could be called upon to identify the species and use the usual professional methods to determine whether other species are in the area.

Invertebrates such as butterflies, bees and beetles could also be surveyed by citizen science. The Museum of Victoria's Bowerbird website (www.bowerbird.org.au) is probably the best resource to use for that purpose. Data submitted through Bowerbird and then verified is channelled into the Atlas of Living Australia.

References

- Bhullar S. and Majer J. (2000). Arthropods on street trees: a food resource for wildlife. *Pacific Conservation Biology* **6**: 171-173.
- Bull M. and others (2014). *Flora of Melbourne*, 4th edition. Hyland House. 608 pp.
- Jellinek S., Driscoll D.A. and Kirkpatrick J.B. (2004). Environmental and vegetation variables have a greater influence than habitat fragmentation in structuring lizard communities in remnant urban bushland. *Austral Ecology* **29**: 294-304
- Catterall C.P., Green R.J. and Jones, D.N. (1989). Occurrence of birds in relation to plants in a subtropical city. *Aust. Wildl. Res.* **16**: 289–305.
- DEPI (2014). *Advisory List of Threatened Vertebrate Fauna in Victoria – 2014*. Victorian Department of Environment & Primary Industries, Melbourne, Victoria. 56 pp.
- MacDougall A.S. and Turkington R. (2005). Are invasive species the drivers or passengers of change in degraded ecosystems? *Ecology* **86**: 42-55.
- Oates N. and Taranto M. (2001). *Vegetation Mapping of the Port Phillip & Westernport Region*. Department of Natural Resources and Environment, East Melbourne, Victoria.
- Recher, H.F. (2003). The need for a vision. *Pac. Conserv. Biol.* **9**: 3–8.
- White J.G., Antos M.J, Fitzsimons J.A. and Palmer G.C. (2005). Non-uniform bird assemblages in urban environments: the influence of streetscape vegetation. *Landscape and Urban Planning* **71**:123-135.

Appendix A - Indigenous Plant Species Inventory

The table below lists the indigenous species that were seen growing wild in Glen Eira during the present study. The list includes mosses, liverworts, ferns and flowering plants. Additional species that have been recorded prior are tabulated immediately after the list below.

Within each of the major plant groups in the list, species are ordered alphabetically according to the names adopted by the National Herbarium of Victoria.

The eight columns to the right of the species names refer to the sites in Chapter 7. The abundance of each species in each site, as recorded in 2017, is represented in those columns by the following symbols:

- Scarce, to the extent of being at risk of dying out from the site;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the relevant vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

A question mark in a cell indicates that all of the species at the site are of uncertain origin – natural, planted or descendants of planted plants. Where there is a mixture of planted and natural individuals of a species, the abundance indicated is for the natural plants only. The final column indicates other locations where the species were seen.

The Known Wild Indigenous Species of Glen Eira in 2017

Scientific name	Common name	Moorabbin Reservoir	Elstermwick rwy reserve	Boyd Park Sanctuary	remainder of Boyd Park	Caulfield Racecourse	Rippon Lea Estate	Glen Huntly Rwy Station	Yarra Yarra Golf Course	Other
Mosses and Liverworts										
<i>Breutelia affinis</i>	Common Breutelia			✓	✓					
<i>Campylopus clavatus</i>	Broody Swan-neck Moss	✓								
<i>Campylopus introflexus</i>	Heath Star Moss	–								
<i>Chiloscyphus semiteres</i>	Green Worms	✓								Probably more widespread
<i>?Eurhynchium praelongum</i>	Common Feather-moss									Nature strip at dead end of Nina Ct, Bentleigh East
<i>Hypnum cupressiforme</i>	Common Hypnum	D								
<i>Lunularia cruciata</i>	Moonwort						✓			Scattered widely
<i>Polytrichum juniperinum</i>	Common Juniper-moss	–								
<i>Rosulabryum billarderi</i>	Common Thread-moss	✓								
<i>Thuidiopsis furfurosa</i>	Golden Weft-moss									lawn, Wilson St, M'beena
<i>Tortula ?antarctica</i>	a moss									Nature strip of Nina Ct, Bentleigh East
Fern										
<i>Pteridium esculentum</i>	Austral Bracken	D							–	Nature strip at dead end of Nina Ct, Bentleigh East; beside rwy line near Nepean Hwy
Trees										
<i>Acacia implexa</i>	Lightwood		D	✓?	✓?					
<i>Acacia mearnsii</i>	Black Wattle		–	✓	✓?					
<i>Acacia melanoxylon</i>	Blackwood	✓?	✓	✓						
<i>Eucalyptus ovata</i>	Swamp Gum			✓?						
<i>Eucalyptus × studleyensis</i>	Studley Park Gum									1 at Brighton Cemetery
<i>Eucalyptus camaldulensis</i>	River Red Gum			✓	✓					Scattered thinly & widely
<i>Eucalyptus melliodora</i>	Yellow Box									1 only, near Labassa

