

Banyule Biodiversity Benchmarking Report



Prepared for Banyule City Council

March 2024

Banyule Biodiversity Benchmarking Report**Banyule City Council****March 2024****PRACTICAL ECOLOGY Pty Ltd**

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EXECUTIVE SUMMARY

Practical Ecology Pty Ltd was commissioned by Banyule City Council to prepare a Technical Benchmarking report to inform the upcoming Banyule Biodiversity Plan. The assessment involved a detailed desktop analysis and a series of engagement workshops with various stakeholders. Through this process, key biodiversity values, knowledge gaps, threats to biodiversity, and opportunities were identified.

Banyule is extremely fortunate to have significant and diverse areas of natural and remnant vegetation, which in turn supports a range of flora and fauna (aquatic and terrestrial). This includes a relatively large number of listed species for a Melbourne City Council. To support this biodiversity, Banyule has some excellent internal resources such as (i) foundational reports documenting biodiversity and connectivity across the municipality, (ii) bushland management plans and practices (iii) a knowledgeable and experienced bush-crew and Council Officers (iv) and a range of outreach programs.

Into the future, this report identifies a range of opportunities that Banyule could pursue to further protect and enhance biodiversity (See Section 5). Key opportunities include:

- the development of a monitoring and evaluation framework; Ideally this would involve collaboration with neighbouring councils to develop a standardised approach at a regional level;
- a municipality wide assessment of biodiversity including significant sites and corridors, to update those undertaken in the late 1990's. This would ideally include a detailed GIS analysis followed by ground-truthing;
- developing Council's internal GIS and other databases so that key biodiversity data is readily available to all departments to inform decision making;
- expanding the development and delivery of education and awareness programs including citizen science, aimed at the community, developers and across Council departments;
- continuing to collaborate across Council departments, Friends Of groups, private land-holders and other land-agencies, especially in regards to waterway and aquatic fauna management, landscape connectivity, pest animals and pathogens, culturally significant flora and fauna, and supporting Friends Of groups;
- ensuring expert biodiversity planning advice, and developing a framework with clear biodiversity guidelines, checklists, and information, within which planning proposals and Council projects can consider biodiversity

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1. INTRODUCTION

1.1. Acknowledgement of Country

Banyule City Council is situated on the land of the Wurundjeri Woi Wurrung people who are the traditional custodians of the land. We pay respect to all Aboriginal and Torres Strait Elders, past, present and emerging, who have resided in the area and have been an integral part of the region's history.

1.2. Document Purpose and Structure

Banyule Council commissioned this report to inform future opportunities and act as an accompanying technical benchmarking document for the upcoming update of the Banyule Biodiversity Plan. The purpose of this report is to collect and analyse existing data on biodiversity, identify areas where knowledge is lacking, evaluate potential future threats to biodiversity, and identify opportunities including around improved or innovative management practices.

To create this report, an extensive review of relevant literature was undertaken, encompassing a comprehensive analysis of various sources including historical literature, policy documents, biodiversity plans and strategies including from other Councils, legislation, and other pertinent references. The literature review aimed to provide a broad understanding of the ecological values within the municipality, emphasising the key ecological features that require protection.

A series of engagement workshops involving Practical Ecology, Council, and various stakeholders were conducted to gather input for the content of this benchmarking report. The outcomes of the engagement workshops were key to informing the development of this document.

The findings of the literature review and stakeholder engagement are collated in Section 5 into a succinct list of opportunities under several key themes.

1.3. Scope of Works

As per the RFQ the report will address and provide recommendations on the following:

- Identification and analysis of current threats to biodiversity in Banyule, including impacts from surrounding areas (allowing Council to prioritise cross agency projects to mitigate these threats);
- Assessment of broader drivers of biodiversity decline regionally and nationally
- Outline key biodiversity indicators to assist in monitoring and reporting on the state of biodiversity in Banyule;
- An assessment of Banyule Planning Scheme overlays (ESOs, VPOs and SLOs) and other planning instruments benchmarked against other neighbouring Councils and identifying any opportunities for improvement;
- Assessment and review of Banyule's current biodiversity related documentation against best practice, including the existing Biodiversity Plan, Weed Management Strategy, and management plans;

- Review of Council's existing biodiversity-related community programs (i.e., Gardens for Wildlife, Spring Outdoors) to understand their impact on biodiversity and community connection to nature, and any opportunities for enhancement;
- A literature review of other public sector biodiversity plans and strategies; and
- Recommendations around any innovative approaches to biodiversity management that Council could consider, including those related to research, policy, programs, or on-ground management of biodiversity assets.

1.4. Defining Biodiversity

As defined in Protecting Victoria's Environment – Biodiversity 2037: "biodiversity encompasses all components of the living world: the number and variety of plants, animals and other living things, including fungi and micro-organisms, across our land, rivers, coast and ocean" (DELWP 2017). It includes the diversity of their genetic information, the habitats and ecosystems within which they live, and their connections with other life forms and the natural world". Terms often associated with biodiversity include:

- 'Nature';
- 'The Environment';
- 'Ecosystem';
- 'Flora and Fauna';
- 'Conservation';
- 'Ecology';
- 'Wildlife';
- 'Biosphere'; and
- 'Habitat'.

Biodiversity has intrinsic importance but is also critical to our ongoing well-being and health, and sustainability of our planet. Functional and resilient ecosystems ensure the provision of clean air and water, soil fertility, food resources and carbon sequestration. They are also key to minimising impacts from natural disasters such as flooding and heat-waves.

1.5. Importance of Urban Biodiversity

Urban biodiversity plays a vital role in creating sustainable and thriving cities by encompassing the variety of plants, animals, and ecosystems found within urban areas. It contributes to the overall health and well-being of both humans and the environment in many ways. Urban biodiversity is important to:

- Preserve important local biodiversity including habitat for local fauna and threatened species. The Eltham Copper Butterfly is an excellent example, with City of Banyule supporting two of only a few pockets of habitat for populations of this threatened invertebrate species. The city of Banyule also supports some of the southernmost habitat on mainland for the threatened Swift Parrot as well as range of locally important species.

- Provide connectivity and stepping stone corridors for wildlife between key habitat reserves and nodes, both within and beyond the city of Banyule. The Yarra River, and creek corridors within the city of Banyule are key examples of this.
- Provide ecosystem services where population density is highest including clean air, cooler cities, improved urban hydrology, and pollinator services.
- Provide amenity and well-being through the creation of parks and green spaces for recreation and to escape from suburbia.
- Provide opportunities to connect to nature and the area's natural heritage, flora, and fauna, including nature watching.
- Educate and creating awareness of the importance and wonder of the natural environment.

In short, recognising and safeguarding urban biodiversity is vital for creating sustainable, resilient, and liveable cities for present and future generations.

1.6. Study Area

The City of Banyule, covers ~6251 hectares located in the north-eastern suburbs of Melbourne (Map 1, Appendix 1,) spanning 7 to 21 km from the city centre. It supports 128, 000 residents in 21 suburbs: Banyule shares boundaries with several Councils: Nillumbik, Manningham, Whittlesea (lesser extent), Boroondara, Darebin and Yarra Council (lesser extent).

1.7. Regional Context

The City of Banyule sits within Melbourne's urbanised north-east, and is bordered on all sides by other generally urbanised municipalities. Councils to the north and north-east are an exception, where the southern slopes of the Great Dividing Range and State Parks provides increased natural areas moving north. Banyule is fortunate to have several river and creek corridors providing connection with the surrounding landscape including the Yarra River which bounds Banyule on the south east, the Darebin Creek to the south-west, and the Plenty River which extends through the municipality from the northern boundary to its confluence with the Yarra River (Map 2, Appendix 1).

1.7.1. Bioregions

Bioregions encompass geographical areas characterised by consistent geological and ecological conditions, harbouring distinct combinations of habitats and species. These regions often support unique vegetation and habitats specific to their respective environmental conditions and locales. There are 28 bioregions identified within Victoria (DEECA 2023).

The City of Banyule spans three different Bioregions (See Map 3, Appendix 1). The Highlands Southern Fall (HSF) in the north-east encompass undulating hills with forest and woodland. Moving south-west this transitions to the Gippsland Plains (GP) and Victorian Volcanic Plains (VVPs). Each of these is described in Table 8, Appendix 2. Consequently, the biodiversity in the municipality will be composed of features from each of these bioregions, with these likely intergrading where they transition. The three bioregions loosely correspond to the three physiographic zones identified in the NERO report by Beardsell (1997) as occurring in the City of Banyule – the Yarra Lowland Alluvial Plains, Plenty Lowland Volcanic Plains and Plenty Lowland Hills (Beardsell 1997).

1.7.2. Catchment

Regionally, the City of Banyule is located within the larger Yarra River catchment, which is part of the Port Phillip and Westernport catchment in Victoria, Australia (Map 1, Appendix 1). The Yarra River catchment is a significant watershed that covers an expansive area, extending from the Yarra Ranges in the east to the city of Melbourne and beyond.

Within the City of Banyule, the Yarra River is a key habitat corridor that defines the south-eastern border of Banyule with neighbouring Manningham, Boroondara and Yarra Councils. Several tributaries also run through Banyule and together with the Yarra River play a crucial role in shaping the landscape, providing habitats for numerous plant and animal species, and supporting a range of ecosystems. The tributaries typically run in southerly direction and include:

- Darebin Creek, which forms a Western edge of the municipality with Darebin Council
- Salt Creek
- Banyule Creek
- Plenty River, which extends south from the City of Whittlesea and Nillumbik Shire through the middle of Banyule.

2. BANYULE'S BIODIVERSITY IN THE PAST

2.1. Historic Occupation and Land Use

The Wurundjeri Woi-wurrung People are the original inhabitants of the City of Banyule and have cared for Country for countless generations including the use of sophisticated land management to support themselves through hunting, gathering and locally adapted agriculture. Prior to European settlement, the City of Banyule's undulating hills and creeks in the north-east would have supported a mosaic of forest-woodland communities, contrasting with vast plains of open grassy woodlands rich in River Red Gums to its south-east. Through this flowed the Yarra River – Birrarung, with its network of flats, swamps and Billabongs, and several tributaries, providing a richness of fish, birds, and wildlife. The Birrarung and its tributaries played a hugely important role in the lives of the Wurundjeri Woi-wurrung People, both culturally and for a range of other activities such as trading, provision of food, sites for social gatherings and recreation (Context 2018). *'Over 50 Aboriginal heritage sites have been identified in Banyule, most beside the major waterways of Darebin Creek and the Yarra and Plenty Rivers'* (Context 2018).

Since European settlement, the City of Banyule has undergone significant modification. It was one of the first areas of Melbourne established as a farming district in the late 1830s due to its waterways and rich river flats and plains. This initially included cropping, orchards and farming markets but shifted to dairy farming as the dominant activity through to the 1880's (Figure 1a). Quarrying and timber harvesting also occurred in the 1800's, and gold mining in the later 1800's. These activities, farming in particular, caused a major upheaval to the landscape, with large areas cleared of vegetation and dramatic changes to the natural waterways with erosion, hydrology changes such as the draining and infilling of swamps. The introduction of hooved animals and grazing also had serious implications on ground cover and waterways. The impact of agriculture can be seen in Figure 1(a). Over-time, with the demand for housing, farming activity declined, and urbanisation increased. As population continues to increase demand for housing, urban densification and infill continues (Figure 1b). This

continues to heighten the challenges posed by these, such as increased impermeable surfaces, changed run-off and flow regimes, fragmentation by roads and infrastructure. Figure 1b shows habitat loss associated with the new North East Link Project.

In the early twentieth century, local concern regarding the environment grew, initially with efforts in Heidelberg and Ivanhoe to preserve the riverfront and the river flats as parkland, as well as large trees. Many of Banyule's Friends of and Environmental groups such as the Warringal Conservation Society formed and continue to advocate and protect Banyule's natural habitat and river corridors (Context 2018). This conservation awareness within the municipality appears to have resulted in an overall increase in vegetation along the creeks and public land over the past decades as can be seen in recent aerial images Figure 1 (b).

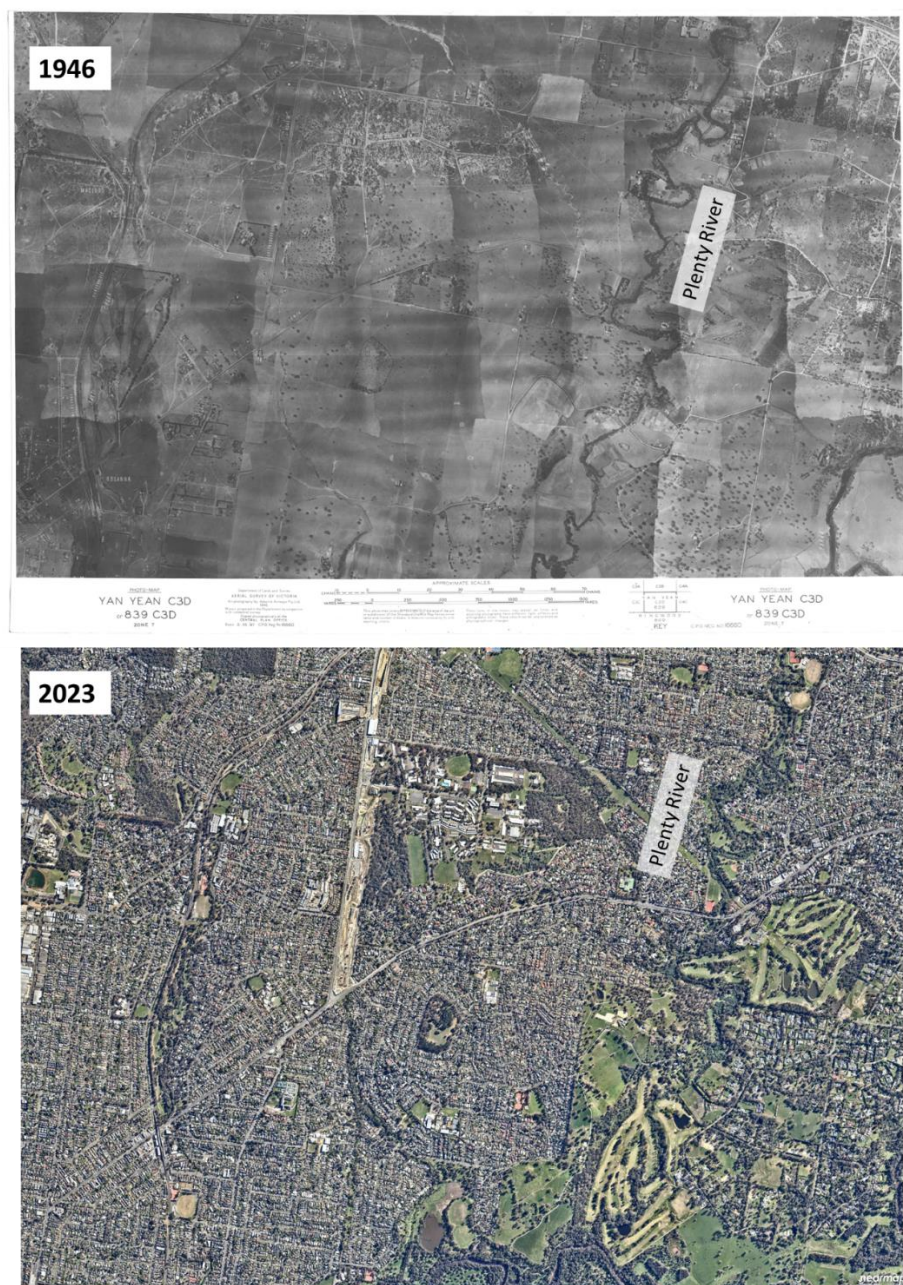


Figure 1 Comparison of City of Banyule suburbs Montmorency and Viewbank adjacent the Plenty River (**Top**) 1946, image taken from DEECA MapShare (DEECA 1946) (**Bottom**) 2023, Taken from NearMap (September 16th 2023).

2.2. Ecological Vegetation Classes

Ecological Vegetation Classes (EVCs) are the basis of Victoria's systematic approach to classifying vegetation across the state. They organise plant communities into common types found in similar environmental conditions. Each vegetation type is identified based on its floristic composition, which refers to the plant species present, as well as its vegetation structure, such as woodland, grassland, or saltmarsh. In addition to floristic composition and vegetation structure, EVCs also consider the landform (e.g., gully, foothill, or plain), as well as the environmental characteristics, such as soil type and climate.

Banyule's historical vegetation communities have been well-documented and mapped by Beardsell (2011) including accompanying species lists for each community, and is a wonderful detailed resource compiled by a naturalist with extensive local knowledge. According to Beardsell, prior to colonisation at least fifteen EVCs were present (Map 4, Appendix 1). This is reasonably diverse, reflecting Banyule's diverse topography, geology, waterways and flood plains. While the EVCs are shown on the map with precise boundaries, in nature these are often less well defined, with communities intergrading. Descriptions for each of these EVCs are given in Table 10 Appendix 2.

Figure 2 compares the historical extent of each EVC within the City of Banyule. Plains Grassy Woodland (53%) and Grassy Dry Forest (23%) are the two most dominant EVCs. Within these two EVCs, there would have been local variation in species composition in response to local conditions. For example, Beardsell (2011) defined a further five sub-communities for Plains Grassland (EVC 55). The remaining 13 EVCs (and their sub-communities) are largely associated with Banyule's waterways – gullies, creeks, rivers, swamps and floodplains, highlighting the habitat diversity provided by these waterway systems.

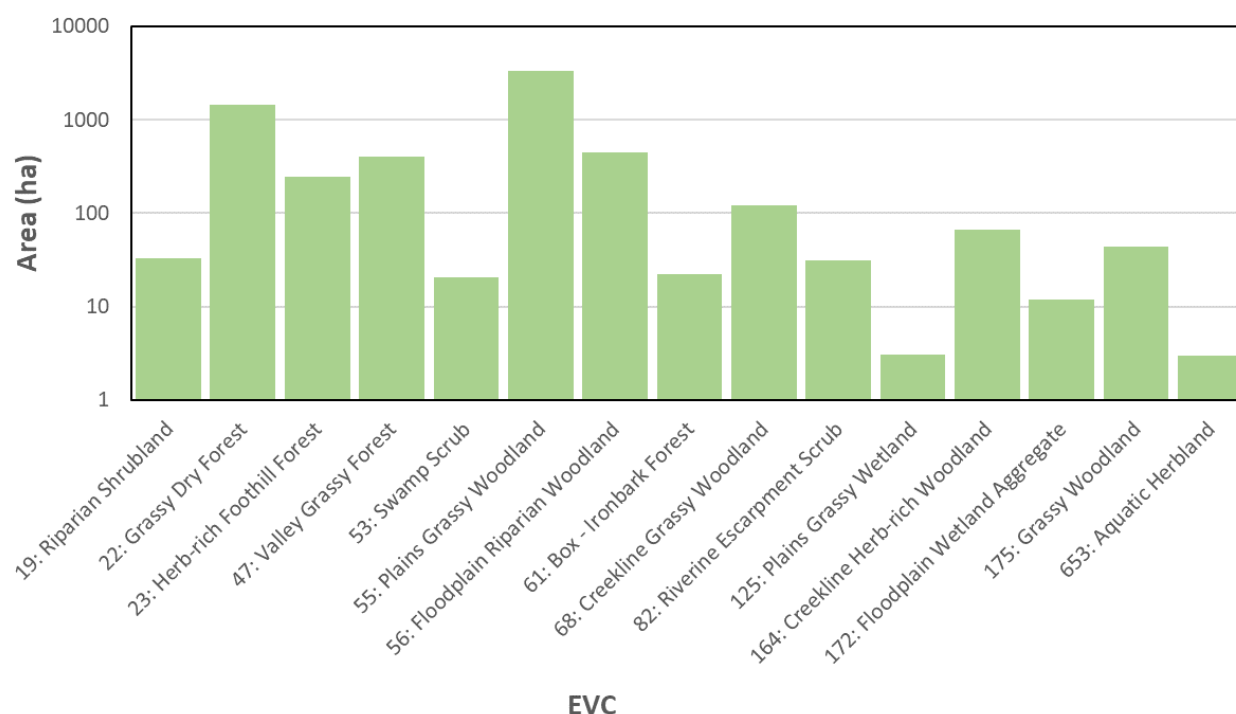


Figure 2. Historical Ecological Vegetation Communities (EVCs) across the Banyule municipality according to (Beardsell 2011). Please note that the vertical axis has a logarithmic scale so that EVCs with a smaller extent are visible.

The Department of Energy, Environment and Climate Action (DEECA), also provides pre-1750's mapping (DEECA 2023). However, Beardsell's mapping is used here given that it has been based on extensive local knowledge of Banyule including extensive site surveys, and is hence very likely to provide a more accurate indication of vegetation communities at a finer scale. While there is generally agreement between the two, differences occur around the gullies and waterways, with Beardsell providing greater detail. Notably, EVC 23: Herb-rich Foothill Forest is quite prominent (248 ha) but absent in the DEECA modelling.

3. BANYULE TODAY

3.1. Legislative and Policy Context

It is important to consider Urban Biodiversity in the context of a number of International, Federal, State, Regional, and Council policies, acts, and strategies, with those of particular relevance to this document listed below. Those considered when preparing this report are listed below and reference as relevant in this document.

3.1.1. International

- Convention on Biological Diversity; and the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention).
- Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment (CAMBA);
- Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment (JAMBA); and
- Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds (ROKAMBA).

3.1.2. Federal

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- Australia's Strategy for Nature (2019–2030); and
- Threatened Species Strategy 2021–2031

3.1.3. State

- Flora and Fauna Guarantee Act 1988 (FFG Act);
- Catchment and Land Management Act 1994 (CaLP Act);
- Wildlife Act 1975;
- Planning and Environment Act 1987;
- Water Act 1989; and
- *Protecting Victoria's Environment – Biodiversity 2037 (2017)* – and its associated Monitoring, Evaluation and Reporting Framework (MERF)
- Climate Change Adaptation Plan 2017–2020

3.1.4. Regional

- Port Phillip and Western Port Catchment Authority's Regional Catchment Strategy (2021–2027)
- Healthy Waterway Strategy (Yarra Catchment) (2018–2028); and
- Burndap Birrarung burndap umarkoo, Yarra Strategic Plan (2022–2032)
- Northern Alliance for Greenhouse Action (NAGA)
- Eastern Region Pest Animal Strategy 2020–2030

3.1.5. Council

- City of Banyule Planning Scheme:
 - Planning Policy Framework
 - Clause 12 Environmental and Landscape Values
 - Clause 14.02 Catchment planning and management
- Zoning
 - Public Park and Recreation Zone (PPRZ)
 - Public Conservation and Resource Zone (PCRZ)
- Overlays
 - Environmental Significance Overlays (ESOs) Schedules 1–5
 - Vegetation Protection Overlays (VPOs) Schedules 1–5
 - Significant Landscape Overlay – Schedule 1 (SLO1)
 - Design and Development Overlays (DDOs) Schedules 1, 2, 8, 15, 17
- Particular Provisions
 - Clause 52.17 Native Vegetation
- Plans and Strategies
 - Council Plan (2021–2025)
 - Banyule Community Vision 2041 Statement “We in Banyule are a thriving, sustainable, inclusive, and connected community. We are engaged, we belong and we value and protect our environment”
 - Key Theme Our Sustainable Environment with strategic objective “A progressive and innovative leader in protecting, enhancing and increasing the health and diversity of our natural environment, where we all commit to playing an active role in achieving environmental sustainability, waste and carbon emissions reduction.”
 - Biodiversity Plan 2019–2022
 - Community Climate Action Plan (CAP)
 - Domestic Animal Management Plan (DAMP) 2022–2026
 - Public Open Space Strategy 2016 –2031

- Water Plan 2019–2023
- Environmental Stewardship Plan
- Housing and Neighbourhood Character Strategy (Review underway)
- Public Realm Strategy (Review underway)
- Wildlife Corridor Program 2000;
- Urban Forest Strategy

3.2. Current Land Use and Management Agencies

Banyule's current land use is primarily urban, and exhibits a matrix of residential, commercial, precinct centers and institutional areas. Residential areas are encompassed by five neighborhood character types, including bush landscapes (Bush Garden, Semi Bush and Bush Woodland) to the north-east and east, and garden suburbs (Garden suburban and Garden Court) in the south and south-west (Banyule City Council 2012). The Semi Bush and Bush Woodland areas include areas zoned Low Density Residential and Rural Conservation adjacent the Yarra River in Lower Plenty. While other areas are designated for higher urban density development such as Greensborough Principal Activity Centre and the major activity centers of Heidelberg and Ivanhoe.

Banyule's green space is diverse and plentiful, including remnant vegetation in natural reserves. The riparian corridors of the Yarra and Plenty Rivers and Darebin and Banyule Creek contain much of Banyule's remnant vegetation, and are important regional ecosystems providing habitat and connections for plants, animals and aquatic life. Map 6 (Appendix 1) shows several of Banyule's key bushland reserves and parks, those highlighted yellow are associated with sites of significance as discussed in more detail at Section 3.3.3.

Several agencies are involved in managing native vegetation and open space in Banyule (Map 7, Appendix 1). According to Banyule's Public Open Space Strategy, there is ~ 890 ha (13.7%) of open space in Banyule of which 606 ha are Council owned and managed, and 285 ha, predominantly along the Yarra River, that are Commonwealth owned and managed by Parks Victoria (Banyule City Council 2016). The Simpson Army Barracks are Commonwealth managed land and support high quality habitat in some areas.

Of the Council managed public open space, ~323 ha is managed by Banyule's Bush Crew to specifically protect and conserve biodiversity. Over the past few years Council has engaged ecologists to gradually undertake surveys and prepare management plans for its bushland reserves, highly valued by the Bush crew (as per Stakeholder engagement). It is understood that some of the Bush Crew managed areas are out-sourced to contractors, allowing the Bush Crew, with their extensive local knowledge and expertise, to focus their efforts towards higher conservation reserves. It is extremely important to ensure that skilled contractors with sound understanding of flora, fauna and weed management are engaged, rather than basing contract awards solely on pricing. Conservation values can easily be set back years through inappropriately management actions.

A railway line (managed by Metro Trains on behalf of VicTrack) and powerline easement also run through Banyule, offering possible opportunities to collaborate for improved habitat connectivity (See Section 3.3.7).

Banyule is fortunate to have several waterways flow through its municipality providing natural habitat and connectivity. However, waterways are inherently difficult to manage because of different land managers working in a complex mosaic of responsibility. As such an ongoing, collaborative, inter-agency approach is important. A key manager in this space is Melbourne Water, managing aspects such as environmental water flows, maintenance works, water quality monitoring, and support for weed control and revegetation works.

Table 1 Banyule's Land Use and Management. This was based on zoning polygon GIS layers available from VicPlan (DTP 2023) and GIS shapefiles provided by Council, and is generally in agreement with the figures quoted above from other Council Strategies.

Value	Area (ha)
Public Ownership (including Simpson Barracks)	~1506.2
Private Ownership	~4744
Golf Courses	~ 123
Total Open Space (Zoned PPRZ or PPCZ)	~898
Open Space – Parks Vic (Commonwealth Land)	~302
Open Space – Council	~596
Managed by Bush Crew	~323

3.2.1. Biodiversity on Private land

There is a further ~123 ha of private open space within two of Banyule's two private golf courses. Rosanna Golf Club is at the confluence of the Yarra and Plenty rivers in Lower Plenty while Heidelberg Golf Course is just to the north-east of Rosanna Golf course, along the Plenty River. A further public golf course, Ivanhoe Public Golf Course also abuts the Yarra River. These areas are particularly valuable due to their location along these rivers. Golf courses on flood plains were often developed in those environments because typical urban development was problematic. This use as a golf course has continued for many years with management of sensitive land implemented through community organisations with private funds rather than public authorities with public money. A recent study of Melbourne found that golf courses often supported greater biodiversity compared to nearby nature reserves and urban parks. This included increased diversity of micro-bat species, invertebrates, and increased bird breeding (Threlfall, Williams et al. 2016, Williams, Hahs et al. 2020).

There is also a significant area of lower density private land zoned Rural Conservation and Low Density Residential abutting or buffering the Yarra River. As discussed further in Section 5, these golf courses and private land provide opportunities to collaborate to identify biodiversity values and plan for their protection.

3.2.2. Friends Groups

The City of Banyule is extremely fortunate to have 16 active Friends groups (Map 8, Appendix 1) highlighting passion within the municipality for protecting nature and biodiversity. Many are long standing groups (20–50+ years) such as the Friends of Darebin Parklands/Darebin Parklands Association, Friends of Montmorency and Warrigal Conservation Society. These groups have a wealth of in-depth local knowledge about their reserves and how they have changed with time. These groups undertake a range of activities to protect and protect biodiversity including:

- Planting and weeding parties (supporting the bush crew)
- Citizen Science projects
- Public education including guest speakers, school group and community activities, social media, newsletters
- Advocacy regarding biodiversity and planning decisions
- Litter collection
- Nest box installation

A key concern expressed during stakeholder engagement was the ongoing sustainability of these groups especially in regards to recruiting new and younger committee members. This is a common problem across many similar groups across Victoria and some groups such as Intrepid Landcare do show how young people can be engaged in environmental work (Intrepid Landcare 2020). Some suggestions are made in Section 5 regarding supports for Friends Groups.

3.3. Ecological Values

Despite extensive clearing of native vegetation, the municipality still supports significant areas of remnant vegetation and restored habitats that hold value for biodiversity conservation including the most significant ecological resource being extensive habitat along its riparian corridors. These support a diversity of flora and fauna including several threatened species as in the sections below.

3.3.1. Vegetation and Canopy Extent

Vegetation Cover mapping for 2005, 2008 and 2014 was provided by Banyule City Council. The results of this are summarised in Table 2 below and indicates a promising trend of increasing vegetation cover between 2005 and 2014 from ~1818 ha (29% of Banyule) to ~2218 ha (35%). This increase was observed across both private and public land although public land consistently had high vegetation coverage, 39% in 2014 compared to 34% on private land.

A recent study by Hurley et al. (2019) examined vegetation cover changes in the Northern Region of Melbourne, including Banyule, from 2014 to 2018. The results showed an increase in combined tree and shrub cover by 0.9% across the region. However, in the city of Banyule the study identified significant extent of vegetation loss concentrated in the north-east and south-west, as well as some areas of vegetation gain.

To get a more recent estimate of canopy cover across the municipality, Tree Extent data from DataVic was used, which estimates canopy cover based on machine learning interpretation of aerial imagery. This gave a canopy cover of 1475 ha (~24%) in 2022. This consisted of 35% canopy cover on public land and only 20% on private. Unfortunately, these figures cannot be directly compared to the 2005–2014 data as it is derived using a different technique and represents only canopy cover as opposed to canopy and shrub vegetation. It highlights that to meet Banyule City Council's 30% canopy cover target, opportunities to increase tree canopy on both private and public land are needed, both retention of trees and new plantings.

A consistent methodology for surveying and mapping vegetation extent across Banyule would be invaluable to monitoring trends in canopy cover, connectivity and the effectiveness of planning controls, and is also a theme in the Urban Forest Strategy (Action S4.3). To this end, Melbourne City Council has undertaken extensive LIDAR surveys to both monitor changes in vegetation and canopy cover, and analyse connectivity. See for example the report by Kirk, Threlfall et al. (2018).

Table 2 Estimates for Vegetation and Canopy Cover across Banyule. The values in brackets indicate % coverage.

Indicator	Total (ha)	Private (ha)	Public (ha)	Source data
Vegetation Cover (Canopy) 2005	1 818 (29%)	1,320 (28%)	498 (33%)	Vegetation 2005 Region (from Council) Vegetation above 2 m in height and 2 m in width
Vegetation Cover (Canopy) 2008	1 968 (31%)	1,429 (30%)	539 (36%)	Vegetation 2008 Region (from Council) Vegetation above 2 m in height and 2 m in width
Vegetation Cover (Canopy) 2014	2 218 (35%)	1,635 (34%)	583 (39%)	Vegetation 2014 Region (from Council) Vegetation above 2 m in height and 2 m in width
Canopy Cover Only 2021	1 475 (24%)	946 (20%)	537 (35%)	Vicmap Tree extent from DataVic <ul style="list-style-type: none"> A presence/absence of tree cover dataset is derived from statewide dataset aerial photography with a minimum of 20cm pixel resolution. The mapping of tree cover was based upon a machine learning technique. Tree cover is defined as woody vegetation greater than approximately two metres in height. https://discover.data.vic.gov.au/dataset/vicmap-vegetation-tree-extent

3.3.2. Native vegetation and EVC extent

There was little in the way GIS data documenting the extent of native vegetation and EVCs across Banyule. Hence modelled 2005 EVC mapping by DEECA was accessed to estimate this (DEECA 2023). Unfortunately, this modelled mapping failed to capture native vegetation that clearly exists along many of Banyule's tributaries to the Yarra River (e.g., Plenty River and Darebin Creek). Therefore, the 2014 vegetation cover (GIS file) supplied by Council was used to estimate the current extent of vegetation cover along these waterways and other bushland reserves missed by the 2005 DEECA mapping. The EVCs present over this combined vegetation extent was then taken based on Cam Beardsell's Vegetation Community mapping (e.g., clipped to the estimated vegetation extent). Map 5, Appendix 1, presents the resulting extent of EVCs across Banyule.

Based on this analysis, native vegetation covers approximately 1012 ha (15.5%) of Banyule, with this spread evenly over public and private land. This is a significant amount of native vegetation given Banyule's inner-city location.

Figure 3 further compares the estimated extent of each EVC today compared with its historical range. As expected, the Plains Grassy Woodland, Grassy Woodland and Grassy Dry Forest EVCs, which once covered the majority of Banyule are significantly reduced compared to their historical extent given the extent of urbanisation within Banyule. The Box-Ironbark Forest community is also severely depleted. While this analysis show that most of the historical EVCs associated with Banyule's waterways (gullies, creeks, rivers, swamps, and floodplains), are still present to some of their former extent across Banyule, it is stressed that the approach used is an estimate with a high degree of uncertainty, especially for EVCs along waterways and wetlands. Wetland and waterway vegetation can be highly dynamic and has likely experienced significant historical disturbance such that these EVCs may have changed or be of poorer ecological condition. For example, several recent Management Plans developed for specific bushland reserves contain EVC mapping that indicates the presence of further EVCs, particularly aggregate EVC associated with wetlands such as 292: Red Gum Swamp, 334: Billabong Wetland

Aggregate, 641: Riparian Woodland, 810: Floodway Pond Herbland, 821: Tall Marsh, 895: Escarpment Shrubland, 932: Wet Verge Sedgeland, and 949 Dwarf Floating Aquatic Herbland.