The Known Wild Indigenous Species of Glen Eira in 2017

Scientific name	Common name	Moorabbin Reservoir	Elsternwick rwy reserve	Boyd Park Sanctuary	remainder of Boyd Park	Caulfield Racecourse	Rippon Lea Estate	Glen Huntly Rwy Station	Yarra Yarra Golf Course	Other
<i>Eucalyptus viminalis</i> ssp. <i>pryoriana</i>	Coast Manna Gum				-?	-?				Springthorpe Gardens
<i>Melaleuca ericifolia</i>	Swamp Paperbark	✓		✓?	-?				-?	
Shrubs										
<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle		-?							
<i>Acacia paradoxa</i>	Hedge Wattle	M?	-?					-		
<i>Bossiaea cinerea</i>	Showy Bossiaea		-							
<i>Bursaria spinosa</i>	Sweet Bursaria	-?	M	✓	✓?					
<i>Cassinia arcuata</i>	Drooping Cassinia			-?	-?				-	Will probably occur spontaneously in many places
<i>Goodenia ovata</i>	Hop Goodenia			✓						
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	-?	-?							
<i>Pultenaea dentata</i>	Clustered Bush-pea								-	
<i>Solanum laciniatum</i>	Large Kangaroo Apple									1 found on rwy embankment near Heywood St
Climber										
<i>Clematis decipiens</i>	a small-leaved clematis			✓						Has potential to be weedy
<i>Muellerina eucalyptoides</i>	Creeping Mistletoe				-					One only, near William St
Creepers and Scramblers										
<i>Dichondra repens</i>	Kidney-weed						✓			Nature strip at dead end of Nina Ct, Bentleigh East
<i>Einadia nutans</i>	Nodding Saltbush	-	✓							
<i>Geranium</i> sp. 2	Variable Crane's-bill			✓						
<i>Kennedia prostrata</i>	Running Postman	-?								
<i>Lobelia anceps</i>	Angled Lobelia					✓				
Grassy species (in the order Poales)										
<i>Austrostipa mollis</i>	a Spear-grass	M	M						-	
<i>Austrostipa scabra</i>	Rough Spear-grass									Only on North Rd median, Ormond
<i>Eleocharis acuta</i>	Common Spike-rush							-		
<i>Eragrostis brownii</i>	Common Love-grass	✓								
<i>Gahnia radula</i>	Thatch Saw-sedge			✓						Also on rwy batter at Woodville Av Glen Huntly
<i>Juncus amabilis</i>	Hollow Rush								-	
<i>Juncus australis</i>	Austral Rush					D?				
<i>Juncus bufonius</i>	Toad Rush			✓	✓					
<i>Juncus pallidus</i>	Pale Rush	-		✓	✓	M	M		-	Booran Res; wasteland
<i>Juncus sarophorus</i>	Broom Rush					D				
<i>Juncus subsecundus</i>	Finger Rush			✓?						
<i>Juncus usitatus</i>	Rush					✓?				
<i>Lachnagrostis filiformis</i>	Common Blown Grass			✓	✓	✓				Common on drying mud
<i>Lepidosperma concavum</i>	Sand-hill Sword-sedge	D								
<i>Lomandra filiformis</i> ⁵	Wattle Mat-rush	✓	D	✓	✓			✓		
<i>Lomandra longifolia</i> subsp. <i>longifolia</i>	Spiny-headed Mat-rush	-								
<i>Lomandra nana</i>	Dwarf Mat-rush		-							
<i>Microlaena stipoides</i>	Weeping Grass	-	-	✓	✓		✓	-		persists in some lawns

⁵ *Lomandra filiformis* in Glen Eira mostly comprises intermediates between the two recognised subspecies.

The Known Wild Indigenous Species of Glen Eira in 2017

Scientific name	Common name	Moorabbin Reservoir	Elsternwick rwy reserve	Boyd Park Sanctuary	remainder of Boyd Park	Caulfield Racecourse	Rippon Lea Estate	Glen Huntly Rwy Station	Yarra Yarra Golf Course	Other
<i>Rytidosperma caespitosum</i>	Common Wallaby-grass		–							
<i>Rytidosperma fulvum</i>	Leafy Wallaby-grass	D	M					–		North Rd median, Ormond
<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass	✓							–	
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	✓	–	✓	✓					
<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	✓	M							North Rd median, Ormond
<i>Schoenoplectus tabernaemontani</i>	River Club-rush					–?	–			
<i>Schoenus apogon</i>	Common Bog-rush						M			
<i>Themeda triandra</i>	Kangaroo Grass		D	✓						

Aquatic and Semi-aquatic Species

<i>Alternanthera denticulata</i>	Lesser Joyweed					✓				
<i>Crassula helmsii</i>	Swamp Crassula					–				
<i>Landoltia punctata</i>	Thin Duckweed						✓			
<i>Lemna disperma</i>	Common Duckweed						M			
<i>Myriophyllum verrucosum</i>	Red Water-milfoil					✓				
<i>Persicaria decipiens</i>	Slender Knotweed						M			
<i>Persicaria lapathifolia</i>	Pale Knotweed					✓				
<i>Phragmites australis</i>	Common Reed						D			
<i>Potamogeton ochreateus</i>	Blunt Pondweed						D			
<i>Typha orientalis</i>	Cumbungi						✓			
<i>Wolffia australiana</i>	Tiny Duckweed						✓			

Others

<i>Cotula australis</i>	Common Cotula			✓	✓		✓			North Rd median, Ormond
<i>Crassula decumbens</i>	Spreading Crassula	–								Probably in nature strips
<i>Dysphania pumilio</i>	Clammy Goosefoot	✓				✓				
<i>Dianella revoluta</i> group	Black-anther Flax-lily		D	✓?						
<i>Dianella ?tasmanica</i>	Tasman Flax-lily	–?								
<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>	Variable Willow-herb	–								Booran Reserve; May volunteer on wasteland
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	–		✓		M				Volunteers on drying mud
<i>Helichrysum luteoalbum</i>	Jersey cudweed					M		–		Volunteers on wasteland
<i>Lythrum hyssopifolia</i>	Small Loosestrife	–				✓	–			Volunteers on drying mud
<i>Microtis parviflora</i>	Slender Onion-orchid			–						
<i>Pimelea curviflora</i>	Curved Rice-flower		–							
<i>Pterostylis curta</i>	Trim Greenhood			✓	✓					
<i>Pterostylis nutans</i>	Nodding Greenhood			–						
<i>Pterostylis pedunculata</i>	Maroonhood									Naturalised in a Glen Huntly garden, rescued in 1995 from Caulfield Nth