The lack of recent data on the extent and quality of native ecological communities across Banyule is a key knowledge gap and recommendations are made in Section 5 to address this.

3.3.3. Sites of Faunal and Habitat Significance in North East Melbourne (1997)

An important overview of the ecological values across the City of Banyule and the broader north-east Melbourne area, with particular focus on the identification and description of sites of faunal and habitat significance was undertaken by Cam Beardsell: *Sites of Faunal and Habitat Significance in North East Melbourne (Beardsell 1997)*. This report is known as the NEROC study because it was an initiative of the erstwhile North East Regional Organisation of Councils (NEROC). The study was undertaken over 10–15 years and resulted in the production of a comprehensive six-volume report. Figure 4 and Figure 5 show the resulting faunal significance and habitat

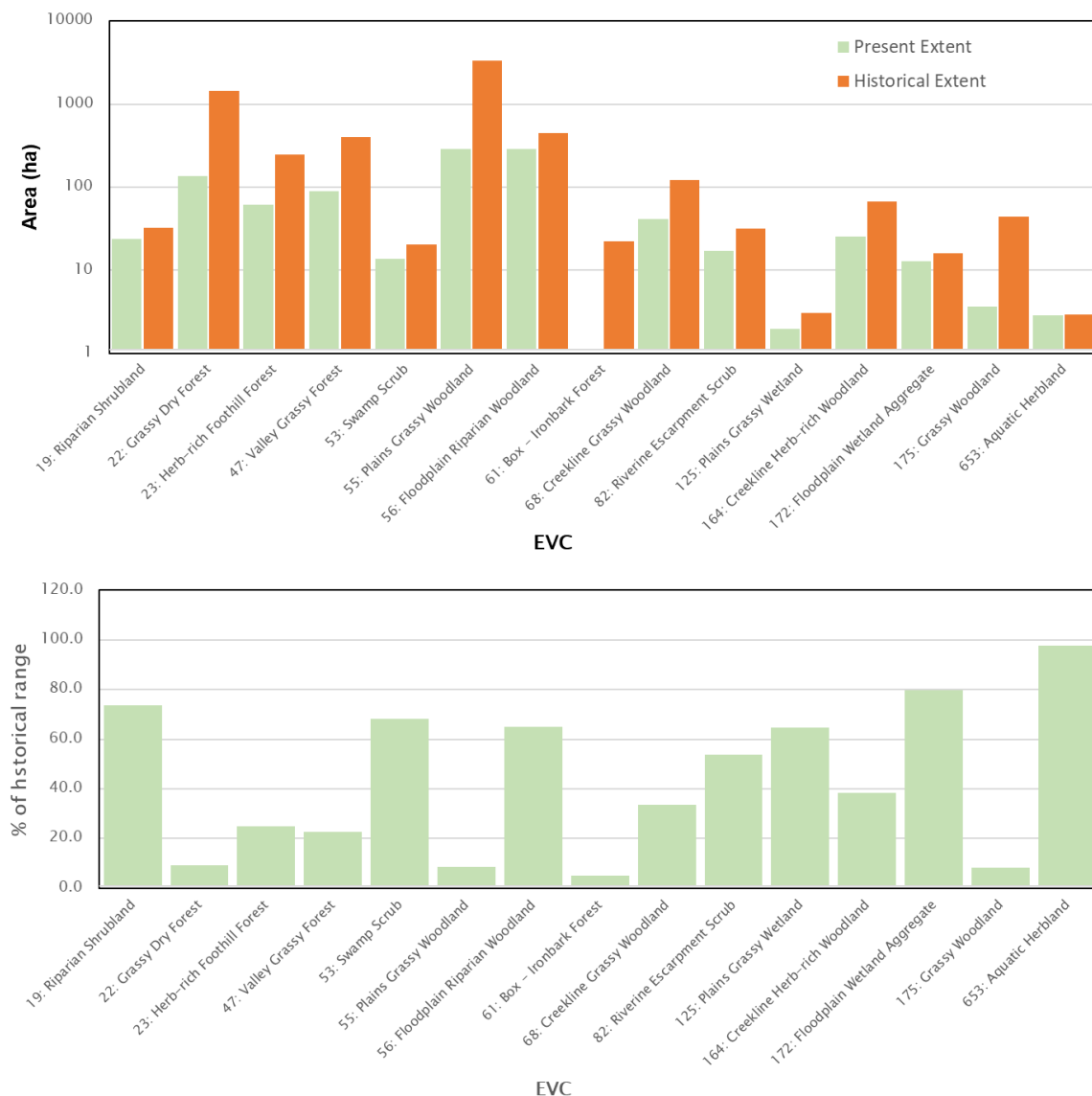


Figure 3 (Top) Present and historical extent of Ecological Vegetation Classes (EVCs); **(Bottom)** Percentage (%) reduction in EVC extent compared to historical values. Please note that the vertical axis has a logarithmic scale.

significance mapping across the city of Banyule and its immediate surrounding area. Most of the continuous habitat along the Yarra and Plenty Rivers within Banyule is rated as medium to high significance and connects to surrounding areas of very high significance or critical conservation areas. As discussed in Section 3.3.7 these form a key part of a network of habitat corridors, across Banyule and the broader landscape. Sections of the Darebin Creek to the north and south are also rated of medium significance. Based on aerial imagery revegetation works since 1997 appear to now provided continuous canopy cover linking these two areas.

The NEROC study also identified 11 sites of significance within the City of Banyule. The sites of significance do not directly refer to named reserves or parklands but rather to a broad area and are summarised in Table 3 and labelled in the Figures below. The sites cover most of the vegetation along the Yarra River, Plenty River and sections along Darebin Creek, but also include some scattered areas in the north east of Banyule including Yandell Reserve, Keswick Glen Reserve, St Helena and Brown's Reserve, as well as the Simpson's Barracks.

Several Sites of Significance identified within the surrounding Councils are also of importance when considering regional landscape connectivity beyond Banyule. These include Gresswell Forest (Site 25), LaTrobe University Wildlife Reserves (Site 26), Plenty-Janefield (Plenty Gorge Parklands and Wetlands, Site 42), Diamond Creek (Site 46), Eltham Copper Butterfly Reserves in Manningham (Site 49) and Meruka Park (Site 52).

It is note that over 25 years has lapsed since this original study and timely for a reassessment (See Section 5).

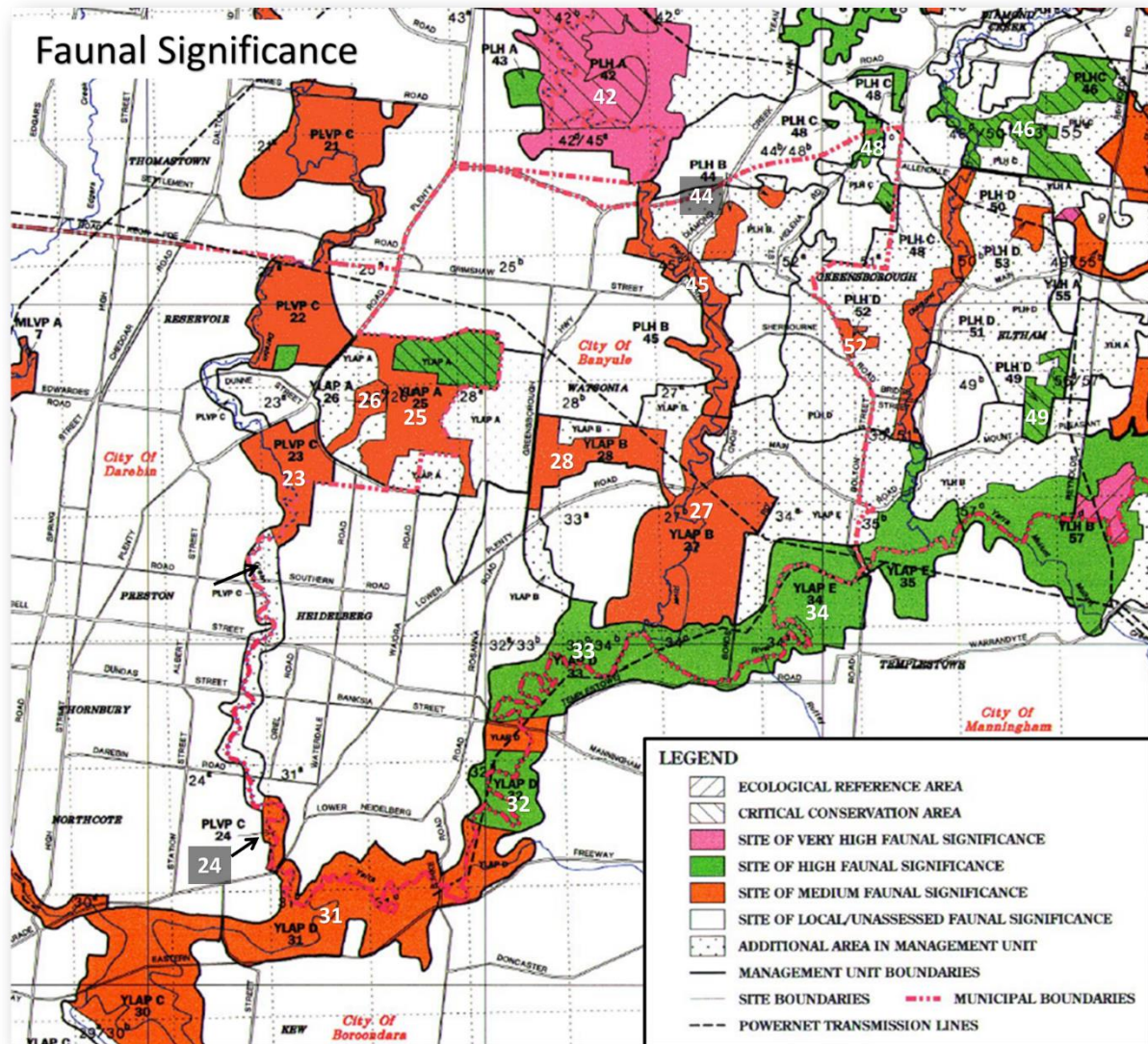


Figure 4 Faunal significance mapped across the City of Banyule. Taken from Beardsell 1997 (Beardsell 1997).

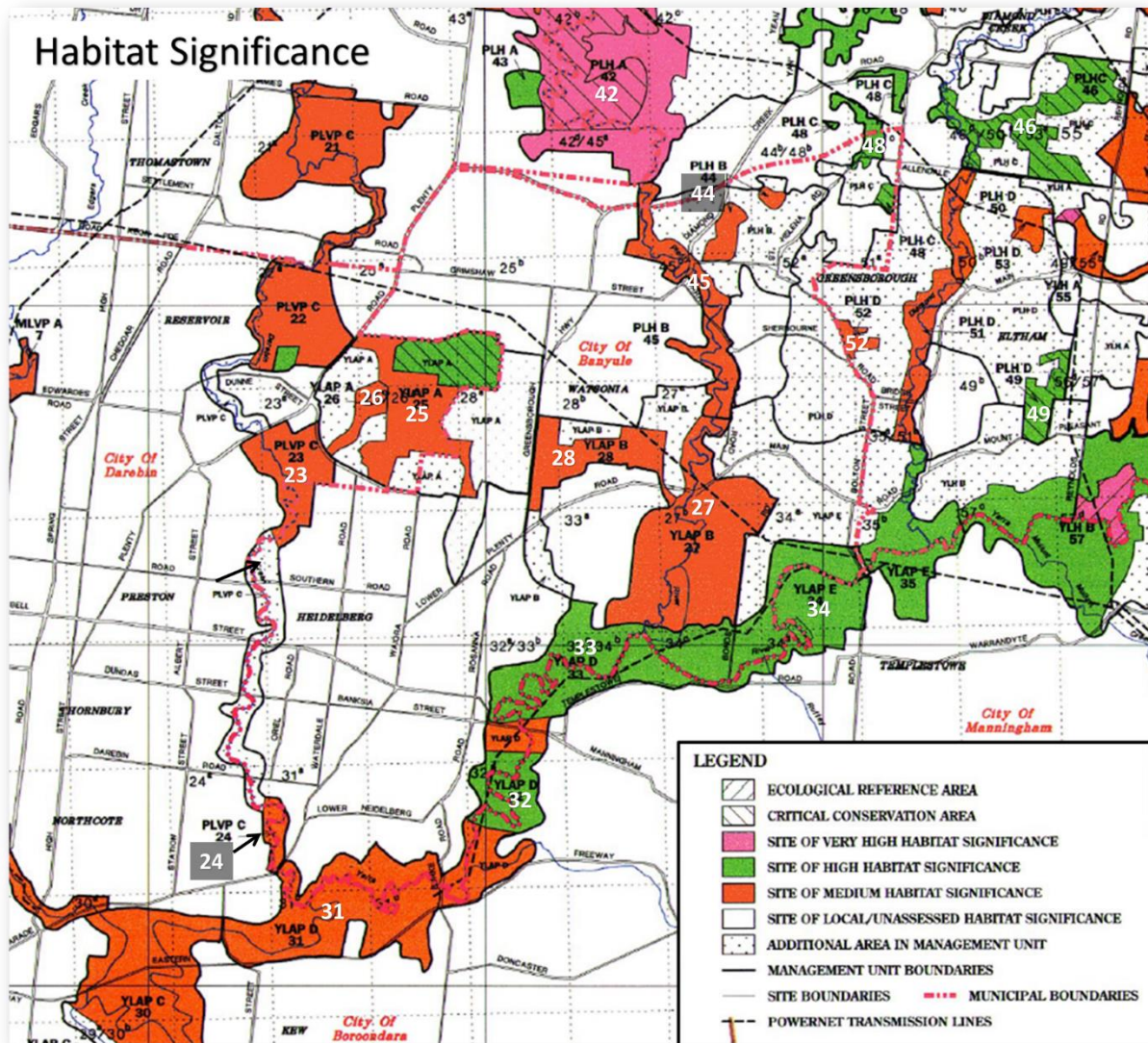


Figure 5 Habitat significance mapped across the City of Banyule Taken from Beardsell (1997).

Table 3 – Sites of Significance (NEROC study)

Site	Name	Mapping Unit (Physiographical region + Letter code)	Habitat Significance	Faunal Significance
23	Doherty Road to Plenty Road (Darebin Ck North)	Plenty Lowland Volcanic Plains (PLVP) PLVP – C	Medium	Regional
24	Darebin Parklands (Darebin Ck South)		Medium	Regional
25	Gresswell Forest – Strathallan Link–Hospitals (only a small section within Banyule City Council, remainder with La Trobe University Campus)	YLAP – A Yarra Lowland Alluvial Plains (YLAP)	High	Regional
27	Plenty River Flats (Plenty River)	YLAP – B	Medium	Regional
28	Simpson Barracks	YLAP – B	Medium	Regional
31	Bailey Billabong – Willsmere Lagoon – Hays Paddock (Yarra River – Wilsons Reserve area)	YLAP – D	Medium	Regional
32	Bolin Billabong, Bulleen (Yarra River)	YLAP – D	High	Regional
33	Banyule Flats – Warringal Swamplands (Yarra River)	YLAP – D	High	State
34	Bonds Road – Birrarung Park – Westerfolds Park (Yarra River)	YLAP – E	High	Regional
44	Greenhills (Yandell Reserve, Keswick Glen Reserve, Brown’s Reserve)	Plenty Lowland Hills (PLH) PLH – B	Medium	State
45	Yallambie to Greensborough (Plenty River)		Medium	Regional
48	St Helena	PLH – C	High	Regional

3.3.4. Threatened Ecological Communities

An ecological community is a complex assemblage of organisms of different species occupying a specific habitat and interacting with each other through various ecological relationships. These interactions play a crucial role in shaping the community’s structure, function, and dynamics. Additionally, factors such as abiotic conditions, resource availability, and disturbance events influence the composition and stability of the community. When an ecological community is considered “threatened,” it means it is at risk of extinction and is therefore listed and protected under the EPBC Act.

Within Banyule, the Protected Matters Search Tool (PMST) has identified four threatened ecological communities that are believed to occur (DCCEEW 2023). The PMST is a database designed to facilitate searches and provide information on protected areas, conservation status, or other matters related to environmental protection under the EPBC Act.

It is essential to assess whether these ecological communities are indeed present within the municipality. A summary of each community is provided in Table 4 below.

It's important to note that the PMST serves as a predictive framework, incorporating various factors to assess the probability of a threatened ecological community's existence in a specific area. In many cases, the species composition necessary to represent these communities no longer exists. However, if they are present, these communities should be the primary focus of biodiversity restoration efforts by the Council. It would be valuable if future surveys and reserve management plans could evaluate the presence of EPBC listed communities.

Table 4 Description of the threatened ecological communities that are known to occur, may occur, or are likely to occur within Banyule according to the PMST. CR = Critically Endangered.

Community ID	Community name	Status	Occurrence	Description and Comments
42	Natural Temperate Grassland of the Victorian Volcanic Plain	CR	May occur within the VVP bioregion within Banyule. However, any grasslands present (such as within the Northern Grassland Reserve) may also represent a derived form of Community 46: Grassy Eucalypt Woodland of the Victorian Volcanic Plain (See below), in which the former trees have been removed.	This grassland is mainly associated with Quaternary basalt soils within the Victorian Volcanic Plain IBRA bioregion. The Natural Temperate Grassland is usually dominated by one or more of the following native tussock-forming grasses: kangaroo grass (<i>Themeda triandra</i>), wallaby grasses (<i>Austrodanthonia spp.</i>), spear grasses (<i>Austrostipa spp.</i>) and/or tussock grasses (<i>Poa spp.</i>). A variety of native herbs, including wildflowers, may be interspersed amongst the native grass tussocks. In some circumstances, the native grasses may be sparse and the other native herbs are dominant, for instance after some fire regimes, and so these native herb fields are included as part of the national ecological community. Trees and large woody shrubs are absent to sparse. Relevant EVCs with synergies with this Ecological Community include (but not limited to): EVC 132 Plains Grassland EVC 654 Creekline Tussock Grassland EVC 897 Plains Grassland/Plains Grassy Woodland Mosaic
43	White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically	CR	May occur within reserves in Banyule's north-east such as Andrew Yandell Habitat Reserve, Harry Pottage Reserve, Kirwanna Reserve, Brown's Nature Reserve, Olympic Park, and Rattray Reserve	This ecological community can occur as either a woodland or derived grassland. It possesses a ground layer of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (<i>E. albens</i>), Yellow Box (<i>E. melliodora</i>), or Blakely's Red Gum (<i>E. blakelyi</i>) dominate this ecological community, where a tree layer still occurs. Relevant EVCs with synergies with this Ecological Community include (but not limited to): EVC 47 Valley Grassy Forest (HSF) EVC 55 Plains Grassy Woodland (HSF) EVC 175 Grassy Woodland (HSF)
46	Grassy Eucalypt Woodland of	CR	May occur within the VVP bioregion within Banyule such as the Northern Grassland	The Grassy Eucalypt Woodland is an open woodland ecosystem dominated by river red gum (<i>Eucalyptus camaldulensis</i>) trees. Other eucalypt species like swamp gum (<i>E. ovata</i>), manna gum (<i>E. viminalis</i>), grey box (<i>E.</i>

Community ID	Community name	Status	Occurrence	Description and Comments
	the Victorian Volcanic Plain		Reserve and other areas mapped as EVC 55 within the VVP Bioregion. However grassland areas could also represent Community 42 Natural Temperate Grassland of the Victorian Volcanic Plain (see above)	<i>microcarpa</i>), or yellow box (<i>E. melliodora</i>) can also be present based on moisture levels. The understorey consists of sparse shrubs and a ground layer similar to grassland. Weeping grass (<i>Microlaena stipoides</i>) and various wildflowers like sheep's burrs (<i>Acaena spp.</i>), chocolate or vanilla lilies (<i>Arthropodium spp.</i>), beauty heads (<i>Calocephalus spp.</i>), and more are commonly found in this woodland community.
133	Natural Damp Grassland of the Victorian Coastal Plains	CR	Possible but unlikely	The Natural Damp Grassland of the Victorian Coastal Plains is a type of grassland dominated by tussock grasses, typically with a sparse presence of trees and shrubs. It is generally found at elevations less than 100 metres above sea level, on heavy grey silty-loamy soils that are poorly draining, often damp and sometimes waterlogged. The ecological community is limited to southern Victoria, and has a disjunct distribution on the coastal plains. There are known occurrences in south Gippsland, the head of Western Port Bay, Philip Island, Mornington Peninsula and the Bellarine Peninsula. Relevant EVCs with synergies with this Ecological Community include (but not limited to): Damper expressions EVC 132 Plains Grassland, as benchmarked in the Victorian Gippsland Plain and Otway Plain (DEPI, 2014). EVC132_62 is the relevant sub floristic community within the Gippsland Plain.

3.3.5. Flora

Flora records were collated based on a search of the Victorian Biodiversity Atlas (VBA) (DEECA 2023) and flora lists (Excel) from recent bushland surveys provided by Council. This identified 1051 species of vascular plants present within Banyule since 1980. Of these species, 500 are indigenous, 551 are introduced. Indigenous plants account for approximately 48% of the total species within the municipality, while introduced species make up the remaining ~52%. A comprehensive list of indigenous vascular plants found within the City of Banyule can be found in Appendix 2.

Beardsell's report "Vegetation Communities of Banyule" provides lists of flora species along with their regional status within Banyule (Beardsell 2011). Several species considered locally rare or threatened by Beardsell have records within the last decade. Many of these records correspond to recent ecological surveys of Banyule's Bushland reserves. At the same time, there are several flora species that were assumed by Beardsell (2011) to survive across Banyule, that have not been observed in the past 10 years. This may be due to a lack of surveying, with some species expected to be relatively common such as Lesser Joyweed *Alternanthera denticulata*, Swamp Gum *Eucalyptus ovata*, and Black Anther Flax-lily *Dianella admixta*. New species beyond those listed by Beardsell also have been recorded within the City of Banyule (See Appendix 2).

3.3.5.1. Listed Flora Species

Listed flora is defined as any indigenous flora species listed under the EPBC and FFG Act. Of the ~1050 flora species present within the municipality; 21 species are considered threatened as shown in Table 11, Appendix 3, although four are not indigenous to the Banyule municipality. Of these, 12 have been recorded in the past 10 years. This is a relatively high number of listed species, indicating the success of the local reserves in supporting listed flora species, although also highlighting the high level of habitat loss and fragmentation across the broader landscape leading to their threatened status. The distribution of these species is shown in Map 9, Appendix 1. Most of the records fall within reserves and along waterways. There are several Studley Park Gums in the footprint of the NELP, which have likely been removed.

3.3.5.2. Listed Flora Species in Banyule Surrounds

A further 17 threatened species were recorded within a 5 km buffer of Banyule (but not present within Banyule itself) – See Table 12, Appendix 3. Two of these species however appeared to relate to a single record in an area that no longer supports vegetation. The listed species within the 5 km come from a mixture of habitats, with some associated with the hills and ranges, others aquatic/riparian or typical grassland species. As discussed in Section 5, where there is suitable habitat in Banyule, the reintroduction of these species would be beneficial to increase their populations and distributions across the wider landscape.

3.3.5.3. Culturally Significant Flora and Fauna

Plants and animals may also be culturally-significant for Traditional Owners, spiritually and as a source of food, medicine, shelter, and fibre. Some of these may now be rare, regionally extinct or at numbers that cannot sustain their continued cultural use (NCCMA 2022). There is relatively little available information on this across the Banyule municipality indicating a knowledge gap,

3.3.6. Fauna

A search was initially undertaken of the VBA for fauna records post 1980 to identify which species are present across Banyule. However, for many species there appeared to be a lack of recent records in the past 10 years, including for more common species such as Garden Skinks *Lampropholis guichenoti*, and Marbled Gecko *Christinus marmoratus* (no records in the VBA since 2008 and 1986, respectively). Therefore a search of the Atlas of Living Australia (ALA) was also undertaken within the Banyule municipality which focused on observations in the past 10 years for Amphibians, Bats, Birds, Fish, Mammals and Reptiles (i.e. invertebrates and Mussels were excluded). Records from a range of sources such as iNaturalist (only research grade records), ebird, VBA, Frog ID, all carry across to the ALA. In the case of Banyule, it was clearly important to capture records other than solely the VBA to get a more accurate picture of species across Banyule. The full collated list is provided in Appendix 6 while Table 5 provides a breakdown of the species by Taxa group. Please note, that many species within the ALA had different scientific naming (compared to those directly downloaded from the VBA) and that while care was taken to ensure these were properly correlated there may be minor discrepancies.

Overall, 347 native species have been recorded since 1980 with a further 33 introduced fauna species. Of the native species, 264 have records within the past decade. Some of those without recent records could possibly represent local extinctions with no records since the 1990's and the a likely absence of suitable habitat (e.g. Plains-wanderer *Pedionomus torquatus*). For others it could represent a lack of surveying effort, or migratory species with sporadic incursions to Banyule. Invertebrates were particularly poorly represented in records since 2014, likely due their inconspicuous and cryptic nature, and minimal surveying and reporting effort.

Birds have by far the highest diversity with 223 reported species. Of these, 190 species had records in the past decade. Species included:

- Birds of Prey (e.g., Brown Goshawk, Wedge Tailed Eagle and Powerful Owl)
- Kingfishers (Azure and Sacred)
- Ducks and Waterbirds (e.g., Australasian Darter, Black Swan, Hardheads)
- Many common urban species (e.g., Noisy Miner, Grey Butcherbird, Australian Magpie)
- Woodland birds (e.g., Striated Thornbills, Spotted and Striated Pardalotes, White-browed Scrubwrens)
- Parrots (Australian King Parrot, Little Lorikeets, Cockatoos, Galahs)

This high diversity is primarily a credit to Banyule's water ways with its riparian habitat offering nesting sites and food resources. Species such as the Azure Kingfisher *Alcedo azurea* and Spotted Pardalote *Pardalotus punctatus* breed in burrows made within creek banks. This high diversity of birds may also reflect the inherent high diversity of bird species within Australia, the ability for many bird species to navigate fragmented landscapes and tap into a range of habitat resources, and a large enthusiast bird-spotting community who report the species they observe to relevant databases.

Banyule is fortunate to have twelve mammals with recent records including the Black-tailed Wallaby *Wallabia bicolor*, Bare-nosed Wombat *Vombatus ursinus*, Common Brush-tailed Possum *Trichosurus vulpecula*, Eastern Grey Kangaroo *Macropus giganteus*, Eastern Ring-tailed Possum *Pseudocheirus peregrinus*, Platypus *Ornithorhynchus anatinus*, Short-beaked Echidna *Tachyglossus aculeatus*, Sugar Gliders *Petaurus breviceps*, and Water Rats *Hydromys chrysogaster*. This is a significant number for a more inner Melbourne Suburb and valuable to preserve.

A further 11 amphibians, 9 bats, 9 fish, 17 Reptiles and 18 invertebrates also had records within the past 10 years. Various species of microbats were recorded and are likely use a range of riparian and other habitats to catch insects and find refuge during the day in tree hollows or in bark crevices.

The Eltham Copper Butterfly is a threatened species of high importance, given that Banyule protects two of few habitats supporting populations of this species.

This diverse range of fauna highlights the ecological richness of the Banyule municipality and its diversity of ecological vegetation classes, rivers, creeks, wetlands and bushland reserves. This emphasizes the importance of preserving and protecting these habitats to support the continued survival and well-being of these species.

Table 5. Number of species per Taxon type with records since 1980 and 2014. Records included VBA records from 1980 and ALA records from the past 10 years. ALA records were not compiled for invertebrates, mussels, decapod or crustacea.

Taxon Type	# Species (1980)	# Species (2014)
Amphibians	15	11
Aquatic inverts	13	1
Bats	11	8
Birds	223	190
Fish	14	9
Invertebrates	34	17
Mammals	12	11
Mussels, decapod crustacea	4	0
Reptiles	22	17
Grand Total	348	264

3.3.6.1. Listed Fauna Species

Of the 347 fauna species, 55 are listed as significant under either the EPBC and FFG Acts (Table 14, Appendix 5), representing ~16% of the fauna records. Of these 40 (11.5% of all fauna records) have at least one record within the past 10 years. The location of the VBA records are shown in Map 10, Appendix 1. In addition to the listed VBA records, Map 9 also includes collated data for five listed species taken from a recent study by Ecology Australia (See also Section 3.3.6.3) (Ewing and White 2022).

A concentration of records is clearly evident along Banyule's waterways and waterbodies. Banyule Flats is a key hot spot for listed waterbird fauna including recent records (past 10 years) for the Australasian Shoveler *Spatula rhynchotis*, Freckled Duck *Stictonetta naevosa*, Hardhead *Aythya australis*, Latham's Snipe *Gallinago hardwickii*, Lewins Rail *Lewinia pectoralis*, Little Egret *Egretta garzetta*, Musk Duck *Biziura lobata*, Plummed Egret *Ardea intermedia plumifera*, Powerful Owl *Ninox strenua*, Reed Warbler *Acrocephalus australis*, and White throated Needletail *Hirundapus caudacutus*.

Other relatively recent records included:

- Gang Gang Cockatoo *Callocephalon fimbriatum* and Hardheads records at Kalparrin Lake
- Platypus records within Plenty River and Darebin Creek,
- Swift Parrot *Lathamus discolor*
- Scattered records across for Grey-headed Flying-fox *Pteropus poliocephalus* and Gang Gang Cockatoos.

This highlights the importance of Banyule's waterways and riparian vegetation in supporting threatened species.

Macquarie Perch *Macquaria australasica* and Murray Cod *Maccullochella peelii*, while threatened species, are not locally indigenous to Banyule. In the early 1900s, the Murray Cod, Golden Perch, Macquarie Perch, and Freshwater Catfish, were intentionally introduced into the Yarra River to enhance recreational fishing opportunities. Notably, the Murray Cod, Macquarie Perch, and Freshwater Catfish are now protected species under the EPBC Act or FFG Act. Amidst the widespread degradation of river habitats in southeastern Australia, as other populations of these native fish decline, the presence and preservation of these introduced populations become increasingly significant for the long-term survival and conservation of these species. There were also

records of Australian Grayling *Prototroctes maraena* within the Yarra River within the Banyule municipality as well as south and north of it. The presence of these significant threatened native fish species is likely attributed to the conscientious and effective management of the Yarra River aquatic environment primarily through the maintenance of environmental flows and secondarily the protection of water quality.

Another key species of note is the Eltham Copper Butterfly, which is supported within two of Banyule's smaller bush reserves – Andrew Yandell and Mayona Conservation Reserve. This is discussed further in Section 3.3.6.3. Given its specific habitat requirements, low mobility, and only handful of known populations, this species is clearly a priority for conservation efforts.

There were several species with few but relatively recent records, which would be worth further exploration. Examples include: Satin Flycatcher, Rufous Fantail, Blue-winged Parrot, Murray River Turtle, Tussock Skink, and Regent Honeyeater. The one record of the endangered Tussock Skink *Pseudemoia pagenstecheri* is from a residential area in Banyule's north-east and is accompanied by a photo matching this species, possibly a pregnant Tussock Skink. Hence further investigation of this species, especially within appropriate habitat such as grassland areas would be interesting to determine its presence and protection.

3.3.6.2. Listed species in Banyule Surrounds

A further 29 threatened fauna species were recorded within a 5 km buffer of Banyule on the VBA, which were either:

- not recorded within Banyule itself or
- had many more recent records compared to within Banyule

These are listed in Table 15 Appendix 5. Those with more frequent records outside of Banyule were often associated with hot spots such as Plenty Gorge (Blue-billed Duck, Satin Flycatcher), Nangak Tamboree Wildlife Sanctuary and Gresswell Forest (Black Falcon, Dwarf Galaxias, Rainbow Bee-eater), and Warrandyte Park (Satin Flycatcher, Rainbow Bee-eater).

Of note are two frog species:

- Growling Grass Frog *Litoria raniformis* – There are recent VBA records for Growling Grass Frogs along Darebin Creek to the north of Banyule, with opportunity for recolonisation if there is appropriate habitat along Darebin Creek (See Section 3.3.6.3).
- Brown Toadlet *Pseudophryne bibronii* – There are records (2009) along the Yarra River east of Banyule in Warrandyte. This species typically shelters in damp areas under leaf litter, logs, or other forms of cover near water, and could potentially be present within Banyule.

3.3.6.3. No Local Extinctions Action Plan Technical Report – August 2022

Banyule City Council commissioned a No Local Extinctions Technical report by Ecology Australia investigating in further detailed 6 indicator species (Ewing and White 2022):

- Eltham copper butterfly (ECB) *Paralucia pyrodiscus lucida*
- Growling Grass Frog *Litoria raniformis*
- Krefft's Glider *Petaurus notatus* (previously sugar glider *P. breviceps*)
- Platypus *Ornithorhynchus anatinus*
- Powerful Owl *Ninox strenua*
- Swift Parrot *Lathamus discolor*

All except for the Krefft's Glider are listed under the EPBC Act and/or FFG Acts. The report outlines their habitat and ecology needs, collates and maps records from various sources for each species to determine their presence and extent across Banyule and a 5 km buffer, identifies hot spots and corridors, discusses threats, and makes recommendations regarding each species (Map 10, Appendix 1).

The provided mapping and recommendations in the No Local Extinctions Technical report are highly relevant and have been considered in opportunities identified in Section 5. For example, both it and Practical Ecology's Swift Parrot Report (O'Malley 2017) provide a sound evidence base to support town planning decisions to protect key habitat for these species such as retention of Yellow Gums, Red Ironbarks and other habitat trees used by Swift Parrots, and Large Old Trees for Powerful Owls and Krefft's Gliders.

The following sections give a brief review of information provide in Ecology Australia's report regarding each of the 6 species. Other relevant reports are also discussed briefly where available.