Previously Recorded Wild Indigenous Species of Glen Eira

Scientific name	Common name	Last record	Location
<u>Mosses and Liverworts</u>			
<i>Bryum pachythecha</i>	a moss	1886	Murrumbeena
<i>Ditrichum difficile</i>	a moss	1884	Murrumbeena
<i>Gemmabryum pachytheicum</i>	Acorn-fruited Thread-moss	1886	Murrumbeena
<i>Tayloria octoblepharum</i>	Dung Moss	1886	Near Murrumbeena, on dung
<i>Thuidium cymbifolium</i>	Eastern Weft-moss	1886	Murrumbeena
<u>Ferns & Fern Allies</u>			
<i>Lindsaea linearis</i>	Screw Fern	pre 1904	Caulfield
<i>Selaginella uliginosa</i>	Swamp Selaginella	1914	'Glenhuntly along Rosstown line'
<u>Other</u>			
<i>Acacia oxycedrus</i>	Spike Wattle	1903	Glen Huntly
<i>Acaena echinata/ovina</i>	Sheep's Burr	c. 2002	Rwy cutting beside Riddell Pde
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	1992	Boyd Park Sanctuary
<i>Apodasmia brownii</i>	Coarse Twine-rush	undated	Caulfield
<i>Arthropodium strictum</i>	Chocolate Lily	1992	Boyd Park Sanctuary
<i>Allocasuarina paradoxa</i>	Green Sheoak	1934	South Caulfield
<i>Brachyscome parvula</i>	Coast Daisy	1902	Glen Huntly and Murrumbeena
<i>Caesia parviflora</i>	Pale Grass-lily	c. 1900	Caulfield
<i>Centipeda cunninghamii</i>	Common Sneezeweed	1902	Rosstown (Murrumbeena)
<i>Centrolepis aristata</i>	Pointed Centrolepis	1887	Glen Huntly
<i>Convolvulus erubescens</i> group	Pink Bindweed	1994	Glen Huntly Railway Station
<i>Convolvulus remotus</i>	Grassy Bindweed	1994	Glen Huntly Railway Station
<i>Correa reflexa</i> var. <i>reflexa</i>	Common Correa	1903	Glen Huntly
<i>Corybas incurvus</i>	Slaty Helmet-orchid	1886	Murrumbeena
<i>Cotula coronopifolia</i>	Water Buttons	1902	'Rosstown, Caulfield'
<i>Cynoglossum suaveolens</i>	Sweet Hound's-tongue	1885	Caulfield
<i>Daviesia latifolia</i>	Hop Bitter-pea	c. 1900	Caulfield
<i>Daviesia ulicifolia</i>	Gorse Bitter-pea	1902	Murrumbeena
<i>Dillwynia glaberrima</i>	Smooth Parrot-pea	1911	Caulfield
<i>Drosera glanduligera</i>	Scarlet Sundew	1886	Elsternwick
<i>Drosera macrantha</i>	Climbing Sundew	1903	Glen Huntly
<i>Drosera pygmaea</i>	Pygmy Sundew	1902	Glen Huntly
<i>Drosera spatulata</i>	Spoon-leaf Sundew	1884	Caulfield
<i>Epacris impressa</i>	Common Heath	1891	Caulfield
<i>Glossodia major</i>	Wax-lip Orchid	1900	Caulfield South
<i>Gompholobium huegelii</i>	Common Wedge-pea	1902	Caulfield & Murrumbeena
<i>Goodenia geniculata</i>	Bent Goodenia	1902	Glen Huntly & Rosstown (Murrumbeena)
<i>Goodenia humilis</i>	Swamp Goodenia	1902	Caulfield, Glen Huntly & Rosstown
<i>Hakea decurrens</i>	Bushy Needlewood	1903	Glen Huntly
<i>Hardenbergia violacea</i>	Purple Coral-pea	1903	Glen Huntly
<i>Isolepis producta</i>	Nutty Club-rush	undated	Caulfield
<i>Juncus caespiticus</i>	Grassy Rush	1873	Caulfield
<i>Juncus holoschoenus</i>	Jointed Rush	1887	Caulfield
<i>Leptorhynchos squamatus</i>	Scaly Buttons	1903	Glen Huntly
<i>Leptorhynchos tenuifolius</i>	Wiry Buttons	1902	Rosstown (Murrumbeena)
<i>Lindsaea linearis</i>	Screw Fern	pre 1900	Caulfield
<i>Lobelia pratioides</i>	Poison Lobelia	1897	Rosstown (Murrumbeena)
<i>Melaleuca squarrosa</i>	Scented Paperbark	1889	Caulfield
<i>Myriophyllum crispatum</i>	Upright Water-milfoil	1887	Caulfield
<i>Orthoceras strictum</i>	Horned Orchid	1896	Murrumbeena
<i>Ottelia ovalifolia</i>	Swamp Lily	1889	Caulfield (swamp)
<i>Oxalis exilis</i>	Shady Wood-sorrel	1902	Rosstown (Murrumbeena)
<i>Oxalis perennans</i>	Grassland Wood-sorrel	1994	Glen Huntly Railway Station
<i>Patersonia occidentalis</i>	Long Purple-flag	1884	Caulfield
<i>Pentapogon quadrifidus</i>	Five-awned Spear-grass	c. 1900?	Caulfield
<i>Pimelea humilis</i>	Common Rice-flower	c. 2002	Rwy cutting beside Riddell Pde

Scientific name	Common name	Last record	Location
<i>Plantago varia</i>	Variable Plantain	1885	Caulfield
<i>Pterostylis nana</i>	Dwarf Greenhood	c. 1870?	Caulfield
<i>Pterostylis pedoglossa</i>	Prawn Greenhood	1922	Carnegie
<i>Poa sieberiana</i>	Grey Tussock-grass	1902	Glen Huntly
<i>Ricinocarpos pinifolius</i>	Wedding Bush	c. 1900	Caulfield
<i>Schoenus nitens</i>	Shiny Bog-rush	1884	Rosstown (Murrumbeena)
<i>Sebaea albidiflora</i>	White Sebaea	1888	Glen Huntly
<i>Senecio squarrosus</i>	Leafy Fireweed	1903	Glen Huntly
<i>Stylidium despectum</i>	Small Triggerplant	1897	Glen Huntly
<i>Thelionema caespitosum</i>	Tufted Blue-lily	1887	Caulfield
<i>Trachymene composita</i>	Parsnip Trachymene	1886	Caulfield & Glen Huntly
<i>Tricoryne elatior</i>	Yellow Rush-lily	1992	Boyd Park Sanctuary
<i>Triglochin striata</i>	Streaked Arrow-grass	1902	Rosstown (Murrumbeena)
<i>Utricularia dichotoma</i>	Fairies' Aprons	1884	Caulfield
<i>Viminaria juncea</i>	Golden Spray	1992	Boyd Park Sanctuary (planted?)
<i>Wahlenbergia communis</i>	Tufted Bluebell	1994	Glen Huntly Railway Station
<i>Wahlenbergia luteola</i>	Yellowish Bluebell	1994	Glen Huntly Railway Station
<i>Wurmbea dioica</i>	Common Early Nancy	1903	Glen Huntly
<i>Xanthosia huegelii</i>	Heath Xanthosia	1882	Caulfield
<i>Xanthorrhoea minor</i>	Small Grass-tree	1902	Murrumbeena
<i>Xyris gracilis</i>	Slender Yellow-eye	1902	Caulfield & Glen Huntly

Appendix B - Environmental Weed Inventory

The table below lists all species of introduced plant species that were seen in this study in situations where they appeared to be causing the loss of indigenous plants or preventing them from establishing. Introduced species will inevitably volunteer themselves in places where conditions have been made intolerable for indigenous plants, but that only makes them symptoms of environmental change, not causes. Only species that appear to be causing change are included here.

The table is to be interpreted the same as Appendix A except for the additional feature that red cells indicate the most serious threats to indigenous flora.

Scientific name	Common name	Caulfield Racecourse	Elsternwick rwy reserve	Glen Huntly Rwy Station	Boyd Park Sanctuary	remainder of Boyd Park	Moorabbin Reservoir	Other
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle						✓	
<i>Agrostis capillaris</i>	Brown-top Bent						✓	
<i>Aira caryophyllea</i>	Silvery Hair-grass						✓	
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass						M	
<i>Avena barbata</i>	Bearded Oat		✓	✓			-	
<i>Brassica fruticulosa</i>	Twiggy Turnip			-			✓	
<i>Briza maxima</i>	Large Quaking-grass		✓	D			M	
<i>Bromus catharticus</i>	Prairie Grass			-			-	
<i>Bromus diandrus</i>	Great Brome			✓				
<i>Cenchrus clandestinus</i>	Kikuyu	M					D	
<i>Chamaecytisus palmensis</i>	Tree Lucerne		✓				-	
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	Boneseed		-					
<i>Cortaderia selloana</i>	Pampas Grass	-						
<i>Cotoneaster glaucophyllus</i>	Cotoneaster		M				✓	
<i>Cotoneaster pannosus</i>	Cotoneaster			D				
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	D	D	✓				widespread as lawn & a weed
<i>Cyperus congestus</i>	Dense Flat-sedge	-						
<i>Cyperus eragrostis</i>	Drain Flat-sedge	✓						
<i>Ehrharta erecta</i>	Panic Veldt-grass				✓	M	✓	Very common throughout
<i>Ehrharta longiflora</i>	Annual Veldt-grass		D				✓	
<i>Eragrostis curvula</i>	African Love-grass							North Rd, Ormond
<i>Erigeron sumatrensis</i>	Fleabane			✓			-	
<i>Euphorbia ?lathyris</i>	Caper Spurge					✓		
<i>Foeniculum vulgare</i>	Fennel			✓				
<i>Fraxinus angustifolia</i>	Desert Ash	-	✓		-			
<i>Galenia pubescens</i>	Galenia						✓	
<i>Galium aparine</i>	Cleavers				✓			
<i>Genista monspessulana</i>	Montpellier Broom		✓					
<i>Hedera helix</i>	Ivy				-			
<i>Hypericum tetrapterum</i>	Square-stem St John's Wort							Rippon Lea lake
<i>Hypochaeris radicata</i>	Cat's Ear						✓	✓
<i>Juncus articulatus</i>	Jointed Rush	-						
<i>Ligustrum lucidum</i>	Large-leafed Privet				-		-	
<i>Lycium ferocissimum</i>	African Box-thorn						-	
<i>Oxalis pes-caprae</i>	Soursob		D	D			✓	✓
<i>Paspalum distichum</i>	Water Couch	D						
<i>Phoenix canariensis</i>	Canary Island Date Palm		-	-				
<i>Pittosporum undulatum</i>	Sweet Pittosporum						✓	-
<i>Romulea rosea</i>	Common Onion-grass						✓	