Powerful Owl *Ninox strenua*

Key habitat requirements include large hollows of breeding, which typically occur in large, old eucalypt trees such as Manna Gums *Eucalyptus viminalis* but also sometimes in exotic trees such as Poplars **Populus* spp. Powerful owls tend to inhabit open forests, woodland, and sheltered gullies with wet forests and dense understorey, particularly along watercourses. Understorey vegetation (particularly wattle species) support key prey species such as possums and Krefft Gliders, and provide screening vegetation for roosting Owls.

*"For roosting habitat choices, local observations within the Banyule Flats region, with over 3,500 detailed roosting records between 2003–2021 by Lyn Easton, indicates a strong preference by residential owls to roost within wattles (65%), particularly silver wattle *Acacia dealbata*, black wattle *A. mearnsii* and, to a lesser extent, blackwood, followed by eucalypts (23%), and introduced species, including a particular willow *Salix* sp. Tree (12%) (which has since been removed)."*

Within Banyule, the Yarra River riparian corridor and Plenty River connecting to the Simpsons Barracks and Andrew Yandell Reserve form key habitat and connectivity within Banyule. Hotspots for sightings included Banyule Flats & Wilson Reserve (Banyule CC), Yarra Flats and Yarrabend (Nilumbik CC) and Candlebark Park (Manningham CC).

There is evidence that breeding efforts have not been as successful recently potentially due to loss of suitable nesting trees/hollows and anthropogenic disturbance including heightened visitation by people near their nesting trees that may also be affecting their ability to reproduce. Powerful Owls require large hollows up to 0.5 m deep in areas protected from human disturbance which can only occur in large trees and such ecological assets are uncommon in urban Melbourne. Tree hollows are probably their main limitation to breeding success because most other aspects of urban habitats, such as abundant possums and day roosting sites, are generally not limiting factors.

Eltham copper butterfly *Paralucia pyrodiscus lucida*

This species has very specific habitat requirements such as the presence of spiny dwarfed form of Sweet Bursaria *Bursaria spinosa* and are reliant on an obligatory association with epaulette ants. These requirements, their highly localised distribution with only a few known populations and low mobility makes them highly vulnerable, and a high priority for protection. The continued survival and conservation of these populations is critical for ensuring its long-term survival and genetic diversity. Within Banyule ECBs occur within two remnant patches of habitat at Andrew Yandell Reserve and the recently discovered population at Mayona Reserve adjacent the Montmorency train station and partly within VicTrack-managed land. Both support the Grassy Dry Forest EVC which is often associated with known ECB sites within the Melbourne area. Within 5 km of Banyule populations exist within Nillumbik Shire to the east at Hones Hill and Pauline Toner Reserves, and two smaller populations off Eucalyptus Road and Diosma Road, Eltham.

Council also engaged Wildlife and Ecology in 2021 to undertake monitoring of the new Montmorency Site to inform its management and conservation, including in regards to the Railway upgrades, with further recommendations for management (Himbeck and Harris 2021).

Swift parrot *Lathamus discolor*

This species breeds in Tasmania in summer and migrates to mainland south-eastern Australia in autumn and winter. Within Victoria it is largely nomadic during this non-breeding period, following flowering eucalypts, consuming nectar, seeds, flowers, psyllids and lerps. Key flowering Gum species include Yellow Gum *E. leucoxylon* and Red Ironbark *E. tricarpa* (both can have abundant flower resources). Within Banyule it has a wide distribution with records “concentrated on northern Plenty River corridor and adjacent areas in Greensborough and Eltham, and habitat comprising of mature eucalypts within the Macleod Village and railway station area.

An extensive study of Swift Parrots, their habitat, core habitat areas, and movement corridors was undertaken by Practical Ecology in 2017 (O'Malley 2017). Habitat corridors within Banyule and surrounds which support the species, include the Yarra River, Darebin Creek, Plenty River, and Diamond Creek corridors. High value areas in Banyule include Andrew Yandell Reserve (Greensborough), Browns Reserve (Greensborough), Anthony Beale Reserve (Saint Helena), Dalvida Reserve (Eltham North), St Helena Bush Reserve / Liddesdale Bushland Reserve (Eltham North), Cleveland Avenue (Lower Plenty), Yarra Valley Parklands (Heidelberg-Fairfield), Warringal Parklands and Banyule Flats (Heidelberg, Viewbank).

Recommendations from this study included:

- collecting and maintaining databases of trees referred through the planning system including tree locations, species, DBH, health and other arborist information.

- Remote sensing surveys for trees using LIDAR (Light Detection And Ranging) followed by ground truthing:
 - City of Yarra has recently inventoried tree canopy using LIDAR
 - Potential for identifying taller (larger) trees in urban contexts in a consistent objective way

The loss of winter-flowering Eucalypts, urbanisation, and species competition (such as by Noisy Miners) were identified as key threats.

Platypus *Ornithorhynchus anatinus*

Platypus occupy aquatic habitats and require permanent water, abundant macroinvertebrates prey and stable earthen banks for burrow construction. The bulk of these within the city of Banyule are from Plenty River between Greensborough and Viewbank, and along the Yarra River between Lower Plenty downstream to Heidelberg.

Krefft's glider *Petaurus notatus* (previously Sugar Glider *P. breviceps*)

Krefft's gliders typically inhabit forest with a mix of stringybark, box and ironbark and gum eucalypts with larger wattles such as Black Wattle, Silver Wattle, and Golden Wattle *Acacia pycnantha*, notable food sources. They also rely on tree hollows for roosting and breeding. Within Banyule there are many records within Banyule with focal areas including Montmorency region, Banyule Flats, Darebin creek corridor, and the Plenty River corridor.

Growling grass frog *Litoria raniformis*

Growling Grass Frogs require water bodies with still or slow-moving water such as lagoons, swamps, lakes pond and farm dams, with a combination of dense emergent vegetation around the edges and mats of floating and submerged plants (SWIFFT 2022). Typical vegetation includes Pondweed *Potamogeton tricarlinatus*, Water Ribbons *Triglochin procerum*, Common Reed *Phragmites australis* and Common Rush *Juncus usitatus* but can include a range of other vegetation. Submerged vegetation is important for breeding success between October to November. Growling Grass Frogs have been recorded 200 m from water and can readily migrate from one area to another in search of more suitable habitat if needed (DEWHA 2009, SWIFFT 2022).

Within Banyule there are very few records, with none since the 1990s. All the other records within Banyule are closely correlated with both Darebin Creek and Yarra River. Within a 5 km buffer, most of the recent records are clustered west of Banyule within Bundoora Park and wetlands associated with Darebin Creek. With so few records it is possible that this species is already locally extinct. However, as populations exist upstream of Darebin Creek there are likely opportunities for its re-introduction through improved habitat and connectivity.

3.3.7. Connectivity

Biodiversity corridors within urban environments are critical in maintaining and enhancing urban biodiversity. They connect otherwise isolated habitat areas supporting viable flora and fauna populations. Improved connectivity is also critical to allow fauna and vegetation communities to shift in response to climate change.

Different species have different mobility, home-ranges and patch size requirements such that different habitat attributes may be necessary to ensure connectivity for different species. For example, mobile bird species, such as Swift Parrots can traverse long distances without resting such that relatively well spaced stepping stone pockets of vegetation can provide sufficient connectivity, although more continuous vegetation likely reduces movement costs even for these species. In contrast smaller arboreal species such as Sugar Gliders are unlikely to traverse wide areas cleared or trees that exceed their glide capacity, ~30–50 m in the case of Sugar

Gliders(Caryl, Thomson et al. 2013). Similarly, many smaller birds and reptiles require largely continuous habitat corridors, with key habitat attributes such as complex understories. Hence it is ideal if several focal species of importance are considered in the context of connectivity.

There are several studies that consider connectivity within Banyule:

- Beardsell, C. (1997) *Sites of Faunal and Habitat Significance in North East Melbourne*. (Beardsell 1997) – referred to as the NEROC report.
- Banyule City Council (2000) *Banyule's Wildlife Corridors*. (Banyule City Council 2000)
- Ewing, A. & White, M. Ecology Australia (2022) *Banyule's No Local Extinction Action Plan Technical Report*. (Ewing and White 2022)
- O'Malley, A. Practical Ecology (2017) *Swift Parrots in Banyule and Surrounds*.(O'Malley 2017)

The former two consider habitat more broadly and were prepared 2 decades ago while the latter two recent reports focus on specific species. Ecology Australia's report included a quick review of the corridor map in the Wildlife Corridor Plan in relation to a 'heat map' based on records of the 6 key indicator species it focused on. This is re-produced in Figure 6. It also prioritises corridors considered most likely to be most useful for the majority of the 6 species (i.e. along existing riparian, open space, or railway reserves). These corridors also largely overlap with those proposed in the other three studies above.

In regards to corridors, the Yarra River and its tributaries (Plenty River, Darebin Creek, Salt Creek, and Banyule Creek) provide natural connectivity through Banyule and the broader landscape for both aquatic and terrestrial fauna. This is supported by the concentration of VBA fauna records along these important habitat corridors (Map 10). Fish species, including the Australian Grayling *Prototroctes maraena*, rely on the Yarra River and its connection to the sea for their essential migratory patterns. A potential longer-term opportunity is to explore the feasibility of daylighting Salt Creek.

The railway track and powerline easement are also highlighted as corridors, and importantly provided connectivity in a west-easterly direction between the various tributaries to the Yarra. Another consideration is the North-East Link Project underway, which further dissects Banyule, and is an example where strategically placed wildlife crossing infrastructure is likely warranted.

When considering habitat corridors it's important that they link larger core habitat areas. The four reports above identify several core areas both within Banyule and in the adjacent Councils, as follows.

Core Habitat Areas outside Banyule include:

- Yarra Bend Parklands
- Plenty Gorge
- La Trobe University, Wildlife Reserve, Gresswell Reserve, and Bundoora Park complex
- Meruka Park
- Lower Eltham and Diamond Creek complex
- Yarra Valley Parklands

Core Habitat Areas within Banyule include:

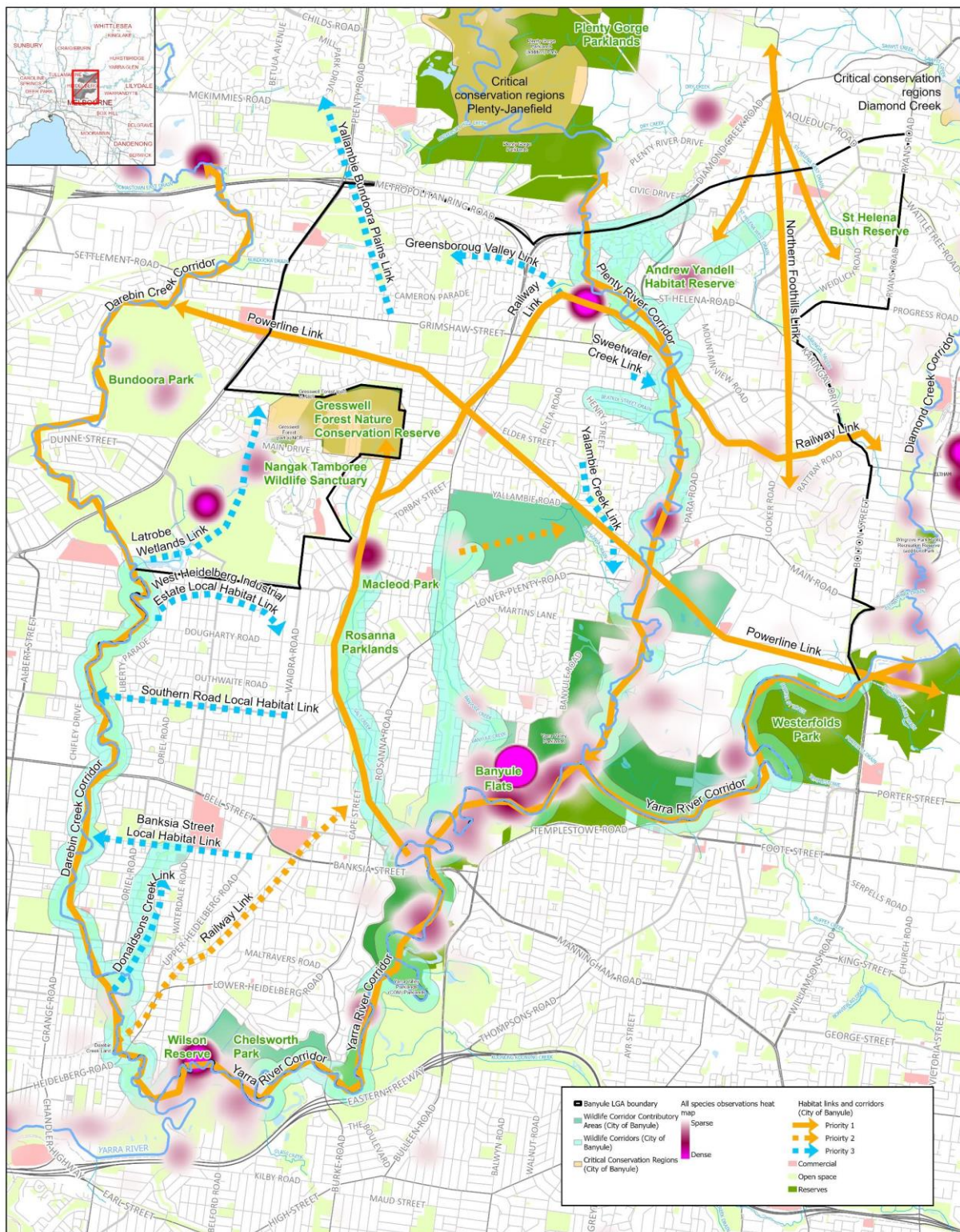
- Andrew Yandell, Browns Reserve, Anthony Beale and St Helena (Swift Parrot)
- Several other smaller reserves in the north-east
- Warringal and Banyule Flats
- Simpson Army Barracks

Discussion

The Core habitat areas are generally well linked by the proposed corridors in Figure 6. However, to the north-east there are several smaller, scattered, high quality bushland reserves that are relatively isolated from each other by surrounding suburbia. It would be ideal if these could be better connected through the suburban environment and linked to Karingal Yalloc Creek.

This could involve (i) recognition of habitat corridors by Council requiring enhancement, and replacing older trees with indigenous and native trees and (ii) collaboration and participation from residents through programs such as Council Garden for Wildlife and potentially Nature Strip Plants. This would also benefit many other areas such as properties within buffers to conservation reserves and creek corridors more generally. To this end, Boroondara Council have defined some 48 Biodiversity Encouragement Areas, focused on areas that buffer habitat corridors and bushland reserves, and actively engages with residents living in these. Banyule City Council's Weed Management Plan proposes a similar action to "establish the Banyule Bushland Neighbours Program to work direction with private property owners who border local conservation areas".

Several Councils (e.g. Boroondara, Frankston, Monash and Whitehorse) have adopted Naturestrip Guidelines which aim to transition exotic grassy patches into more diverse and structurally-rich plantings, and in doing so encouraging pollinators and habitat for fauna dispersal. Both these activities would require greater resources to expand Banyule's Gardens for Wildlife Program, and establish and support a program of nature strip plantings.



Map 8. Habitat values and connectivity - City of Banyule with 5km buffer

Figure 6 Habitat values and connectivity taken from Ecology Australia's report (Ewing and White 2022).

3.4. Council Biodiversity Outreach and Education Programs

Council implements a wide range of successful initiatives to enhance and preserve urban biodiversity within the municipality following the establishment of the Banyule Biodiversity Plan (2019–2022). A list of Council's current education and outreach programs is listed below and were collated based on Stakeholder engagement and information in the Biodiversity Plan and Council Webpages.

As discussed further in Section 4.9, the conservation of urban biodiversity faces significant challenges due to the complex intersection of community perception, values, and priorities. Hence it is important to encourage a positive community perception of and foster a sense of connection and appreciation for urban biodiversity. Banyule's outreach projects listed below are invaluable in achieving this and reaching across the broad community:

- Weed brochure and online videos showing how to remove key weeds
- Gardens for Wildlife
- Schools for Wildlife program
- Spring Outdoors Program – A community facing biodiversity engagement program
- Nature Play Program
- 'Buy 1, get 1 free' indigenous plant voucher system
- Banyule and Nillumbik Teacher Environment Network
- Annual Kids Teaching Kids Day held at Edendale Farm
- Greenwrap newsletter
- Bush Crew Diaries
- Yearly State of the Environment
- Enviro-grants aimed to support biodiversity focused projects by the community
- City Nature Challenge and Bioblitz iNaturalist sessions
- Support of Friends Groups
- Night walks
- Banyule Banner

Stakeholder engagement indicated a strong appetite and demand amongst the community for biodiversity and biodiversity related events, with advertised events, such as the Breakfast with the Birds, often sold-out months in advance. Demand for Council's Gardens for Wildlife program, despite no active advertising, exceeds capacity. It is a credit to Council that this the Gardens for Wildlife has evolved to a well-established program with a strong group of 7–9 volunteer guides. As discussed further in Section 3.3.7, it would be ideal if this program could be further resourced to allow its expansion to targeted priority areas adjacent reserves. Banyule's 'Buy 1 get 1' free indigenous plant voucher complements the Gardens for Wildlife program, but as raised in the Stakeholder engagement meetings, is difficult to assess outcomes. Residents taking advantage of this scheme are added to distribution list and sent information such as the Green-Wrap newsletter.

Other community engagement approaches that could be considered for inclusion in Banyule's program include:

- Preparation of a 'Welcome Pack' for distribution to new land owners in target areas to educate land owners on the biodiversity of their local area and how they can help (e.g. Mornington Peninsula Shire Council). This could include resources on Gardens for Wildlife, Friends and other Environmental groups, environmental weeds, and reserves;
- Continue to develop practical guidance information for private land owners and developers on key biodiversity conservation topics (environmental weeds, pest animals, habitat values, light pollution, indigenous plantings)
- Development of an online interactive tool, through which residents could find information relevant to their address, such as EVC, planting lists, indigenous flora information (See Section 2.2)
- Targeted campaigns each year aimed at a key biodiversity concern (e.g. weed, pest)
- Expand and promote Citizen Science programs and Apps
- Collaborating with sporting groups and other clubs on revegetation projects in their areas
- Identifying key focal fauna species to pitch awareness campaigns. This could include collaboration with future open space team to design play spaces and informative signage around these species.
- Incentive programs.
 - For example Mornington Peninsula Shire offers a Conservation Land Rate incentive has a <https://www.mornpen.vic.gov.au/Environment/Natural-Environment-Biodiversity/Plants-of-the-Peninsula>
 - Yarra Ranges has a "Apply for a Weed Wipeout tip Voucher" system
- Upskilling Council Officers and Environmental Groups

3.5. Banyule Planning Scheme

Council relies on the Banyule Planning Scheme as a comprehensive regulatory framework to exert control over vegetation loss on both public and private land by implementing both zoning and environmental overlays. It is one of the key ways in which Council can protect and improve biodiversity values on private land in conjunction with incentive programs, outreach, and education.

3.5.1. Zonings and Overlays

It is a merit to Banyule Council that its Planning Scheme consists of a solid strategic framework with different zoning, overlays (VPOs, ESOs, SLO's and DDOs) and controls in place for tree and biodiversity protection. These controls layer to form a patchwork of permit requirements and objectives for different areas across the municipality. The overlays are summarised in Table 6, and their extent shown in Maps 11 to 15, Appendix 1. Banyule's 2019 Planning Forum Slides provide an excellent overview of how the various zoning and overlays combine in regards to the protection of vegetation across Banyule (Figure 7) (Banyule City Council 2019). Zoning and overlays are briefly discussed in this section. Given the comprehensive framework in place, there were no outstanding recommendations in this regard. It would be useful, however, to evaluate the effectiveness of these controls to assess whether there is room for improvements.

Map 11 shows areas zoned as Public Conservation and Resource Zone (PCRZ) and Public Park and Recreation Zone (PPRZ). Ideally reserves with conservation as their key purpose should be zoned PCRZ as this gives priority to biodiversity values in the consideration of any developments. In comparisons, open space, green space and recreational reserves (PPRZ) while still require consideration for biodiversity values, offer less protection. The zoning appears to generally be consistent with this.

Environmental Significance Overlays are a primary tool for protecting biodiversity values by specifying key biodiversity objectives and desired outcomes. The Banyule Planning Scheme has five ESOs (Map 12). ESO1 and 3 are strongly based on the Sites of Significance listed in the 1997 NEROC report covering riparian vegetation along the Yarra and Plenty Rivers and Darebin Creek, and bushland reserves away from the creek corridors, respectively (Beardsell 1997). ESO 4 refers to the Significant Tree register, while ESO 2 and 5 cover precincts with specific conservation values. A significant landscape overlay (SLO1 – Map 13) further protects the Yarra River requiring a permit for all native vegetation removal. It's noted that sections of vegetation along Banyule Creek and Salt Creek are not as well protected as other riparian corridors, and may warrant further protection in the future given their role as habitat corridors.

There are many Design and Development Overlays across Banyule. Five of these align with areas containing biodiversity values (Map 15). Of note are DDO15 and 17, which cover residential growth zones that abut Darebin Creek corridor. This is a sensitive environment and it will be important for development to respond sensitively to the Creek Corridor to minimise impacts on native flora and fauna such as light pollution which is emerging as a major threat for fauna, which can hopefully be achieved through the DDOs.

A key theme emerging throughout this benchmarking report is the need to reassess native vegetation and across Banyule including its habitat corridors and sites of significance, with the last municipality wide assessment in 1997. Ideally Banyule's zoning and overlays would be re-assessed and updated following this to reflect findings.

Consideration could also be given to the creation of new ESOs targeted to Banyule's habitat corridors and specific species such the Swift Parrot and their food resources. Although initial discussions with Council indicated these could likely be protected under current overlays if evidence was available to support Council Decisions. To this end there is opportunity to develop practice notes based on reports such as Ecology Australia's No Local Extinctions Technical Report (Ewing and White 2022) and Practical Ecology's Swift Parrot Report (O'Malley 2017) to protect aspects such as

- Retention of Yellow Gums, Red Ironbark Eucalypts and other habitat trees for Swift Parrots roosting and foraging;
- Protection of Large Old Trees and Trees with hollows for Powerful Owls and Krefft Gliders;

3.5.2. Practical information and resources

A theme throughout stakeholder engagement and literature review, was the need for practical information and resources to apply the current planning scheme controls more effectively. Access to such information is critical for consideration of ecological implications at an early stage of development design when there is greater opportunity to minimize habitat loss and negative impacts.

Opportunities identified include:

- Clear biodiversity guidelines and checklists for accessing town planning proposals and Council infrastructure projects, indicating when to engage with a biodiversity officer.
- Continued panel meetings with biodiversity officers to consider key applications;
- Consider employing an environmental planner focused on supporting biodiversity outcomes through the planning scheme;
- Developing Council's internal GIS database and other databases so that key biodiversity data and information is readily available to all departments and can be used for scoping, planning, and assessing planning applications, and can also be made available to state and utility authorities to ensure proper consideration of locally significant biodiversity values in larger infrastructure projects;
- Developing a framework to guide the level of biodiversity outcomes desired across different areas of the municipality and within different contexts;
- Development of EVC planting palettes and native landscape–biodiversity design guide for developers;
- Banyule's Housing and Neighborhood Character is currently being updated and is an excellent opportunity to highlight the biodiversity values of each Neighborhood requiring protection;
- Upskilling planning officers;
- Nature Strip guidelines;
- Green–roof guidelines (See City of Melbourne, which has developed such guidelines) (Schiller, Rayner et al. 2023).

3.5.3. Consideration of Local Laws






During the literature search it was noted that some other Councils have incorporated local laws targeting biodiversity issues such as weed species (Knox City Council) and requiring permits for tree removal (Boroondara City Council) as they are not open to the same appeal processes as planning permit applications.

Ecology Australia's No Local Extinctions Report, also suggests consideration of local laws to

- protect existing Powerful Owl, Kreft Glider, Platypus, Swift Parrot priority habitats especially during critical breeding seasons
- introduce a 24–hour cat curfew to protect Swift Parrots, Platypus and Kreft Gliders

Given this, it may be worth considering the merit of using local laws for town planning purposes.

A PERMIT IS REQUIRED TO REMOVE OR PRUNE

-  Any native vegetation (no size criteria)
-  Native vegetation 5m in height AND with a trunk circumference greater than 50cm at 1m above ground
-  Any vegetation 5m in height AND with a trunk circumference greater than 50cm at 1metre above the ground
-  Any vegetation 12m in height OR with a trunk diameter greater than 400mm at 1.4m above ground
-  Any native vegetation (no size criteria)
Any non-native and exotic vegetation (including Weed species) that have at least one of the following:
 - A trunk circumference greater than 34cm at 1 metre above the ground OR
 - A Height greater than 6 metres OR
 - A canopy spread greater than 4 metres

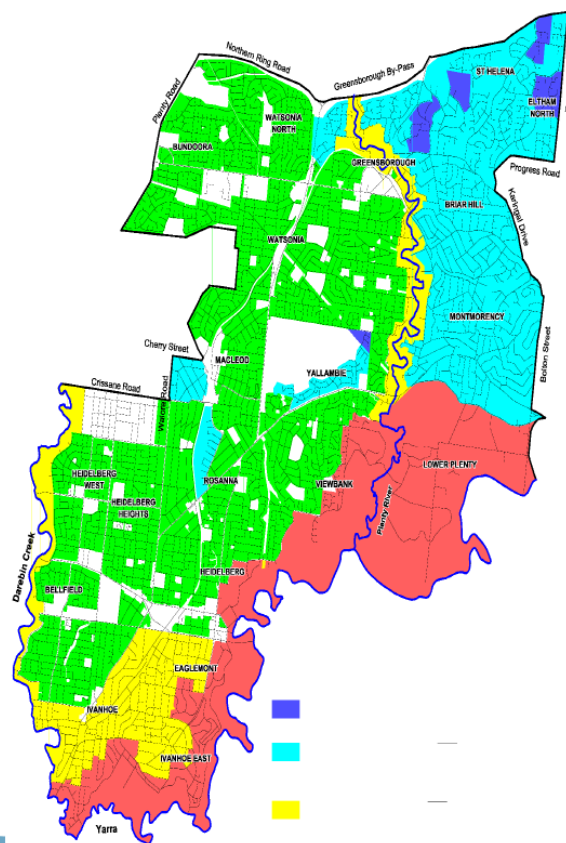


Figure 7 Native Vegetation Protection across Banyule. Taken from (Banyule City Council 2019)

Table 6 Summary of Overlays related to environment and biodiversity in Banyule.

Environmental Significance Overlays	
ESO1 – <i>Yarra River, Plenty River and Darebin Creek</i>	Encompasses stretches along the Yarra River, Plenty River, and the Darebin Creek. These are “Predominantly streamside areas supporting open space and remnant indigenous vegetations and wetlands.” They support vulnerable and rare species such as Swift Parrot and Latham’s Snipe.
ESO2 – <i>Macleod Red Gum Area</i>	Significant stands of River Red Gums and associated indigenous vegetation that provide important habitat for native fauna and wildlife corridors.
ESO3 – <i>Sites of Botanical, Zoological and Habitat Significance</i>	<p>This area “includes those sites of significance which are removed from the major waterways” i.e. not covered by ESO1. “All are significant for the presence of important indigenous vegetation but they also provide habitat for significant fauna.”</p> <p>“Yandell Reserve and the adjoining Greenhills area is particularly significant for the presence of the vulnerable Eltham Copper Butterfly. St Helena Reserve is particularly important for the presence of the Emerald Greenhood. The north-east part of the Streeton Views Estate contains stands of an unusual hybrid between River Red Gum and Swamp Gum.”</p> <p>The overlay is based strongly on the NEROC 1997 report.</p>
ESO4 – <i>Significant trees and areas of vegetation</i>	A “variety of native and exotic trees and other vegetation, which are of landscape, habitat, horticultural or genetic value, are rare or of localised distribution, are outstanding examples of their species or are of cultural or historical significance.”
ESO5 – <i>Streeton Views estate</i>	<p>Areas of Eucalyptus Grassy Woodland Community. “The community is dominated in parts by <i>Eucalyptus x studleyensis</i> and <i>Eucalyptus melliodora</i>, with scattered individuals of <i>Eucalyptus camaldulensis</i>, <i>Eucalyptus ovata</i> and more rarely <i>Eucalyptus goniocalyx</i>.”</p> <p>Provides “wildlife habitat and is an important link in habitat corridors connecting areas including the Watsonia Army Barracks and Gresswell Forest.”</p>
Significant Landscape Overlays	
SLO1 – <i>Yarra (Birrarrung) River Corridor Environs</i>	
Vegetation Protection Overlays	
VPO1 – <i>Plenty River – East</i>	This area contains developed and developing urban areas which have significant natural, habitat and environmental qualities.
VPO2 – <i>Loyola Seminary Precinct</i>	<i>A large number of trees and shrubs within the Loyola Seminary Precinct form part of the building’s original garden surrounds and are an integral part of its significance.</i>
VPO3 – <i>Eglemont, Ivanhoe East and Ivanhoe Area</i>	
VPO4 – <i>Elliston Estate</i>	
VPO5 – <i>Substantial Tree Protection Area</i>	

Design and Development Overlays (Subset)
DDO1 – <i>Darebin Parklands and Rockbeare Park Environs</i>
DDO2 – <i>Yarra (Birrarung) River Corridor</i>
DDO8 – <i>Plenty River East Neighbourhood character</i>
DDO15 – <i>Postcode 3081 Urban Design Framework Creekside West</i>
DDO17 – <i>Postcode 3081 Urban Design Framework Creekside East</i>

4. CHALLENGES TO BIODIVERSITY

Through the workshops and comprehensive literature review, several challenges to urban biodiversity in Banyule have been identified. This section of the report briefly discusses the impact of these on urban biodiversity within Banyule and highlights opportunities and recommendations to address them.

4.1. Climate Change

The world is continuing to heat up at an alarmingly rapid pace (Gallant and Reid 2023) with anthropogenic Climate Change posing significant risks for Banyule's natural ecosystems, flora, and fauna.

According to CSIRO's Regional Climate Change Projections (*The Southern Slopes Victoria West Sub-Cluster*), climate change impacts across Banyule include (CSIRO and BOM 2019):

- Increased average temperatures in all seasons (very high confidence);
- More hot days and warm spells are projected with very high confidence;
- Fewer frosts are projected with high confidence;
- Generally, less rainfall in the cool season – winter and spring (high confidence);
- Increased intensity of extreme rainfall events is projected, with high confidence;
- A harsher fire-weather climate in the future (high confidence).

This changing climate will have both direct and indirect impacts upon biodiversity such as increased flooding, damage to waterways, fires, changed phenology, increased pest and disease outbreaks, and reduced vegetation health during extended dry periods, pest and disease out-breaks. Changes in extreme heat and its duration can also have direct impact to fauna in turn impacting the ecosystems they interact with.

Approximately ~40% of Banyule's natural vegetation lies along creek and river corridors, including both in stream, riparian and floodplain communities. This makes Banyule's biodiversity particularly vulnerable to reduced rainfall (reduced flows) and extreme events (increased erosion, sediment deposition, pollution) and associated changed disturbance regimes (Northern Alliance for Greenhouse Action 2014). Smaller and isolated biodiversity sites within Banyule, and those that support threatened species or communities also face heightened risks.

Planning for and adapting to climate change will be important to address this challenge and ensure the ongoing viability of biodiversity across Banyule. Preparation of Banyule's first Climate Adaptation will commence in 2024 and is an important opportunity to undertake such planning. Banyule is also a member of the Northern Alliance for Greenhouse Action (NAGA) which has commissioned an "Adaptation in the North" report. This report considers in detail projected climatic changes for the region and assessed impacts, risks, and vulnerabilities, and actions.

4.2. Weeds

Weed invasion is especially pronounced in urban areas due to physical and chemical soil alterations and disturbance, seed-dispersal by non-indigenous fauna, altered fire regimes, and pressure from garden escapees. These weeds degrade indigenous habitats by displacing indigenous plants and thus reducing various resources (e.g., nesting, food, cover) for native fauna. They can also alter soils through biomass accumulation, and smother habitat features.

Banyule recently updated its Weed Management Plan in 2022, which documents Banyule's priority weeds species and action plan for addressing these issues.

4.3. Pest Animals

Urban biodiversity in Banyule, like most areas throughout Australia, faces a significant challenge from pest animals. These species, often introduced or advantaged through human activities, can have a detrimental impact on the local ecosystems through competition, predation, habitat destruction and spread of weeds and disease, both within terrestrial and aquatic environments. Within Banyule key invasive species include:

- Brown Rat *Rattus norvegicus*;
- Black Rat *Rattus rattus*;
- Common Blackbird *Turdus merula*;
- Common Myna *Acridotheres tristis*;
- Eastern Gambusia *Gambusia holbrooki*.
- European Rabbit *Oryctolagus cuniculus*;
- European Honey Bee *Apos mellifera*;
- European Wasps *Vespula germanica*;
- European Carp *Cyprinus carpio*; and
- European Brown Hare *Lepus europaeus*
- Feral Cat *Felis catus*;
- House Mouse *Mus musculus*;
- Queensland fruit flies
- Red Fox *Vulpes vulpes*;

- Sambar Deer *Cervus unicolor*

While it is extremely unlikely that they can be eradicated, it is important that their numbers are controlled through ongoing, targeted control in priority areas. To this end, monitoring is beneficial to gain a better understanding of the distribution of invasive animals, to target control programs and track success. This can also utilise citizen science, potentially through available Apps such as iNaturalist and FeralScan.

Pest animal management can also be enhanced through collaborative efforts with adjoining councils and land managers. Council currently participates in the Eastern Region Pest Animal Network, which has developed a regional approach to pest management through its document – Eastern Region Pest Animal Strategy (2020–2030). Council could also consider creating its own a pest animal management strategy.

4.4. Companion Animals

Domestic pets, such as dogs and cats, can have a significant impact on urban biodiversity. Dogs off leash, and roaming cats (whether stray or registered, hungry, or well-fed) in natural areas, pose several threats (Holderness–Roddam 2011):

- Their presence and scent can cause stress to the local wildlife, leading to changes in behaviour, habitat use and more time spent hiding and fleeing, rather than on other needs such as feeding and resting.
- Predation of native birds, small mammals, reptiles, frogs and other urban wildlife (Invasive Species Council Australia 2023), particularly by cats but also by dogs.
- Dog droppings, when not disposed of responsibly, is a major pollutant of creeks and can also act as a fertilizer for weeds, encouraging weed growth over indigenous vegetation.
- Fur can attract seed of exotic plant species which is then spread into other areas.
- Trampling sensitive areas such as along creek verges.