Scientific name	Common name	Caulfield Racecourse	Elsterwick rwy reserve	Glen Huntly Rwy Station	Boyd Park Sanctuary	remainder of Boyd Park	Moorabbin Reservoir	Other
<i>Rubus anglocandicans</i>	Blackberry	-						
<i>Salpichroa organifolia</i>	Pampas Lily-of-the-Valley						-	
<i>Setaria parviflora</i>	Slender Pigeon Grass		✓					Rail reserves
<i>Sporobolus africanus</i>	Rat-tail Grass	D					✓	
<i>Ulex europaeus</i>	Gorse (Furze)						✓	
<i>Vicia sativa</i>	Common Vetch			-				
<i>Vulpia bromoides</i>	Squirrel-tail Fescue				✓		✓	+
<i>Vulpia myuros</i>	Rat's-tail Fescue						-	Probably common in Jul-Dec
<i>Zantedeschia aethiopica</i>	White Arum Lily				✓	M		
<i>Oxalis corniculata</i>	Creeping Wood-sorrel				-			

Appendix C - Fauna Inventory

The following table lists the wild vertebrate species that are believed to occur in Glen Eira, at least occasionally. The second column indicates the most recent year of a reliable record of each species. The last column summarises how well represented each species is within Glen Eira, as inferred by the author, assisted by very experienced bird observer and Glen Eira resident, Mr Lewis Hiller.

An asterisk before a species' name indicates that it is introduced. Species are ordered according to the taxonomic sequence presently used by the Department of Environment, Land, Water and Planning. Names in bold are listed by the department as rare or threatened on a state-wide scale.

Common name	Scientific name	Latest Year	Status in Glen Eira
Mammals			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	2017	Abundant in suburbia
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	2017	Abundant in suburbia
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	2003	Probably common in some seasons
*Red Fox	<i>Canis vulpes</i>	2015	Abundant in suburbia
*European Rabbit	<i>Oryctolagus cuniculus</i>	2017	Localised, e.g. Moorabbin Reservoir
*House Mouse	<i>Mus musculus</i>	2017	Abundant in suburbia
*Brown Rat	<i>Rattus norvegicus</i>	1998	Probably common
*Black Rat	<i>Rattus rattus</i>	2017	Abundant in suburbia
Frogs			
Common Froglet	<i>Crinia signifera</i>	2016	Localised, e.g. Packer Park
Southern Bullfrog (Pobblebonk)	<i>Limnodynastes dumerilii</i>	2016	Rare
Southern Brown Tree Frog	<i>Litoria ewingii</i>	2017	Rare
Reptiles			
Marbled Gecko	<i>Phyllodactylus marmoratus</i>	2016	Rarely noticed but possibly common. Probably absent at colonisation.
Garden Skink	<i>Lampropholis guichenoti</i>	2017	Uncertain
Fish			
Shortfin Eel	<i>Anguilla australis</i>	2017	Possibly confined to Elster Ck area
*Common (or European) Carp	<i>Cyprinus carpio</i>	2017	Reportedly common in lakes
*Mosquitofish	<i>Gambusia holbrooki</i>	2017	Uncertain
Birds			
Blue-billed Duck	<i>Oxyura australis</i>	2014	Transient; a rare visitor
Black Swan	<i>Cygnus atratus</i>	2016	Transient; an occasional visitor
*Greylag Goose	<i>Anser anser</i>	2017	Resident at Caulfield Park
*Domestic ducks (various breeds)		2017	Resident at Caulfield Park
Australian Wood Duck	<i>Chenonetta jubata</i>	2017	Common near waterbodies
*Mallard	<i>Anas platyrhynchos</i>	2017	Resident at Caulfield Park
Pacific Black Duck	<i>Anas superciliosa</i>	2017	Common near waterbodies
Grey Teal	<i>Anas gracilis</i>	2017	Occasional visitor
Chestnut Teal	<i>Anas castanea</i>	2016	Occasional visitor
Hardhead	<i>Aythya australis</i>	2015	Occasional visitor to Yarra Yarra GC
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	2017	Regularly at waterbodies
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	2015	Occasional visitor
Darter	<i>Anhinga melanogaster</i>	2015	Occasional visitor
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	2017	Regularly at waterbodies
Pied Cormorant	<i>Phalacrocorax varius</i>	2015	Occasional visitor
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	2016	Occasional visitor
Great Cormorant	<i>Phalacrocorax carbo</i>	2017	Occasional visitor
Australian Pelican	<i>Pelecanus conspicillatus</i>	2017	Occasional visitor