Banyule's Domestic Animal Management Plan currently promotes responsible pet ownership, registration, desexing (via reduced registration fees), and caps number of pets that can be kept without a permit.

Possible measures that could be explored to reduce the impact of cats and dogs on native vegetation include:

- A cat curfew (ideally 24 hour confinement). These have been implemented in many Councils including – Bayside, Bendigo, Darebin, Knox, Mitchell, Monash, Whitehorse, Yarra Ranges, City of Port Phillip, Whittlesea, and City of Yarra (as of Jan 2024).
- Re-considering the definition of 'effective control'. For example, some Councils (Monash, Whitehorse, Darebin) define 'effective control' as placing a leash, chain, cord or similar not exceeding 1.5 metres in length on a dog and held by the owner.
- Considering biodiversity impacts within the Domestic Animal Management Plan (DAMP) (See for example Darebin Council which includes the objective "to contribute to protect local biodiversity including wildlife through Council's animal management functions" and a section focused on actions contributing to biodiversity protection.)
- Fencing off and clearly defining dog-off-leash areas, or fencing sensitive areas of vegetation to exclude off-lead dogs from entering.

- Locating dog off lead areas away from high value sites.
- Updating the interactive mapping on the council website to indicate No dogs allowed and dog on-lead areas, in addition to the current dog off-lead areas. <https://www.banyule.vic.gov.au/Events-activities/Parks-and-reserves>
- Creating webpages clearly defining dog and cat owner responsibilities including biodiversity related aspects.

4.5. Invasive Pathogens and Insect Pests

Myrtle Rust, *Phytophthora* and Pine Scale pose risks for biodiversity in Banyule to varying extent. All three pathogens can be unintentionally spread by moving infested plant material (e.g. branches, mulch, and logs), using contaminated gardening equipment and carrying it on clothing, machinery, and cars (Agriculture Australia 2024).

Myrtle rust and *Phytophthora* pose significant implications for urban biodiversity. Myrtle rust, a fungal disease, targets plants in the *Myrtaceae* family, some *eucalypts* and other ornamental species, causing defoliation and plant death. *Phytophthora*, a water mold, induces root rot and foliar diseases, reducing plant diversity and favouring invasive species (DoEE 2018). These pathogens disrupt ecosystems, endanger native plants, and alter ecological dynamics.

Pine Scale is an insect that feeds on the sap of pine, fir, and spruce. These insects have no known predators in Australia with infested trees eventually drying up and dying. While pine scale does not pose a risk to native vegetation it could potentially affect some native fauna temporarily, where susceptible exotic tree species provide nesting or feeding sites (e.g. Cockatoos), or key habitat corridors (e.g. for arboreal marsupials).

It is understood that Council has implemented vehicle wash down stations and other biosecurity procedures to prevent its spread. Council could also consider implementing early detection measures, community awareness, and further strict hygiene protocols such as foot wash stations to high value conservation reserves, along with re-vegetation works.

4.6. Development

Ongoing development in Banyule presents challenges to environmental values. Major infrastructure projects such as the North-East Link Project and Level Crossing Removal Program, residential extensions, sub-divisions, and multi-unit developments can have adverse impacts on the environment during and after construction. These include vegetation clearing, including the loss of canopy trees on private land, runoff from construction sites, chemical use, erosion, dumping of construction waste.

Projected population growth and higher density dwellings with less open space, is also projected to increase pressure on green spaces through visitation. As was evident during COVID lockdowns, increased human recreational usage can disrupt wildlife and degrade habitat.

These are complex issues requiring a combination of comprehensive planning and regulatory measures that prioritise the protection and enhancement of biodiversity in urban developments (See Section 3.5), awareness, and education programs (see Section 4.9) supported by practical resources.

4.7. Degrading Waterways

As discussed in Section 3.3.6.2 and 3.3.6, Banyule's waterways and riparian habitat support a wide range of fauna including listed fish species. Hence protecting and improving the health of these waterway systems is critical.

A key risk to waterways is degradation through stormwater run-off, exacerbated by urbanisation and reduced permeable surfaces. Historically, storm-water collection systems have been designed to collect and deliver surface run-off to the nearest waterway, as quickly as possible. This results in pulses of high-velocity water flows, in turn leading to erosion and other knock-on effects for the stream ecology and biota (Walsh 2004). The surface run-off also typically contains higher pollutant loads.

Water Sensitive Urban Design (WSUD) infrastructure such as wetlands and swales, is a known technology to mitigate against this. This is a key issue addressed in Council's Water Plan 2019–2023 which also proposed the development of an Integrated Water Management Plan. To encourage WSUD infrastructure in the private realm and to developers, practical WSUD guidelines could be developed and/or promoted as has been done in other Councils (GHD 2013, Water 2013). The City of Yarra in partner with a number of other Councils and Northern Alliance for Greenhouse Action have developed "The Embedding Green Infrastructure Best Practice Toolkit" applicable for all Victorian Local Government (Alluvium 2016).

Ongoing restoration of riparian is also crucial as it improves water quality by filtering and absorbing stormwater pollutants, while also providing shade, soil stabilisation, and water regulation for aquatic ecosystems.

4.8. Light Pollution

Awareness of light pollution is rapidly growing. Artificial light sources within urban environments, including streetlights and buildings, have a profound impact on the natural behaviour and patterns of various fauna species. Nocturnal fauna relies heavily on darkness for navigation, feeding, and reproduction (Council 2023). However, light pollution disrupts their biological rhythms, causing disorientation, reduced foraging efficiency, and altered migration patterns (Perr et al., 2008; Straka et al., 2016).

Light pollution is particularly disruptive near wildlife corridors and bushland reserves, where native fauna is concentrated. The larvae of the threatened Eltham Copper Butterfly, for example, are known to be sensitive to light sources, especially during the active feeding period being from September to May (Himbeck and Harris 2021). Opportunities within Banyule to address this issue include:

- Education and awareness, initially targeted to priority areas;
- Consideration of biodiversity in lighting design in both public and private developments and inclusion in planning scheme;
- Considering biodiversity when updating Council strategies related to lighting;
- Considering increased property setback requirements, where properties abut priority areas;

A key document in this space is: *The National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2020)*, which is currently being updated.

4.9. Education and Awareness

The conservation of urban biodiversity faces significant challenges due to the complex intersection of community perception, values, and priorities. These challenges arise from divergent views on the importance of biodiversity and the competing demands of land use. The varying priorities within the community can hinder efforts to garner broad support and engagement for urban biodiversity initiatives. Changing community perception is essential to address several challenges including:

- Responsible pet ownership;
- Weeds;
- Pests;
- Rodenticide use and impacts to wildlife via secondary poisoning;
- Light pollution; and
- Managing biodiversity on private land

4.10. Lack of strategic monitoring and data gaps

While this issue may not be perceived as a threat to ecological values by many people, current biodiversity information and ongoing monitoring is part of an essential feedback loop. It is impossible to determine if conservation work is being directed to areas most in need or that it is working to maintain or improve habitat values without measuring and evaluating change over time. Evaluating the most effective actions is essential to determining priorities and spending limited budgets on the most effective actions.

Monitoring is also the basis of adaptive management where monitoring helps to guide the development of annual and long-term management and works programs, and will be important to respond to the impacts of climate change. The flow chart below (Figure 8) sets out a basic cycle of monitoring, management, and assessment. The importance of monitoring for effective biodiversity management is also reflected by its prominence in State and National Biodiversity Strategies such as 'Protecting Victoria's Environment – Biodiversity 2037'.

A simple and robust ecological monitoring framework should be developed for the City of Banyule, ideally in collaboration with neighbouring councils to develop some standardised approaches that allow for greater consistency and effective decision making at a regional level. Section 5.3 discusses possible approaches to monitoring in further detail.

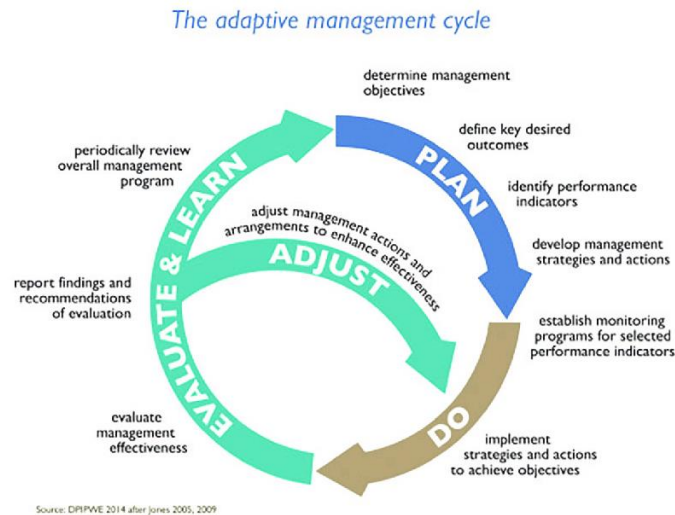


Figure 8. Adaptive management approach. Taken from (West 2016).

5. OPPORTUNITIES INTO THE FUTURE

Many worthy opportunities were identified based on key findings from the literature review and analysis, and Stakeholder engagement. These are summarized below under key themes, with some falling under several themes. These opportunities will require prioritization and gradual implementation over future years depending on budgets. While many of the opportunities will require greater upfront investment, in the longer term they offer invaluable benefits such as:

- more targeted and effective use of resources to protect and manage biodiversity;
- informed town planning and decision making;
- better use and leverage of citizen science, the community and volunteer groups;
- a healthier and more resilient city.

High priority opportunities that will require investment include:

- development of a monitoring and evaluation framework; Ideally this would involve collaboration with neighbouring councils to develop some standardised approach at a regional level;
- a municipality wide assessment of biodiversity including significant sites and corridors, to update those undertaken in the late 1990's;
- development of a biodiversity data management system available across Council departments. This would need to include local data that is maintained by Banyule City Council for its own use as well as data that is uploaded or retrieved from other biodiversity databases.

Further details regarding the development of a monitoring framework and Citizen Science opportunities are provided in Section 5.3. Some brief comments regarding synergies and opportunities with other key Council Strategies is also given in Section 5.2.

5.1. Opportunities aligned to key themes

Table 7 List of opportunities aligned to key themes. Please note that the indicative costs are highly speculative as it is difficult to gauge the extent/resources of many activities (e.g. collaboration estimates have not included potential future projects arising from collaboration.) It is provided to give a rough comparison of costings for different activities, \$ <20k, \$\$ 20–50k, \$\$\$ > 50k

Item	Opportunity	Relevant sections	3-year Indicative Cost*
1. Updated municipality wide biodiversity data that is easily accessible across Council Departments to inform Council decisions			
1a	Develop Council's internal GIS and other databases so that key biodiversity data and information is readily available to all departments to inform decisions, planning, and assessing planning applications, and can also be made available to state and utility authorities to ensure proper consideration of locally significant biodiversity values in larger infrastructure projects. This could be in the form of an interactive online toolkit;	3.3.6 3.5.2 4.10	\$\$
1b	Regularly update databases as new data becomes available to ensure its currency. It is suggested that relevant biodiversity databased for flora and fauna records are accessed yearly;	3.3.5 3.3.6	\$–\$\$
1c	Develop information/factsheets on key biodiversity aspects;	3.4 3.5.2	\$
1d	Obtain GIS files of EVC mapping provided in recent reserve land-management plans and merged these into a single polygon layer, for easier access and understanding of EVCs across Banyule reserves.	3.3.2	\$
1e	Undertake more detailed GIS analysis followed by ground-truthing to re-assess native vegetation extent, ecological vegetation classes, significant sites, flora and fauna habitat values (terrestrial and aquatic) including for listed species, large trees and connectivity across Banyule. It has been over two decades since this the last comprehensive municipality wide assessment and this is a major knowledge gap limiting biodiversity management;	3.3.2 3.3.3 3.3.6.3 3.3.7	\$\$\$
1f	Where Council historical flora and fauna records have potential to add further understanding, consider collating with data provided in this report;	3.3.5	\$–\$\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
1g	Develop a framework to guide the level of biodiversity outcomes desired across different areas of the municipality and within different contexts.	3.5.2 3.4	\$\$
2. Monitoring and Evaluation Framework			
2a	<p>Developing a framework with consistent methodologies for surveying, mapping and monitoring of biodiversity values and vegetation extent across the municipality and within indicator reserves, ideally in collaboration with other regional Councils. See Section 5.3.1 for a detailed discussion; This ideally should also consider climate change.</p> <p>As part of this process develop indicators, consistent with Council's goals and objectives to monitor and evaluate biodiversity; It may be necessary to first define Vision, Goals and Objectives.</p> <p>As discussed in Section 3.3, Banyule supports several listed flora and fauna species. Ideally the monitoring and evaluation framework would consider the status of these species. Given the large number of the large number of threatened species occurring across Banyule, selection of a smaller group of indicator species could be a more practical approach.</p>	3.3.2 3.3.3 3.3.7 4.10 5.3 3.3.6.1 5.3	\$\$\$ (Ongoing with monitoring with costs spread over multiple years)
2b	<p>Consider identifying indicator species that could be used as focal species for monitoring, planning habitat enhancement, connectivity and outreach activities to the community (links to 2a).</p> <p>As discussed in Ecology Australia's report in regards to connectivity, it would be ideal to select several indicator species representing different connectivity/habitat requirements.</p> <p>The City of Yarra, for example, has developed an ecosystem model that includes animals that can be considered as focal species for monitoring, promotion to the community and for use when planning and designing habitat links or enhancing existing areas of critical habitat (Yarra City Council 2020).</p>	3.3.6.1	\$\$
2c	Develop a citizen science program that aligns with Council's goals and objectives. This could include reporting of weeds and pest animals, and monitoring of indicator species, and rely on readily available apps like iNaturalist, which can share data with Councils (See also Section 5.3.3).	3.4 5.3.3	\$\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
3. Collaboration			
3a	<p>Collaboration with Parks Vic, Melbourne Water, adjoining Councils and private land owners, particularly golf courses, in priority areas, for waterway management including improved water quality, flow regime (e.g. WSUD) and riparian habitat.</p> <p>This is critical for the many threatened species, aquatic and terrestrial, that rely on Banyule's waterways, and should consider threatened species requirements.</p>	<p>3.2.1 3.3.6.1 4.7</p>	\$
3b	Determine indicator species around which to focus collaboration. Potential aquatic focal species identified include Platypus, and Australian Grayling (along the Yarra River) and Growling Grass Frog (Darebin Creek).	<p>3.3.6.1 3.3.6.3</p>	\$\$
3c	Collaboration with Darebin Council and Melbourne Water to determine if there are any opportunities to increase connectivity and habitat for Growling Grass Frog populations occurring within the Darebin Creek catchment just west of Banyule	<p>3.3.6.2 3.3.6.3</p>	\$
3d	Liaise with Vic Tracks and Power Utility regarding enhancement of railway line and Power easement for improved connectivity.	<p>3.3.7 3.2</p>	\$
3e	Targeted collaboration with Golf Course managers and private land owners in high priority areas such land abutting conservation reserves and waterways, or providing connectivity.	<p>3.2</p>	\$
3f	Collaborate with adjacent Councils regarding pest management. Relevant newer threats include deer and pathogen spread.	<p>4.3 4.5</p>	\$
3g	Collaborate with adjacent Councils where possible to develop a Biodiversity Monitoring Framework. This is an action of the Northern Alliance for Climate Action, as well in recent Biodiversity Action Plans for surrounding Councils such as Whittlesea. Further information is provided in Section 5.3 below. This links with 2a.	<p>4.10 5.3 4.1</p>	\$--\$
3h	Foster relationships and collaboration with universities such as La Trobe and Melbourne University for research and monitoring.	<p>4.10 5.3.3</p>	\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
3i	Continue collaborating with Friends groups on: <ul style="list-style-type: none"> Grants, plantings and weed works Citizen science projects Promotion of Friends Groups such as: <ul style="list-style-type: none"> providing an engaging and informative page on Council website promotion of activities in the Banyule Banner. 	3.2.2 3.4	\$--\$
3j	Investigate if there is merit and support in setting up an overarching friends environmental network committee (such as Frankston's Environmental Friends Network) for cross-collaboration between Friends groups and Council	3.2.2	\$
3k	Collaboration with Wurundjeri Woi Wurrung to understand cultural flora and fauna, and sites of significance across the municipality and management of these using cultural land management.	3.3.5.3	\$--\$
3l	Developing internal process to ensure Biodiversity is considered in future Council strategies and action plans. Of note are: <ul style="list-style-type: none"> Domestic Animal Management Plan (DAMP). Climate Adaptation Plan Banyule's Housing and Neighbourhood Character that is currently being updated is an excellent opportunity to highlight the biodiversity values of each Neighbourhood requiring protection. Integrated Water Management Plan 	4.4	\$
4. Outreach and Education			
4a	Continue to run current programs to connect the community with and instill an appreciation of nature;	3.4	\$\$\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
4b	<p>Develop practical resources for the community:</p> <ul style="list-style-type: none"> Beardsell's mapping of Banyule is a wonderful resource. While this information is currently available it could be translated into a format that is more easily interpreted by the public and developers to include practical information, for example EVC planting palettes with species height, availability, hardiness, growing conditions to allow easier application by the community (See Appendix 8 for two examples from other Councils); Consider developing an online mapping tool, through which the community can interactively choose their site and access local biodiversity information; 	2.2 3.4	\$-\$-\$-\$
4c	Decide on several indicator species that reflect Banyule's biodiversity values and goals and use these for monitoring purposes and to raise awareness and community appreciation of biodiversity; Links to 2a,b and 3b.	3.3.6.1 3.4	\$-\$-\$
4d	Consider designing future playgrounds and open space areas around the chosen indicator species along with informative signage;	3.3.6.1 3.4	\$
4e	<p>Define 'Biodiversity Encouragement Areas' such as areas along defined habitat corridors or adjacent bushland reserves, for targeted outreach and collaboration in regards to issues such as:</p> <ul style="list-style-type: none"> Weeds; Responsible pet ownership; Light pollution; Pathogens; Gardens for wildlife; <p>This links to recommendation 1g.</p>	3.3.7 3.4 4.8 4.9	\$
4f	Expand Banyule's Garden for Wildlife program so it also has capacity to actively engage with residents in priority areas (e.g., 'Biodiversity encouragement areas');	3.3.7 3.4	\$-\$-\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
4g	Continue to develop practical guidance information for private land owners and developers on key biodiversity conservation topics (environmental weeds, pest animals, habitat values, light pollution, indigenous plantings);	3.4 4.9	\$ \$
4h	Develop and roll-out a nature strip program;	3.3.7 3.4 3.5.2	\$ \$-\$ \$ \$
4i	Upskilling of both Council Officers and Environmental Community Groups such as Friends Groups. Look at opportunities for funded education;	3.4 3.5.2	\$-\$ \$
4j	Preparation of a 'Welcome Pack' for distribution to new land owners in target areas to educate on biodiversity in their local area and how they can help (e.g. Mornington Peninsula). This could include resources on Gardens for Wildlife, Friends and other Environmental groups, environmental weeds, and reserves;	3.4	\$-\$ \$
4k	Targeted campaigns each year aimed at a key biodiversity concern (e.g. weed, pest);	3.4	\$
4l	Collaborating with sporting, scouts and church groups, and other clubs on revegetation projects in their areas;	3.4	\$
4m	Explore possible incentive schemes e.g. rebates for conservation works, grants, "Apply for a Weed Wipeout tip Voucher" in Yarra Ranges;	3.4	\$
4n	Consider employing a biodiversity education/outreach officer to implement the expanded range of offerings, and better support and leverage community groups for improved biodiversity outcomes;	3.4	\$ \$ \$ (Ongoing – but would replace many of the costs for line items above)

Item	Opportunity	Relevant sections	3-year Indicative Cost*
5. Bushland management			
5a	When considering monitoring for bushland reserves consider a framework based on the National Standards for Ecological Restoration (See Section 5.3.2);	5.3.2	\$
5b	Compile and develop flora and fauna lists for Banyule's bushland reserves, and municipality wide (e.g. excel worksheets) and update these regularly (at least yearly) based on searches of relevant biodiversity databases, and Council records;	3.3.5	\$--\$
5c	<p>Continue engaging ecological consultants to progressively develop reserve specific land management plans. This is critical for ensuring the ongoing protection and best practice management of conservation reserves in Banyule.</p> <p>Consider increasing their scope to also consider fauna values, presence of EPBC Act listed communities, and monitoring priorities and recommendations, ensure that survey results are uploaded to the VBA database;</p> <p>Consider developing of a Vision and Guiding Principles for conservation reserves;</p>	<p>3.2</p> <p>3.3.4</p> <p>3.3.5</p> <p>3.3.6.3</p>	<p>\$--\$\$\$</p> <p>(Ongoing)</p>
5d	<p>Choose a simple app that can be used on a mobile phone/tablet by all Council on-ground staff to allow sightings (flora, fauna, weeds, pests) to be recorded. These should also be uploaded to the VBA;</p> <p>The VBA is typically the first tool used by ecological consultants to explore flora and fauna values and make judgements on the likelihood of occurrence of species. Hence it is important to devise a system to allow on-ground staff to easily report observations of notable flora, weed and fauna species, which are then regularly uploaded to the VBA. Possible applications include Merginmaps or FieldMaps.</p>	<p>3.3.5</p> <p>3.3.6</p>	\$
5e	Ensure skilled contractors are engaged with a sound understanding of flora, fauna and weed management;	3.2	\$
5f	Continue pest animal programs including monitoring for more targeted management. Consider creating a pest animal management strategy;	4.3	\$\$\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
5g	Consider recommendations made in the No Local Extinctions report (See Section 3.3.6.3);	3.3.6.3	\$-\$
5h	Work with and learn from local indigenous groups on culturally significant flora and fauna and Traditional Owner Land Management; Recognition and protection of culturally significant Flora and Fauna was an identified knowledge gap.	3.3.5.3	\$-\$
5i	Advocate to Melbourne Water to consider daylighting sections of Salt Creek in barrel drains;	3.3.7	\$
5j	Consider undertaking and mapping large trees (ties in with monitoring) and using this to direct next box installation for appropriate species in bushland lacking sufficient mature trees with tree hollows.	3.3.6.3	\$\$-\$\$\$
5k	Continue to manage and monitor Eltham Copper Butterfly sites within Banyule (Andrew Yandell and Mayona Conservation Reserve) to ensure their continued survival. Given its specific habitat requirements, low mobility, and only handful of known populations, this species is clearly a high priority for conservation efforts.	4.4	\$\$-\$\$\$ (Ongoing)
5l	Consider directing funding for the removal of weed tree species where they pose risk to high conservation areas. Stakeholder engagement indicated there was little budget for the management of weed tree species, yet these can rapidly alter natural ecosystems through outcompeting and shadowing native species.	4.2	\$\$-\$\$\$
6. Town Planning			
6a	Developing a framework including clear biodiversity guidelines and checklists, within which planning proposals and other Council projects can consider biodiversity values including ecological connectivity.	3.5.2	\$\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
6b	<p>Ensure the provision of Expert Biodiversity Planning Advice.</p> <ul style="list-style-type: none"> - This would ideally be provided through employment of an environmental planner. - Alternatively existing biodiversity staff could provide this function (but reduces their availability to pursue other initiatives and programs). 	3.5.2	\$\$-\$\$\$
6c	Development of EVC planting palettes and native landscape-biodiversity design guide for developers (links to 4b)	3.5.2 3.4	\$-\$\$
6d	<p>Better utilise available biodiversity information in Ecology Australia's 'No Local Extinctions Technical Report' (Ewing and White 2022) and Practical Ecology's 'Swift Parrot Report' (O'Malley 2017) in town planning decisions such as:</p> <ul style="list-style-type: none"> • Retention of Yellow Gums, Red Ironbark Eucalypts and other habitat trees for Swift Parrots roosting and foraging; • Protection of Large Old Trees and Trees with hollows for Powerful Owls and Krefft Gliders; 	3.3.6.3	\$-\$\$
6e	Consider Local Laws for weeds, protection of trees, cat curfew, and protection of focal species	3.5.3	\$\$
6f	Evaluate the effectiveness Banyule's overlays in protecting vegetation, and if there is a need/opportunity to strengthen these and/or supporting internal procedures and guidelines;	3.5.1	\$\$
6g	Upskill planning officers	3.5.2	\$
6h	Develop Nature Strip guidelines	3.5.2 3.4 3.3.7	\$\$-\$\$\$
6i	Consider developing Green-roof guidelines (e.g. City of Melbourne's recently published guidelines)	3.5.2	\$\$
7. Waterways			
7a	Consider opportunities to increase uptake and implementation of water sensitive urban design elements, within both the public and private realm.	4.7 4.1	\$

Item	Opportunity	Relevant sections	3-year Indicative Cost*
7b	Develop a planting–design guide for WSUD elements such as rain gardens	4.7 4.1	\$ \$
8. Climate Change			
8a	Preparation of Banyule’s first Climate Adaptation will commence in 2024 and is an important opportunity to consider (i) the key role biodiversity can play in mitigating and adapting to climate change, and (ii) actions to assist biodiversity values adapt to Climate Change.	4.1	\$

* Indicative costing only: \$ <20k, \$ \$ 20–50k, \$ \$ \$ >50k

5.2. Synergies with other Council Strategies

5.2.1. Urban Forest Strategy

The recently updated Urban Forest Strategy has biodiversity values woven into its vision, guiding principles and six strategic areas. Its fifth guiding principle is: *We protect and enhance the Banyule’s natural environment to care for flora and fauna*, while its 2nd guiding principle is to *“Increase the diversity of the Urban Forest for biodiversity and habitat with ground cover and shrub layer plantings”*.

The strategy recommends the development of a prioritisation matrix that takes into consideration multiple values including biodiversity to direct urban forest improvements to most vulnerable suburbs and areas in need. This is a focus of action items S1.1 and S1.2. The technical report proposed use of the Environmental Significance Overlay (ESO) as an indicator of where efforts should be prioritised in regards to biodiversity. This is a poor choice of indicator. Instead, a more nuanced approach is recommended based on biodiversity data and mapping of habitat extent, quality, linkages, and corridors. For example, lower quality vegetation critical to wildlife corridors could be prioritised for indigenous understory plantings to improve structural habitat for key focal species.

This again highlights the need for an up-to-date understanding of biodiversity and connectivity across Banyule and its benefit for directing limited resources to where they are most effective as proposed as an action in the Urban Forest Strategy (Action 52.5).

There are also many other opportunities for the biodiversity strategy to link and add value to implementation of the Urban Forest Strategy and its implementation plan including:

- Development of practical information such as planting palettes and a framework for landscaping approaches depending on context. This ties in with Action S2.6 of the Forest Urban Strategy Implementation Plan;
- How planting should respond and adapt to climate change;

- Nature strip planting guidelines (Action 52.4);
- Encourage retention of trees and native habitat on private property, especially those with significant vegetation (Action S3.3);
- Regular monitoring including extent of vegetation and canopy across the municipality (Action S4.3);
- Citizen Science projects to support monitoring programs (S5.3).

5.2.2. Banyule's Housing and Neighbourhood Character Strategy

This is currently being updated and is an excellent opportunity to highlight biodiversity values across each neighbourhood requiring protection.

5.2.3. Public Open Space Strategy

Biodiversity falls under two pillars of this strategy: Diversity (of experiences) and Sustainability, with strategic actions related to:

- tree plantings to enhance native habitat corridors and connectivity;
- indigenous revegetation, restoration and management along creek corridors, key conservation reserves (Peck's Dam Reserve, Simonelli Reserve, Dalvida Reserve, Rattray Reserve, St. Helena Bush Reserve, Yandell Habitat Reserve and Browns Nature Reserve) and linkages;
- implementation of bushland interpretation program and education program;
- establish regeneration areas around remnant vegetation in reserves north of Partingtons Flat (currently mown);
- investigate programs for re-establishment of ECB habitat;

This strategy also discusses Pedestrian and Cycle Connectivity "Wherever practical, parks and reserves in Banyule will be connected by safe accessible corridors". This may also provide opportunities for plantings and habitat attributes to improve ecological connectivity. The Hurstbridge rail corridor – active travel and open spaces is an example of this. There are also ongoing opportunities to

- incorporate biodiversity and natural features/landscaping when preparing masterplans;
- design themed playgrounds and spaces around charismatic focal fauna species.

5.2.4. Banyule's first Climate Adaptation Plan

Preparation of Banyule's first Climate Adaptation will commence in 2024 and is an important opportunity to consider (i) the key role biodiversity can play in mitigating and adapting to climate change, and (ii) actions to assist biodiversity values adapt to Climate Change

5.3. Ecological Monitoring, Data Collection and Evaluation

As discussed, integrating regular monitoring and data collection into the forthcoming Urban Biodiversity Strategy is critical to:

- inform decision-making, both at a landscape scale and local/reserve level;
- inform adaptive Natural Resource Management practices;
- to direct limited resources to where they are most needed and effective;
- to ensure that environmental values are appropriately considered across all Council Departments and town planning to inform decisions.

This reports' assessment of urban biodiversity within Banyule is limited to the availability of online resources, previous assessments conducted, and through general observations as presented during the stakeholder engagement events. Many of Banyule's foundation documents such as the NERO study and Banyule's Wildlife Corridors were undertaken over two decades ago.

Hence there is a need to (i) consolidate available data to give a better understanding of the current base-line and past trends across all of Banyule, (ii) create a system going forward for efficient collection of indicator data that can be readily accessed across Council to inform future biodiversity management, and (iii) undertake further assessments to fill in identified knowledge gaps. To facilitate this, a monitoring framework is needed with indicators carefully chosen to respond to Council's goals and objectives. Ideally this would be developed in collaboration with other regional Councils. Collaborating at a regional scale would help promote consistency of monitoring allowing better biodiversity understanding at regional landscape scales and joint targets. Developing such a Framework is also a joint action within the NAGA 'Adapting in the North' climate change report (Northern Alliance for Greenhouse Action 2014). This may also be timely given that the City of Whittlesea has objectives within its recent Biodiversity Strategy around collating existing biodiversity datasets, and undertaking surveying and mapping to provide a comprehensive baseline data, while neighbouring Councils of Nillumbik and Manningham appear to be currently updating their biodiversity strategies. There is also opportunity for collaboration with universities such as La Trobe and the University of Melbourne in regards to monitoring and research. The sections below provide further pertinent information found during the literature review regarding monitoring frameworks and some best practice examples.

5.3.1. Elements of a successful Framework for Monitoring and Evaluation

A summary of elements considered essential for a success of monitoring framework are summarised by Lindenmayer and Likens and include (Lindenmayer and Likens 2010, Threlfall, Harrison et al. 2015):

- "The development of a conceptual framework or model of the system to be monitored;
- Development of monitoring questions and program objectives, that can be allowed to evolve as new data comes to hand; Key evaluation questions and specified S.M.A.R.T. targets;
- Design of repeatable and appropriate measurements or indicators;
- Collection of high-quality data and implementation of good data management strategies;
- Rigorous and regular analysis and interpretation of data;

- Reporting, reflection and adaptation, and the frequent use of data;
- The development of a database for monitoring results that is accessible to multiple parties;
- The development of partnerships between scientists, resource managers and policy makers;
- Developing long-term funding and commitment.”

Ideally the monitoring would involve indicators at both a landscape scale and others based at a more local-reserve level. Current and ongoing climate change is also an important consideration and poses complexities, particularly when setting objectives for monitoring programs. Some recommend that objectives should be set to manage change rather than preventing it (Threlfall, Harrison et al. 2015). Hence objectives need to be able to accommodate for the large uncertainty surrounding climate change and a variety of potential end-states. Examples include aiming to maintain the current extent and a diversity of habitats, or to preserve the abundance and diversity of wetland bird species, while allowing for the composition of habitats or bird species to change over time with climate change, and maintaining the ecosystem functions and processes while ecosystem types change (Threlfall, Harrison et al. 2015).

Eastern Area Greenhouse Alliance Framework

A highly successful monitoring framework has been that developed by the Eastern Alliance for Greenhouse Action (EAGA) for indicators of biodiversity health in the context of a changing climate. This has been trialled and now implemented by member councils and has won several awards for its pioneering work. The development of this report was founded on a discussion/background report undertaken by Melbourne University which gives an excellent summary of relevant literature and biodiversity monitoring examples, as well as insights into the development of the final EAGA protocol (Threlfall, Harrison et al. 2015). Much of the information discussed in this section has been summarised from this work. The EAGA framework settled on four indicators:

- **Vegetation Extent** (ideally across the entire municipality but can be of Council managed land);
- **Vegetation Condition** (Ideally two 20 x 20m quadrats including 5 transects, are placed within ‘indicator reserves’ chosen by the Council. Within these a range of attributes are measured. While many of these attributes are the same as used in Habitat Hectare (HH) Scoring, a modified approach to HH scoring was used that is more sensitive to monitoring change over time);
- **Phenology** (ClimateWatch routes);
- **Local Bird Communities** (Birdlife Australia protocols – 20 mins, 2ha searches)

These were chosen to address the specific goals and questions that were defined as part of the framework, and also because they are cost effective to measure, repeatable, sensitive to change, well-studied (often associated with citizen science or well-developed measurement protocols), and responsive to various management interventions.

The Framework choose as its key objectives:

The EAGA region has resilient and functioning ecosystems that can adapt to climate change:

- Diverse indigenous habitat, including native flora and fauna;
- Reduced weed cover;

- Increased or sustained species numbers;
- Greater connectivity among habitat patches;
- Improved habitat quality (condition and extent);
- Increased or greater value placed on biodiversity by the community.

City of Yarra

According to its Nature Strategy, Yarra City Council has undertaken a two year Biodiversity Health Survey that aimed to develop a inventory of biodiversity values across open space areas (Yarra City Council 2020). The survey included both vegetation and fauna surveys including:

- *“Assessment methods ascribing ecological vegetation types and functional coverage,*
- *identification of land cover and vegetation types,*
- *assessment of fauna habitat values: leaf litter, significant habitat trees and hollow abundance,*
- *documentation of plant species diversity, including indigenous plants and weeds,*
- *daytime (diurnal) and night-time (nocturnal) bird surveys,*
- *frog and reptile surveys,*
- *microbat surveys using specialised bat detector devices, and*
- *wildlife camera trap surveys.”*

It also includes a monitoring program completed by a contracted ecological consultant to measure progress towards long and short-term management goals, mainly focused on vegetation and weed cover.