Common name	Scientific name	Latest Year	Status in Glen Eira
White-faced Heron	<i>Egretta novaehollandiae</i>	2017	Regularly at waterbodies
White-necked Heron	<i>Ardea pacifica</i>	2017	Rare visitor, with irruptions
Great Egret	<i>Ardea alba</i>	2017	Occasional visitor
Intermediate Egret	<i>Ardea intermedia</i>	2010	Rare visitor
Cattle Egret	<i>Ardea ibis</i>	2014	Rare visitor, not really indigenous
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	2017	Breeding; Regularly at waterbodies
Australian White Ibis	<i>Threskiornis molucca</i>	2017	Common in flight and on open grass
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	2017	Common in flight and on open grass
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	2017	Rare visitor
Black-shouldered Kite	<i>Elanus axillaris</i>	2016	Occasional visitor
Square-tailed Kite	<i>Lophoictinia isura</i>	2016	Vagrant
Black Kite	<i>Milvus migrans</i>	2015	Rare visitor
Whistling Kite	<i>Haliastur sphenurus</i>	2017	Occasional visitor
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	2015	Vagrant, only flying over
Spotted Harrier	<i>Circus assimilis</i>	2015	Rare visitor
Swamp Harrier	<i>Circus approximans</i>	2017	Occasional visitor
Brown Goshawk	<i>Accipiter fasciatus</i>	2017	Widespread; moderately common
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	2016	Rare visitor
Wedge-tailed Eagle	<i>Aquila audax</i>	2015	Rare visitor
Little Eagle	<i>Hieraaetus morphnoides</i>	2017	Occasional visitor
Brown Falcon	<i>Falco berigora</i>	2017	Occasional visitor, mainly flying over
Australian Hobby	<i>Falco longipennis</i>	2017	Widespread; moderately common
Black Falcon	<i>Falco subniger</i>	2015	Vagrant
Peregrine Falcon	<i>Falco peregrinus</i>	2016	Localised but not rare
Nankeen Kestrel	<i>Falco cenchroides</i>	2016	Transient visitor; no suitable habitat
Purple Swamphen	<i>Porphyrio porphyrio</i>	2017	Regularly at waterbodies
Dusky Moorhen	<i>Gallinula tenebrosa</i>	2017	Occasional visitor to waterbodies
Eurasian Coot	<i>Fulica atra</i>	2017	Occasional visitor to waterbodies
Masked Lapwing	<i>Vanellus miles</i>	2017	Common around open grass
Pacific Gull	<i>Larus pacificus</i>	2017	Moderately common
Silver Gull	<i>Larus novaehollandiae</i>	2017	A common urban bird
unidentified tern species (overhead)		2015	Vagrant; no suitable habitat
*Rock Dove	<i>Columba livia</i>	2017	A common urban bird
*Spotted Dove	<i>Spilopelia chinensis</i>	2017	A common urban bird
Common Bronzewing	<i>Phaps chalcoptera</i>	2016	Occasional visitor; no suitable habitat
Brush Bronzewing	<i>Phaps elegans</i>	2014	Very rare vagrant; no suitable habitat
Crested Pigeon	<i>Ocyphaps lophotes</i>	2017	A common urban bird
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	2017	Occasional visitor
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	2015	Rare visitor
Galah	<i>Cacatua roseicapilla</i>	2017	A fairly common urban bird
Long-billed Corella	<i>Cacatua tenuirostris</i>	2017	Occasional visitor
Little Corella	<i>Cacatua sanguinea</i>	2017	Becoming fairly common
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	2017	No longer rare
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	2017	A common urban bird
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	2015	Rare visitor
Musk Lorikeet	<i>Glossopsitta concinna</i>	2017	A common nomad of flowering trees
Little Lorikeet	<i>Glossopsitta pusilla</i>	2017	Occasional visitor
Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>	2016	Rare visitor
Australian King-Parrot	<i>Alisterus scapularis</i>	2015	Rare visitor
Crimson Rosella	<i>Platycercus elegans</i>	2016	Rare visitor
Eastern Rosella	<i>Platycercus eximius</i>	2017	Common in areas with eucalypts
Swift Parrot	<i>Lathamus discolor</i>	2015	Pauses briefly during migration
Red-rumped Parrot	<i>Psephotus haematonotus</i>	2017	Rare visitor
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	2001	Vagrant