5.3.2. Monitoring for Specific Reserves

The following sections provide some examples and suggestions that could be applied at the local/reserve level.

5.3.2.1. National Standards for the Practice of Ecological Restoration

The National Standards for the Practice of Ecological Restoration, sets out 6 principles for ecological restoration including information and guidance on setting objectives, goals, indicators and monitoring. The Yarra Riverkeeper Association has developed a Regeneration guide based on the SERA principles (Kelly and Miller 2021), which translates these into a more accessible resource.

It is highly recommended that a monitoring tool be developed considering these so that the data can be translated into the progress evaluation ‘*recovery wheel*’ defined by these standards. This will require development of a set of specific monitoring indicators tailored to Banyule’s reserves. It is recommended that this includes numerical or data-based monitoring indicators (i.e. species richness, weed cover), so that the scoring method is more objective.

Some examples for how these can be adapted for Banyule’s reserves are provided below in Table 8. It would likely be easier to apply this system to each EVC on site, so that the benchmark can be used to compare progress.

Table 8. Example of three components for a five-star rating system for bushland reserves. Multiple indicators could be defined for each attribute.

Recovery Wheel Attribute	Indicator	One-star	Two-star	Three-star	Four-star	Five-star
Species composition	Indigenous Plant Diversity	< 20 % of benchmark diversity	20 to <40 % of benchmark diversity	40 to <60 % of benchmark diversity	60 to <80 % of benchmark diversity	80 % or more of benchmark diversity
Structural diversity	Structural Diversity*	0 or 1 structural layer present	2 structural layers present	3 structural layers present	4 structural layers present	5 structural layers present
External Exchanges	Connectivity – <i>may be defined specifically for different fauna guilds</i>	Reserve >1 km from another natural reserve without stepping stone connectivity**	Reserve >1 km from another natural reserve with stepping stone connectivity**	Reserve <1 km from another natural reserve without stepping stone connectivity**	Reserve <1 km from another natural reserve with stepping stone connectivity**	Reserve contiguous with another natural reserve

*The relevant components for structural diversity should be based on an appropriate EVC benchmark. Components to consider could be: groundlayer, shrub layer, sub-canopy tree layer, canopy layer, scramblers/climbers. Note however that as not all EVCs contain all of these components. For example, in an EVC that does not normally contain a sub-canopy or canopy layer, the groundlayer could be broken up into groundlayer forbs, graminoids, and shrubs such that there are still 5 components.

**In this example, the distance between stepping stones may need to be defined based on specific fauna guilds.

The above would then ideally be aligned with specific goals for each reserve/patch of vegetation. For example, it may be the aim to improve connectivity for woodland birds – such that the two-star ranking is met with stepping stone connectivity at specific distances based on the species present. However, if connectivity for arboreal mammals is the goal, then meeting the five-star rank may be necessary if they require a continuous canopy.

5.3.2.2. Indigenous understorey vegetation cover mapping

To show progress of weed control and revegetation works over time, a possible approach is to divide each bushland reserve into a grid (e.g., 20 x 20 m grids).

In each grid square, the percentage cover of indigenous understorey vegetation cover can then be captured at regular intervals (e.g. every 2 years in early spring).

These maps can be loaded onto phone/tablet-based applications and data can be captured during regular works programs by on-ground staff. There is no need to mark out the grids on site.

Within each grid square, different aspects could also be recorded e.g. cover of high-threat weeds, indigenous species diversity, bare ground, leaf litter, logs.

These maps are great to visualise change over time, are simple to interpret and clearly indicate where strategic priority works can be targeted to enlarge and connect better quality areas. A mock-up for provided below in Figure 9. This could also be supplemented with photo-points.

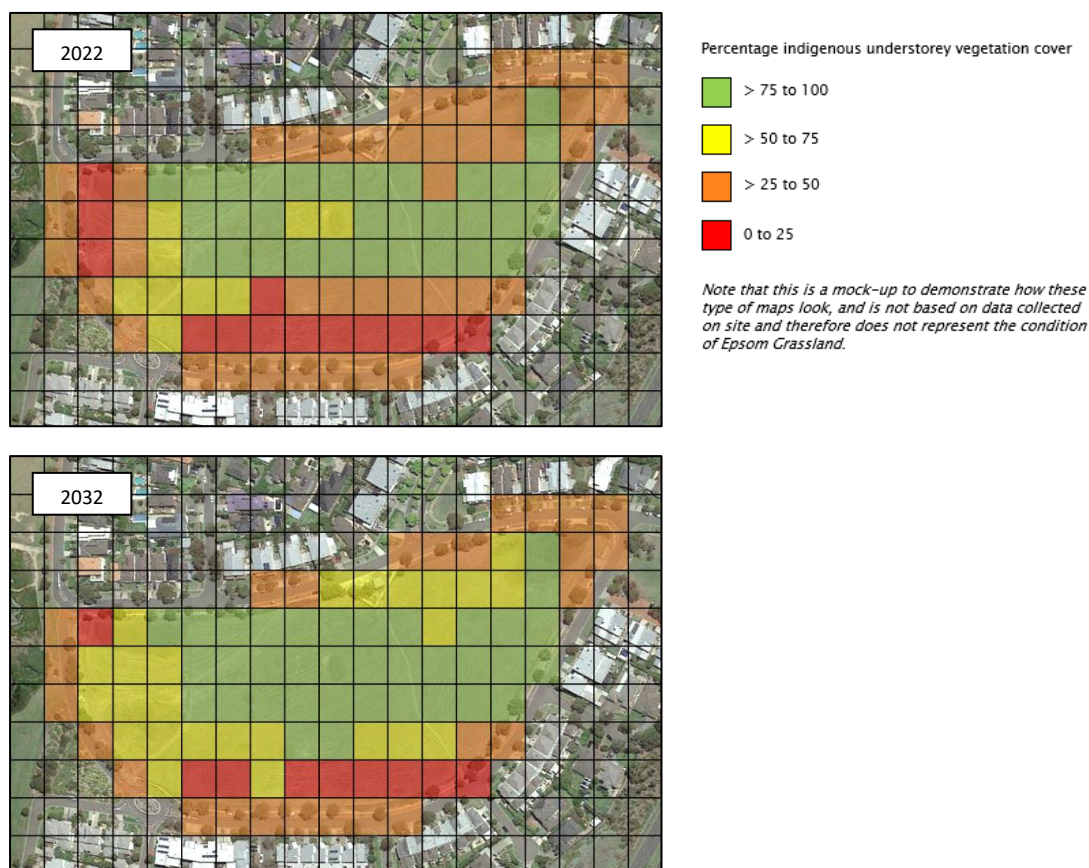


Figure 9 Mock-up of an indigenous understorey vegetation cover map.

5.3.3. Citizen Science Opportunities

There are numerous opportunities to partner with community conservation groups such as Friends' groups to monitor biodiversity within the municipality, and take advantage of an array of online biodiversity apps. Well-designed citizen science programs have the power to collect data at much larger spatial and temporal than would be otherwise possible by Council staff alone. It also has the joint benefit of providing participants with new knowledge, skills and an appreciation of biodiversity. This benefit is recognised in the biodiversity 2037 Strategy, with its aim to have "All Victorians connecting with nature" and "more people undertaking effective action for the environment, including through 'citizen science'".

Opportunities include:

- Selecting several citizen science applications of most benefit to Banyule and promoting these to the community. Potential Apps include: iNaturalist, FrogID, Birddata, PlatypusSPOT, Questagame, (<https://questagame.com/the-game> and VBA Go (when available), FeralScan;
- Promote community participation in events such as the Frog Census, Aussie Bird Count (BirdLife Australia), Bioblitz and City Nature Challenge;

- Collaborating with wildlife carer organisations to keep detailed records of wildlife rescued, recovered or taken into care. This data can provide important information on fauna diversity and movement and help Council plan to mitigate threats to wildlife including identifying locations of high frequency wildlife-vehicle collisions;
- Support Friends Of Groups to design and operate monitoring programs through grants and education (e.g., The Friends of Monty has excellent programs aimed at Krefft's Glider and Powerful Owls).
- Consider developing citizen science programs that are designed specifically to monitor
 - Indicator fauna species relevant to Banyule
 - Indicators that measure the success of Council programs and works.

An example is the 'Superb City Wrens' Citizen Science program currently underway within the City of Melbourne. This program aims to monitor the impacts of strategic vegetation works to improve habitat and connectivity for small birds such as the Superb Fairy-wren, and understanding where they live.

<https://www.melbourne.vic.gov.au/community/greening-the-city/urban-nature/Pages/superb-city-wrens.aspx>

5.3.3.1. Bird Monitoring and Citizen Science: Australian Bird Atlas

Banyule is fortunate to support a high diversity of bird species, hence this is an ideal to taxa to target for citizen science and monitoring purposes. Monitoring bird populations is one of the most accessible ways to measure the habitat created and enhanced by weed control and restoration projects, and can be conducted by Banyule staff, external contractors, volunteers, and the community, offering an excellent opportunity to involve community groups.

The *Survey Techniques* developed by BirdLife Australia (2020) are a standardised set of methods which are easily applied and used, and thus are the most appropriate for bird monitoring in Banyule.

Bird monitoring is especially recommended where the goals for certain reserves is to improve the habitat for certain bird guilds. While monitoring the habitat *itself* is still beneficial (i.e. the presence of a well-developed shrub layer), monitoring the actual abundance and diversity of birds can be useful to determine if bird populations are responding, and if not, whether other factors need to be improved such as connectivity or pest animal populations.

The 2 ha, 20 minute systematic bird survey is recommended for these purposes, where Banyule staff, contractors, amateur birders or trained environmental groups, undertake the survey. The fixed route monitoring approach, could be made accessible to the general public or community groups, allowing more frequent monitoring. This could be supported by offering outreach program with occasional surveys led by an ornithologist or someone with a practical knowledge of birds, to build community confidence in undertaken the fixed route surveys. The fixed route monitoring involves defining a fixed route through the area of interest.

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Appendix 1. Maps

Map 1. Banyule Regional Context

Map 2. Waterways of Banyule

Map 3. Bioregions of Banyule

Map 4. Historical Banyule EVCs (Based on Beardsell 2011)

Map 5. Current EVC Extent

Map 6. Parks and Reserves

Map 7. Land Management

Map 8. Friends Of Groups

Map 9. VBA Listed Flora Records across Banyule

Map 10. VBA Listed Fauna Records across Banyule

Map 11. Planning Scheme – PCRZ and PPRZ

Map 12. Planning Scheme – Environmental Significance Overlays

Map 13. Planning Scheme – Significant Landscape Overlay

Map 14. Planning Scheme – Vegetation Protection Overlays

Map 15. Planning Scheme – Design and Development Overlays

Map 16. Planning Scheme – Public and Private Ownership

Please see separate attachment for Appendix 1

Appendix 2. Bioregions and EVCs of Banyule

Table 9 Bioregions of Banyule. Descriptions based on information at (DEECA 2023).

Bioregion	Description
Victorian Volcanic Plains (VVP)	<p>This bioregion is characterised by its recent volcanic activity and basalt-derived soils and geology. These deposits formed an extensive flat to undulating basaltic plain with stony rises, old lava flows, numerous volcanic cones and old eruption points and is dotted with shallow lakes both salt and freshwater. Numerous volcanic cones dot the landscape with scoria cones being the most common (e.g. Mt Elephant, Mt Napier and Mt Noorat) although some basalt cones are present (e.g. Mt Cottrell) (DEECA 2023).</p> <p>Within Banyule, this bioregion covers a narrow stretch to the west along Darebin Creek.</p> <p>This bioregion, generally aligns with the Plenty Lowland Volcanic Plains physiographic region defined by Beardsell (2000) within Banyule.</p>
Gippsland Plain (GP)	<p>The Gippsland Plain in south-eastern Victoria is characterised by flat, low-lying coastal and alluvial plains with a gently undulating terrain. It is dominated by barrier dunes, floodplains, and swampy flats.</p> <p>Within Banyule, this bioregion includes the catchments of the lower Yarra River and its tributaries such as lower Plenty River and Banyule Creek. These lowlands gently rise north-east wards to the undulating hills of the Highlands Southern Falls region. The fertile floodplains and swamps have pale yellow and grey texture contrast soils (Hydrosols), providing a habitat for Swamp Scrub, Plains Grassy Woodland, Plains Grassy Forest, Plains Grassland, and Gilgai Wetland ecosystems (DEECA 2023).</p> <p>This bioregion generally aligns with the Plenty Lowland Alluvial Plains physiographic region defined by Beardsell (2000).</p>
Highlands Southern Fall (HSF)	<p>This bioregion is the southerly aspect of the Great Dividing Range. These dissected uplands have moderate to steep slopes, high plateaus, and alluvial flats along the main valleys. The geology is of Palaeozoic deposits giving rise to predominantly sedimentary and granitic rocks. The brown and red porous earths (Dermosols) occur in the upper reaches and yellow and red texture contrast soils (Chromosols and Kurosols) graduate down the valleys (DEECA 2023).</p> <p>Within Banyule, this bioregion covers the north-east part of Banyule including a significant part of the Plenty River catchment.</p> <p>This bioregion generally aligns with the Plenty Lowland Hills physiographic region defined by Beardsell (2000).</p>

Table 10 Description of the pre-European EVCs within Banyule and their current conservation status within each bioregion. D = Depleted, Vu = Vulnerable, and En = Endangered, () = historically not present in that Bioregion within Banyule.

EVC no.	EVC name	Conservation Status			Description
		GP	HSF	VVP	
19	Riparian Shrubland	E	Rare	*	<p>This is mapped along sections of the Plenty and Darebin Rivers.</p> <p>Its benchmark description describes it as a diverse, medium to tall shrubland to 8 m tall occurring on rocky substrates of major streams and banks and channels of rocky creeks and along perennial streams in gorge tracts. It can withstand frequent flooding or regenerate rapidly after such disturbance and often forms dense thickets along the stream's edge during long periods without flooding. Trees may be irregularly scattered throughout but tend to be restricted to the banks of the rivers and creeks. Sedges and rushes common to riparian environments dominate the understorey as well as an array of herbs and grasses including many ephemeral species which survive on the bare sands or in rock crevice.</p> <p>Beardsell maps two sub-communities, one characterised by Muttonwood along the rapids in sedimentary river gorges of the foothills. The other characterised by Woolly Tea-tree occurs along streams on the volcanic plains.</p>
22	Grassy Dry Forest	LC	LC	(D)	<p>This community dominates in the north-eastern part of Banyule, occurring on the hill slopes.</p> <p>According to its benchmark description, Grassy Dry Forest occurs on a variety of gradients and altitudes and on a range of geologies. The overstorey is dominated by a low to medium height open forest of eucalypts to 20 m tall, sometimes resembling a woodland. The understorey usually consists of a sparse shrub layer of medium height. Grassy Dry Forest is characterised by a ground layer dominated by a high diversity of drought-tolerant grasses and herbs, often including a suite of fern species. Characteristic Eucalypt species include: Red Stringybark <i>Eucalyptus macrorhyncha</i>, Bundy <i>Eucalyptus goniocalyx</i> s.l. and Red Box <i>Eucalyptus polyanthemos</i>.</p> <p>Much of the area mapped as EVC22 is considered a Box-Stringybark Woodland community by Beardsall (2011), where it is described as an ecological bridge between Plains Grassy Woodland and Grassy Dry Forests of the mountains. It supports a characteristic and diverse orchid assemblage as well as shrubs and grasses in the understorey.</p>
23	Herb-rich Foothill Forest	V	LC	(V)	<p>This is mapped along the sections of gullies, creeks and rivers.</p> <p>Its benchmark describes it as occurring on relatively fertile, moderately well-drained soils on an extremely wide range of geological types and in areas of moderate to high rainfall. Occupies easterly and southerly aspects mainly on lower slopes and in gullies. A medium to tall open forest to 25 m tall with a large shrub or understorey tree layer over a sparse to dense medium shrub layer. A high cover and diversity of herbs and grasses in the ground layer which characterises this EVC.</p>

EVC no.	EVC name	Conservation Status			Description
		GP	HSF	VVP	
47	Valley Grassy Forest	V	V	(V)	<p>This community occupies lower slopes in the foothill valleys.</p> <p>Its benchmark describes it as occurring under moderate rainfall regimes of 700–800 mm per annum on fertile well-drained colluvial or alluvial soils on gently undulating lower slopes and valley floors. Open forest to 20 m tall that may carry a variety of eucalypts, usually species which prefer more moist or more fertile conditions over a sparse shrub cover. In season, a rich array of herbs, lilies, grasses and sedges dominate the ground layer but at the drier end of the spectrum the ground layer may be sparse and slightly less diverse, but with the moisture-loving species still remaining. Characteristic eucalyptus species vary with the bioregion but may include Yellow Box <i>Eucalyptus melliodora</i> and Candlebark <i>Eucalyptus rubida</i></p> <p>Beardsell describes two sub-communities in Banyule, one occupying the main valley and adjoining sheltered foot-slopes on the east side, with the other occupying more exposed hill-slopes above.</p>
53	Swamp Scrub	E	€	€	<p>This community is mapped on the floodplains adjacent to billabongs on the Yarra River between Kew and Templestowe.</p> <p>In the benchmark description it is a closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The vegetation characteristically lacks a eucalypt overstorey and is dominated by Swamp Paperbark <i>Melaleuca ericifolia</i> (or sometimes Woolly Tea-tree <i>Leptospermum lanigerum</i>) which often forms a dense thicket, out-competing other species. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer. Beardsell (2011) note these are characterised by Swamp Paperbark.</p>
55	Plains Grassy Woodland	E	E	E	<p>Plains Grassy Woodland is the historically dominant vegetation across the central and southern areas of Banyule. It is an open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. A key species is the River Red-gums <i>Eucalyptus camaldulensis</i>.</p> <p>Beardsell (2011) further mapped 5 sub-communities, all dominated by River Red Gums.</p>
56	Floodplain Riparian Woodland	E	E	E	<p>This community occurs predominantly along the Yarra and lower Plenty Rivers.</p> <p>The Floodplain Riparian Woodland is an open eucalypt woodland to 20 m tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. It occurs along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall are relatively low and soils are fertile alluviums subject to periodic flooding and inundation. This EVC is intermediate between the true wetland areas that are generally free of trees and the more elevated woodlands.</p> <p>According to Beardsell (2011) it is dominated by River Red Gums along Yarra River and Manna Gum along Plenty River.</p>

EVC no.	EVC name	Conservation Status			Description
		GP	HSF	VVP	
61	Box- Ironbark Woodland	(V)	V	(D)	<p>One localised area of this community is mapped in Banyule just north of Andrew Yandell Reserve on a hill crest, and is dominated by Yellow Gum.</p> <p>According to its benchmark description, this community occurs on gently undulating rises, low hills and peneplains on infertile, often stony soils derived from a range of geologies. It consists of an open overstorey to 20 m tall consists of a variety of eucalypts, often including one of the Ironbark species. The mid storey often forms a dense to open small tree or shrub layer over an open ground layer ranging from a sparse to well-developed suite of herbs and grasses</p>
68	Creekline Grassy Woodland	E	E	E	<p>According to its benchmark description this is a Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. It occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds.</p> <p>Within Banyule, Beardsell (2011) describes two sub-communities, both dominated by River Red Gums. The first occurs along semi-permanent creeks of the plains with a floristic composition similar to Creekline herb-rich woodland and Valley Grassy Forest. The second is along ephemeral drainage lines being distinguished by the addition of riparian species in common with Floodplain Riparian Woodland.</p>
82	Riverine Escarpment Scrub	E	LC	*	<p>This is described as a shrubland to 10 m tall with occasional emergent eucalypts. Occurs on shallow colluvial soils along rocky cliffs and slopes associated with rivers and creeks and may extend onto alluvial terraces. Characterised by a dense medium to tall shrub layer over a ground layer which can range from low to high diversity and consist of a variety of graminoids and herbs. Ferns can often be a major component of the ground stratum.</p>
125	Plains Grassy Wetland	E	€	€	<p>Scattered occurrences of this are mapped along the Yarra River. This EVC is usually treeless, but in some instances can include sparse River Red Gum <i>Eucalyptus camaldulensis</i> or Swamp Gum <i>Eucalyptus ovata</i>. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.</p>
164	Creekline Herb-rich Woodland	E	V	€	<p>According to its Benchmark this is a woodland or open forest to 15 m tall occurring on creek terraces and along shallow drainage lines with ephemeral flows. Soils are mostly alluvial deposits of seasonally wet sands and silts. Characterised by a sparse shrub layer above a grassy/sedgy understorey, often rich in herbs within the inter-tussock spaces.</p>
172	Floodplain Wetland Aggregate	*	(*)	(*)	<p>This community is mapped along billabongs and swamps on alluvial plans of the Yarra River.</p> <p>It encompasses several EVC components. These EVCs can occur in very fine-scale mosaics reflecting local variations in depth and duration of wetting. Some of these EVCs occur in temporal mosaics, where they are expressed during different phases of the wetting and drying cycles.</p> <p>Beardsell (2011) describes this community as “a collective of EVCs covering various vegetation zones in the wet and dry phases of billabongs and swamps associated with riparian floodplains. The zones can vary dramatically depending on environmental conditions (e.g. become absent after extended drought). They re-</p>

EVC no.	EVC name	Conservation Status			Description
		GP	HSF	VVP	
					appear when wetlands remain inundated for an extended period. The different vegetation zones usually occur together but form distinct vegetation strata and provide habitat to differing animal groups." The following components are variously recognisable within Floodplain Wetland: Aquatic Herbland, Aquatic Sedgeland, Tall Marsh, Swamp Scrub, Floodway Pond Herbland and Dwarf Floating Aquatic Herbland. Billabong Wetland is also an aggregate EVC including many of these components.
175	Grassy Woodland	€	D	€	<p>There are three localised occurrences of this community mapped across Banyule. One on the alluvial fans on the Yarra, and the other on volcanic hill-crest cappings east of the Plenty River near the northern boundary of the municipality.</p> <p>This community is a variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies.</p>
653	Aquatic herbland	*	(*)	€	Herbland of permanent to semi-permanent wetlands, dominated by sedges (especially on shallower verges) and/or aquatic herbs. Occurs on fertile paludal soils, typically heavy clays beneath organic accumulations.

* Not listed in Bioregion

Appendix 3. Listed Flora – Summary Tables

Table 11 Threatened species listed under the EPBC or FFG Acts with records within Banyule since 1980. Vu = vulnerable, En = endangered, and Cr = critically endangered. Those highlighted green have been recorded within the VBA in the past 10 years. Those with an # are not indigenous to the area.

Scientific Name	Common Name	Origin	EPBC	FFG	Last Year Observed
<i>Acacia howittii</i>	Sticky Wattle	#	–	Vu	2008
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass		VU		1995
<i>Austrostipa rudis subsp. australis</i>	Veined Spear-grass		–	En	2008
<i>Billardiera scandens s.s.</i>	Velvet Apple-berry		–	En	2020
<i>Corybas fimbriatus</i>	Fringed Helmet-orchid		–	En	1992
<i>Corymbia maculata</i>	Spotted Gum	#	–	Vu	2019
<i>Dianella amoena</i>	Matted Flax-lily		EN	Cr	2021
<i>Dianella sp. aff. longifolia (Benambra)</i>	Arching Flax-lily		–	Th	2015
<i>Eucalyptus leucoxylon subsp. Connata</i>	Melbourne Yellow-gum		–	En	2006
<i>Eucalyptus leucoxylon subsp. megalocarpa</i>	Large-fruit Yellow-gum	#	–	Cr	2019
<i>Eucalyptus sideroxylon subsp. sideroxylon</i>	Mugga		–	En	1998
<i>Eucalyptus X studleyensis</i>	Studley Park Gum		–	Cr	2019
<i>Geranium solanderi var. solanderi s.s.</i>	Austral Crane's-bill		–	En	2015
<i>Geranium sp. 3</i>	Pale-flower Crane's-bill		–	En	2015
<i>Glycine latrobeana</i>	Clover Glycine		VU	Vu	1988
<i>Melaleuca armillaris subsp. armillaris</i>	Giant Honey-myrtle	#	–	En	2019
<i>Pterostylis chlorogramma</i>	Green-striped Greenhood		VU	En	1993
<i>Pterostylis smaragdina</i>	Emerald-lip Greenhood		–	En	1999
<i>Senecio campylocarpus</i>	Floodplain Fireweed		–	En	2014
<i>Senecio psilocarpus</i>	Swamp Fireweed		VU	–	2014
<i>Xerochrysum palustre</i>	Swamp Everlasting		VU	Cr	2014

Table 12. Threatened species listed under the EPBC or FFG Acts present within a 5 km buffer of Banyule but have no records within Banyule. Vu = vulnerable, En = endangered, and Cr = critically endangered. Those with Year in green text have been recorded in the VBA in the past 10 years.

Scientific Name	Common Name	Origin	EPBC	FFG	Last Year Observed
<i>Acacia stictophylla</i> ^{^^}	Dandenong Wattle			En	2011
<i>Caladenia amoena</i>	Charming Spider-orchid		EN	Cr	1997
<i>Caladenia oenochila</i>	Wine-lipped Spider-orchid			Cr	2021
<i>Caladenia rosella</i>	Little Pink Spider-orchid		EN	Cr	2015
<i>Callitriche brachycarpa</i>	Short Water-starwort			En	2013
<i>Cardamine papillata</i>	Forest Bitter-cress			En	2011
<i>Carex tasmanica</i>	Curly Sedge			En	2020
<i>Corymbia gummiifera</i>	Red Bloodwood			Vu	2022
<i>Cullen tenax</i>	Tough Scurf-pea			En	2020
<i>Fimbristylis velata</i> [^]	Veiled Fringe-sedge			En	2011
<i>Geranium sp. 1</i>	Large-flower Crane's-bill			Cr	2010
<i>Goodia medicaginea</i>	Western Golden-tip			En	2021
<i>Levenhookia sonderi</i>	Slender Stylewort			En	2011
<i>Nicotiana suaveolens</i>	Austral Tobacco			En	2017
<i>Picris barbarorum</i> ^{^^}	Plains Picris			Ex	2011
<i>Pomaderris vacciniifolia</i>	Round-leaf Pomaderris		CR	Cr	2011
<i>Pterostylis clivosa</i>	Red-tip Greenhood			En	2014
<i>Senecio glomeratus subsp. longifructus</i>	Annual Fireweed			Vu	2011
<i>Tripogonella loliiformis</i>	Rye Beetle-grass			En	2021

[^] Records in Ivanhoe east along Yarra – Bolin Bolin Reserve

^{^^} These are likely no longer present as the vegetation appears to no longer exist in aerial images

Appendix 4. List of flora species with records in Banyule

Origin

* = Exotic species

= Native species extended beyond natural range

EPBC Act 1999:

EX: Extinct, CR: Critically endangered, EN: Endangered,
VU: Vulnerable and CD: Conservation dependant

FFG Act 1998 (2020 status)

Cd: Conservation dependant, Cr: Critically endangered,
En: Endangered, Ex: Extinct, Th: Threatened, Vu: Vulnerable
En(Ex): Endangered (extinct in Vic)

Banyule Status (Taken from Beardsell 2011)

- 1 observed over last fifteen years and assumed to currently survive;
- 1m considered locally rare or threatened and may not survive beyond the short term unless appropriately managed;
- 2 formerly recorded but not observed for over five years and currently presumed extinct;
- 3 known only from an introduced population;
- 4 no confirmed prior record but likely occurred as located in similar habitat in surrounding district (within 5 km of municipal boundary);
- 5 no prior record for Banyule or district but known from similar habitat elsewhere in the lowlands of North East Melbourne (small selection of species only).

Table 13 – Indigenous and naturalised species across City of Banyule.

These records were taken from the VBA (from 1980) and Records provided as excel files from selected reserves surveyed by Karl Just. Where a record from one of Karl Just's surveys was more recent than the VBA record, this is reflected by the Source – VBA + KJ, or just KJ where there were previously no VBA records.

Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
DICOTYLEDONS									
Aizoaceae	500656	<i>Carpobrotus modestus</i>	Inland Pigface	VBA				1m	1987
Amaranthaceae	500184	<i>Alternanthera denticulata s.l.</i>	Lesser Joyweed	VBA				1	2007
Amaranthaceae	505097	<i>Alternanthera denticulata s.s.</i>	Lesser Joyweed	VBA				1	2008
Anthemideae	500846	<i>Cotula australis</i>	Common Cotula	VBA	#			1	2010
Apiaceae	500706	<i>Centella cordifolia</i>	Centella	VBA				1	2007
Apiaceae	500989	<i>Daucus glochidiatus</i>	Australian Carrot	VBA				1	2001
Apiaceae	501240	<i>Eryngium vesiculosum</i>	Prickfoot	VBA				2 (3 4)	2014
Araliaceae	501720	<i>Hydrocotyle foveolata</i>	Yellow Pennywort	VBA				1	2008
Araliaceae	501722	<i>Hydrocotyle hirta</i>	Hairy Pennywort	VBA				1	2008
Araliaceae	501723	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	VBA				1	2008
Asteraceae	500466	<i>Brachyscome multifida</i>	Cut-leaf Daisy	VBA + KJ				1	2015
Asteraceae	500666	<i>Cassinia aculeata subsp. aculeata</i>	Common Cassinia	VBA				1	2019
Asteraceae	500668	<i>Cassinia longifolia</i>	Shiny Cassinia	VBA				1	2008
Asteraceae	500667	<i>Cassinia sifton</i>	Drooping Cassinia	VBA	#				2022
Asteraceae	500707	<i>Centipeda cunninghamii</i>	Common Sneezeweed	VBA				1	2014
Asteraceae	500708	<i>Centipeda minima s.l.</i>	Spreading Sneezeweed	VBA				1	1995
Asteraceae	504281	<i>Chrysocephalum apiculatum s.s.</i>	Common Everlasting	VBA + KJ				1m	2019

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Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Asteraceae	501628	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	VBA				1m	2008
Asteraceae	501626	<i>Coronidium scorpioides s.s.</i>	Button Everlasting	VBA				1	2001
Asteraceae	500903	<i>Cymbonotus preissianus</i>	Austral Bear's-ear	VBA				1m	2001
Asteraceae	503749	<i>Euchiton involucratus s.l.</i>	Common Cudweed	VBA					2018
Asteraceae	501465	<i>Euchiton involucratus s.s.</i>	Star Cudweed	VBA				1	2014
Asteraceae	504652	<i>Euchiton japonicus s.l.</i>	Clustered/Creeping Cudweed	VBA					2005
Asteraceae	501466	<i>Euchiton japonicus s.s.</i>	Creeping Cudweed	VBA				1	2019
Asteraceae	501471	<i>Euchiton sphaericus</i>	Annual Cudweed	VBA				1	2008
Asteraceae	501862	<i>Lagenophora gunniana</i>	Coarse Bottle-daisy	VBA + KJ				1m	2015
Asteraceae	502762	<i>Laphangium luteoalbum</i>	Jersey Cudweed	VBA				1	2008
Asteraceae	501946	<i>Leptorhynchos squamatus</i>	Scaly Buttons	VBA				1m	1988
Asteraceae	505610	<i>Leptorhynchos squamatus subsp. squamatus</i>	Scaly Buttons	VBA + KJ					2015
Asteraceae	501947	<i>Leptorhynchos tenuifolius</i>	Wiry Buttons	VBA				1	2001
Asteraceae	501638	<i>Leucochrysum albicans s.l.</i>	Hoary Sunray	VBA				1m	2005
Asteraceae	504578	<i>Leucochrysum albicans s.s.</i>	Hoary Sunray	KJ				1m	2015
Asteraceae	504579	<i>Leucochrysum albicans subsp. albicans</i>	Hoary Sunray	VBA					2001
Asteraceae	502312	<i>Olearia lirata</i>	Snowy Daisy-bush	VBA				1m	2022
Asteraceae	501616	<i>Ozothamnus ferrugineus</i>	Tree Everlasting	VBA				1	2008
Asteraceae	501620	<i>Ozothamnus obcordatus</i>	Grey Everlasting	VBA				1m	2001
Asteraceae	503102	<i>Senecio biserratus</i>	Jagged Fireweed	VBA				1m	2003
Asteraceae	507136	<i>Senecio campylocarpus</i>	Floodplain Fireweed	VBA			En	3 (4)	2014
Asteraceae	503107	<i>Senecio glomeratus</i>	Annual Fireweed	VBA				1	2019

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Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Asteraceae	507141	<i>Senecio glomeratus subsp. glomeratus</i>	Annual Fireweed	VBA					2008
Asteraceae	503111	<i>Senecio hispidulus s.l.</i>	Rough Fireweed	VBA					2007
Asteraceae	504959	<i>Senecio hispidulus s.s.</i>	Rough Fireweed	VBA + KJ				1	2015
Asteraceae	503119	<i>Senecio minimus</i>	Shrubby Fireweed	VBA				1	2008
Asteraceae	507176	<i>Senecio phelleus</i>	Stony Fireweed	VBA					2008
Asteraceae	503126	<i>Senecio prenanthoides</i>	Beaked Fireweed	VBA				1m	2001
Asteraceae	504659	<i>Senecio psilocarpus</i>	Swamp Fireweed	VBA		VU			2014
Asteraceae	503124	<i>Senecio quadridentatus</i>	Cotton Fireweed	VBA				1	2019
Asteraceae	503125	<i>Senecio runcinifolius</i>	Tall Fireweed	VBA				4	2008
Asteraceae	503129	<i>Senecio tenuiflorus s.l.</i>	Slender Fireweed	VBA				1	2005
Asteraceae	503195	<i>Solenogyne dominii</i>	Smooth Solenogyne	VBA + KJ				1	2015
Asteraceae	503196	<i>Solenogyne gunnii</i>	Hairy Solenogyne	VBA				4	2008
Asteraceae	503300	<i>Stuartina muelleri</i>	Spoon Cudweed	VBA				1	2001
Asteraceae	503541	<i>Vittadinia muelleri</i>	Narrow-leaf New Holland Daisy	VBA				1m	1987
Asteraceae	503763	<i>Xerochrysum palustre</i>	Swamp Everlasting	VBA		VU	Cr	2 (3)	2014
Asteraceae	501633	<i>Xerochrysum viscosum</i>	Shiny Everlasting	VBA + KJ				2 (4)	2020
Boraginaceae	500910	<i>Hackelia suaveolens</i>	Sweet Hound's-tongue	VBA + KJ				1m	2019
Brassicaceae	501908	<i>Lepidium pseudohyssopifolium</i>	Native Peppercross	VBA				4	2014
Brassicaceae	501910	<i>Lepidium pseudotasmanicum</i>	Shade Peppercross	VBA + KJ				1m	2015
Campanulaceae	502024	<i>Lobelia anceps</i>	Angled Lobelia	VBA				1	2008
Campanulaceae	502025	<i>Lobelia gibbosa sensu Willis (1973)</i>	Tall Lobelia	VBA				1m	1999
Campanulaceae	502026	<i>Lobelia pratioides</i>	Poison Lobelia	VBA				4	2014
Campanulaceae	503551	<i>Wahlenbergia capillaris s.l.</i>	Tufted Bluebell	VBA				1m	1997

Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Campanulaceae	504124	<i>Wahlenbergia gracilenta s.s.</i>	Hairy Annual-bluebell	VBA					2001
Campanulaceae	503558	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	VBA				1	2008
Campanulaceae	504059	<i>Wahlenbergia luteola</i>	Bronze Bluebell	VBA + KJ				1m	2015
Campanulaceae	503560	<i>Wahlenbergia multicaulis</i>	Branching Bluebell	VBA				1m	2001
Campanulaceae	503559	<i>Wahlenbergia stricta subsp. stricta</i>	Tall Bluebell	VBA				1m	2001
Casuarinaceae	500677	<i>Allocasuarina littoralis</i>	Black Sheoak	VBA				2 (3 4)	1988
Casuarinaceae	500685	<i>Allocasuarina verticillata</i>	Drooping Sheoak	VBA				1m	2019
Celastraceae	503244	<i>Stackhousia monogyna s.l.</i>	Creamy Stackhousia	VBA					2001
Celastraceae	528493	<i>Stackhousia monogyna s.s.</i>	Creamy Candles	KJ				1m	2015
Chenopodiaceae	500332	<i>Atriplex semibaccata</i>	Berry Saltbush	VBA				1m	2019
Chenopodiaceae	500748	<i>Dysphania pumilio</i>	Clammy Goosefoot	VBA	#			1	2008
Chenopodiaceae	501132	<i>Einadia hastata</i>	Saloop	VBA				1m	2008
Chenopodiaceae	501133	<i>Einadia nutans</i>	Nodding Saltbush	VBA				1	2019
Chenopodiaceae	505732	<i>Einadia nutans (matted form)</i>	Nodding Saltbush (matted form)	VBA					2008
Chenopodiaceae	501134	<i>Einadia trigonos subsp. trigonos</i>	Lax Goosefoot	VBA + KJ	#			1m	2015
Chenopodiaceae	501156	<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush	VBA				1m	2019
Convolvulaceae	500604	<i>Calystegia sepium subsp. roseata</i>	Large Bindweed	VBA				1	1995
Convolvulaceae	505884	<i>Convolvulus angustissimus</i>	Blushing Bindweed	VBA					2008
Convolvulaceae	505885	<i>Convolvulus angustissimus subsp. angustissimus</i>	Blushing Bindweed	KJ				1	2019
Convolvulaceae	505549	<i>Convolvulus angustissimus subsp. omnigracilis</i>	Slender Bindweed	VBA				4	2006
Convolvulaceae	500809	<i>Convolvulus erubescens s.l.</i>	Pink Bindweed	VBA					2005

Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Convolvulaceae	503673	<i>Convolvulus remotus s.l.</i>	Grassy Bindweed	VBA					1988
Convolvulaceae	501036	<i>Dichondra repens</i>	Kidney-weed	VBA				1	2019
Crassulaceae	500860	<i>Crassula decumbens var. decumbens</i>	Spreading Crassula	VBA				1	2022
Crassulaceae	500862	<i>Crassula helmsii</i>	Swamp Crassula	VBA				1	2017
Crassulaceae	500866	<i>Crassula sieberiana s.l.</i>	Sieber Crassula	VBA				1	2022
Crassulaceae	504378	<i>Crassula sieberiana s.s.</i>	Sieber Crassula	VBA					2008
Crassulaceae	504337	<i>Crassula tetramera</i>	Australian Stonecrop	VBA					2008
Droseraceae	501102	<i>Drosera auriculata</i>	Tall Sundew	VBA				1	2020
Droseraceae	503689	<i>Drosera peltata s.l.</i>	Pale Sundew	KJ					2020
Droseraceae	501107	<i>Drosera peltata subsp. peltata spp. agg.</i>	Pale Sundew	VBA				1	2008
Elatinaceae	501138	<i>Elatine gratioloides</i>	Waterwort	VBA				1	1995
Ericaceae	500123	<i>Acrotriche serrulata</i>	Honey-pots	VBA				1	2019
Ericaceae	500304	<i>Styphelia humifusa</i>	Cranberry Heath	VBA				1	2018
Fabaceae	500440	<i>Bossiaea prostrata</i>	Creeping Bossiaea	VBA				1	2019
Fabaceae	501000	<i>Daviesia leptophylla</i>	Narrow-leaf Bitter-pea	VBA				1	2001
Fabaceae	501008	<i>Desmodium gunnii</i>	Southern Tick-trefoil	KJ				1m	2015
Fabaceae	501050	<i>Dillwynia cinerascens s.l.</i>	Grey Parrot-pea	VBA				1	2008
Fabaceae	505931	<i>Dillwynia cinerascens s.s.</i>	Grey Parrot-pea	VBA					1992
Fabaceae	501455	<i>Glycine clandestina</i>	Twining Glycine	VBA				1	2008
Fabaceae	501456	<i>Glycine latrobeana</i>	Clover Glycine	VBA		VU	Vu	2 (4)	1988
Fabaceae	503741	<i>Glycine microphylla</i>	Small-leaf Glycine	VBA + KJ				1	2020
Fabaceae	501457	<i>Glycine tabacina s.l.</i>	Variable Glycine	VBA				4	1989

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Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Fabaceae	501596	<i>Hardenbergia violacea</i>	Purple Coral-pea	VBA	#			1	2022
Fabaceae	501705	<i>Hovea heterophylla</i>	Common Hovea	VBA				1	2001
Fabaceae	501761	<i>Indigofera australis subsp. australis</i>	Austral Indigo	VBA				1m	2019
Fabaceae	501847	<i>Kennedia prostrata</i>	Running Postman	VBA + KJ				1m	2020
Fabaceae	501848	<i>Kennedia rubicunda</i>	Dusky Coral-pea	VBA	#				2006
Fabaceae	502569	<i>Platylobium obtusangulum</i>	Common Flat-pea	VBA				1m	2020
Fabaceae	502864	<i>Pultenaea pedunculata</i>	Matted Bush-pea	VBA				1m	2018
Geraniaceae	505867	<i>Geranium aff. sp. 3</i>	Rosella Crane's-bill	VBA					2008
Geraniaceae	505345	<i>Geranium gardneri</i>	Rough Crane's-bill	VBA				1	2015
Geraniaceae	501431	<i>Geranium potentilloides</i>	Soft Crane's-bill	VBA				1m	2018
Geraniaceae	501432	<i>Geranium retrorsum s.l.</i>	Grassland Crane's-bill	VBA + KJ				4	2015
Geraniaceae	501434	<i>Geranium solanderi s.l.</i>	Austral Crane's-bill	VBA				1m	2022
Geraniaceae	505337	<i>Geranium solanderi var. solanderi s.s.</i>	Austral Crane's-bill	KJ			En		2015
Geraniaceae	505343	<i>Geranium sp. 2</i>	Variable Crane's-bill	VBA				1	2005
Geraniaceae	505344	<i>Geranium sp. 3</i>	Pale-flower Crane's-bill	VBA + KJ			En	1m	2015
Geraniaceae	505346	<i>Geranium sp. 5</i>	Naked Crane's-bill	VBA + KJ	#			1	2018
Geraniaceae	505350	<i>Geranium sp. aff. retrorsum (Nillumbik)</i>	Valley Crane's-bill	VBA + KJ				1m	2020
Geraniaceae	502446	<i>Pelargonium inodorum</i>	Kopata	KJ				4	2015
Goodeniaceae	500508	<i>Brunonia australis</i>	Blue Pincushion	VBA				1	2001
Goodeniaceae	501497	<i>Goodenia geniculata</i>	Bent Goodenia	VBA					2022
Goodeniaceae	501507	<i>Goodenia ovata</i>	Hop Goodenia	VBA				1	2020
Goodeniaceae	503490	<i>Goodenia paradoxa</i>	Spur Goodenia	VBA				1m	2001
Haloragaceae	501489	<i>Gonocarpus tetragynus</i>	Common Raspwort	VBA				1	2018

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Family	VBA TaxonID	Scientific Name	Common Name	Source	Origin	EPBC	FFG	Banyule Status (Beardsell)	Most Recent Year Observed
Haloragaceae	501584	<i>Haloragis heterophylla</i>	Varied Raspwort	VBA + KJ				1m	2019
Haloragaceae	503867	<i>Myriophyllum crispatum</i>	Upright Water-milfoil	VBA				1	2008
Hypericaceae	501741	<i>Hypericum gramineum</i>	Small St John's Wort	VBA				1	2020
Hypericaceae	501743	<i>Hypericum japonicum</i>	Matted St John's Wort	VBA				1m	1988
Lamiaceae	502085	<i>Lycopus australis</i>	Australian Gipsywort	VBA				1	2016
Lamiaceae	502743	<i>Prostanthera lasianthos</i>	Victorian Christmas-bush	VBA				1m	1995
Linaceae	502017	<i>Linum marginale</i>	Native Flax	VBA				1m	2018
Loranthaceae	500218	<i>Amyema miquelii</i>	Box Mistletoe	VBA				1	2008
Loranthaceae	500220	<i>Amyema pendula</i>	Drooping Mistletoe	VBA + KJ				1	2015
Loranthaceae	500222	<i>Amyema quandang</i> var. <i>quandang</i>	Grey Mistletoe	VBA				1	2020
Loranthaceae	502233	<i>Muellerina eucalyptoides</i>	Creeping Mistletoe	VBA				1	2008
Lythraceae	502092	<i>Lythrum hyssopifolia</i>	Small Loosestrife	VBA				1	2019
Malvaceae	501557	<i>Gynatrix pulchella</i> s.l.	Hemp Bush	VBA				1	2019
Menyanthaceae	503521	<i>Ornduffia reniformis</i>	Running Marsh-flower	VBA				2 (3 4)	2014
Mimosaceae	500007	<i>Acacia acinacea</i> s.l.	Gold-dust Wattle	VBA				1	2020
Mimosaceae	504778	<i>Acacia acinacea</i> s.s.	Gold-dust Wattle	VBA					2008
Mimosaceae	500021	<i>Acacia cognata</i>	Narrow-leaf Bower-wattle	VBA	#				2005
Mimosaceae	500025	<i>Acacia dealbata</i>	Silver Wattle	VBA				1	2022
Mimosaceae	500036	<i>Acacia floribunda</i>	White Sallow-wattle	VBA	#				2008
Mimosaceae	500038	<i>Acacia genistifolia</i>	Spreading Wattle	VBA				1	2008
Mimosaceae	500044	<i>Acacia howittii</i>	Sticky Wattle	VBA	#		Vu		2008
Mimosaceae	500045	<i>Acacia implexa</i>	Lightwood	VBA				1	2022
Mimosaceae	505128	<i>Acacia longifolia</i>	Sallow Wattle	VBA	#				2005

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Mimosaceae	500053	<i>Acacia longifolia subsp. longifolia</i>	Sallow Wattle	VBA	#				2019
Mimosaceae	500088	<i>Acacia longifolia subsp. sophorae</i>	Coast Wattle	VBA	#				2018
Mimosaceae	500056	<i>Acacia mearnsii</i>	Black Wattle	VBA				1	2022
Mimosaceae	500057	<i>Acacia melanoxylon</i>	Blackwood	VBA				1	2022
Mimosaceae	500072	<i>Acacia paradoxa</i>	Hedge Wattle	VBA				1	2022
Mimosaceae	504209	<i>Acacia provincialis</i>	Wirilda	VBA	#				1988
Mimosaceae	500078	<i>Acacia pycnantha</i>	Golden Wattle	VBA				1	2022
Mimosaceae	528406	<i>Acacia verniciflua s.s.</i>	Varnish Wattle	KJ					2015
Mimosaceae	500100	<i>Acacia verticillata</i>	Prickly Moses	VBA				1	2016
Mimosaceae	504213	<i>Acacia verticillata subsp. verticillata</i>	Prickly Moses	VBA				1	1995
Montiaceae	502221	<i>Montia australasica</i>	White Purslane	VBA				1m	1997
Myrtaceae	500565	<i>Callistemon sieberi</i>	River Bottlebrush	VBA				1	2019
Myrtaceae	501295	<i>Corymbia maculata</i>	Spotted Gum	VBA	#		Vu		2019
Myrtaceae	501252	<i>Eucalyptus blakelyi</i>	Blakely's Red-gum	VBA				1m	2018
Myrtaceae	501254	<i>Eucalyptus botryoides</i>	Southern Mahogany	VBA	#				2018
Myrtaceae	501258	<i>Eucalyptus camaldulensis</i>	River Red-gum	VBA				1	2022
Myrtaceae	501260	<i>Eucalyptus cephalocarpa s.l.</i>	Silver-leaf Stringybark	VBA					2019
Myrtaceae	503733	<i>Eucalyptus cephalocarpa s.s.</i>	Mealy Stringybark	VBA					2006
Myrtaceae	501282	<i>Eucalyptus globulus</i>	Southern Blue-gum	VBA	#				2007
Myrtaceae	501286	<i>Eucalyptus goniocalyx s.l.</i>	Bundy	VBA				1	2022
Myrtaceae	503732	<i>Eucalyptus goniocalyx s.s.</i>	Bundy	VBA					2019
Myrtaceae	505461	<i>Eucalyptus goniocalyx x ovata subsp. ovata</i>	Bundy x Swamp Gum hybrid	VBA					2019

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Myrtaceae	507799	<i>Eucalyptus goniacalyx x viminalis</i>	Bundy x Manna Gum hybrid	VBA					2008
Myrtaceae	501293	<i>Eucalyptus leucoxylon</i>	Yellow Gum	VBA	#				2013
Myrtaceae	504484	<i>Eucalyptus leucoxylon subsp. connata</i>	Melbourne Yellow-gum	VBA			En		2006
Myrtaceae	507643	<i>Eucalyptus leucoxylon subsp. connata x melliodora</i>	Melbourne Yellow-gum x Yellow Box hybrid	VBA					2008
Myrtaceae	504455	<i>Eucalyptus leucoxylon subsp. megalocarpa</i>	Large-fruit Yellow-gum	VBA	#		Cr		2019
Myrtaceae	504456	<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Waxy Yellow-gum	VBA				1m	2004
Myrtaceae	501294	<i>Eucalyptus macrorhyncha</i>	Red Stringybark	VBA + KJ				1	2020
Myrtaceae	501297	<i>Eucalyptus melliodora</i>	Yellow Box	VBA				1	2022
Myrtaceae	507798	<i>Eucalyptus melliodora x polyanthemos</i>	Yellow Box x Red Box hybrid	VBA					2008
Myrtaceae	501304	<i>Eucalyptus obliqua</i>	Messmate Stringybark	VBA				4	2018
Myrtaceae	501307	<i>Eucalyptus ovata</i>	Swamp Gum	VBA				1	2005
Myrtaceae	505179	<i>Eucalyptus ovata subsp. ovata</i>	Swamp Gum	VBA					2008
Myrtaceae	505462	<i>Eucalyptus ovata x viminalis subsp. viminalis</i>	Swamp Gum x Manna Gum hybrid	VBA					1998
Myrtaceae	501310	<i>Eucalyptus polyanthemos</i>	Red Box	VBA				1	2019
Myrtaceae	504335	<i>Eucalyptus polyanthemos subsp. vestita</i>	Red Box	VBA				1	2008
Myrtaceae	501313	<i>Eucalyptus radiata s.l.</i>	Narrow-leaf Peppermint	VBA				1m	2005
Myrtaceae	503828	<i>Eucalyptus radiata subsp. radiata</i>	Narrow-leaf Peppermint	VBA					2008
Myrtaceae	501315	<i>Eucalyptus rubida</i>	Candlebark	VBA + KJ				1m	2020
Myrtaceae	504493	<i>Eucalyptus sideroxylon subsp. sideroxylon</i>	Mugga	VBA			En		1998

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Myrtaceae	501323	<i>Eucalyptus viminalis</i>	Manna Gum	VBA + KJ					2020
Myrtaceae	504487	<i>Eucalyptus viminalis subsp. pryoriana</i>	Coast Manna-gum	VBA				2 (4)	2018
Myrtaceae	504463	<i>Eucalyptus viminalis subsp. viminalis</i>	Manna Gum	VBA				1	2016
Myrtaceae	505209	<i>Eucalyptus X studleyensis</i>	Studley Park Gum	VBA			Cr	1m	2019
Myrtaceae	501856	<i>Kunzea ericoides s.l.</i>	Burgan	VBA					2018
Myrtaceae	507040	<i>Kunzea leptospermoides</i>	Yarra Burgan	VBA				1	2008
Myrtaceae	501956	<i>Leptospermum continentale</i>	Prickly Tea-tree	VBA					2008
Myrtaceae	501958	<i>Leptospermum lanigerum</i>	Woolly Tea-tree	VBA				1m	2019
Myrtaceae	502145	<i>Melaleuca armillaris subsp. armillaris</i>	Giant Honey-myrtle	VBA	#		En		2019
Myrtaceae	502147	<i>Melaleuca ericifolia</i>	Swamp Paperbark	VBA	#			1	2008
Myrtaceae	500115	<i>Syzygium smithii</i>	Lilly Pilly	VBA	#				2018
Onagraceae	501174	<i>Epilobium billardioreanum</i>	Variable Willow-herb	VBA					2007
Onagraceae	504444	<i>Epilobium billardioreanum subsp. billardioreanum</i>	Smooth Willow-herb	VBA				1m	2008
Onagraceae	504445	<i>Epilobium billardioreanum subsp. cinereum</i>	Grey Willow-herb	VBA				1	2008
Onagraceae	501179	<i>Epilobium hirtigerum</i>	Hairy Willow-herb	VBA				1	2019
Oxalidaceae	504791	<i>Oxalis aff. exilis (glabrescent)</i>	Small-flower Wood-sorrel	VBA	#				2008
Oxalidaceae	502379	<i>Oxalis corniculata s.l.</i>	Yellow Wood-sorrel	VBA				1	2019
Oxalidaceae	502381	<i>Oxalis exilis</i>	Shade Wood-sorrel	VBA				1	2008
Oxalidaceae	502386	<i>Oxalis perennans</i>	Grassland Wood-sorrel	VBA				1	2022
Oxalidaceae	502389	<i>Oxalis radicata</i>	Stout-rooted Wood-sorrel	KJ				4	2015
Phrymaceae	501449	<i>Glossostigma elatinoides</i>	Small Mud-mat	VBA				1	2014

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Phrymaceae	502133	<i>Mazus pumilio</i>	Swamp Mazus	VBA				1m	1992
Phyllanthaceae	502683	<i>Poranthera microphylla s.l.</i>	Small Poranthera	VBA				1	2005
Phyllanthaceae	507704	<i>Poranthera microphylla s.s.</i>	Small Poranthera	VBA					2008
Pittosporaceae	504291	<i>Billardiera mutabilis</i>	Common Apple-berry	VBA				1	2008
Pittosporaceae	500403	<i>Billardiera scandens s.l.</i>	Common Apple-berry	VBA					2005
Pittosporaceae	504290	<i>Billardiera scandens s.s.</i>	Velvet Apple-berry	VBA + KJ			En		2020
Pittosporaceae	505690	<i>Bursaria spinosa</i>	Sweet Bursaria	VBA				1	2019
Pittosporaceae	500515	<i>Bursaria spinosa subsp. spinosa</i>	Sweet Bursaria	VBA					2019
Pittosporaceae	504296	<i>Bursaria spinosa subsp. spinosa var. macrophylla</i>	Tree Bursaria	VBA					1998
Pittosporaceae	504298	<i>Bursaria spinosa subsp. spinosa var. spinosa</i>	Sweet Bursaria	VBA					2001
Pittosporaceae	502543	<i>Pittosporum undulatum</i>	Sweet Pittosporum	VBA	#				2022
Plantaginaceae	500573	<i>Callitriche sonderi</i>	Matted Water-starwort	VBA				1m	1995
Plantaginaceae	502555	<i>Plantago debilis</i>	Shade Plantain	VBA				1m	2005
Plantaginaceae	502566	<i>Plantago varia</i>	Variable Plantain	VBA				1	2019
Plantaginaceae	503506	<i>Veronica gracilis</i>	Slender Speedwell	VBA + KJ				1	2020
Plantaginaceae	503512	<i>Veronica plebeia</i>	Trailing Speedwell	VBA				1	2018
Polygalaceae	500801	<i>Comesperma volubile</i>	Love Creeper	VBA				1	2020
Polygonaceae	503919	<i>Persicaria decipiens</i>	Slender Knotweed	VBA				1	2013
Polygonaceae	502628	<i>Persicaria hydropiper</i>	Water Pepper	VBA	#			1	1995
Polygonaceae	502630	<i>Persicaria lapathifolia</i>	Pale Knotweed	VBA	#			1	2018
Polygonaceae	503938	<i>Persicaria praetermissa</i>	Spotted Knotweed	VBA				1	1987

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Polygonaceae	502635	<i>Persicaria prostrata</i>	Creeping Knotweed	VBA				1	1997
Polygonaceae	502637	<i>Persicaria subsessilis</i>	Hairy Knotweed	VBA				1	2007
Polygonaceae	502634	<i>Polygonum plebeium</i>	Small Knotweed	VBA				1m	1995
Polygonaceae	502968	<i>Rumex brownii</i>	Slender Dock	VBA				1	2008
Portulacaceae	502684	<i>Portulaca oleracea</i>	Common Purslane	VBA	#			1	2010
Primulaceae	502916	<i>Myrsine howittiana</i>	Mutton-wood	VBA				1m	1988
Proteaceae	501550	<i>Grevillea rosmarinifolia</i>	Rosemary Grevillea	VBA	#				2020
Proteaceae	505070	<i>Hakea decurrens</i>	Bushy Needlewood	VBA					2019
Ranunculaceae	500788	<i>Clematis aristata</i>	Mountain Clematis	VBA				4	2006
Ranunculaceae	507387	<i>Clematis decipiens</i>	Slender Clematis	VBA				1	2008
Ranunculaceae	500790	<i>Clematis microphylla s.l.</i>	Small-leaved Clematis	VBA					2022
Ranunculaceae	504312	<i>Clematis microphylla var. microphylla</i> <i>spp. agg.</i>	Small-leaved Clematis	VBA					2006
Ranunculaceae	502893	<i>Ranunculus inundatus</i>	River Buttercup	VBA				1	1997
Ranunculaceae	502894	<i>Ranunculus lappaceus</i>	Australian Buttercup	VBA + KJ				1m	2015
Ranunculaceae	502912	<i>Ranunculus sessiliflorus</i>	Annual Buttercup	VBA				1m	2008
Rhamnaceae	502650	<i>Pomaderris aspera</i>	Hazel Pomaderris	VBA				1	2005
Rhamnaceae	502660	<i>Pomaderris lanigera</i>	Woolly Pomaderris	VBA					2006
Rhamnaceae	502670	<i>Pomaderris prunifolia var. prunifolia</i>	Prunus Pomaderris	VBA + KJ				1m	2015
Rosaceae	500104	<i>Acaena agnipila</i>	Hairy Sheep's Burr	VBA				1	2004
Rosaceae	500106	<i>Acaena echinata</i>	Sheep's Burr	VBA				1	2008
Rosaceae	500105	<i>Acaena novae-zelandiae</i>	Bidgee-widgee	VBA				1	2022
Rosaceae	500107	<i>Acaena X ovina</i>	Australian Sheep's Burr	VBA				1	2018

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Rosaceae	505159	<i>Acaena X ovina var. velutina</i>	Australian Sheep's Burr	VBA					1998
Rosaceae	500240	<i>Aphanes australiana</i>	Australian Piert	VBA				4	2008
Rosaceae	502956	<i>Rubus parvifolius</i>	Small-leaf Bramble	VBA				1	2019
Rubiaceae	500278	<i>Asperula conferta</i>	Common Woodruff	VBA + KJ				1	2019
Rubiaceae	500284	<i>Asperula scoparia subsp. scoparia</i>	Prickly Woodruff	VBA				4	1988
Rubiaceae	500285	<i>Asperula subsimplex</i>	Water Woodruff	VBA				3 (4)	2014
Rubiaceae	500822	<i>Coprosma quadrifida</i>	Prickly Currant-bush	VBA				1	2007
Rubiaceae	501409	<i>Galium gaudichaudii</i>	Rough Bedstraw	VBA				1	2001
Rubiaceae	502341	<i>Opercularia ovata</i>	Broad-leaf Stinkweed	VBA				1	2008
Rubiaceae	502344	<i>Opercularia varia</i>	Variable Stinkweed	VBA				1	2001
Rutaceae	500830	<i>Correa glabra var. glabra</i>	Rock Correa	VBA				1	2019
Rutaceae	505403	<i>Correa glabra x reflexa</i>	Rock Correa x Common Correa hybrid	VBA				1	2015
Rutaceae	500832	<i>Correa reflexa</i>	Common Correa	VBA				1m	2022
Santalaceae	501350	<i>Exocarpos cupressiformis</i>	Cherry Ballart	VBA				1	2020
Sapindaceae	501095	<i>Dodonaea viscosa</i>	Sticky Hop-bush	VBA	#				2016
Sapindaceae	501089	<i>Dodonaea viscosa subsp. cuneata</i>	Wedge-leaf Hop-bush	VBA					1988
Sapindaceae	504421	<i>Dodonaea viscosa subsp. spatulata</i>	Sticky Hop-bush	VBA				1m	2001
Scrophulariaceae	502243	<i>Myoporum petiolatum</i>	Sticky Boobialla	VBA					2020
Solanaceae	503168	<i>Solanum americanum</i>	Glossy Nightshade	VBA	#				2007
Solanaceae	503169	<i>Solanum aviculare</i>	Kangaroo Apple	VBA	#			1m	2019
Solanaceae	503179	<i>Solanum laciniatum</i>	Large Kangaroo Apple	VBA				1	2022
Stylidiaceae	501997	<i>Levenhookia dubia</i>	Hairy Stylewort	VBA				4	1990

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Stylidiaceae	503303	<i>Stylidium graminifolium s.l.</i>	Grass Triggerplant	VBA				1m	1992
Stylidiaceae	504971	<i>Stylidium graminifolium s.s.</i>	Grass Triggerplant	KJ				1m	2019
Thymelaeaceae	502517	<i>Pimelea curviflora s.l.</i>	Curved Rice-flower	VBA				1	1988
Thymelaeaceae	504832	<i>Pimelea curviflora s.s.</i>	Curved Rice-flower	VBA + KJ				1	2019
Thymelaeaceae	505597	<i>Pimelea curviflora subsp. gracilis/sericea subspp. agg.</i>	Curved Rice-flower	VBA					2001
Thymelaeaceae	504145	<i>Pimelea curviflora subsp. sericea</i>	Curved Rice-flower	VBA					1998
Thymelaeaceae	502523	<i>Pimelea humilis</i>	Common Rice-flower	VBA				1	2008
Urticaceae	503476	<i>Urtica incisa</i>	Scrub Nettle	VBA				1	2017
Violaceae	501731	<i>Melicytus dentatus s.l.</i>	Tree Violet	VBA				1	2022
Violaceae	504933	<i>Melicytus dentatus s.s.</i>	Tree Violet	VBA					2010
Violaceae	505058	<i>Viola hederacea sensu Entwisle (1996)</i>	Ivy-leaf Violet	VBA					2008
Violaceae	503528	<i>Viola hederacea sensu Willis (1973)</i>	Ivy-leaf Violet	VBA					1988
Fern and allies									
Aspleniaceae	500288	<i>Asplenium flabellifolium</i>	Necklace Fern	VBA				1	2015
Blechnaceae	501098	<i>Blechnum parrisiae</i>	Common Rasp-fern	VBA				1m	1995
Cyatheaceae	500895	<i>Cyathea australis</i>	Rough Tree-fern	VBA				1m	1995
Dennstaedtiaceae	501753	<i>Hypolepis rugosula</i>	Ruddy Ground-fern	VBA				1m	2007
Dennstaedtiaceae	502777	<i>Pteridium esculentum subsp. esculentum</i>	Austral Bracken	VBA				1	2022
Dryopteridaceae	502645	<i>Polystichum proliferum</i>	Mother Shield-fern	VBA				1m	1995
Pteridaceae	500129	<i>Adiantum aethiopicum</i>	Common Maidenhair	VBA	#			1	2020
Pteridaceae	500730	<i>Cheilanthes austrotenuifolia</i>	Green Rock-fern	VBA				1m	2001

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Pteridaceae	500733	<i>Cheilanthes sieberi subsp. sieberi</i>	Narrow Rock-fern	VBA + KJ					2015
Pteridaceae	502449	<i>Pellaea falcata s.l.</i>	Sickle Fern	VBA					1995
Pteridaceae	504809	<i>Pellaea falcata s.s.</i>	Sickle Fern	KJ				2 (4)	2015
Pteridaceae	502779	<i>Pteris tremula</i>	Tender Brake	VBA				1m	2018
Pteridaceae	502780	<i>Pteris umbrosa</i>	Jungle Brake	VBA					2018
Salviniaceae	500348	<i>Azolla pinnata</i>	Ferny Azolla	VBA				1	1997
Salviniaceae	500347	<i>Azolla rubra</i>	Pacific Azolla	VBA				1	1998
Fungi									
Amanitaceae	510801	<i>Amanita xanthocephala</i>		VBA					2020
Boletiniaceae	513805	<i>Phlebopus marginatus</i>		VBA					2020
Polyporaceae	514392	<i>Trametes versicolor</i>	Turkey-tail	VBA					2020
Lichens									
Cladoniaceae	507591	<i>Cladia aggregata</i>	Common Coral-lichen	VBA					2001
Parmeliaceae	507597	<i>Flavoparmelia rutidota</i>	Common Biscuit Lichen	VBA					1998
Liverworts									
Frullaniaceae	506313	<i>Frullania clavata</i>	Scalewort	VBA					1994
Frullaniaceae	506315	<i>Frullania falciloba</i>	Rufous Scalewort	VBA					1996
Frullaniaceae	506318	<i>Frullania pentapleura</i>	Khaki Scalewort	VBA					1996
Frullaniaceae	506319	<i>Frullania probosciphora</i>	Chocolate Scalewort	VBA					2001
Lophocoleaceae	506447	<i>Chiloscyphus semiteres s.l.</i>	Common Crestwort	VBA					2006
Marchantiaceae	506459	<i>Marchantia berteroana</i>	Common Marchantia	VBA					2006
Metzgeriaceae	506471	<i>Metzgeria decipiens</i>	Common Veilwort	VBA					1995
Metzgeriaceae	506474	<i>Metzgeria furcata</i>	Forked Veilwort	VBA					1995

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Ricciaceae	506634	<i>Riccia bifurca</i>	Lizard Crystalwort	VBA				1	2006
Ricciaceae	506640	<i>Riccia duplex var. duplex</i>	Floating Crystalwort	VBA				1m	1998
Ricciaceae	506650	<i>Ricciocarpos natans</i>	Fringed Heartwort	VBA				1	1998
Monocotyledons									
Alismataceae	500174	<i>Alisma plantago-aquatica</i>	Water Plantain	VBA				1	2008
Anthericaceae	503399	<i>Thysanotus patersonii</i>	Twining Fringe-lily	VBA				1	2001
Araceae	501893	<i>Lemna disperma</i>	Common Duckweed	VBA				1	2008
Araceae	504707	<i>Lemna minor s.l.</i>	Common Duckweed	VBA					1995
Araceae	503224	<i>Spirodela punctata</i>	Thin Duckweed	VBA					2008
Araceae	503578	<i>Wolffia australiana</i>	Tiny Duckweed	VBA				1	2007
Asparagaceae	500269	<i>Arthropodium milleflorum s.l.</i>	Pale Vanilla-lily	VBA + KJ				1m	2015
Asparagaceae	505125	<i>Arthropodium milleflorum s.s.</i>	Pale Vanilla-lily	VBA					2008
Asparagaceae	501038	<i>Arthropodium strictum s.l.</i>	Chocolate Lily	VBA				1	2021
Asparagaceae	505126	<i>Arthropodium strictum s.s.</i>	Chocolate Lily	VBA					2008
Asphodelaceae	500510	<i>Bulbine bulbosa</i>	Bulbine Lily	VBA + KJ				1m	2020
Colchicaceae	500512	<i>Burchardia umbellata</i>	Milkmaids	VBA				1	2020
Colchicaceae	503581	<i>Wurmbea dioica</i>	Common Early Nancy	VBA				1	2020
Colchicaceae	504082	<i>Wurmbea dioica subsp. dioica</i>	Common Early Nancy	VBA					2008
Cyperaceae	500416	<i>Bolboschoenus caldwellii</i>	Salt Club-sedge	VBA				1	2014
Cyperaceae	500417	<i>Bolboschoenus medianus</i>	Marsh Club-sedge	VBA				1	1997
Cyperaceae	500623	<i>Carex appressa</i>	Tall Sedge	VBA				1	2016
Cyperaceae	500627	<i>Carex breviculmis</i>	Common Grass-sedge	VBA				1	2008
Cyperaceae	500638	<i>Carex fascicularis</i>	Tassel Sedge	VBA				1m	2016