Common name	Scientific name	Latest Year	Status in Glen Eira
Common Koel	<i>Eudynamys scolopacea</i>	2015	Rare visitor during migration
Barn Owl	<i>Tyto alba</i>	2011	Rare
Tawny Frogmouth	<i>Podargus strigoides</i>	2017	A common urban bird
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	2017	Aerial; increasingly rare visitor
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	2015	Occasional visitor
Sacred Kingfisher	<i>Todiramphus sanctus</i>	2014	Vagrant
Spotted Pardalote	<i>Pardalotus punctatus</i>	2017	Rare; reliant on eucalypt cover
Striated Pardalote	<i>Pardalotus striatus</i>	2016	Vagrant
White-browed Scrubwren	<i>Sericornis frontalis</i>	2015	Rare and declining
Brown Thornbill	<i>Acanthiza pusilla</i>	2017	Moderately common in leafier areas
Red Wattlebird	<i>Anthochaera carunculata</i>	2017	A common urban bird
Little Wattlebird	<i>Anthochaera chrysoptera</i>	2017	A common urban bird
Noisy Miner	<i>Manorina melanocephala</i>	2017	A common urban bird
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2017	Declining, localised but not yet rare
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	2017	Declining, localised but not yet rare
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	2017	Declining, localised but not yet rare
Scarlet Robin	<i>Petroica multicolor</i>	2000	Rare, transient visitor passing through
Pink Robin	<i>Petroica rodinogaster</i>	2013	Occasional visitor; poor habitat
Golden Whistler	<i>Pachycephala pectoralis</i>	2011	Rare visitor
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	2012	Vagrant; no suitable habitat
Magpie-lark	<i>Grallina cyanoleuca</i>	2017	A common urban bird
Rufous Fantail	<i>Rhipidura rufifrons</i>	2017	Transient presence during migration
Grey Fantail	<i>Rhipidura fuliginosa</i>	2016	Occasional visitor; no suitable habitat
Willie Wagtail	<i>Rhipidura leucophrys</i>	2017	Rare
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2017	Seasonally nomadic around Glen Eira
Grey Butcherbird	<i>Cracticus torquatus</i>	2017	Widespread; not rare
Australian Magpie	<i>Gymnorhina tibicen</i>	2017	A common urban bird
Pied Currawong	<i>Strepera graculina</i>	2017	A common urban bird
Grey Currawong	<i>Strepera versicolor</i>	2017	Occasional visitor
Little Raven	<i>Corvus mellori</i>	2017	A common urban bird
*Skylark	<i>Alauda arvensis</i>	2000	Rare visitor
*House Sparrow	<i>Passer domesticus</i>	2017	Common in urban centres
*Eurasian Tree Sparrow	<i>Passer montanus</i>	2001	Rare visitor
*European Greenfinch	<i>Carduelis chloris</i>	2017	Not rare
*European Goldfinch	<i>Carduelis carduelis</i>	2015	Occasional visitor
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2001	Rare visitor (no mistletoe!)
Welcome Swallow	<i>Hirundo neoxena</i>	2017	Widespread; moderately common
Tree Martin	<i>Hirundo nigricans</i>	2014	Rare visitor
Australian Reed-warbler	<i>Acrocephalus stentoreus</i>	2016	Occasional visitor
Silvereye	<i>Zosterops lateralis</i>	2017	Seasonally nomadic around Glen Eira
*Common Blackbird	<i>Turdus merula</i>	2017	A common urban bird
*Song Thrush	<i>Turdus philomelos</i>	2014	Rare visitor
*Common Starling	<i>Sturnus vulgaris</i>	2017	A common urban bird
*Common Myna	<i>Acridotheres tristis</i>	2017	A common urban bird