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Cyperaceae	500642	<i>Carex inversa</i>	Knob Sedge	VBA	#			1	2010
Cyperaceae	500643	<i>Carex iynx</i>	Tussock Sedge	VBA + KJ				1m	2019
Cyperaceae	500645	<i>Carex longebrachiata</i>	Bergalia Tussock	VBA					1995
Cyperaceae	500651	<i>Carex tereticaulis</i>	Poong'ort	VBA				1	2022
Cyperaceae	500926	<i>Cyperus lucidus</i>	Leafy Flat-sedge	VBA				1m	2016
Cyperaceae	501139	<i>Eleocharis acuta</i>	Common Spike-sedge	VBA				1	2019
Cyperaceae	501146	<i>Eleocharis sphacelata</i>	Tall Spike-sedge	VBA				1	2016
Cyperaceae	501780	<i>Ficinia marginata</i>	Little Club-sedge	VBA				1	2008
Cyperaceae	501394	<i>Gahnia radula</i>	Thatch Saw-sedge	VBA				1m	2008
Cyperaceae	505944	<i>Isolepis cernua s.l.</i>	Nodding Club-sedge	VBA					2005
Cyperaceae	501772	<i>Isolepis cernua s.s.</i>	Nodding Club-sedge	VBA				1m	1995
Cyperaceae	501777	<i>Isolepis hookeriana</i>	Grassy Club-sedge	VBA				1m	2004
Cyperaceae	501779	<i>Isolepis inundata</i>	Swamp Club-sedge	VBA				1	2008
Cyperaceae	501783	<i>Isolepis platycarpa</i>	Broad-fruit Club-sedge	VBA				1m	2008
Cyperaceae	501923	<i>Lepidosperma laterale</i>	Variable Sword-sedge	VBA + KJ				1	2020
Cyperaceae	504700	<i>Lepidosperma laterale var. laterale</i>	Variable Sword-sedge	VBA					1997
Cyperaceae	500375	<i>Machaerina articulata</i>	Jointed Twig-sedge	VBA				3 (4)	2014
Cyperaceae	503038	<i>Schoenoplectus tabernaemontani</i>	River Club-sedge	VBA				1	2020
Cyperaceae	503039	<i>Schoenus apogon</i>	Common Bog-sedge	VBA				1	2008
Cyperaceae	503056	<i>Schoenus tesquorum</i>	Soft Bog-sedge	VBA				1m	1995
Hemerocallidaceae	500519	<i>Caesia calliantha</i>	Blue Grass-lily	VBA				1m	2019
Hemerocallidaceae	505555	<i>Dianella admixta</i>	Black-anther Flax-lily	VBA				1	2008

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Hemerocallidaceae	507584	<i>Dianella admixta x amoena</i>	Black-anther x Matted Flax-lily hybrid	KJ					2015
Hemerocallidaceae	505084	<i>Dianella amoena</i>	Matted Flax-lily	VBA		EN	Cr	1m	2021
Hemerocallidaceae	504412	<i>Dianella brevicaulis</i>	Small-flower Flax-lily	KJ					2019
Hemerocallidaceae	501027	<i>Dianella caerulea s.l.</i>	Paroo Lily	VBA					1992
Hemerocallidaceae	501028	<i>Dianella longifolia s.l.</i>	Pale Flax-lily	VBA					2018
Hemerocallidaceae	504420	<i>Dianella longifolia var. longifolia s.l.</i>	Pale Flax-lily	VBA					1995
Hemerocallidaceae	501029	<i>Dianella revoluta s.l.</i>	Black-anther Flax-lily	VBA					2019
Hemerocallidaceae	504413	<i>Dianella revoluta var. revoluta s.l.</i>	Black-anther Flax-lily	VBA					2004
Hemerocallidaceae	505560	<i>Dianella sp. aff. longifolia (Benambra)</i>	Arching Flax-lily	KJ			Th	4	2015
Hemerocallidaceae	503421	<i>Tricoryne elatior</i>	Yellow Rush-lily	VBA				1	2022
Hydrocharitaceae	502375	<i>Ottelia ovalifolia subsp. ovalifolia</i>	Swamp Lily	VBA				1m	2008
Hypoxidaceae	501756	<i>Hypoxis hygrometrica</i>	Golden Weather-glass	VBA					2008
Hypoxidaceae	503778	<i>Pauridia vaginata</i>	Yellow Star	VBA + KJ					2020
Juncaceae	501803	<i>Juncus amabilis</i>	Hollow Rush	VBA				1	2022
Juncaceae	501807	<i>Juncus articulatus x holoschoenus</i>	Jointed Rush x Joint-leaf Rush hybrid	VBA					1997
Juncaceae	501808	<i>Juncus australis</i>	Austral Rush	VBA				1	2000
Juncaceae	501810	<i>Juncus bufonius</i>	Toad Rush	VBA	#			1	2008
Juncaceae	501818	<i>Juncus flavidus</i>	Gold Rush	VBA				1m	2008
Juncaceae	501820	<i>Juncus gregiflorus</i>	Green Rush	VBA				1	2022
Juncaceae	501821	<i>Juncus holoschoenus</i>	Joint-leaf Rush	VBA				1	2008
Juncaceae	501822	<i>Juncus homalocaulis</i>	Wiry Rush	VBA				1m	2008

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Juncaceae	501825	<i>Juncus ingens</i>	Giant Rush	VBA				1m	2014
Juncaceae	501830	<i>Juncus pallidus</i>	Pale Rush	VBA				1	2008
Juncaceae	501837	<i>Juncus radula</i>	Hoary Rush	VBA				1m	1998
Juncaceae	501841	<i>Juncus sarophorus</i>	Broom Rush	VBA				1	1998
Juncaceae	501843	<i>Juncus subsecundus</i>	Finger Rush	VBA				1	2019
Juncaceae	501845	<i>Juncus usitatus</i>	Billabong Rush	VBA				1m	2006
Juncaceae	503841	<i>Luzula meridionalis</i>	Common Woodrush	VBA				1	2005
Juncaceae	502069	<i>Luzula meridionalis</i> var. <i>densiflora</i>	Common Woodrush	VBA					2008
Juncaginaceae	505507	<i>Cycnogeton procerum</i> (broad erect leaf variant)	Common Water-ribbons	VBA				1	2008
Juncaginaceae	504073	<i>Cycnogeton procerum</i> s.s.	Common Water-ribbons	VBA				1	2016
Juncaginaceae	503448	<i>Cycnogeton</i> spp.	Water Ribbons	VBA					2007
Juncaginaceae	503449	<i>Triglochin striata</i>	Streaked Arrowgrass	VBA				1	2008
Orchidaceae	504439	<i>Acianthus pusillus</i>	Small Mosquito-orchid	VBA + KJ				1m	2020
Orchidaceae	504900	<i>Caladenia catenata</i> s.s.	White Fingers	VBA				1m	1999
Orchidaceae	504476	<i>Caladenia parva</i>	Small Spider-orchid	VBA + KJ				1m	2015
Orchidaceae	500543	<i>Caladenia praecox</i>	Early Hood-orchid	VBA				1m	1996
Orchidaceae	502705	<i>Corunastylis despectans</i>	Sharp Midge-orchid	VBA + KJ				1m	2015
Orchidaceae	507741	<i>Corybas diemenicus</i> s.s.	Stately Helmet-orchid	KJ					2020
Orchidaceae	500839	<i>Corybas fimbriatus</i>	Fringed Helmet-orchid	VBA			En	4	1992
Orchidaceae	500837	<i>Corybas incurvus</i>	Slaty Helmet-orchid	VBA				1m	1991
Orchidaceae	500524	<i>Cyanicula caerulea</i>	Blue Fairy	VBA				1m	1996
Orchidaceae	500112	<i>Cyrtostylis reniformis</i>	Small Gnat-orchid	VBA				1m	1991

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Orchidaceae	504501	<i>Dipodium roseum s.l.</i>	Rosy Hyacinth-orchid	VBA				1m	2015
Orchidaceae	505423	<i>Diuris chryseopsis</i>	Golden Moths	KJ				1m	2015
Orchidaceae	501079	<i>Diuris orientis</i>	Wallflower Orchid	VBA + KJ				1m	2020
Orchidaceae	501080	<i>Diuris pardina</i>	Leopard Orchid	VBA + KJ				1m	2015
Orchidaceae	501085	<i>Diuris sulphurea</i>	Tiger Orchid	VBA + KJ				1m	2020
Orchidaceae	501219	<i>Eriochilus cucullatus s.l.</i>	Parson's Bands	VBA				1m	1996
Orchidaceae	501445	<i>Glossodia major</i>	Wax-lip Orchid	VBA				1m	2020
Orchidaceae	502187	<i>Microtis parviflora</i>	Slender Onion-orchid	VBA				1	2008
Orchidaceae	502189	<i>Microtis unifolia</i>	Common Onion-orchid	VBA				1	2008
Orchidaceae	502814	<i>Pterostylis ampliata</i>	Large Autumn Greenhood	VBA				1m	2001
Orchidaceae	504728	<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	VBA		VU	En		1993
Orchidaceae	502789	<i>Pterostylis concinna</i>	Trim Greenhood	VBA				1m	2018
Orchidaceae	502791	<i>Pterostylis curta</i>	Blunt Greenhood	VBA + KJ				1m	2020
Orchidaceae	502802	<i>Pterostylis longifolia s.l.</i>	Tall Greenhood	VBA					1996
Orchidaceae	504131	<i>Pterostylis melagramma</i>	Tall Greenhood	VBA				1	2020
Orchidaceae	502805	<i>Pterostylis nana</i>	Dwarf Greenhood	VBA				1m	2020
Orchidaceae	502806	<i>Pterostylis nutans</i>	Nodding Greenhood	VBA				1	2020
Orchidaceae	502808	<i>Pterostylis parviflora s.l.</i>	Tiny Greenhood	VBA				1m	1996
Orchidaceae	502810	<i>Pterostylis pedunculata</i>	Maroonhood	VBA				1	2020
Orchidaceae	503915	<i>Pterostylis smaragdina</i>	Emerald-lip Greenhood	VBA			En	1m	1999
Orchidaceae	505869	<i>Pterostylis sp. aff. striata (Silurian)</i>	Silurian Striped Greenhood	VBA				2 (4)	2015
Orchidaceae	502816	<i>Pterostylis squamata s.l.</i>	Common Ruddyhood	VBA				1m	2020
Orchidaceae	505355	<i>Thelymitra arenaria</i>	Forest Sun-orchid	VBA				?	2001

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Orchidaceae	503382	<i>Thelymitra pauciflora s.l.</i>	Slender Sun-orchid	VBA					2020
Orchidaceae	505013	<i>Thelymitra pauciflora s.s.</i>	Slender Sun-orchid	KJ				1	2020
Poaceae	503623	<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VBA		VU		1m	1995
Poaceae	503628	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass	VBA				1m	1995
Poaceae	500146	<i>Anthosachne scabra s.l.</i>	Common Wheat-grass	VBA				1	2008
Poaceae	503266	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass	KJ				1m	2019
Poaceae	503279	<i>Austrostipa mollis</i>	Supple Spear-grass	VBA				1	2008
Poaceae	503288	<i>Austrostipa pubinodis</i>	Tall Spear-grass	VBA + KJ				1m	2019
Poaceae	503289	<i>Austrostipa rudis</i>	Veined Spear-grass	VBA					2005
Poaceae	504940	<i>Austrostipa rudis subsp. australis</i>	Veined Spear-grass	VBA			En	1	2008
Poaceae	504942	<i>Austrostipa rudis subsp. rudis</i>	Veined Spear-grass	VBA				1	2008
Poaceae	503290	<i>Austrostipa scabra</i>	Rough Spear-grass	VBA					1992
Poaceae	503275	<i>Austrostipa scabra subsp. falcata</i>	Rough Spear-grass	VBA				1	2001
Poaceae	504943	<i>Austrostipa scabra subsp. scabra</i>	Rough Spear-grass	VBA				1m	2001
Poaceae	503291	<i>Austrostipa semibarbata</i>	Fibrous Spear-grass	VBA + KJ				1m	2015
Poaceae	500756	<i>Chloris truncata</i>	Windmill Grass	VBA				1m	2018
Poaceae	500907	<i>Cynodon dactylon</i>	Couch	VBA	#				2022
Poaceae	501023	<i>Deyeuxia quadriseta</i>	Reed Bent-grass	VBA				1	1992
Poaceae	501033	<i>Dichelachne crinita</i>	Long-hair Plume-grass	VBA				1	2016
Poaceae	501034	<i>Dichelachne sciurea spp. agg.</i>	Short-hair Plume-grass	VBA					1987
Poaceae	503791	<i>Dichelachne sieberiana</i>	Rough Plume-grass	VBA				1m	1999
Poaceae	501122	<i>Echinopogon ovatus</i>	Common Hedgehog-grass	VBA				1	2008
Poaceae	501185	<i>Eragrostis brownii</i>	Common Love-grass	VBA				1	2008

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Poaceae	503708	<i>Eragrostis infecunda</i>	Southern Cane-grass	VBA					2014
Poaceae	501451	<i>Glyceria australis</i>	Australian Sweet-grass	VBA				1	2008
Poaceae	501654	<i>Hemarthria uncinata</i> var. <i>uncinata</i>	Mat Grass	VBA				1m	2008
Poaceae	500149	<i>Lachnagrostis aemula</i> s.l.	Leafy Blown-grass	VBA				1	2005
Poaceae	504205	<i>Lachnagrostis aemula</i> s.s.	Leafy Blown-grass	VBA					2008
Poaceae	500151	<i>Lachnagrostis filiformis</i> s.l.	Common Blown-grass	VBA					2005
Poaceae	504219	<i>Lachnagrostis filiformis</i> s.s.	Common Blown-grass	VBA				1	2008
Poaceae	502179	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	VBA				1	2022
Poaceae	502404	<i>Panicum effusum</i>	Hairy Panic	VBA				4	2006
Poaceae	502456	<i>Pentapogon quadrifidus</i> var. <i>quadrifidus</i>	Five-awned Spear-grass	VBA				1	2008
Poaceae	502497	<i>Phragmites australis</i>	Common Reed	VBA				1	2019
Poaceae	502590	<i>Poa ensiformis</i>	Sword Tussock-grass	VBA				1	2022
Poaceae	502600	<i>Poa labillardierei</i>	Common Tussock-grass	VBA				1	2022
Poaceae	507344	<i>Poa labillardierei</i> (Suggan Buggan blue-leaved form)	Suggan Buggan Blue Tussock-grass	KJ					2019
Poaceae	504694	<i>Poa labillardierei</i> var. <i>labillardierei</i>	Common Tussock-grass	VBA					2008
Poaceae	502602	<i>Poa morrisii</i>	Soft Tussock-grass	VBA				1	2019
Poaceae	502609	<i>Poa rodwayi</i>	Velvet Tussock-grass	VBA				1m	1998
Poaceae	502608	<i>Poa sieberiana</i>	Grey Tussock-grass	VBA					2022
Poaceae	504834	<i>Poa sieberiana</i> var. <i>hirtella</i>	Grey Tussock-grass	KJ				1m	2015
Poaceae	504835	<i>Poa sieberiana</i> var. <i>sieberiana</i>	Grey Tussock-grass	VBA				1	2008
Poaceae	507345	<i>Poaceae</i> spp.	Grass	VBA					1997

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Poaceae	500960	<i>Rytidosperma auriculatum</i>	Lobed Wallaby-grass	VBA				4	2000
Poaceae	500968	<i>Rytidosperma bipartitum s.l.</i>	Leafy Wallaby-grass	VBA					1992
Poaceae	504418	<i>Rytidosperma bipartitum s.s.</i>	Leafy Wallaby-grass	VBA					2000
Poaceae	500961	<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	VBA				1	2019
Poaceae	500963	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass	VBA				1m	1997
Poaceae	500964	<i>Rytidosperma erianthum</i>	Hill Wallaby-grass	VBA				1	2008
Poaceae	504409	<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass	VBA				1	2008
Poaceae	500965	<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass	VBA				1	2008
Poaceae	500967	<i>Rytidosperma laeve</i>	Smooth Wallaby-grass	VBA				1	2008
Poaceae	500973	<i>Rytidosperma pallidum</i>	Silvertop Wallaby-grass	VBA				1	2001
Poaceae	500974	<i>Rytidosperma penicillatum</i>	Weeping Wallaby-grass	VBA				1	2010
Poaceae	500975	<i>Rytidosperma pilosum</i>	Velvet Wallaby-grass	VBA				1	2008
Poaceae	504403	<i>Rytidosperma pilosum var. paleaceum</i>	Large Velvet Wallaby-grass	VBA					1998
Poaceae	500977	<i>Rytidosperma racemosum var. racemosum</i>	Slender Wallaby-grass	VBA				1	2019
Poaceae	500979	<i>Rytidosperma semiannulare</i>	Wetland Wallaby-grass	VBA + KJ				1m	2019
Poaceae	500980	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	VBA				1	2019
Poaceae	504379	<i>Rytidosperma setaceum var. setaceum</i>	Bristly Wallaby-grass	VBA				1	2005
Poaceae	505384	<i>Rytidosperma sp. aff. setaceum</i>	Wallaby Grass	VBA					2002
Poaceae	500981	<i>Rytidosperma tenuius</i>	Purplish Wallaby-grass	VBA				1	2008
Poaceae	503387	<i>Themeda triandra</i>	Kangaroo Grass	VBA				1	2020
Potamogetonaceae	505274	<i>Potamogeton cheesemanii</i>	Red Pondweed	VBA				1m	2008
Potamogetonaceae	502690	<i>Potamogeton ochreatus</i>	Blunt Pondweed	VBA				1	2008

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Potamogetonaceae	502693	<i>Potamogeton tricarinatus s.l.</i>	Floating Pondweed	VBA					2005
Potamogetonaceae	502691	<i>Stuckenia pectinata</i>	Fennel Pondweed	VBA				4	1992
Typhaceae	503468	<i>Typha domingensis</i>	Narrow-leaf Cumbungi	VBA				1	2006
Typhaceae	503470	<i>Typha orientalis</i>	Broad-leaf Cumbungi	VBA				1m	2007
Xanthorrhoeaceae	502042	<i>Lomandra filiformis</i>	Wattle Mat-rush	VBA				1	2019
Xanthorrhoeaceae	504709	<i>Lomandra filiformis subsp. coriacea</i>	Wattle Mat-rush	VBA					2018
Xanthorrhoeaceae	504710	<i>Lomandra filiformis subsp. filiformis</i>	Wattle Mat-rush	VBA					2021
Xanthorrhoeaceae	502046	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	VBA				1	2022
Xanthorrhoeaceae	504714	<i>Lomandra longifolia subsp. longifolia</i>	Spiny-headed Mat-rush	VBA				1	2008
Xanthorrhoeaceae	503843	<i>Lomandra nana</i>	Dwarf Mat-rush	KJ				1m	2015
Xanthorrhoeaceae	503588	<i>Xanthorrhoea minor subsp. lutea</i>	Small Grass-tree	VBA				1m	2008
MOSSES									
Bartramiaceae	506079	<i>Breutelia affinis</i>	Common Breutelia	VBA					2015
Brachytheciaceae	506076	<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss	VBA					2006
Bryaceae	506095	<i>Bryum argenteum</i>	Silver Moss	VBA	#				2006
Bryaceae	506099	<i>Rosulabryum billardieri</i>	Common Thread-moss	VBA					2001
Bryaceae	506102	<i>Rosulabryum campylothecium</i>	Sand Thread-moss	VBA					2006
Dicranaceae	506140	<i>Campylopus introflexus</i>	Heath Star Moss	VBA					2006
Dicranaceae	506144	<i>Campylopus pyriformis</i>	Dwarf Swan-neck Moss	VBA					2001
Ditrichaceae	506154	<i>Ceratodon purpureus subsp. convolutus</i>	Redshank Moss	VBA	#				2006
Ditrichaceae	506237	<i>Eccremidium pulchellum</i>	Earth Moss	VBA					2006
Fissidentaceae	506278	<i>Fissidens curvatus</i>	Portuguese Pocket-moss	VBA					1981

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Fissidentaceae	506285	<i>Fissidens megalotis</i>	Curly Pocket-moss	VBA					2006
Fissidentaceae	506263	<i>Fissidens tenellus</i> var. <i>australiensis</i>	Pocket Moss	VBA					1989
Funariaceae	506329	<i>Funaria hygrometrica</i>	Common Cord-moss	VBA					2006
Grimmiaceae	506348	<i>Schistidium apocarpum</i>	Sessile Grimmia	VBA					1996
Hypnaceae	506387	<i>Hypnum cupressiforme</i>	Common Plait-moss	VBA					2006
Hypnaceae	506389	<i>Hypnum cupressiforme</i> var. <i>filiforme</i>	Combed Plait-moss	VBA					1994
Hypnaceae	506381	<i>Hypnum cupressiforme</i> var. <i>lacunosum</i>	Great Plait-moss	VBA					2001
Hypnaceae	506383	<i>Hypnum cupressiforme</i> var. <i>moosmanianum</i>	Slender Plait-moss	VBA					2006
Meesiaceae	506423	<i>Leptobryum pyriforme</i>	Golden Thread-moss	VBA					2006
Polytrichaceae	506192	<i>Dawsonia polytrichoides</i>	Juniper Dawsonia	VBA					1993
Polytrichaceae	506557	<i>Polytrichum juniperinum</i>	Juniper Haircap	VBA					2006
Pottiaceae	506214	<i>Didymodon torquatus</i>	Beard Moss	VBA					2006
Pottiaceae	506426	<i>Leptodontium paradoxum</i>	Tall Beard-moss	VBA					2001
Pottiaceae	506049	<i>Pseudocrossidium crinitum</i>	Dusky Beard-moss	VBA					2006
Pottiaceae	506710	<i>Syntrichia antarctica</i>	Bristly Screw-moss	VBA					2001
Pottiaceae	506706	<i>Syntrichia laevipila</i>	Screw Moss	VBA					2006
Pottiaceae	506708	<i>Syntrichia papillosa</i>	Screw Moss	VBA					2006
Pottiaceae	506695	<i>Tortella cirrhata</i>	Crisp Moss	VBA					2006
Pottiaceae	506731	<i>Triquetrella papillata</i>	Common Twine-moss	VBA					2006
Sematophyllaceae	506661	<i>Sematophyllum homomallum</i>	Bronze Signal-moss	VBA					1996
Thuidiaceae	506692	<i>Thuidiopsis furfurosa</i>	Golden Weft-moss	VBA					2001
Thuidiaceae	506693	<i>Thuidiopsis sparsa</i>	Weft Moss	VBA					2006

Appendix 5. Listed Fauna – Summary Tables

Table 14. Threatened fauna species listed under the EPBC or FFG Acts with records within Banyule since 1980. Vu = vulnerable, En = endangered, and Cr = critically endangered, B = Bonn Convention, C = CAMBA, J = JAMBA, R = ROKAMBA. Treaties are listed in Section 3.1.2. Those highlighted green have not been recorded in the past 10 years.

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Year of most recent record	# Records	Year of most recent record	# Records
Amphibians										
13207	Hylidae	<i>Litoria raniformis</i>	Growling Grass Frog	VU	Vu		1998	9	–	–
13117	Myobatrachidae	<i>Pseudophryne bibronii</i>	Brown Toadlet		En		1990	1	–	–
Birds										
10220	Accipitridae	<i>Accipiter novaehollandiae</i>	Grey Goshawk		En		2018	14	2021	17
10226	Accipitridae	<i>Haliaeetus leucogaster</i>	White–bellied Sea–Eagle		En	C	2018	1	2023	4
10225	Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle		Vu		2008	13	2023	74
10230	Accipitridae	<i>Lophoictinia isura</i>	Square–tailed Kite		Vu		–	–	2021	1
10215	Anatidae	<i>Aythya australis</i>	Hardhead		Vu		2020	323	2023	1200
10217	Anatidae	<i>Biziura lobata</i>	Musk Duck		Vu		2017	29	2023	65
10216	Anatidae	<i>Oxyura australis</i>	Blue–billed Duck		Vu		2003	1	2022	9
10212	Anatidae	<i>Spatula rhynchotis</i>	Australasian Shoveler		Vu		2019	83	2023	172
10214	Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck		En		2018	12	2020	46
10199	Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose		Vu		2007	2	–	–
10335	Apodidae	<i>Apus pacificus</i>	Fork–tailed Swift			C,R,J	1989	4	2020	3
10334	Apodidae	<i>Hirundapus caudacutus</i>	White–throated Needletail	VU	Vu	C,R,J	2019	83	2021	23
903268	Ardeidae	<i>Ardea alba</i>	Great Egret			C,J	2013	161	2023	110
10187	Ardeidae	<i>Ardea alba modesta</i>	Eastern Great Egret		Vu	C,J	2019	25	–	–
10186	Ardeidae	<i>Ardea intermedia plumifera</i>	Plumed Egret		Cr		2017	1	2017	2

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Year of most recent record	# Records	Year of most recent record	# Records
10197	Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	Cr		1999	3	–	–
10977	Ardeidae	<i>Bubulcus coromandus</i>	Eastern Cattle Egret			C,J	2019	164	2023	325
10185	Ardeidae	<i>Egretta garzetta</i>	Little Egret		En		2019	11	2020	9
10195	Ardeidae	<i>Ixobrychus dubius</i>	Australian Little Bittern		En		1991	1	2019	1
10174	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew		Cr		–	–	2020	1
10268	Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	EN	En		2021	122	2023	529
10270	Cacatuidae	<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	EN	Cr		2006	1	–	–
10366	Dicruridae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher			B	1985	5	2022	5
10362	Dicruridae	<i>Rhipidura rufifrons</i>	Rufous Fantail			B	2009	10	2022	13
10238	Falconidae	<i>Falco subniger</i>	Black Falcon		Cr		–	–	2017	1
10177	Gruidae	<i>Antigone rubicunda</i>	Brolga		En		1991	1	–	–
10112	Laridae	<i>Hydroprogne caspia</i>	Caspian Tern		Vu	C,J	1980	1	–	–
10603	Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CR	Cr		2012	19	–	–
10329	Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater			J	1991	1	–	–
10020	Pedionomidae	<i>Pedionomus torquatus</i>	Plains-wanderer	CR	Cr		1980	1	–	–
10385	Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin	EN	Vu		1992	3	–	–
10309	Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	CR	Cr		2001	32	2022	93
10306	Psittacidae	<i>Neophema chrysostoma</i>	Blue-winged Parrot	VU			1992	4	2018	3
10302	Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot		Vu		1999	1	2016	2
10277	Psittacidae	<i>Polytelis swainsonii</i>	Superb Parrot	VU	En		1999	2	2021	1
10045	Rallidae	<i>Lewinia pectoralis</i>	Lewin's Rail		Vu		2019	14	2023	43
10170	Rostratulidae	<i>Rostratula australis</i>	Australian Painted-snipe	EN	Cr	C	2001	3	–	–
10163	Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper			B,R,J,C	1999	2	2014	2
10168	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe			B,R,J,C	2019	166	2022	348
10246	Strigidae	<i>Ninox connivens</i>	Barking Owl		Cr		1989	2	–	–
10248	Strigidae	<i>Ninox strenua</i>	Powerful Owl		Vu		2019	146	2023	631

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Year of most recent record	# Records	Year of most recent record	# Records
10524	Sylviidae	<i>Acrocephalus australis</i>	Reed-Warbler			B	2020	90	2023	389
Bats										
11321	Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat		Vu		1990	1	–	–
11280	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	Vu		2022	11	2023	17
Fish										
4701	Galaxiinae	<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	En		–	–	2023	1
4871	Percichthyidae	<i>Maccullochella peelii</i>	Murray Cod	VU	En		2020	12	2020	15
4874	Percichthyidae	<i>Macquaria australasica</i>	Macquarie Perch	EN	En		2020	37	2020	28
4686	Prototroctinae	<i>Prototroctes maraena</i>	Australian Grayling	VU	En		–	–	2019	3
Mammals										
5136	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	Platypus		Vu		2021	61	2023	148
Reptiles										
5135	Chelidae	<i>Emydura macquarii</i>	Murray River Turtle		Cr		–	–	2023	5
12993	Scincidae	<i>Pseudemoiapagenstecheri</i>	Tussock Skink		En		–	–	2020	1
12683	Scincidae	<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		En		1991	2	–	–
12283	Varanidae	<i>Varanus varius</i>	Lace Monitor		En		2016	1	2016	1

Table 15. Threatened fauna species listed under the EPBC or FFG Acts with a 5 km buffer of Banyule since 1980. Vu = vulnerable, En = endangered, and Cr = critically endangered, B = Bonn Convention, C = CAMBA, J = JAMBA, R = ROKAMBA. Treaties are listed in Section 3.1.2. Only species not currently in Banyule or those with significantly more recent records (highlighted green) are included in this table.

Scientific Name	Common Name	EPBC	FFG	Treaty	Year of most recent record	# Records
AMPHIBIANS						
<i>Pseudophryne semimarmorata</i>	Southern Toadlet		En		2009	29
<i>Litoria raniformis</i>	Growling Grass Frog	VU	Vu		2021	72
BATS						
<i>Miniopterus orianae oceanensis</i>	Eastern Bent-winged Bat		Cr		1992	6
BIRDS						
<i>Geopelia cuneata</i>	Diamond Dove		Vu		2001	2
<i>Stercorarius parasiticus</i>	Arctic Jaeger			J,R	2013	1
<i>Tringa stagnatilis</i>	Marsh Sandpiper		En	B,R,J,C	1999	2
<i>Calidris ruficollis</i>	Red-necked Stint			B,R,J,C	1990	1
<i>Plegadis falcinellus</i>	Glossy Ibis			B,C	2007	4
<i>Oxyura australis</i>	Blue-billed Duck		Vu		2021	48
<i>Falco subniger</i>	Black Falcon		Cr		2018	15
<i>Tyto novaehollandiae</i>	Masked Owl		Cr		2001	2
<i>Polytelis anthopeplus monarchoides</i>	Regent Parrot	VU	Vu		2000	1
<i>Merops ornatus</i>	Rainbow Bee-eater			J	2021	84
<i>Myiagra cyanoleuca</i>	Satin Flycatcher			B	2020	30
<i>Pyrholaemus sagittatus</i>	Speckled Warbler		En		1991	15
<i>Grantiella picta</i>	Painted Honeyeater	VU	Vu		2001	2
<i>Stagonopleura guttata</i>	Diamond Firetail	VU	Vu		2001	2
<i>Climacteris picumnus</i>	Brown Treecreeper	VU			1990	4
FISH						
<i>Prototroctes maraena</i>	Australian Grayling	VU	En		2019	111
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	En		2022	7
<i>Neochanna cleaveri</i>	Australian Mudfish		En		1991	2
<i>Craterocephalus fluviatilis</i>	Murray Hardyhead	EN	Cr		1989	2
<i>Bidyanus bidyanus</i>	Silver Perch	CR	En		1981	1
<i>Tandanus tandanus</i>	Freshwater Catfish		En		2000	4
MAMMALS						
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale		Vu		2010	5
<i>Sminthopsis murina murina</i>	Common Dunnart		Vu		2020	2
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart		Vu		1991	2
REPTILES						
<i>Chelodina expansa</i>	Broad-shelled Turtle		En		1992	2
<i>Emydura macquarii</i>	Murray River Turtle		Cr		2016	14

Appendix 6. List of fauna species with records in Banyule

Origin:

* = Exotic species

= Native species extended beyond natural range

FFG Listing:

Vu = Vulnerable

En = Endangered

Cr = Critically Endangered

EPBC Listing:

VU = Vulnerable

EN = Endangered

CR = Critically Endangered

International Treaty:

B = Bonn Convention

C = CAMBA

J = JAMBA

R = ROKAMBA

Table 16 – Native Fauna across City of Banyule.

These records were taken from the VBA (from 1980) and the ALA (from 2014). Species highlighted in green text have no records in the past decade.

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
Amphibians										
13182	Hylidae	<i>Litoria ewingii</i>	Southern Brown Tree Frog				2021	144	2023	309
13183	Hylidae	<i>Litoria fallax</i>	Eastern Dwarf Tree Frog				2021	47	2021	85
13204	Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog				2021	28	2023	50
13207	Hylidae	<i>Litoria raniformis</i>	Growling Grass Frog	VU	Vu		1998	9	–	–
63906	Hylidae	<i>Litoria verreauxii verreauxii</i>	Verreaux's Tree Frog				2021	6	–	–
13134	Myobatrachidae	<i>Crinia signifera</i>	Common Froglet				2021	153	2023	408
13033	Myobatrachidae	<i>Geocrinia victoriana</i>	Victorian Smooth Froglet				2021	36	2023	52
13058	Myobatrachidae	<i>Limnodynastes dumerilii</i>	Southern Bullfrog (ssp. unknown)				2020	82	–	–
63913	Myobatrachidae	<i>Limnodynastes dumerilii dumerilii</i>	Pobblebonk Frog				NA	NA	2023	234
13061	Myobatrachidae	<i>Limnodynastes peronii</i>	Striped Marsh Frog				2021	100	2023	229
13063	Myobatrachidae	<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog (race unknown)				2021	93	2023	300
63918	Myobatrachidae	<i>Limnodynastes tasmaniensis SCR</i>	Spotted Marsh Frog SCR				2017	12	–	–
13086	Myobatrachidae	<i>Neobatrachus sudellae</i>	Common Spadefoot Toad				2005	2	–	–
13117	Myobatrachidae	<i>Pseudophryne bibronii</i>	Brown Toadlet		En		1990	1	–	–
Aquatic Invertebrates										
4358	Chironomidae	<i>Kiefferulus martini</i>	midge				1995	1	NA	NA
4362	Chironomidae	<i>Polypedilum (Pentapedilum) leei</i>	midge				1994	2	NA	NA
3387	Corixidae	<i>Sigara (Tropocorixa) neboissi</i>	Water boatman				1995	1	NA	NA
3385	Corixidae	<i>Sigara (Tropocorixa) tadeuszi</i>	Water boatman				1995	1	NA	NA
39	Dugesiidae	<i>Cura pinguis</i>	Planarian				1995	2	NA	NA
3596	Dytiscidae	<i>Limbodessus gemellus</i>	Diving beetle				1994	1	NA	NA

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Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
3985	Elmidae	<i>Notriolus galstonius</i>	Riffle beetle				1995	1	NA	NA
3977	Elmidae	<i>Notriolus maculata</i>	Riffle beetle				1995	1	NA	NA
903885	Megapodagrionidae	<i>Austroargiolestes icteromelas</i>	Common Flatwing				2020	8	NA	NA
3447	Notonectidae	<i>Anisops hyperion</i>	backswimmer				1995	1	NA	NA
3434	Notonectidae	<i>Enithares woodwardi</i>	backswimmer				1995	1	NA	NA
3226	Veliidae	<i>Microvelia (Austromicrovelia) peramoena</i>	riffle bug				1995	1	NA	NA
3234	Veliidae	<i>Microvelia (Pacifcovelia) oceanica</i>	riffle bug				1995	1	NA	NA
Birds										
10222	Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk				2018	16	2023	98
10221	Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk				2018	156	2023	362
10220	Accipitridae	<i>Accipiter novaehollandiae</i>	Grey Goshawk		En		2018	14	2021	17
10224	Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle				2021	11	2023	75
10219	Accipitridae	<i>Circus approximans</i>	Swamp Harrier				2010	5	2021	4
10232	Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite				2006	166	2021	24
10226	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		En	C	2018	1	2023	4
10228	Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite				2018	14	2023	79
10225	Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle		Vu		2008	13	2023	74
10230	Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite		Vu		-	-	2021	1
10229	Accipitridae	<i>Milvus migrans</i>	Black Kite				-	-	2019	4
10317	Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar				2019	9	2023	10
10648	Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark				1991	1	-	-
10319	Alcedinidae	<i>Ceyx azureus</i>	Azure Kingfisher				2019	42	2023	167
10322	Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra				2021	606	2023	2917
10325	Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher				1985	1	-	-

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
10326	Alcedinidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher				2018	138	2023	661
10210	Anatidae	<i>Anas castanea</i>	Chestnut Teal				2021	270	2023	2794
10211	Anatidae	<i>Anas gracilis</i>	Grey Teal				2020	115	2023	1340
10208	Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck				2021	754	2022	14
50359	Anatidae	<i>Anser spp.</i>	Domestic Goose				2017	1	-	-
10215	Anatidae	<i>Aythya australis</i>	Hardhead		Vu		2020	323	2023	1200
10217	Anatidae	<i>Biziura lobata</i>	Musk Duck		Vu		2017	29	2023	65
10202	Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck				2022	386	2023	2646
10203	Anatidae	<i>Cygnus atratus</i>	Black Swan				2021	173	2023	521
10205	Anatidae	<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck				1985	1	-	-
10213	Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck				2021	20	2023	1088
10216	Anatidae	<i>Oxyura australis</i>	Blue-billed Duck		Vu		2003	1	2022	9
10212	Anatidae	<i>Spatula rhynchotis</i>	Australasian Shoveler		Vu		2019	83	2023	172
10214	Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck		En		2018	12	2020	46
10207	Anatidae	<i>Tadorna tadornoides</i>	Australian Shelduck				2020	30	2021	12
10101	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter				2019	68	2023	402
10199	Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose		Vu		2007	2	-	-
10335	Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift			C,R,J	1989	4	2020	3
10334	Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	VU	Vu	C,R,J	2019	83	2021	23
903268	Ardeidae	<i>Ardea alba</i>	Great Egret			C,J	2013	161	2023	110
10187	Ardeidae	<i>Ardea alba modesta</i>	Eastern Great Egret		Vu	C,J	2019	25	-	-
10186	Ardeidae	<i>Ardea intermedia plumifera</i>	Plumed Egret		Cr		2017	1	2017	2
10189	Ardeidae	<i>Ardea pacifica</i>	White-necked Heron				2019	87	2023	73
10197	Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	Cr		1999	3	-	-
10977	Ardeidae	<i>Bubulcus coromandus</i>	Eastern Cattle Egret			C,J	2019	164	2023	325

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
10185	Ardeidae	<i>Egretta garzetta</i>	Little Egret		En		2019	11	2020	9
10188	Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron				2021	497	2023	1547
10195	Ardeidae	<i>Ixobrychus dubius</i>	Australian Little Bittern		En		1991	1	2019	1
10192	Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen Night-Heron				2020	181	2023	377
10547	Artamidae	<i>Artamus cyanopterus</i>	Dusky Woodswallow				2010	153	2022	50
10543	Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow				1997	1	-	-
10544	Artamidae	<i>Artamus personatus</i>	Masked Woodswallow				2019	4	2020	7
10545	Artamidae	<i>Artamus superciliosus</i>	White-browed Woodswallow				2019	9	2019	7
10700	Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird				2010	10	2019	1
10702	Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird				2021	609	2023	3776
10705	Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie				2022	1107	2023	6069
10694	Artamidae	<i>Strepera graculina</i>	Pied Currawong				2021	294	2023	3395
10697	Artamidae	<i>Strepera versicolor</i>	Grey Currawong				2021	198	2023	903
10174	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew		Cr		-	-	2020	1
10269	Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo				2021	657	2023	3864
10271	Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella				2021	80	2023	1674
10272	Cacatuidae	<i>Cacatua tenuirostris</i>	Long-billed Corella				2021	90	2023	1134
10268	Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	EN	En		2021	122	2023	529
50116	Cacatuidae	<i>Calyptorhynchus banksii</i>	Red-tailed Black-Cockatoo				-	-	2021	1
10267	Cacatuidae	<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo				2021	106	2023	303
10273	Cacatuidae	<i>Eolophus roseicapilla</i>	Galah				2021	605	2023	2939
10270	Cacatuidae	<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	EN	Cr		2006	1	-	-
10274	Cacatuidae	<i>Nymphicus hollandicus</i>	Cockatiel				2005	5	2022	11
10424	Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike				2021	386	2023	1682
10430	Campephagidae	<i>Lalage tricolor</i>	White-winged Triller				2019	32	2019	24

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							Most recent Year	# Records	Most recent Year	# Records
10001	Casuariidae	<i>Dromaius novaehollandiae</i>	Emu				2017	1	2019	2
10144	Charadriidae	<i>Elseya melanops</i>	Black-fronted Dotterel				2013	95	2022	117
10143	Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped Plover				–	–	2019	1
10558	Climacteridae	<i>Cormobates leucophaea</i>	White-throated Treecreeper				2017	14	2023	7
10028	Columbidae	<i>Columba leucomela</i>	White-headed Pigeon				–	–	2017	1
10043	Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon				2021	156	2023	2254
10034	Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing				2021	184	2023	2759
10035	Columbidae	<i>Phaps elegans</i>	Brush Bronzewing				2021	17	2021	8
10318	Coraciidae	<i>Eurystomus orientalis</i>	Oriental Dollarbird				–	–	2021	10
10693	Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Chough				2017	36	2023	78
10691	Corvidae	<i>Corvus bennetti</i>	Little Crow				–	–	2015	1
10930	Corvidae	<i>Corvus coronoides</i>	Australian Raven				2017	111	2021	13
10954	Corvidae	<i>Corvus mellori</i>	Little Raven				2021	725	2023	4665
10338	Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo				2018	133	2023	404
10337	Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo				2019	84	2020	13
10339	Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo				1999	3	–	–
10342	Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo				2009	62	–	–
10344	Cuculidae	<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo				2009	69	2023	96
10341	Cuculidae	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo				2003	2	–	–
10347	Cuculidae	<i>Eudynamis orientalis</i>	Eastern Koel				2020	4	2023	73
10348	Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo				–	–	2022	1
10564	Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird				2020	132	2023	565
10673	Dicruridae	<i>Dicrurus bracteatus</i>	Spangled Drongo				–	–	2015	1
10415	Dicruridae	<i>Grallina cyanoleuca</i>	Magpie-lark				2021	901	2023	4569
10366	Dicruridae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher			B	1985	5	2022	5

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10369	Dicruridae	<i>Myiagra inquieta</i>	Restless Flycatcher				1992	25	–	–
10365	Dicruridae	<i>Myiagra rubecula</i>	Leaden Flycatcher				1998	5	–	–
10361	Dicruridae	<i>Rhipidura albiscapa</i>	Grey Fantail				2021	391	2023	3140
10364	Dicruridae	<i>Rhipidura leucophrys</i>	Willie Wagtail				2021	566	2023	1132
10362	Dicruridae	<i>Rhipidura rufifrons</i>	Rufous Fantail			B	2009	10	2022	13
10239	Falconidae	<i>Falco berigora</i>	Brown Falcon				2019	29	2022	11
10240	Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel				2010	59	2021	20
10235	Falconidae	<i>Falco longipennis</i>	Australian Hobby				2010	133	2023	46
10237	Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon				2020	37	2023	60
10238	Falconidae	<i>Falco subniger</i>	Black Falcon		Cr		–	–	2017	1
10177	Gruidae	<i>Antigone rubicunda</i>	Brolga		En		1991	1	–	–
10357	Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow				2021	647	2023	3012
10360	Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin				2008	86	2020	55
10359	Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin				2021	29	2023	30
10125	Laridae	<i>Chroicocephalus novaehollandiae</i>	Silver Gull				2021	293	2023	2585
10112	Laridae	<i>Hydroprogne caspia</i>	Caspian Tern		Vu	C,J	1980	1	–	–
60126	Laridae	<i>Larus pacificus</i>	Pacific Gull				1997	1	–	–
10522	Locustellidae	<i>Poodytes gramineus</i>	Little Grassbird				2005	69	2023	7
10529	Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren				2021	559	2023	3080
10640	Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater				2000	10	2018	3
10591	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill				2021	212	2023	1002
10638	Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird				2021	876	2023	4165
10637	Meliphagidae	<i>Anthochaera chrysoptera</i>	Little Wattlebird				2021	137	2023	607
10603	Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CR	Cr		2012	19	–	–
10614	Meliphagidae	<i>Caligavis chrysops</i>	Yellow-faced Honeyeater				2021	44	2023	1118

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10641	Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater				–	–	2023	42
10448	Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat				1991	5	–	–
10634	Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner				2021	798	2023	5873
10633	Meliphagidae	<i>Manorina melanophrys</i>	Bell Miner				2020	346	2023	1115
10583	Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater				1992	11	–	–
10578	Meliphagidae	<i>Melithreptus lunatus</i>	White-naped Honeyeater				2007	71	2022	6
10586	Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater				–	–	2022	57
10617	Meliphagidae	<i>Nesoptilotis leucotis</i>	White-eared Honeyeater				1991	13	2022	17
10645	Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird				2009	7	2019	5
10631	Meliphagidae	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater				2010	138	2023	249
10630	Meliphagidae	<i>Phylidonyris pyrrhopterus</i>	Crescent Honeyeater				1990	4	2021	2
10625	Meliphagidae	<i>Ptilotula penicillata</i>	White-plumed Honeyeater				2017	558	–	–
10594	Meliphagidae	<i>Purnella albifrons</i>	White-fronted Honeyeater				1992	2	–	–
10329	Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater			J	1991	1	–	–
10647	Motacillidae	<i>Anthus australis</i>	Australian Pipit				1991	40	–	–
10779	Muscicapidae	<i>Zoothera lunulata</i>	Bassian Thrush				2017	9	2021	13
10549	Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella				1991	32	2021	1
10671	Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole				2020	102	2023	402
10408	Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush				2020	314	2023	1438
10416	Pachycephalidae	<i>Falcunculus frontatus</i>	Eastern Shrike-tit				2009	170	2021	19
10405	Pachycephalidae	<i>Pachycephala olivacea</i>	Olive Whistler				1999	5	2022	1
10398	Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler				2020	169	2023	888
10401	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler				2009	117	2023	95
10486	Pardalotidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill				2018	123	2022	35
10470	Pardalotidae	<i>Acanthiza lineata</i>	Striated Thornbill				2020	96	2023	325

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10471	Pardalotidae	<i>Acanthiza nana</i>	Yellow Thornbill				2020	92	2023	327
10475	Pardalotidae	<i>Acanthiza pusilla</i>	Brown Thornbill				2021	351	2023	2951
10484	Pardalotidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill				2006	10	2020	1
10463	Pardalotidae	<i>Gerygone fusca</i>	Western Gerygone				-	-	2018	1
10454	Pardalotidae	<i>Gerygone mouki</i>	Brown Gerygone				-	-	2019	11
10453	Pardalotidae	<i>Gerygone olivacea</i>	White-throated Gerygone				-	-	2018	4
10565	Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote				2021	296	2023	1983
10976	Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote				2020	107	2023	431
10488	Pardalotidae	<i>Sericornis frontalis</i>	White-browed Scrubwren				2021	372	2023	2610
10465	Pardalotidae	<i>Smicronis brevirostris</i>	Weebill				2007	37	2022	39
10662	Passeridae	<i>Neochmia temporalis</i>	Red-browed Finch				2020	349	2023	1049
10020	Pedionomidae	<i>Pedionomus torquatus</i>	Plains-wanderer	CR	Cr		1980	1	-	-
10106	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican				2013	121	2023	25
10392	Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin				2020	231	2023	863
10385	Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin	EN	Vu		1992	3	-	-
10377	Petroicidae	<i>Microeca fascinans</i>	Jacky Winter				2001	17	-	-
10380	Petroicidae	<i>Petroica boodang</i>	Scarlet Robin				2003	32	2022	56
10381	Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin				1982	1	2017	1
10382	Petroicidae	<i>Petroica phoenicea</i>	Flame Robin				2010	94	2022	35
10383	Petroicidae	<i>Petroica rodinogaster</i>	Pink Robin				1999	2	2022	4
10384	Petroicidae	<i>Petroica rosea</i>	Rose Robin				1999	16	2022	18
10100	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant				2021	254	2023	1388
10096	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant				2013	189	2023	82
10097	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant				2020	165	2023	575
10099	Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant				2020	13	2023	31

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10009	Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail				1992	16	2016	1
10010	Phasianidae	<i>Synoicus ypsilophorus</i>	Brown Quail				2001	3	–	–
6001	Platycercini	<i>Barnardius zonarius</i>	Australian Ringneck				–	–	2021	2
60294	Platycercini	<i>Barnardius zonarius zonarius</i>	Port Lincoln Parrot				1992	22	–	–
10313	Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth				2020	203	2023	1313
10060	Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe				–	–	2014	1
10062	Podicipedidae	<i>Polyocephalus polyocephalus</i>	Hoary-headed Grebe				2021	51	2023	1450
10061	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe				2021	252	2023	1877
10281	Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot				2021	67	2023	1066
10258	Psittacidae	<i>Glossopsitta concinna</i>	Musk Lorikeet				2021	329	2023	2600
10309	Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	CR	Cr		2001	32	2022	93
10310	Psittacidae	<i>Melopsittacus undulatus</i>	Budgerigar				–	–	2022	1
10306	Psittacidae	<i>Neophema chrysostoma</i>	Blue-winged Parrot	VU			1992	4	2018	3
10302	Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot		Vu		1999	1	2016	2
10259	Psittacidae	<i>Parvipsitta porphyrocephala</i>	Purple-crowned Lorikeet				2008	7	2023	37
10260	Psittacidae	<i>Parvipsitta pusilla</i>	Little Lorikeet				2020	56	2023	172
10286	Psittacidae	<i>Platycercus adscitus</i>	Pale-headed Rosella				2001	2	–	–
10282	Psittacidae	<i>Platycercus elegans</i>	Crimson Rosella				2021	155	2023	952
10288	Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella				2021	644	2023	2286
10277	Psittacidae	<i>Polytelis swainsonii</i>	Superb Parrot	VU	En		1999	2	2021	1
10295	Psittacidae	<i>Psephotus haematonotus</i>	Red-rumped Parrot				2021	414	2023	2358
10256	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet				2020	33	2023	162
10254	Psittacidae	<i>Trichoglossus molucannus</i>	Rainbow Lorikeet				2022	749	2023	212
10421	Psophodidae	<i>Psophodes olivaceus</i>	Eastern Whipbird				–	–	2018	13
10679	Ptilonorhynchidae	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird				–	–	2015	1

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10059	Rallidae	<i>Fulica atra</i>	Eurasian Coot				2021	378	2023	2452
10056	Rallidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen				2021	518	2023	3174
10046	Rallidae	<i>Hypotaenidia philippensis</i>	Buff-banded Rail				2021	41	2023	21
10045	Rallidae	<i>Lewinia pectoralis</i>	Lewin's Rail		Vu		2019	14	2023	43
10058	Rallidae	<i>Porphyrio melanotus</i>	Australasian Swamphen				2021	350	2021	15
10049	Rallidae	<i>Porzana fluminea</i>	Australian Spotted Crake				-	-	2019	33
10050	Rallidae	<i>Porzana pusilla</i>	Baillon's Crake				2019	15	2019	4
10051	Rallidae	<i>Porzana tabuensis</i>	Spotless Crake				2021	12	2021	3
10055	Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Native-hen				1986	2	-	-
10147	Recurvirostridae	<i>Cladorhynchus leucocephalus</i>	Banded Stilt				2004	1	-	-
528555	Recurvirostridae	<i>Himantopus leucocephalus</i>	Pied Stilt				2013	66	2016	1
10170	Rostratulidae	<i>Rostratula australis</i>	Australian Painted-snipe	EN	Cr	C	2001	3	-	-
10163	Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper			B,R,J,C	1999	2	2014	2
10168	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe			B,R,J,C	2019	166	2022	348
10242	Strigidae	<i>Ninox boobook</i>	Southern Boobook				2019	47	2023	37
10246	Strigidae	<i>Ninox connivens</i>	Barking Owl		Cr		1989	2	-	-
6003	Strigidae	<i>Ninox novaeseelandiae</i>	Morepork				-	-	2016	1
10248	Strigidae	<i>Ninox strenua</i>	Powerful Owl		Vu		2019	146	2023	631
10524	Sylviidae	<i>Acrocephalus australis</i>	Reed-Warbler			B	2020	90	2023	389
10508	Sylviidae	<i>Cincloramphus cruralis</i>	Brown Songlark				1991	10	-	-
10509	Sylviidae	<i>Cincloramphus mathewsi</i>	Rufous Songlark				1991	24	2021	1
10525	Sylviidae	<i>Cisticola exilis</i>	Golden-headed Cisticola				2019	142	2021	35
10182	Threskiornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill				2013	54	2023	98
10181	Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill				2019	57	2023	100
10179	Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis				2020	243	2023	1732

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10180	Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis				2021	135	2023	778
10014	Turnicidae	<i>Turnix varius</i>	Painted Button-quail				2005	1	2023	6
10249	Tytonidae	<i>Tyto alba</i>	Barn Owl				2020	18	2021	5
10132	Vanellinae	<i>Erythrogonys cinctus</i>	Red-kneed Dotterel				2013	8	2020	25
10133	Vanellinae	<i>Vanellus miles</i>	Masked Lapwing				2021	376	2020	25
10135	Vanellinae	<i>Vanellus tricolor</i>	Banded Lapwing				2005	2	-	-
10574	Zosteropidae	<i>Zosterops lateralis</i>	Silvereye				2021	367	2023	1757
Bats										
11321	Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat		Vu		1990	1		
11324	Molossidae	<i>Austronomus australis</i>	White-striped Free-tailed Bat				2017	6	2017	4
11839	Molossidae	<i>Ozimops ridei</i>	Ride's Free-tailed Bat				1992	1	-	-
528542	Pteropodidae	<i>Pteropus alecto</i>	Black Flying-fox				-	-	2014	2
11280	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	Vu		2022	11	2023	17
11349	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat				1992	152	2023	8
11351	Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat				1991	2	2015	1
11335	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat				1994	19	2023	1
11811	Vespertilionidae	<i>Scotorepens orion</i>	Eastern Broad-nosed Bat				1989	1	2015	3
11381	Vespertilionidae	<i>Vespadelus darlingtoni</i>	Large Forest Bat				1992	5	2015	2
11379	Vespertilionidae	<i>Vespadelus vulturnus</i>	Little Forest Bat				2005	11		
Fish										
4651	Anguillidae	<i>Anguilla australis</i>	Southern Shortfin Eel				2020	52	2021	29
5060	Eleotridae	<i>Philypnodon grandiceps</i>	Flatheaded Gudgeon				2019	3	2019	5
4696	Galaxiinae	<i>Galaxias maculatus</i>	Common Galaxias				2020	36	2023	30
4693	Galaxiinae	<i>Galaxias truttaceus</i>	Spotted Galaxias				1999	1	-	-
4701	Galaxiinae	<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	En		-	-	2023	1

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4603	Mordaciidae	<i>Mordacia mordax</i>	Shorthead Lamprey				2007	4	–	–
4949	Percichthyidae	<i>Gadopsis marmoratus</i>	River Blackfish				1998	5	–	–
4871	Percichthyidae	<i>Maccullochella peelii</i>	Murray Cod	VU	En		2020	12	2020	15
4873	Percichthyidae	<i>Macquaria ambigua</i>	Golden Perch				2008	1	–	–
4874	Percichthyidae	<i>Macquaria australasica</i>	Macquarie Perch	EN	En		2020	37	2020	28
4884	Percichthyidae	<i>Nannoperca australis</i>	Southern Pygmy Perch				2010	2	–	–
4686	Prototroctinae	<i>Prototroctes maraena</i>	Australian Grayling	VU	En		–	–	2019	3
4985	Pseudaphritidae	<i>Pseudaphritis urvillii</i>	Tupong				–	–	2019	4
4683	Retropinninae	<i>Retropinna semoni</i>	Australian Smelt				2020	33	2020	29
Invertebrates										
19042	Aeshnidae	<i>Adversaeschna brevistyla</i>	Blue-spotted Hawker Dragonfly				2015	1	NA	NA
521175	Arctiidae	<i>Spilosoma curvata</i>	Crimson Tiger Moth				2011	2	NA	NA
1747	Baetidae	<i>Offadens frater</i>	Mayfly				1995	1	NA	NA
1838	Caenidae	<i>Tasmanocoenis arcuata</i>	mayfly				1995	1	NA	NA
74620	Calliphoridae	<i>Calliphora (Calliphora) vicina</i>	European Blowfly				2010	1	NA	NA
519445	Coenagrionidae	<i>Ischnura heterosticta</i>	Common Bluetail Damselfly				1995	2	NA	NA
1864	Corydalidae	<i>Archichauliodes (Riekochauliodes) plumleyi</i>	Dobsonfly				1995	1	NA	NA
2888	Ecnomidae	<i>Ecnomus pansus</i>	Caddisfly				1995	1	NA	NA
520963	Geometridae	<i>Pholodes sinistraria</i>	geometer moth				2016	1	NA	NA
522598	Halictidae	<i>Homalictus (Homalictus) brisbanensis</i>	sweat bee				1987	1	NA	NA
522742	Halictidae	<i>Lasioglossum (Chilalictus) bicingulatum</i>	sweat bee				1987	2	NA	NA

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
522750	Halictidae	<i>Lasioglossum (Chilalictus) calophyllae</i>	sweat bee				1987	15	NA	NA
522769	Halictidae	<i>Lasioglossum (Chilalictus) hemichalceum</i>	sweat bee				1987	4	NA	NA
2335	Hemicorduliidae	<i>Hemicordulia tau</i>	Emerald Tau Dragonfly				2020	1	NA	NA
519646	Hepialidae	<i>Abantiades labyrinthicus</i>	ghost moth				2004	1	NA	NA
2616	Hydrobiosidae	<i>Tanjilana zothecula</i>	Caddisfly				1995	1	NA	NA
520381	Lasiocampidae	<i>Genduara punctigera</i>	Crexa Moth				2016	1	NA	NA
2166	Libellulidae	<i>Orthetrum caledonicum</i>	Blue Skimmer Dragonfly				2019	1	NA	NA
520535	Lycaenidae	<i>Jalmenus evagoras</i>	Common Imperial Blue Butterfly				2020	3	NA	NA
522967	Megachilidae	<i>Megachile erythropyga</i>	bee				1987	1	NA	NA
904612	Muscidae	<i>Stomoxys calcitrans</i>	Stable fly				2018	10	NA	NA
520032	Noctuidae	<i>Comocrus behri</i>	Mistletoe Moth				2016	1	NA	NA
520097	Noctuidae	<i>Dasypodia selenophora</i>	Southern Old Lady Moth				2010	1	NA	NA
19048	Noctuidae	<i>Phalaenoides glycinae</i>	Grapevine Moth				2016	2	NA	NA
19030	Nymphalidae	<i>Heteronympha merope</i>	Common Brown Butterfly				2020	5	NA	NA
520538	Nymphalidae	<i>Junonia villida</i>	Meadow Argus Butterfly				2020	1	NA	NA
19037	Nymphalidae	<i>Vanessa itea</i>	Australian Admiral Butterfly				2019	1	NA	NA
19035	Nymphalidae	<i>Vanessa kershawi</i>	Australian Painted Lady Butterfly				2019	1	NA	NA
2456	Paragripopteryginae	<i>Leptoperla neboissi</i>	Stonefly				1994	1	NA	NA
2462	Paragripopteryginae	<i>Leptoperla tasmanica</i>	Stonefly				1995	1	NA	NA
519856	Pieridae	<i>Belenois java</i>	Caper White Butterfly				2020	1	NA	NA
19038	Pieridae	<i>Pieris rapae</i>	Cabbage White Butterfly				2020	1	NA	NA
903887	Salticidae	<i>Apricia jovialis</i>	Jovial Jumping Spider				2017	2	NA	NA
65003	Theclinae	<i>Paralucia pyrodiscus lucida</i>	Eltham Copper Butterfly	EN	En		2021	97	NA	NA

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
Mammals										
50249	Dasyuridae	<i>Antechinus spp.</i>	Antechinus				1981	1		
11265	Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo				2019	15	2023	88
11242	Macropodidae	<i>Wallabia bicolor</i>	Black-tailed Wallaby				2020	9	2023	31
11415	Muridae	<i>Hydromys chrysogaster</i>	Water Rat				2017	12	2021	10
11395	Muridae	<i>Rattus fuscipes</i>	Bush Rat				–	–	2022	1
5136	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	Platypus		Vu		2021	61	2023	148
11138	Petauridae	<i>Petaurus breviceps</i>	Sugar Glider				2000	12	2023	9
11162	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala				2001	6	2022	2
11129	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	Eastern Ring-tailed Possum				2021	112	2023	64
11003	Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna				2020	17	2022	47
11113	Trichosurini	<i>Trichosurus vulpecula</i>	Common Brush-tailed Possum				2019	83	2023	47
11165	Vombatidae	<i>Vombatus ursinus</i>	Bare-nosed Wombat				2018	4	2023	37
Mussels, decapod crustacea										
1557	Atyidae	<i>Paratya australiensis</i>	Common Freshwater Shrimp				2003	7	NA	NA
636	Cyrenidae	<i>Corbicula australis</i>	Little Mussel				2003	1	NA	NA
1645	Parastacidae	<i>Euastacus yarraensis</i>	Southern Victorian Spiny Crayfish				1998	1	NA	NA
641	Sphaeriidae	<i>Musculium tasmanicum</i>	Small Pea Clam				1995	1	NA	NA
Reptiles										
5134	Chelidae	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle				2003	5	2023	21
5135	Chelidae	<i>Emydura macquarii</i>	Murray River Turtle		Cr		–	–	2023	5
12681	Elapidae	<i>Notechis scutatus</i>	Tiger Snake				2018	27	2023	27
12693	Elapidae	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake				1991	1	2022	2
12699	Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake				–	–	2022	2
12126	Gekkonidae	<i>Christinus marmoratus</i>	Marbled Gecko				1986	2	2023	37

Taxon ID	Family	Scientific Name	Common Name	EPBC	FFG	Treaty	VBA		ALA	
							Most recent Year	# Records	Most recent Year	# Records
12682	Scincidae	<i>Acritoscincus duperreyi</i>	Eastern Three-lined Skink				1990	2	2023	1
12375	Scincidae	<i>Ctenotus spaldingi</i>	Large Striped Skink				2000	1	–	–
12408	Scincidae	<i>Egernia cunninghami</i>	Cunningham's Skink				2000	1	–	–
12557	Scincidae	<i>Eulamprus quoyii</i>	Eastern Water Skink				–	–	2020	1
62956	Scincidae	<i>Eulamprus tympanum tympanum</i>	Southern Water Skink				2005	4	2023	8
12450	Scincidae	<i>Lampropholis delicata</i>	Delicate Skink				2008	10	2023	9
12451	Scincidae	<i>Lampropholis guichenoti</i>	Garden Skink				2008	22	2023	62
12475	Scincidae	<i>Lerista bougainvillii</i>	Bougainville's Skink				1992	1	2021	1
62941	Scincidae	<i>Liopholis whitii</i> SPOTTED BACK MORPH	Egernia SPOTTED BACK MORPH				2020	1	–	–
12948	Scincidae	<i>Pseudemoia form cryodoma/pagenstecheri</i>	Grass skink FORM (P.pag/cry)				1992	6	–	–
12993	Scincidae	<i>Pseudemoia pagenstecheri</i>	Tussock Skink		En		–	–	2020	1
12683	Scincidae	<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		En		1991	2	–	–
12452	Scincidae	<i>Saproscincus mustelinus</i>	Weasel Skink				1990	2	–	–
12578	Scincidae	<i>Tiliqua nigrolutea</i>	Blotched Blue-tongued Lizard				2018	3	2023	27
12580	Scincidae	<i>Tiliqua scincoides</i>	Common Blue-tongued Lizard				2005	14	2023	39
12283	Varanidae	<i>Varanus varius</i>	Lace Monitor		En		2016	1	2016	1

Appendix 7. NEROC Report – Definitions of Habitat and Faunal Significance

Habitat Significance Criteria:

- **Rarity:**
 - *Criterion 1 – Importance for rare or threatened flora, vegetation community or other natural biotic phenomena*
- **Richness and diversity:**
 - *Criterion 2 – Importance in exhibiting unusual richness or diversity of indigenous flora*
- **Representativeness:**
 - *Criterion 3 – Importance in demonstrating the principal characteristics of the range of indigenous vegetation communities*
- **Population density and abundance:**
 - *Criterion 4a – Importance in demonstrating existing ecological processes or natural systems*
 - *Criterion 4b – Importance in maintaining existing ecological processes at the regional to national scale*
- **Scientific and educational value**
 - *Criterion 5a – Importance for information contributing to wider understanding of natural history, by virtue of their use as research sites, significant Type localities, educational areas and reference or benchmark sites*
 - *Criterion 5b – Importance in demonstrating the evolution of indigenous flora and/or fauna*

Faunal Significance Criteria:

National

The occurrence of an attribute contributes substantially to its conservation in Australia. These sites contain very high natural heritage values and it would be desirable on faunal conservation grounds if they were protected under Commonwealth government legislation.

State

The occurrence of an attribute contributes substantially to its conservation in Victoria but not necessarily Australia. These sites contain high natural heritage and conservation values and it would be desirable on faunal conservation grounds if they were protected under Victorian government legislative controls.

The occurrence of an attribute contributes substantially to its conservation in Greater Melbourne but not necessarily Victoria. The region in this study is defined as Greater Melbourne (GM) of which North East Melbourne (NEM) is one of four study areas. These sites contain medium natural heritage and conservation values and it would be desirable on faunal conservation grounds if they were protected under local government conservation controls.


Appendix 8. Examples of easily interpretable community planting and EVC information

Presentation of EVCs and Planting Palettes for the Community

Councils such as Frankston and Mornington Peninsula Shire have fact sheets for each EVC as shown below providing information such as lifeform (e.g., Shrub, Tree), nursery availability and height. This provides a more intuitive format and practical information for those wanting to plant locally indigenous species. This would ideally be linked to mapping such as that by Beardsell for Banyule, so residents and developers or other users can quickly determine the appropriate EVCs to their location.

EVC 048:
Heathy Woodland

Species List



opportunity » growth » lifestyle

Structure:	Woodland to 15 metres
Environment:	Well-drained, relatively infertile sand sheets and dunes
Pre-1750 distribution:	Widespread and extensive except in southern areas
Present distribution:	Widespread but rare
Status:	Vulnerable
Notes:	Distinguished by dominance by Manna Gum <i>Eucalyptus viminalis</i> or Narrow-leaf Peppermint <i>Eucalyptus radiata</i> with Heath Tea-tree <i>Leptospermum myrsinoides</i> prominent in understorey; where eucalypts do not form a distinct layer the EVC is Sand Heathland

Major Species:
Maximum heights indicated (trees in metres, other plants in centimetres)

Scientific name	Common name	Height	Available
Trees			
<i>Acacia mearsii</i>	Black Wattle	12	✓
<i>Acacia melanoxylon</i>	Blackwood	30	✓
<i>Allocasuarina littoralis</i>	Black Sheoak	15	✓
<i>Banksia marginata</i>	Silver Banksia	12	✓
<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	20	
<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint	15	✓
<i>Eucalyptus ovata</i>	Swamp Gum	30	
<i>Eucalyptus pryoriana</i>	Coast Manna-gum	15	✓
<i>Exocarpos cupressiformis</i>	Cherry Ballart	8	

The Shire of Mornington Peninsula also have a [Biodiversity Maps Online webpage](#), with an interactive map allowing residents to find their property and download biodiversity information about:

- Bushland and Foreshore Reserves
- Friends Groups locations
- Landcare Group boundaries
- Waterways and wetlands
- Recent aerial photography
- Native vegetation types (or Ecological Vegetation Classes) linking to the EVC fact sheet.


Yarra Ranges Local Plant Directory

A standout Council website in terms of providing information on EVCs and individual plant species is that of the Yarra Ranges. [The Yarra Ranges Local Plant Directory](#) provides information on a range of plants either by Community (EVC) or by Storey (Lower, Middle and Upper). For each plant species a range of information is provided to aid plant selection, along with the EVC communities it is part of, and a range of photos.

Billardiera macrantha

Purple Apple-berry


Slender climbing plant with sticky brown stems.



Additional information

Synonym	Gladiolus longiflorus
Family	Platanaceae
Storey	Lower storey
Size	Tall
Plant grouping	Climbers & creepers
Leaves	Shiny, opposite leaves 25-40 mm x 3-10 mm.
Flower colour	Yellow-green
Flowering time	August to January
Flowers	Single tubular flowers to 40 mm, hanging from the ends of branches. Fruit is glossy purple berry.
Bird attracting	Nectar, berries
Butterfly attracting	No
Frog habitat	No
Growing conditions	Moist well drained soils in open forest. Light frost. Dappled and partial shade.
Garden use	An attractive light climber for trellis, pergola or grown amongst shrubs. Will grow amongst established trees.
Commercially available	Australian plant & indigenous nurseries
Conservation status	Significant within the Shire. Known from few local sites. More common outside the Shire boundary.

Photo Gallery



Photographer: Marlye Bell

Plant Communities

- 09 Skirling Gum-Montrose Wet Forest (EVC 30)
- 04 Alpine Ash-Montrose Wet Forest (EVC 30)
- 03 Narrow-leaf Peppermint-Montrose damp Forest (EVC 30)
- 06 Mountain Ash Wet Forest - Sandstone (EVC 30)